U.S. Military Forces in FY 2022

Peering into the Abyss

AUTHOR
Mark F. Cancian

A Report of the CSIS International Security Program
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ISBN: 978-1-5381-7043-4 (pb); 978-1-5381-7044-1 (ebook)
Acknowledgments

U.S. Military Forces is an annual report on how changes in the defense budget and in the security environment are shaping the size and composition of the force, and what those changes mean in terms of cost, strategy, and risk. The report is part of a broader effort, called Defense 360 (defense360.csis.org), to collect in one location the analysis that CSIS has done on current security issues.

The chapters of this report originally came out as separate papers published from October 2021 to December 2021.

This report is made possible by general support to CSIS. No direct sponsorship contributed to this report.

The author would like to thank Robert Maxwell for his research support throughout this study.

Finally, the author thanks the many reviewers, inside CSIS and outside, who read the draft and provided valuable comments. Their insights improved the report, but the content presented—including any errors—remain solely the responsibility of the author.
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Executive Summary

Strategy and Budget overview

• For strategic and budgetary reasons, force structure is “staring into the abyss.”
  ◦ Many strategists would trade force structure, particularly Air Force and Army force structure, for investment in advanced technologies to counter China.
  ◦ Growth in the defense budget ended in FY 2021, and the Biden administration’s proposed FY 2022 budget continues that no-growth pattern. If that continues, force structure will shrink rapidly. Congressional proposals to increase the defense budget, if adopted, would likely allow force structure to remain at about its current level.

• In FY 2022, active-duty end strength declines slightly, from 1,351,000 in FY 2021 to 1,346,400 (-4,600). Long-term force structure is undetermined pending publication of national security documents at the end of the year.

• In the long term, force structure faces the same four challenges as last year. Unfortunately for force planners, these challenges pull force structure in different directions.
  1. The need to meet heavy day-to-day deployment demands for crisis response, allied engagement, gray zone competition, and ongoing regional conflicts works against reducing force size.
  2. The opening of a gap between resources and strategy—as budgets are flat or reduced and the strategy remains unchanged—increases risk, as military capabilities may not be able to back foreign policy commitments.
3. The desire to move more aggressively toward a structure designed for great power conflict would increase modernization and trade off force structure if necessary. A major uncertainty here is how the concept of “legacy” systems will be applied—does that mean old systems or old types of systems?

4. Many libertarians and progressives support a foreign policy of “restraint” that would have the United States less involved with nations overseas and more focused on climate change and global health. This view has not gained much traction, despite the chaotic withdrawal from Afghanistan and lingering effects of the pandemic.

- The best course would be to implement a high-low mix (high-capability forces for great power conflict, lower-capability forces for regional conflicts and other operations), increase reliance on reserve forces, and promote a gradual transition toward new technologies as they prove themselves.

- The public will be the ultimate arbiter. Polling indicates public support for a force of about the current size.

- The overview concludes with an analyst’s plea for a clear explanation about how the administration calculated force structure requirements, something missing for nearly 20 years.

**Army**

- Many strategists, including those in the new administration, would cut Army end strength to fund Navy, Space, and Air Force capabilities for use against China. The Army argues to maintain its force structure and modernization because it provides many capabilities globally, including in the Indo-Pacific theater.

- In FY 2022, the Army took a big risk: despite a declining budget, it held onto structure. This reflects a strategic decision to fight in the ongoing strategy development process, with the hope of maintaining its share of the budget.

- Thus, the Army maintained its personnel strength in FY 2022, both regular and reserve components, at roughly the FY 2021 level. FY 2022 targets include: 485,000 in the regular Army, 336,000 in the National Guard, and 189,500 in the Army Reserve.

- To maintain end strength within a declining total budget, the Army cut (1) modernization, hoping that Congress would add the cuts back (a risk that may pay off), and (2) readiness, despite having rebuilt readiness over the last few years.

- The active-reserve mix has stabilized at 48 percent active, 52 percent National Guard/Army Reserve.

- The long-term Army force structure depends on budgets. A flat budget, as projected by the Trump administration and implied by the Biden administration, would entail deep force structure cuts. Proposed congressional budget increases might avert those cuts.

- Army modernization procures existing systems in FY 2022 but at slower rates. A few new systems are coming out of the research, development, testing, and evaluation (RDT&E) “primordial soup.” However, most major elements of Army modernization—referred to as the “31+4” programs—are still in the future. The Army acknowledges that it cannot afford them all but has not indicated which ones will go forward. Additionally, the new administration may have a different set of modernization priorities.
In an environment of constrained end strength, the Army will need to cut existing brigade combat teams (BCTs) if it wants to build new units. So far it has been unwilling to do this.

Constrained resources may also push the Army into battles with the Office of the Secretary of Defense over strategic direction, with the Air Force over long-range strike, and with the National Guard over distribution of budget cuts.

**Navy**

In FY 2022, fleet size stays about the same, at 296 ships. Previously ordered ships arrive in large numbers, but the Navy retires 15 ships, 10 early. Navy active-duty personnel decrease by 1,600 to 346,200.

Ship numbers matter to the Navy because of high day-to-day demands for its forces for crisis response, allied and partner engagement, conventional deterrence, and ongoing regional conflicts.

The future fleet architecture—its size and composition—remains a work in progress. The Trump administration's 355-ship goal was deemed infeasible because of its high cost and outmoded operational concepts. At the end of its term, the Trump administration articulated a new vision incorporating unmanned systems and distributed capabilities. The Biden administration published a similar architecture, but smaller and with ranges for ship numbers. Cost is a problem with all of these notional architectures because they require large funding increases which may not occur. Nevertheless, some insights are emerging:

- **Carriers:** Recent force structure proposals have implied a reduction in the number of carriers. However, contractual commitments and political constraints may have locked the Navy into the present carrier force for many years regardless of strategic considerations. Small carriers seem to be receding into the background once again.

- **Large Surface Combatants:** Future architectures envision deep cuts to this fleet, implying production cutbacks and many early retirements. However, industrial base and strategic concerns about shrinking fleet size will clash with the new goals.

- **Small Surface Combatants:** All the future fleet architectures show an increase, the only question being how much of an increase and how fast.

- **Amphibious Ships:** New amphibious concepts and the introduction of a small amphibious ship imply reductions in the number of large amphibious ships. However, as with the large surface combatants, industrial base interests will clash with the new and lower goals.

- **Attack Submarines:** All future architectures envision an increase in the size of the attack submarine fleet. However, slow production in the 1990s and production capacity limits today will limit fleet size until the 2040s.

- **Ballistic Missile Submarines:** The Columbia-class ballistic missile submarine program, the Navy's highest-priority program, remains on schedule and (generally) at target cost but with some risk. Any program delay would disrupt the U.S. nuclear deterrent, while any cost increase would disrupt every other shipbuilding program.

- **Unmanned Surface and Undersea Vessels:** These figure prominently in Navy architectures, but the systems remain experimental and none of the larger programs have a production plan. The FY 2022 budget seems to entail a pause in development.
• Naval aviation is generally in good shape, with stable inventories and acceptable average fleet ages. However, it remains focused on manned platforms.

**Marine Corps**

• General David Berger’s *Force Design 2020* initiative aims to restore the Marine Corps to its naval roots after two decades of operations ashore, invest in capabilities focused on great power conflict in the Pacific, and divest forces unneeded for these conflicts. The Marines intend to be a “stand-in” force that can operate inside an adversary’s (China’s) defensive bubble.

• To pay for new capabilities and accommodate a flat budget top line, the Marine Corps cuts active-duty end strength on a path to about 172,000, the level before the wars in Iraq and Afghanistan.

• Ground forces gain long-range precision fires but give up three infantry battalions, tanks, and most counterinsurgency capabilities. Most artillery convert from cannon to missile units. These changes are all underway. Final designs for logistics, reserve, and reconnaissance forces are still under development.

• Marine aviation gets smaller, consistent with cuts in the ground forces. Emerging concepts imply cuts to manned aircraft, particularly the F-35, but such plans are still under development.

• In FY 2022, the Marine Corps buys six MQ-9 Reaper unmanned aerial vehicles (UAVs), its first major such acquisition, but is far behind the Air Force in this area.

• The future amphibious fleet will include large numbers of light amphibious warships (LAWs) and fewer traditional large amphibious ships (LPDs, LSDs, LHAs, and LHDs). These small LAWs will provide more distributed capabilities to implement the new warfighting concept. The trade-off is that, because of the LAW’s small size, they will not be able to support the customary level of global forward deployments, which may decline as a result.

• The restructuring has been criticized for focusing too much on a maritime campaign in the Western Pacific, ignoring other global conflicts, and relying on unproven operational concepts.

**Air Force**

• Air Force military personnel levels, active and reserve component, are essentially level in FY 2021 and over the five-year period. The largest increase is among civilians.

• Like the other services, the Air Force faces high day-to-day operational tempo while at the same time preparing to meet the demands of great power conflict.

• Aircraft inventories and fleet aging have stabilized in the near term.

• However, the Air Force is not buying enough new aircraft to maintain the inventory over the long term. Increasing procurement to the levels needed to sustain the inventory will require historically high costs.

• Instead, the Air Force plans to close this gap by retiring older aircraft and shrinking the force, possibly substantially. However, Congress has been reluctant to do this in the past.

• Given these circumstances, the Air Force is backing away from its 25 percent expansion goal to reach 386 operational squadrons.
• The FY 2021 budget procures no unmanned aircraft, so the unmanned fleet has plateaued at 6 percent of the force.

• Nuclear forces require a greater share of the Air Force budget as Reagan-era systems reach the end of their service lives, and, as a result, nuclear modernization generates some opposition.

• The Space Force continues to take shape, so far entirely from Air Force elements.

Space Force, SOF, Civilians, and Contractors

U.S. SPACE FORCE
• Major elements of the U.S. Space Force (USSF), such as a service headquarters, appropriations accounts, training and educational commands, operational headquarters, and systems command, have been established. The shape of the acquisition organization and related acquisition processes are major unresolved questions.

• Personnel and organizations continue to transfer to the new service, though there may be controversy about remaining transfers as the Army and Navy seek to retain some space capabilities.

• Major space issues include creation of a guard and reserve component, the balance of offensive and defensive capabilities, international agreements on “responsible” behavior, and the balance between commercial and military capabilities.

• The USSF’s small size will require heavy reliance on other services, particularly the Air Force, for support functions as well as a different approach to personnel management.

SPECIAL OPERATIONS FORCES
• Special Operations Forces (SOF) continues its gradual expansion and shifts focus away from counterinsurgency toward great power conflict.

• Nevertheless, the strategic shift raises questions about SOF’s long-term size.

• SOF has (so far) successfully transitioned its funding away from heavy dependence on war funding accounts.

• Institutional arrangements shifted briefly to a status like a military service, then back, but the debate continues.

• A broad set of actions to counter recent instances of ethical misconduct by its personnel seems to be having a positive effect.

DEPARTMENT OF DEFENSE CIVILIANS
• The number of DOD civilians rises slightly in FY 2022, reflecting the civilian workforce’s contribution to readiness and lethality.

• However, civilians are often seen as overhead and targeted for reduction in management reform efforts. The Biden administration’s position here is not yet clear.

CONTRACTORS
• Contractors have become a permanent part of the federal workforce but remain controversial due to enduring questions about cost and what contractors should or should not do.
- Operational contractors continue to play a vital role in U.S. Central Command (CENTCOM), though reduced with the end of operations in Afghanistan. DOD’s ongoing strategy review is unlikely to recommend more use of contractors. However, that could be the effect if DOD cuts troop numbers without reducing operational requirements.
The Budget and Strategy Overview

KEY TAKEAWAYS

- For strategic and budgetary reasons, force structure is “staring into the abyss.”
  - Many strategists would trade force structure, particularly Air Force and Army force structure, for investment in advanced technologies to counter China.
  - Growth in the defense budget ended in FY 2021, and the Biden administration’s proposed FY 2022 budget continues that no-growth pattern. If that continues, force structure will shrink rapidly. Congressional proposals to increase the defense budget, if adopted, would likely allow force structure to remain at about its current level.
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uncertainty here is how the concept of “legacy” systems will be applied—does that mean old systems or old types of systems?

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- The best course would be to implement a high-low mix (high-capability forces for great power conflict, lower-capability forces for regional conflicts and other operations), increase reliance on reserve forces, and promote a gradual transition toward new technologies as they prove themselves.
- The public will be the ultimate arbiter. Polling indicates public support for a force of about the current size.
- The overview concludes with an analyst’s plea for a clear explanation about how the administration calculated force structure requirements, something missing for nearly 20 years.

What is force structure? The Department of Defense (DOD) defines force structure as “the number, size, and structure of units.” Force structure is one of four elements of military capability, the others being readiness (“the ability of units and equipment to deliver the outputs for which they were designed”), modernization (“the technical sophistication of weapon systems and equipment”), and sustainment (“the ability to maintain the necessary level of military activity”).

The Biden Administration’s Strategy

Analysis of force structure must begin with strategy since that, at least in theory, drives all elements of military capability as well as national security policy and budgets.

A complete explanation of the Biden administration’s defense strategy and defense program will not be available until late in 2021 or even with the submission of the FY 2023 budget in February 2022. However, the administration did publish the Interim National Security Strategy Guidance (INSSG), with the main points shown below:

- **Expanded Definition of National Security:** The INSSG discusses democracy enhancement, voter rights, human rights, domestic infrastructure, international trade, economic prosperity, systemic racism, workforce diversity, global health, and education. It cites climate 27 times but never mentions the military services by name. The administration has discussed this broad vision of national security as “integrated deterrence.”

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3 “Integrated deterrence” does not appear in the INSSG but does appear in a variety of later administration documents and statements. For example, Lloyd Austin, “The Pentagon Must Prepare for a Much Bigger Theater of War,” Washington Post,
Five Threats: China, Russia, North Korea, Iran, and Global Terrorism: These are the same threats that the Trump administration identified and that the Obama administration described at the end of its tenure. Like the Trump administration, the Biden administration strategy places greatest emphasis on China. Although the Biden administration identifies Iran as a threat, it will likely treat Iran differently from the Trump administration because of its desire to reestablish an arms control agreement.

Importance of Allies: The strategy extols the role of allies and expresses a desire to reestablish U.S. leadership. This attitude toward allies is not much different from the Trump administration’s stated position, but it was never clear whether President Trump himself supported these relationships. President Biden has repeatedly sought to reassure allies and partners.

Ending “Forever Wars”: Withdrawal from Afghanistan, Iraq, and Syria will ease the operational tempo of military forces but may not produce enough slack to allow significant cuts to force structure. See discussion below under Challenge 1.

Cutting “Legacy Systems”: This parallels discussion among many strategists but leaves unclear the definition of “legacy.” See discussion below under Challenge 3.

Constraints on Defense Resources: “Our national security budget will prioritize new resources for diplomacy and development.” See discussion below.

Pursuing Arms Control: “We will head off costly arm races and re-establish our credibility as a leader in arms control.” However, there are some tensions here because the budget supports most elements of nuclear modernization.

Implementing Progressive Social Goals and Screening Arms Sales: These efforts will greatly affect particular communities but will not likely have a direct effect on force structure.

The interim strategy does not contain the strong component of management reform that the Trump administration’s 2018 National Defense Strategy (NDS) did. The Biden administration’s final National Security Strategy (NSS) and NDS will almost certainly contain something about the need for management reform, but unlike the Trump administration, the Biden administration does not seem to be planning to find large savings there. This likely means no major organizational DOD restructuring or change in roles and missions.

Gone also is the strong tone of U.S. primacy found in the Trump strategy documents. Instead, there is an emphasis on cooperation, diplomacy, and international institutions.

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The Biden Administration’s Budget: Near-Term Caps and Long-Term Uncertainty

As budgeteers like to say, “Plans without funding are hallucinations.” The Trump administration put resources against its strategy—Figure 1 shows increased budgets from FY 2017 to FY 2020. These budget increases allowed the services to rebuild readiness, institute a robust modernization program, and grow force structure a little.

Figure 1: Recent DOD Budget History (constant dollars, including war funding)

![Budget History Graph]


Note: The enacted amount for FY 2020 includes pandemic supplementals.

However, budget increases ended in FY 2020, and DOD resources have since declined. The Trump administration projected flat resource levels in constant dollars over the five-year planning horizon. The Biden administration has a similar projection, though the out-years are placeholders pending decisions about long-term strategy and resources. A budget proposal even this high was a surprise given the negative tone of the Democratic Party platform: “We can maintain a strong defense and protect our safety and security for less.”

One major change is that the budget folds war funding (“Overseas Contingency Operations”) into the base, thus simplifying budget processes and eliminating a long-standing item of controversy.

The Biden administration’s resource level is slightly below that projected by the Trump administration, but the difference disappears when the reduced resource requirements for Afghanistan are considered. This level is surprising, given the wording in the Democratic Party’s platform. However, during the campaign, Biden had said there would be no major cuts to defense, and the FY 2022 budget bears that out.

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Nevertheless, these resources are unlikely to be adequate for the expansive national security strategy that the Biden administration has laid out. The Trump administration would have faced the same challenge. A budget pause of one or two years might be accommodated, but several years of flat budgets will erode U.S. capabilities. A less ambitious strategy could accommodate that erosion, but the Biden administration’s commitment to global engagement may drive a continuing high level of military deployments.

Competing pressures act on long-term defense budget projections. FY 2020 and FY 2021 had federal budget deficits of more than $3 trillion, and the forecast for future deficits is in the vicinity of $1.5 trillion a year, even with tax increases proposed by the administration. These large deficits may eventually produce caps such as those in the Budget Control Act of 2011. On the other hand, no one in Washington—Democrat or Republican—seems overly concerned about the massive deficits that recent spending has generated.

Further, defense hawks argue for increased resources and seem to be gaining traction. Representative Mike Rogers (R-AL) of the House Armed Services Committee called the FY 2022 budget, “putting lipstick on a pig. This budget is woefully inadequate. It doesn’t keep pace with China.” The Senate Armed Services Committee supported a $25 billion increase to the Biden proposal. Surprisingly, the House Armed Services Committee also supported an increase despite skepticism by its chairman. The House Appropriations Committee has marked at the level of the Biden administration’s proposal. Republican efforts to include defense infrastructure in the government-wide infrastructure bill were unsuccessful.

If these efforts succeed, force structure could be yanked back from the brink. Congressional proposals for increased resources have not added personnel but would take the pressure off force structure as the source of funding. Force structure in all the services would likely continue at about its current level, with the possible exception of Navy ships, which increase.

Changes in appropriations in FY 2022 are surprising. Military personnel increases, as does research, development, testing, and evaluation (RDT&E), but procurement decreases by $8 billion. The increase in military personnel seems contrary to a “divest to invest” approach, but that may await implementation in the long-term strategy. The increase in RDT&E combined with a decrease in procurement has a “skip a generation” appearance—reducing procurement of current systems in order to invest in a future generation of systems. Former secretary of defense Donald Rumsfeld had tried this in the early 2000s, but the wars overwhelmed the effort.

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The Administration’s FY 2022 Plan for Force Structure

Table 1 shows the evolution of force structure plans.

Table 1: Force Structure Targets

<table>
<thead>
<tr>
<th></th>
<th>Obama FY 2020 Goal</th>
<th>FY 2021</th>
<th>Trump FY 2025 Goal</th>
<th>FY 2022 Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Active-Duty End Strength</strong></td>
<td>1,000,500</td>
<td>1,351,000</td>
<td>1,361,000</td>
<td>1,346,400</td>
</tr>
<tr>
<td><strong>Guard and Reserve End Strength</strong></td>
<td>739,1000</td>
<td>800,200</td>
<td>806,200</td>
<td>799,500</td>
</tr>
<tr>
<td><strong>Regular/Reserve Army End Strength</strong></td>
<td>450,000/530,000</td>
<td>485,900/526,300</td>
<td>490,500/529,300</td>
<td>485,000/525,500</td>
</tr>
<tr>
<td><strong>Army Brigade Combat Teams: Total, (Active/Reserve)</strong></td>
<td>56 (30/26)</td>
<td>58 (31/27)</td>
<td>58 (31/27)</td>
<td>58 (31/27)</td>
</tr>
<tr>
<td><strong>Navy Carriers</strong></td>
<td>11</td>
<td>11</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td><strong>Navy Ships</strong></td>
<td>295</td>
<td>306</td>
<td>315</td>
<td>297</td>
</tr>
<tr>
<td><strong>Air Force TacAir A/C (4th/5th Generation)</strong></td>
<td>1,101 (699/402)</td>
<td>1,194 (939/255)</td>
<td>~1,200</td>
<td>1,207 (904/303)</td>
</tr>
<tr>
<td><strong>USMC End Strength</strong></td>
<td>180,000</td>
<td>181,200</td>
<td>184,100</td>
<td>178,500</td>
</tr>
</tbody>
</table>

Source: Author’s compilation through external resources.

Note: “End strength” is the number of military personnel in the service at the end of the fiscal year (September 30). Excludes Space Force since it is so new and without these historical data.

- The left column of Table 1 shows the last plans of the Obama administration.11 Former deputy secretary of defense Robert Work noted that this force was “too big for the budget allocated but too small to meet demands laid on it.”12
- The second column shows the FY 2021 enacted levels.
- The third column shows the Trump administration’s goals. Whether the administration could have achieved these force levels with the resources planned is unlikely.
- The fourth column shows FY 2022 in the president’s budget proposal.

Subsequent chapters on the individual services discuss the specifics of each services’ forces, and the full analysis must await publication of the administration’s long-term plans. Nevertheless, a few insights emerge.

In the FY 2022 budget, the services have generally maintained end strength, even at the expense of modernization, despite what the strategy says. This likely reflects a desire to avoid preemptively losing structure before a final strategy is developed. Once structure is lost, it is hard to regain.

The Navy and Air Force have proposed retiring older platforms as “legacy” systems (see discussion below). Congress may support the Navy retirements but seems likely to limit those of the Air Force. The Marine Corps is a clear exception. Having consciously changed strategy, it proposes a substantial cut to personnel to invest in modernization. Half of DOD’s FY 2022 personal reductions come from the Marine Corps.

The Trump administration’s plan for moderate growth in force structure has likely been shelved. Active-duty and reserve end strength have been rising and falling together. Although the strategy might lean toward a more active-duty force for rapid deployment, this balance reflects the political power of the reserve components, which have used their congressional contacts in the past to object to any effort to cut them disproportionately. The Army chapter will contain a detailed discussion of this since the Army is most heavily dependent on its reserve component.

Challenge 1: Retaining Capacity for Regional Conflicts, Crisis Response, and Allied Engagement

Since World War II, U.S. strategy has entailed a high level of global presence for regional conflicts, crisis response, and allied engagement. The notion that great power conflict will occur mostly in the “gray area” further increases day-to-day demand for military forces. As many experts point out, physical presence is needed to meet these demands and to exercise global leadership; virtual presence is actual absence. Former secretary of defense Robert Gates called ignoring current conflicts and focusing on future conflicts “next war-itis.”

High demand for forces increases operational tempo. DOD has a global force management process to prioritize force requests and allocate forces to meet them so that they do not overly stress personnel. However, combatant commanders have no restrictions on the extent of their requests for forces, so a gap always exists between requests and the forces available. Further, the national leadership often directs deployments and commitments in response to global events despite intentions to reduce demands. The recent surge of forces for the evacuation of Afghanistan is an example. Another is that deployments to Europe have increased greatly since Russia seized Crimea and invaded Ukraine. Thus, the services are caught in “a bear trap of current commitments.”

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16 For an excellent description of how force demands are generated, forces are allocated, and services cycle units through deployments, see Edward J. Filiberti, *Generating Military Capabilities* (Carlisle, PA: U.S. Army War College Press, 2016).

17 Attributed to General Joseph Langyel when chief of the National Guard Bureau.
The Trump administration’s NDS described a concept called “dynamic force employment,” designed to prioritize deployments and allow some reduction. However, this failed in the face of continuing high global demands.\(^ {18} \)

The Biden administration may propose a similar effort to reduce the burden of deployments. Secretary of Defense Lloyd Austin launched a global force posture review intended to assess “how we best allocate military forces in pursuit of national interest.”\(^ {19} \) However, this review will likely run into the same barriers: reducing the tempo of operations requires reductions in global activity. Yet, this conflicts with the Biden administration’s emphasis on support to allies and partners, which would regard any reduction in U.S. presence as evidence of U.S. withdrawal, particularly after the debacle in Afghanistan. In their view, increased diplomatic engagement is unlikely to substitute for military presence.\(^ {20} \)

To meet both wartime and day-to-day force demands, some strategists have proposed maintaining capabilities for these other global commitments.

- Elaine McCusker and John Ferrari at the American Enterprise Institute (AEI) caution against ignoring near-term risk. “Invariably, when we attempt to pretend near-term risk does not exist and assume a reduction in operational tempo that does not occur, the force struggles to keep up. Near-term readiness decays at an accelerated rate that cascades into reducing future readiness—the very thing the leadership thought it was buying.” Instead, they propose maintaining a fully manned force structure and using legacy forces for experimentation before committing to large, untested, expensive development programs.\(^ {21} \)

- Evan Montgomery at the Center for Strategic and Budgetary Assessments makes a similar argument in the naval context. He notes that “the United States is on the hook to deter for rivals across three theaters.” To do this, he proposes “introducing more diversification into defense strategy” to “enable it to conduct operations against second-tier opponents without burning through the capabilities it needs to deter its main competitors.”\(^ {22} \)

- The Heritage Foundation’s Index of U.S. Military Strength proposes a large expansion of U.S. active-duty components to meet both warfighting and peacetime requirements: 50 regular Army brigade combat teams, 400 battle force ships, 625 strike aircraft, 36 active-duty Marine Corps battalions,

\(^{18}\) DOD, National Defense Strategy, 7.


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and 1,200 active-duty Air Force fighter/ground-attack aircraft. All the military services were rated as “marginal” and particularly deficient on capacity (i.e., the size of the forces).23

- Seth Jones, then-director of CSIS’s Transnational Threats Project, has argued that a focus on great power competition should not obscure the fact that the most likely demands on DOD will be to respond to global terrorism and actions in the gray area between peace and conflict. He notes: “It would be imprudent if the United States were to move too quickly away from countering terrorists while the threat is still high.”24

The competing demands of high-end conflict and day-to-day force deployments push the military services toward a high-low mix: a force that incorporates advanced, and often very expensive, technologies along with less expensive elements that can cover less-demanding threats, such as regional opponents and crisis response. The administration’s emerging program does not acknowledge such an approach. However, the services appear to have moved in that direction in the last several years with regard to particular decisions, such as the Air Force’s decision to retain the A-10 fleet and procure some F-15EXs; the Navy’s decision to continue the frigate program, expand the number of unmanned systems, and develop less-expensive amphibious ships; and Special Operations Command’s pursuit of an armed overwatch aircraft.25

Challenge 2: A Strategy-Resources Gap

Gaps between strategy and resources are a recurring theme in the national security literature. The strategic desires of policy officials often outrun the resources that the budget process provides. The gap will particularly affect force structure because the emerging national defense strategy prioritizes modernization. Force structure in all the services (except possibly the Navy and the Space Force) would likely be a bill payer.

The flat budget of the Biden administration, and of the Trump administration before it, would open a strategy-resources gap because DOD needs some real growth every year to offset increases in the cost of personnel and operations. (Note: congressional additions to the FY 2022 Biden administration’s budget would mitigate this gap.) Compensation for military and civilian personnel has historically had to increase about 1 percent above inflation to compete with the civilian labor market.26 Further, spending in the Operations and Maintenance account, which includes a wide variety of activities, from military operations to healthcare to base operations to environmental restoration, has also increased in real terms, averaging 2.6 percent above inflation.27 The Congressional Budget Office estimates that

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26 Calculated by comparing inflation for the military personnel account with DOD’s overall inflation. Office of the Undersecretary of Defense (Comptroller), FY 2022 Defense Budget Overview, Table 5-6.
DOD’s current plans will require an additional $77 billion over the five-year planning period from FY 2021 to FY 2025.\(^{28}\)

In 2019, General Joseph Dunford set off a debate when he was chairman of the Joint Chiefs of Staff by saying that the defense strategy requires 3 to 5 percent real growth per year. Dunford and other senior officials made that point many times, so it was not a casual observation. Many use that as a benchmark for resource requirements.\(^{29}\)

Although General Dunford and others provided no analytic justification for the 3 to 5 percent requirement, the internal dynamics of budget growth (described above) plus increasing threats from China and elsewhere indicate the need for real increases in the DOD budget just to stand still.

Even when the defense budget was rising, there was criticism that resources were inadequate. The National Defense Strategy Commission, a group created by Congress to consider DOD’s 2018 NDS and provide an independent perspective, strongly endorsed General Dunford’s goal of 3 to 5 percent real budget growth.\(^{30}\)

Conservative think tanks have picked up this theme. The Heritage Foundation affirmed the 3 to 5 percent annual growth standard.\(^{31}\) Similarly, Mackenzie Eaglen of AEI recommended that Congress “plan a two-year budget deal that buys back readiness and investment lost to the Budget Control Act.”\(^{32}\) Eaglen’s colleague, Gary Schmitt, called the current situation “strategic insolvency,” observing that “money matters and for three decades we have failed to come to terms with that basic fact.”\(^{33}\)

An exercise conducted by the Center for Strategic and Budgetary Assessments and Ronald Reagan Institute illustrated the problems created by a strategy-resources gap. In the exercise, teams sought to build forces under a reduced defense budget. Nearly all teams cut force structure and personnel heavily to preserve investment. The result “made all teams question America’s ability to win a war, let alone deter another.” Further, the resulting structure “increased U.S. reliance on nuclear deterrence [because there were] fewer conventional rungs in the escalation ladder.”\(^{34}\)

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\(^{34}\) Thomas G. Mahnken et al., *America’s Strategic Choices: Defense Spending in a Post-Covid 19 World* (Washington, DC: CSBA and Ronald Reagan Institute, January 2021), 8, 9, https://csbaonline.org/research/publications/americas-strategic-choices-
Challenge 3: The Need to Shift More Aggressively to a Great Power Structure

A continuing criticism of recent DOD budgets is that they do not go far enough in shifting to a focus on great power conflict. In this view, the budgets retain too many legacy forces and systems and do not invest enough in funding and fielding the kinds of advanced technologies that such conflicts require. In general, such critics call for cutting forces to fund more modernization. It is thus the opposite of the desire to meet day-to-day deployment demands. As one example among many, Becca Wasser and Stacey Pettyjohn argue that the FY 2022 budget tries to do “too much with too little.” They argue for a strategy that cuts personnel to invest in advanced munitions.35 This approach is captured in the phrase, “divest to invest.”

This criticism frequently revolves around the question of “legacy systems.” The INSSG, like the Democratic Party platform before it, states the need to “shift our emphasis from unneeded legacy platforms and weapon systems to free up resources for investments in cutting-edge technologies and capabilities that will determine our military and national security advantage in the future.”36

However, a major unanswered question is, what are “legacy” platforms? On this definition hang tens of billions of dollars of acquisition funding and the structure of future forces. Many strategists see legacy platforms as those that use old technologies and outdated operational concepts. They would cut manned aircraft, aircraft carriers, and armored vehicles, substituting unmanned, smaller, and distributed systems.37

The military services define legacy systems as old systems in the inventory. They would retire older systems and buy similar but more modern systems. For example, strategists would urge the Air Force to curtail F-35 procurement and move toward a fleet of unmanned aerial vehicles (UAVs). The Air Force would retire F-16s and A-10s and use the savings to buy more F-35s.

The FY 2022 budget indicates that the service definition is prevailing, judging by the treatment of manned and unmanned aerial systems. In FY 2022, the Army buys 60 manned aircraft but no major unmanned systems. The Air Force buys 91 manned aircraft but no unmanned systems. The Department of the Navy buys 101 manned aircraft and just 6 unmanned aircraft. Indeed, unmanned aircraft are a major defense-spending-in-a-post-covid-19-world.


DOD divestment area, with the Air Force divesting MQ-4 Block 30 Global Hawks, the Navy divesting its remaining four BAMS-D UAVs, and the Marine Corps divesting the disappointing RQ-21s. This balance could change in the long-term plan after incorporating the results of all the many ongoing reviews, but it indicates the service preference.

Lingering in the background of this discussion is whether the new platforms and munitions are fully ready to replace legacy systems. As Thomas Spoehr of the Heritage Foundation noted, "if you've already jettisoned your legacy equipment and the innovative alternative is not yet ready for prime time, you've left yourself wide open."38

**Challenge 4: Strategy Changes That Could Change Force Structure**

Strategy drives force structure. Thus, any changes in strategy will change the size and shape of the forces. The Biden administration's interim strategy has received broad support in Congress and the national security community (at least those elements related to traditional national security), as did the Trump administration's NDS.

Nevertheless, two challenges have arisen to this strategic approach. First, some libertarians and progressives have proposed a strategy of “restraint” and the reduced spending that goes with it.

CATO, a libertarian think tank, has consistently rejected a strategy of engagement and forward deployments. As Christopher Preble, then CATO's vice president for defense and foreign policy studies, argues: “Admitting that the United States is incapable of effectively adjudicating every territorial dispute or of thwarting every security threat in every part of the world is hardly tantamount to surrender. It is, rather, a wise admission of the limits of American power and an acknowledgment of the need to share the burdens, and the responsibilities, of dealing with a complex world.”39

CATO's strategy would reduce forward deployments and cut the Army, Air Force, and Marine Corps by a third. The strategy would cut the Navy relatively less (by 25 percent) to retain the ability to deploy globally when needed. Reserves would be reduced less than active-duty forces to maintain a surge capability. These changes would cut about $110 billion per year from the defense budget.40

In recent years, a progressive critique of national security strategy and budgets has arisen. For example, a coalition of progressives in Congress called on President Biden to “cut the Pentagon budget by more than 10 percent” and instead “invest in diplomacy, humanitarian aid, global public health, sustainability initiatives, and basic research.”41 A detailed progressive analysis came out in a similar place to the libertarian analysis: cutting ground force structure heavily (in the Army and Marine

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Corps), reducing readiness through cuts in civilians and contractors, and terminating several nuclear modernization programs and most national missile defense programs. It would save about $125 billion per year if fully implemented.42

Many of these critics want to focus national security on climate and global health as the greatest challenges rather than conventional military threats. They seek to leverage public opinion, which shows great concerns about “infectious disease,” “global climate change,” and “global poverty.”43

Figure 2: Public Opinion on Threats to the Nation

So far, this alternative strategy has not gained enough traction to shift the national security strategy in a major way. The Biden administration strategy rejects “restraint,” instead continuing engagement with allies and partners.

The DOD budget will contain some funding for pandemics and climate change. Much of this will focus on making the military more resilient. The FY 2022 budget contains $617 million for “tackling the climate crisis,” about half of which would harden infrastructure. This seems quite in line with DOD’s traditional missions.

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Some of this climate- and pandemic-related funding may be, in effect, a tax on DOD to support society- and government-wide climate initiatives. For example, the current budget includes $3.6 billion dollars for environmental construction.44

**Where Is Public Opinion?**

Ultimately, the size and shape of the defense effort depend on the level of support from the American people. The chart below shows public attitudes toward national defense.45 The good news for defense is that there is little support for the notion that the United States is too strong. That opinion barely gets into double digits. The bad news is that support for budget increases or force expansion is weak though growing.

**Figure 3: Public Opinion on National Defense**

Do you, yourself, feel that our national defense is stronger now than it needs to be, not strong enough, or about right at the present time?


The opinion that the United States is not strong enough began rising in 2012, as the postwar drawdown took effect, and continued rising with the increased threats from Russia, ISIS, and China becoming apparent in 2014.

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“Not strong enough” dipped dramatically after 2017, likely reflecting satisfaction with the defense buildup and concerns about the Trump administration, but bumped up in FY 2021. Questions about the level of the defense budget elicit similar dynamics.

**The Analyst’s Plea: Why Do We Have What We Have?**

Since the early 2000s, DOD has not offered any rationale for its force structure calculations. For example, the Trump administration proposed a “1+” construct for sizing forces: “defeating aggression by a major power . . . [and] deterring aggression by [another] major power.” That required 58 total Army brigade combat teams, 355 Navy ships, about 1,200 Air Force aircraft, and a Marine Corps of 185,000 personnel. There was no description of how the administration determined these very specific force levels from the very general description of the strategic goals it was proposing. This was not unusual. The Quadrennial Defense Reviews of 2010 and 2014 had the same lack of connection.46

This is not an academic concern. Such an explanation would require articulation of “theories of victory,” which lay out how the United States proposes to use its forces in conflict to achieve some result. That would illuminate many trade-offs and operational concepts that are now hidden. Some members of Congress have picked up on this, for example, Representative Luria (D-VA) pressing the Navy for its assumptions behind its goals for fleet size.47

By providing such an explanation in its national defense strategy, the Biden administration would strengthen its budget justification, help the public understand the basis for its force goals, and further its own policy of enhancing transparency in government.

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Army

The U.S. Army’s force structure remains steady even though its budget declined by $3.6 billion dollars. The Army does this by cutting modernization and readiness. In the long term, the Army’s force structure is at risk because of the strategic focus on China, perceived as primarily an air and naval theater.

KEY TAKEAWAYS

- Many strategists, including those in the new administration, would cut Army end strength to fund Navy, Space, and Air Force capabilities for use against China. The Army argues to maintain its force structure and modernization because it provides many capabilities globally, including in the Indo-Pacific theater.

- In FY 2022, the Army took a big risk: despite a declining budget, it held onto structure. This reflects a strategic decision to fight in the ongoing strategy development process, with the hope of maintaining its share of the budget.

- Thus, the Army maintained its personnel strength in FY 2022, both regular and reserve components, at roughly the FY 2021 level. FY 2022 targets include: 485,000 in the regular Army, 336,000 in the National Guard, and 189,500 in the Army Reserve.

- To maintain end strength within a declining total budget, the Army cut (1) modernization, hoping that Congress would add the cuts back (a risk that may pay off), and (2) readiness, despite having rebuilt readiness over the last few years.

- The active-reserve mix has stabilized at 48 percent active, 52 percent National Guard/Army Reserve.

- The long-term Army force structure depends on budgets. A flat budget, as projected by the Trump administration and implied by the Biden administration, would entail deep force structure cuts. Proposed congressional budget increases might avert those cuts.
• Army modernization procures existing systems in FY 2022 but at slower rates. A few new systems are coming out of the research, development, testing, and evaluation (RDT&E) “primordial soup.” However, most major elements of Army modernization—referred to as the “31+4” programs—are still in the future. The Army acknowledges that it cannot afford them all but has not indicated which ones will go forward. Additionally, the new administration may have a different set of modernization priorities.

• In an environment of constrained end strength, the Army will need to cut existing brigade combat teams (BCTs) if it wants to build new units. So far it has been unwilling to do this.

• Constrained resources may also push the Army into battles with the Office of the Secretary of Defense over strategic direction, with the Air Force over long-range strike, and with the National Guard over distribution of budget cuts.

Force Structure in FY 2022

Table 1: Army End Strength – Regular and Civilians

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Regular Army Brigade Combat Teams</th>
<th>Regular Army End Strength</th>
<th>Civilian Full-Time Equivalents (000s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2020 Actual</td>
<td>31</td>
<td>485,400</td>
<td>192,100</td>
</tr>
<tr>
<td>FY 2021 Actual</td>
<td>31</td>
<td>485,900</td>
<td>194,800</td>
</tr>
<tr>
<td>FY 2022 Request</td>
<td>31</td>
<td>485,000</td>
<td>196,700</td>
</tr>
</tbody>
</table>


Regular Army end strength holds steady. Recruiting adjusts to the pandemic by leveraging remote operations and is helped by high unemployment. As the economy has opened up, the Army has returned to its normal recruiting practices, but the decline in unemployment may create challenges.

Civilian personnel levels are climbing back after a dip in 2020.

Table 2: Army End Strength – National Guard and Reserve

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Army National Guard Brigade Combat Teams</th>
<th>Army National Guard End Strength</th>
<th>Army Reserve Authorized End Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2020 Actual</td>
<td>27</td>
<td>336,000</td>
<td>189,500</td>
</tr>
<tr>
<td>FY 2021 Actual</td>
<td>27</td>
<td>336,500</td>
<td>189,800</td>
</tr>
<tr>
<td>FY 2022 Request</td>
<td>27</td>
<td>336,000</td>
<td>189,500</td>
</tr>
</tbody>
</table>

End strength for the Army reserve components held steady, with minor variations. In recent years, the reserve components have been constrained as much by recruiting challenges as by funding.

On average over the last five years, about 25,000 Army reservists and National Guard personnel have been mobilized at any time, mainly supporting operations in the Middle East.\textsuperscript{48} With high force demands on the Army continuing, this level of mobilization will likely persist.

Since March 2020, the National Guard has been activated to deal with the pandemic, unrest following the murder of George Floyd, and the events of January 6. These activations have helped law enforcement and public health officials. Repeated deployments have stressed the Guard. Activations peaked at 23 percent of National Guard personnel in June 2020.\textsuperscript{49}

Figure 1: Total Army End Strength FY 1999–FY 2022

\begin{figure}
\centering
\includegraphics[width=\textwidth]{army_end_strength.png}
\caption{Total Army End Strength FY 1999–FY 2022}
\end{figure}


Note: This and several other historical charts begin with the year 1999 because it is before the 9/11 buildup but after completion of the post-Cold War reductions.

Figure 1 shows the Army’s growth in the 2000s for the wars in Iraq and Afghanistan and its subsequent drop as the wars wound down. The total Army today is 33,000 soldiers below its pre-9/11 level.

The Army had fought hard against plans in the Obama administration to drop to 980,000 soldiers—regular, National Guard, and Army Reserve—or fewer. The Trump administration’s FY 2019 plan called for expansion to 1,040,000 by FY 2023, and Army officials had talked about even higher levels. However,

\textsuperscript{48} Military Manpower Data Center, Weekly Reserve Activation Reports [limited distribution, not publicly available].

such talk has nearly disappeared as the Army has struggled to maintain its current strength. That also means deferring earlier plans to fill operational units at 105 percent to ensure rapid deployability without having to draw personnel from other units, thus further straining near-term readiness.\footnote{Units need extra personnel (105 percent) because at any particular time some members are non-deployable because of temporary health problems (for example, broken limbs), personal hardship, legal difficulties, or pending transfers.}

There are no major Army force structure changes in FY 2022. The regular Army will maintain 31 brigade combat teams (BCTs) and 11 combat aviation brigades (CABs). The Army National Guard will maintain its current force of 27 BCTs, 2 CABs, and 6 expeditionary CABs, for a total of 8 aviation brigades. The Army Reserve, which consists mostly of support units (“enablers”), will retain two theater aviation brigades (TABS) and makes no major changes in its functional and support brigades.

The Army has finished establishing the security force assistance brigades (SFABs), five in the regular force and one in the National Guard. SFABs “train, advise, assist, enable, and accompany operations with allied and partner nations,” thus reducing the burden on BCTs, which would otherwise have to deploy in pieces for this mission. SFABs could also provide the basis for future BCTs if the Army needed to expand. Although they initially focused on Afghanistan and Iraq, they have a broad mission and have worked with a wide variety of partners and allies. As a result, they will likely continue in a Biden administration that focuses on China.

The total Army has been getting slightly heavier, which is unsurprising since it has reoriented itself from a focus on counterinsurgency, which needs infantry, to a focus on great power conflict with a particular emphasis on Russia, which needs firepower. The Army argues that operational plans drive the mix of heavy, medium, and light forces and the balance between the components. The implication is that operational plans for Russia and North Korea (and perhaps others) require heavy forces early.

Table 3: Army BCT Balance by Type

<table>
<thead>
<tr>
<th></th>
<th>Light (Infantry)</th>
<th>Medium (Stryker)</th>
<th>Heavy (Armored)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>33</td>
<td>9</td>
<td>14</td>
</tr>
<tr>
<td>2022</td>
<td>33</td>
<td>9</td>
<td>16</td>
</tr>
</tbody>
</table>


However, there is a major difference in the BCT balance between the components. The National Guard is mostly infantry (74 percent). This reduces the need for vehicle maintenance and gunnery training, which are difficult with part-time personnel. The regular Army is more equipment intensive, with 65 percent of BCTs being medium or heavy.
The Army Budget

In FY 2022 the Army took a big risk: despite a declining budget, it held onto structure. This reflects a strategic decision to fight in the ongoing strategy development process with the goal of maintaining its share of the budget. As John Whitley, the acting secretary the Army stated, “What we've got now is an Army budget that has risk built into it.”

In current dollars, the Army budget declined by $3.6 billion, from $176.6 billion to $173.0 billion. In constant dollars, the decline was even larger, $5.5 billion. Some of this decline reflects the planned reduction in Middle East operations. However, some is just a cut.

The Army leadership argues that they are at the end of finding internal savings. They point to the Army’s multiyear “night court” process, which identified and cut lower-priority programs, claiming $7.3 billion in savings between FY 2020 and FY 2022. The Army published details on these cuts, so they were credible. However, the Army leadership also argues that this process has run its course and identified only $70 million in savings in FY 2022.


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In FY 2022, every account declines except for military personnel (and “other,” driven by small increases in specialized accounts, such as Arlington National Cemetery).

- The cut in procurement, $2.8 billion, meant shaving a variety of ongoing procurement programs, as described later.
- The cut in RDT&E meant slowing modernization efforts. This cut came mainly from the science and technology category, falling $1.3 billion, a congressional favorite and likely to be restored. That allowed most existing development programs to continue while reducing long-term efforts, which will be unpopular with the technology community.
- The cut in operations and maintenance (O&M) meant taking risk in readiness since some activities such as civilian personnel and healthcare increase. Congress may restore some of these cuts, which the Army put on its “unfunded requirements list."
- The Army secretary and chief of staff testified that “the Army is moving to a foundational readiness model that prioritizes the training of individuals and small units at the company level and below.” That means reducing the training of higher-level units, a reversal of its strategy in the past several years.
- The number of BCT rotations through the combat training centers declines from 19 to 14.
• Active-duty unit training declines, with “full-spectrum training miles” cut from 1,549 in FY 2020 to 1,109 proposed for FY 2022 (a decline of 40 percent), and monthly flying hours per crew cut from 11.6 in FY 2020 to 10.2 proposed for FY 2022 (a fall of 14 percent).\textsuperscript{56} Similarly, Army National Guard full-spectrum training miles decrease from 604 in 2020 and 624 in FY 2021 to 581 proposed for 2022. Army National Guard rotations at the combat training centers will decline from four planned in previous years to two. Army Reserve readiness is mixed, with some elements declining (training miles for support brigades) and other elements increasing (flying hours from 17.6 to 20.7 per year).\textsuperscript{57}

The Future Size of the Army

Three opposing dynamics pull the future size and shape of the Army: guidance to focus on China, demands of day-to-day operations, and potential recruiting challenges.

The Interim National Security Strategic Guidance directs a focus on great power conflicts, especially China. Many statements by senior Biden administration officials reinforce that guidance. As noted in the overview chapter, that focus implies a force equipped with advanced, and likely very expensive, technologies paid for, if necessary, by cuts to structure and Army modernization that is not aligned to great power conflict with China.

Many strategists have explicitly proposed cutting Army end strength to fund Navy and Air Force capabilities for conflict against China in the Western Pacific. Their notion is that this theater is primarily a maritime and air theater and that, while the Army has some useful capabilities, these are not needed in the quantities available. A few illustrative citations make that point.

General Mark Milley, chairman of the Joint Chiefs of Staff, noted: “Look, I’m an Army guy, and I love the Army . . . but the fundamental defense of the United States, and the ability to project power forward [are] going to be naval and air and space power.”\textsuperscript{58}

Blake Herzinger, a naval commentator, stated: “The U.S. National Defense Strategy clearly names the People’s Republic of China as America’s primary strategic competitor, while the secretary of defense made clear that China is, and will remain, America’s ‘pacing challenge.’ That challenge is playing out on the world’s oceans, and it is likely to intensify . . . For a 7 percent decrease in active-duty Army garrison strength, the Navy could purchase 40 new ships over the current procurement plan and extend the service lives of 10 guided missile cruisers.”\textsuperscript{59}


A CSIS study group likewise noted: “Ground forces under the Innovation Superiority Strategy [a concept for countering China] see a sizeable reduction relative to the DoD’s current force structure plans for FY 2030. Army Active Component Infantry Brigade Combat Teams are reduced in line with the strategy’s plan to withdraw from Afghanistan and Syria and reduce U.S. ground presence in Europe.”

The Army makes several arguments for its relevance to the new strategy.

- It brings a variety of traditional capabilities to a conflict in the Pacific, such as theater logistics and air and ballistic missile defense.
- The Army can bring new capabilities such as long-range ground and anti-ship fires. In this, the Army would seem to be competing with the Marine Corps, which makes a similar strategic argument. However, the Army argues that it brings mass and depth that the Marine Corps lacks.
- Ground forces can employ these capabilities from inside the Chinese defensive zone because ground forces can move and are hard to find. Thus, they are less vulnerable than air or naval forces.
- Army forces are relevant to conflicts globally—in Europe against Russia and for other threats such as North Korea and Iran.

Besides wartime requirements, the Army notes the high day-to-day demand for forces to deploy to the Middle East, Europe, and elsewhere: “171,000 soldiers deployed worldwide in 140 countries on six continents.” That implies the need for a larger force that may not require the most advanced technologies. Army statements do not complain about stress, unlike statements through about 2016, which did express concerns about high personnel tempo. This implies that the Army is at a sustainable level of deployment given its current force structure. Demands in the Middle East have declined substantially from their peak in the 2000s, though increased deployments to Europe and the Pacific have filled some of the slack. Some communities, such as air defense, are an exception, being at their maximum deploy-to-dwell ratio.

Difficulties in recruiting and retention may drive force size regardless of strategy. Recruiting difficulties kept Army end strength lower than planned in FY 2019, but improved recruiting and retention allowed the Army to reach its target end strength in FY 2020 and beyond. However, as the Heritage Foundation points out, the recruiting environment will continue to be challenging as the propensity to enlist among U.S. youth declines and as many of the target demographics have difficulty meeting military requirements for education, physical fitness, and drug/legal suitability.

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62 “The Army in the Indo Pacific,” CSIS.

63 Department of the Army, Fiscal Year (FY) 2022 Budget Estimates, Volume 1.

64 For a full discussion of day-to-day deployment demands and their impact on force structure, see the overview chapter of this series.

In the long term, the regular Army had hoped to get to 495,000 by 2023. Even that was a reduced goal. The chief of staff has stated that the regular Army needs 540,000 to 550,000 soldiers to fill its structure and meet all its peacetime and wartime commitments.\(^{67}\)
As Figure 5 shows, the Army Reserve had planned to increase to 200,000 and the Army National Guard planned to increase to 343,000. Instead, both now aim to maintain their current end strength.

Balance of Regular and National Guard/Army Reserve Forces

The bottom line is that the Army seems to have reached equilibrium at 48 percent regular, 52 percent reserve components, a level attained in FY 2015. Although the active/reserve mix has frequently been a source of tension in the Army, those tensions have eased in recent years as a result of closer consultation arising from a 2016 commission, higher budgets that benefit both components, and the difficulty that both components have in recruiting and retaining additional soldiers. With lean budgets ahead, this conflict may reemerge.

Nevertheless, given the different cultures, missions, and histories of the two components, the active-reserve mix is a tension that must be managed, not a problem that can be solved.

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Tensions between regulars and reservists have existed since the founding of the United States. This tension is particularly an issue for the Army because it has the largest reserve component by far, both in relative and absolute terms. For example, 52 percent of the total Army is in the reserve components, compared to only 35 percent of the total Air Force, 18 percent of the total Marine Corps, and 15 percent of the total Navy. As Figure 6 shows, Army reserve components (green) are nearly twice the size of all the other reserve components put together (in FY 2022, 525,500 versus 274,000).

As Figure 7 shows, the Army’s active/reserve balance has shifted over time. The ratio moved away from an active-heavy force to parity between the components due to the establishment of the Total Force Policy in 1970, which called for increased reliance on the reserves; the initiation of the Volunteer Force in 1973, which raised the cost of military personnel; and the end of the draft in 1973, which cut off an easy supply of active-duty personnel.
However, this balance has been dynamic. With the end of the Cold War, the ratio changed to a reserve-heavy force as the regular force decreased more rapidly than the reserves. The ratio reached parity again with expansion of the regular force during the wars in Iraq and Afghanistan but has returned to what appears to be a strategically stable level: 48 percent regular, 52 percent National Guard/Army Reserve. Instead of large growth in either the regular or National Guard/Army Reserve force, the Army, and DOD in general, has turned to contractors, as discussed in a later section in this series.

Tensions between the components peak during drawdowns when constrained resources force difficult trade-offs. Thus, there was a crisis in the late 1990s during the post-Cold War drawdown and another in 2014 during the post-Iraq/Afghanistan drawdown. Key to easing recent tensions was the 2016 National Commission on the Future of the Army. The commission looked broadly at all the components and the total Army’s needs and published a set of recommendations that all components could accept. The recent budget increases have helped implement the commission’s recommendations and eased tensions generally, as the Army does not need to make trade-offs between the components.

However, a budget downturn might bring these tensions to the surface again. Further, a national defense strategy that requires rapid reaction—as the 2018 National Defense Strategy came close to doing—would also increase tension by moving capabilities from the reserve components to the active components. Finally, the large number of infantry BCTs (20 of the Army’s total of 33) in the National Guard may exceed strategic needs when the strategy is moving away from counterinsurgency and stability operations.

The Future Structure of the Army: Modernization, New Capabilities, and New Units

Broadly, Army modernization is a “good news, bad news” story: the good news is that the Army continues production of proven systems—though at lower rates in 2022—and has a well-modernized force as a result. More good news is a few new systems are coming out of the RDT&E “primordial soup.” The bad news is that the Army is still several years away from having a new generation of systems in production to take it into the 2020s and beyond and set it up for combat against great power adversaries. More bad news is that the Army cannot afford all the systems it is developing and does not have a clear path for selecting which technologies to take forward. Finally, the new administration will likely have different modernization priorities than the Army, setting up future tensions.

MODERNIZING THE CURRENT FORCE

In the near term, the Army is sensibly plugging its most serious capability gaps by upgrading the major systems it has. As CSIS acquisition experts Andrew Hunter and Rhys McCormick point out, focusing on capabilities through upgrades rather than developing major new systems avoids the technical, budgetary, and political risk of relying on a few costly, high-profile programs.


Thus, the Army FY 2022 budget funds the latest versions of existing systems. These programs run smoothly, produce equipment at known costs and on predictable schedules, and avoid acquisition scandals that in the past embarrassed the Army in front of Congress and the public. However, the Army cut down on most procurement quantities compared with FY 2021 levels to meet the budget reduction, as described earlier.

Despite the strategic emphasis on unmanned systems, the Army (like the other services) seemingly deemphasized that capability in FY 2022.

Table 4: Major Army Procurement in FY 2022

<table>
<thead>
<tr>
<th>System</th>
<th>First Fielded</th>
<th>Current Version</th>
<th>FY 2021 Enacted</th>
<th>FY 2022 Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1 Abrams tank</td>
<td>1981</td>
<td>M1A2 SEP V2</td>
<td>102</td>
<td>70</td>
</tr>
<tr>
<td>Bradley Fighting Vehicle M-2/3</td>
<td>1981</td>
<td>M2A4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stryker fighting vehicle</td>
<td>2003</td>
<td>Double V-Hull, 30 mm gun</td>
<td>254</td>
<td>187</td>
</tr>
<tr>
<td>M109 Paladin self-propelled howitzer</td>
<td>1963</td>
<td>M109 PIM (A7)</td>
<td>31</td>
<td>25</td>
</tr>
<tr>
<td>UH-60 Blackhawk</td>
<td>1978</td>
<td>M-model</td>
<td>42</td>
<td>24</td>
</tr>
<tr>
<td>AH-64 Apache</td>
<td>1987</td>
<td>E-model</td>
<td>50</td>
<td>30</td>
</tr>
<tr>
<td>CH-47 Chinook</td>
<td>1962</td>
<td>F- and G-models</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>Great Eagle</td>
<td>2009</td>
<td>C-model</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>


Three relatively new programs are also in production: the Joint Light Tactical Vehicle (JLTV, an armored light truck and replacement for the up-armored HMMWVs), the Armored Multipurpose Vehicle (AMPV, a replacement for the M113 armored personnel carrier), and the Mobile Protected Firepower system (MPF, a light tank to support the infantry).

Table 5: Major Army Procurement in FY 2022 – New Systems

<table>
<thead>
<tr>
<th>System</th>
<th>First Fielded</th>
<th>FY 2021 Enacted</th>
<th>FY 2022 Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>JLTV</td>
<td>2016</td>
<td>884</td>
<td>575</td>
</tr>
<tr>
<td>AMPV</td>
<td>2020</td>
<td>63</td>
<td>105</td>
</tr>
<tr>
<td>MPF</td>
<td>2022</td>
<td>0</td>
<td>287</td>
</tr>
</tbody>
</table>

The Army’s FY 2022 budget continues robust funding for long-range munitions, for example, the Guided MLRS rocket, Precision Strike Missile, and Patriot missiles (MSE). This reflects preparation for the intense combat that a great power would entail. Conversely, funding for short-range missiles, such as Hellfire anti-tank missiles, was halved from $516.6 million in FY 2021 to $230.0 million in FY 2022.\footnote{Office of the Under Secretary of Defense (Comptroller)/Chief Financial Officer, \textit{Defense Budget Overview}, 2–12.}

Table 6: Major Army Procurement in FY 2022 – Long-Range Fires

<table>
<thead>
<tr>
<th>System</th>
<th>FY 2021 Enacted</th>
<th>FY 2022 Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patriot Missile (MSE)</td>
<td>146</td>
<td>180</td>
</tr>
<tr>
<td>Guided MLRS Rocket</td>
<td>5,796</td>
<td>5,886</td>
</tr>
<tr>
<td>Precision Strike Missile</td>
<td>30</td>
<td>110</td>
</tr>
</tbody>
</table>


The effect of this approach, combined with the large wartime procurements and rebuilds/upgrades funded by the Overseas Contingency Operations (OCO) reset during the 2000s, is that the Army’s force structure is filled with relatively new equipment. For example, the Apache fleet averages 8 years old, the Chinook fleet averages 10 years old, and the ground combat vehicle fleets are all at about 10 years old.\footnote{Congressional Budget Office, \textit{Cost of Replacing Today’s Army Aviation Fleet} (Washington, DC: May 2019), Table A-1, https://www.cbo.gov/system/files/2019-05/55180-ArmyAviation.pdf; and Edward Keating and Adebayo Adedeji, \textit{Projected Acquisition Costs for the Army’s Ground Combat Vehicles} (Washington, DC: Congressional Budget Office, April 2021), 4, https://www.cbo.gov/publication/57085.} Gone are prewar concerns about aging equipment fleets.

\section*{CREATEING NEW CAPABILITIES AND NEW UNITS}

A long-standing concern about Army modernization is that there are few new systems coming online to replace the existing generation. This was the result of a “triple whammy”: a missed procurement cycle due to program failures, a focus on near-term systems for wartime operations, and modernization funding reductions in the postwar drawdown.\footnote{Rhys McCormick, \textit{“The Army Modernization Challenge: A Historical Perspective,”} CSIS, March 31, 2016, http://fysa.csis.org/2016/03/31/the-army-modernization-challenge-a-historical-perspective.}

The Army has divided its development effort into six major priorities (sometimes known as “the big six”): Long Range Precision Fires (artillery), Next Generation Combat Vehicle (armor), Future Vertical Lift (aviation), Air and Missile Defense, Soldier Lethality (infantry), and Army Network. The Army has added two more capability areas—Assured Positioning, Navigation, and Timing and Synthetic Training Environment—so the modernization effort is often referred to as “6+2.”

The Army points to “31+4” systems in development (31 overseen by Army Futures Command, 4 overseen by the Rapid Capabilities Office). For a long time, the Army has known that this number is far more than it can afford to procure and field. General John Murray, head of the Army Futures Command, made that point again this year: “We have made a bunch of our choices, and are going to have to make more hard choices. In many cases, it’s almost at the point of being impossible.”\footnote{Sydney Freedberg, \textit{“Army Faces ‘Almost Impossible Choices’: Gen. Murray,”} Breaking Defense, May 12, 2021, https://}
Unlike in previous years, the Army did not publish its funding in the six priority areas and show changes from the previous year. That is likely because the news was not good: most areas went down.

Shown below are major initiatives in development. The list gives a sense of systems that might enter the force in the future. Of these, 22 are planned for delivery by FY 2025.75

Table 7: Major Development Initiatives

<table>
<thead>
<tr>
<th>Long Range Precision Fires</th>
<th>Strategic Long-Range Cannon Precision Strike Missile (PrSM)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Extended Range Cannon Artillery (ERCA)</td>
</tr>
<tr>
<td></td>
<td>Long-range hypersonic weapon</td>
</tr>
</tbody>
</table>
|                           | Because of the strategic emphasis on long-range precision strike, these programs have received highest priority. PrSM is in production now and others will follow soon. However, they have engendered a debate about roles and missions with the Air Force because of their range. Air Force advocates have called the Army long-range weapons “duplicative [of bombers] . . . prohibitively expensive, non-reusable and requiring extensive deployment logistic support.”76
|                           | The fortunes of the artillery have turned around substantially in the last decade. During the stabilization conflicts of the 2000s, artillery was considered a “dead branch walking” because there was less need for firepower. Now, it may be the premier branch. |
|                           |                                                            |
| Next Generation Combat Vehicles | Armored Multi-Purpose Vehicle |
|                           | Mobile Protected Firepower                                 |
|                           | Optionally Manned Fighting Vehicle (OMFV, Bradley replacement) |
|                           | Robotic Combat Vehicle: 3 variants                          |
|                           | Decisive Lethality Platform (Abrams replacement)            |
|                           | The AMPV is in production now; the MPF will enter production in FY 2022. The other programs are further in the future. Support for improvements to existing systems is likely to remain strong. The OMFV is a high Army priority but will face challenges because of its high cost and appearance of being a legacy capability. Many observers question whether the Army can develop a new fighting vehicle, given its failure to do so in the past. |

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| **Future Vertical Lift** | **Future Attack Reconnaissance Aircraft** *(FARA, Apache replacement)*  
**Future Long-Range Assault Aircraft** *(FLRAA, Black Hawk replacement)*  
**Future Attack Unmanned System** | FARA and FLRAA are major, longer-term programs that will go into production in the late FY 2020s. Many question the relevance of these two programs in a conflict with China, given the vast expanses of the theater and China's capable air defenses. Further, plans for a manned (even optionally manned) reconnaissance helicopter run into advocates who claim that this mission can be done better by totally unmanned systems. These programs also face an affordability challenge since the Army is at the same time trying to recapitalize its 2,000 Blackhawk helicopters. |
| **Air and Missile Defense** | **Maneuver Short-Range Air defense (M-SHORAD)**  
**Indirect Fire Protection Capability (IFPC).** | Air and missile defense has received a lot of attention recently because of its applicability to great power conflicts and because support for this mission in Congress and DOD will continue to be strong.

M-SHORAD is in production now. The Indirect Fire Protection Capability, designed to defend fixed points against cruise missiles and UAVs, will be fielded in FY 2023.\textsuperscript{77}

Two Iron Dome batteries purchased from Israel provide an interim point defense system.

Near-term capabilities will use missiles; longer-term capabilities may use directed energy. |
| **Soldier Lethality** | **Next Generation Squad Weapons – Automatic Rifle**  
**Next Generation Squad Weapons – Rifle** | The Army is fielding many small improvements in this area. New generation weapons may use a 6.8 mm round (as opposed to the current 5.56 mm and older 7.62 mm) but are still in the testing phase.

These are inexpensive programs with direct applicability to troops and are likely to retain strong support in DOD and with Congress. |

---

Cyber expansion seems to be complete since it has mostly disappeared from Army statements. Although cyber receives a lot of attention, the Army component numbers only several hundred personnel.\(^78\) In the longer term, the Army intends to build integrated intelligence—cyber-electronic warfare units—as part of the multidomain forces.

Building networks remains a challenge for the joint force, and the Army is no exception; the Army, after having severe problems with its Warfighter Information Network-Tactical, needs to convince sceptics that its most recent efforts will work.

The Army’s overall concept for multidomain operations is called AimPoint, and the current thinking is that the major changes will occur at higher echelons, division and above.\(^79\)

Ultimately, the Army intends to develop “multidomain task forces” that would integrate space, cyber, air, ground, and maritime “to execute simultaneous and sequential operations using surprise and the rapid and continuous integration of capabilities across all domains to present multiple dilemmas to an adversary.”\(^80\) These remain mostly conceptual, although the Army has published concepts and built an experimental unit using an artillery brigade as the base unit. The Army plans to build five Multi-Domain Task Forces: two aligned to the Indo-Pacific, one aligned to Europe, one positioned in the Arctic and oriented on multiple threats, and the final aligned for global response.\(^81\)

Project Convergence is a major Army experimental effort to knit together capabilities from launchers, munitions, intelligence, cyber, and intelligence, surveillance, and reconnaissance (ISR).

If the Army wants to build new kinds of units in an environment of constrained end strength, it will need to reduce or eliminate some existing units. Because the active force has so few support units left, most having been transferred to the reserve components, that will mean eliminating or slimming down BCTs, with infantry BCTs being the likely target.

---


There is bipartisan support to expand the Navy, but limited budgets and early retirements—“divesting to invest”—make achieving that goal difficult. The Biden administration’s emerging fleet plan incorporates smaller ships and large numbers of unmanned systems, as proposed by many strategists, but high costs, production limitations, and congressional opposition may prevent full implementation.

**KEY TAKEAWAYS**

- In FY 2022, fleet size stays about the same, at 296 ships. Previously ordered ships arrive in large numbers, but the Navy retires 15 ships, 10 early. Navy active-duty personnel decrease by 1,600 to 346,200.

- Ship numbers matter to the Navy because of high day-to-day demands for its forces for crisis response, allied and partner engagement, conventional deterrence, and ongoing regional conflicts.

- The future fleet architecture—its size and composition—remains a work in progress. The Trump administration’s 355-ship goal was deemed infeasible because of its high cost and outmoded operational concepts. At the end of its term, the Trump administration articulated a new vision incorporating unmanned systems and distributed capabilities. The Biden administration published a similar architecture, but smaller and with ranges for ship numbers. Cost is a problem with all of these notional architectures because they require large funding increases which may not occur. Nevertheless, some insights are emerging:

  - **Carriers:** Recent force structure proposals have implied a reduction in the number of carriers. However, contractual commitments and political constraints may have locked the Navy into the present carrier force for many years regardless of strategic considerations. Small carriers seem to be receding into the background once again.
- **Large Surface Combatants**: Future architectures envision deep cuts to this fleet, implying production cutbacks and many early retirements. However, industrial base and strategic concerns about shrinking fleet size will clash with the new goals.

- **Small Surface Combatants**: All the future fleet architectures show an increase, the only question being how much of an increase and how fast.

- **Amphibious Ships**: New amphibious concepts and the introduction of a small amphibious ship imply reductions in the number of large amphibious ships. However, as with the large surface combatants, industrial base interests will clash with the new and lower goals.

- **Attack Submarines**: All future architectures envision an increase in the size of the attack submarine fleet. However, slow production in the 1990s and production capacity limits today will limit fleet size until the 2040s.

- **Ballistic Missile Submarines**: The Columbia-class ballistic missile submarine program, the Navy’s highest-priority program, remains on schedule and (generally) at target cost but with some risk. Any program delay would disrupt the U.S. nuclear deterrent, while any cost increase would disrupt every other shipbuilding program.

- **Unmanned Surface and Undersea Vessels**: These figure prominently in Navy architectures, but the systems remain experimental and none of the larger programs have a production plan. The FY 2022 budget seems to entail a pause in development.

- Naval aviation is generally in good shape, with stable inventories and acceptable average fleet ages. However, it remains focused on manned platforms.

### End Strength in FY 2022

**Table 1: Navy End Strength – Active, Reserve, and Civilians**

<table>
<thead>
<tr>
<th></th>
<th>Active Navy</th>
<th>Navy Reserve</th>
<th>Civilian</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>End Strength</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FY 2021 Enacted</strong></td>
<td>347,800</td>
<td>58,800</td>
<td>199,051</td>
</tr>
<tr>
<td><strong>FY 2022 Request</strong></td>
<td>346,200</td>
<td>58,300</td>
<td>200,192</td>
</tr>
<tr>
<td><strong>Change from FY 2020</strong></td>
<td>-1,600</td>
<td>-500</td>
<td>+1,141</td>
</tr>
</tbody>
</table>

Source: Department of the Navy, *Highlights of The Department of the Navy FY 2022 Budget* (Washington, DC: Department of Defense, 2021), Active End Strength data in Figure 7.2, Reserve End Strength data in Figure 7.3, Civilian data in Figure 7.10 (includes direct and indirect hires but excludes Marine Corps civilians), https://www.secnav.Navy.mil/fmc/fmb/Documents/22pres/Highlights_Book.pdf.

Navy personnel levels have been on a roller coaster, reaching a post-Cold War high of 383,000 in FY 2002 and a low of 318,000 in FY 2012. The number has crept back up, but the Navy is still far below its pre-9/11 size. However, the number of sailors tracks roughly to the number of ships in the fleet (see Figure 1).
The Navy projects that active-duty end strength will decline slightly in FY 2022 to 346,200. This reflects the Navy’s near-term plan to retire older ships with large crews. A few Navy personnel will transfer to the Space Force in FY 2022, but major decisions here lie in the future. The FY 2020 and FY 2021 projections had shown continued personnel growth.

82 “Space Force Selects over 900 to Transfer in FY 22,” U.S. Space Force, September 30, 2021, https://www.spaceforce.mil/News/Article/2793972/space-force-selects-more-than-900-personnel-to-transfer-fy22/. Although 900 personnel were selected, nearly all were from the Army.
Although its end strength has been roughly stable since 2014, the Navy Reserve will shrink by 500 sailors to 58,300 in FY 2022. Over the long term, the Navy Reserve has been shrinking, unlike other Department of Defense (DOD) reserve components. This long-term decline results from the retirement of all Navy Reserve ships and many Navy Reserve aircraft, so the remaining forces are mainly for logistics and support. Billets for staff augmentation are being eliminated. While these remaining functions have an important role, it is much narrower compared to the reserve components of other services. Unlike the Army and Air Force, the Navy and the Marine Corps have not increased the number of reservists to compensate for constraints on the number of active-duty personnel.

The number of Navy civilians increases by 1,100 in FY 2022, continuing a long-term increase, though at a slower rate. The Navy appears to be using civilians to offset constraints on military personnel. This is a sensible policy because civilians are less expensive than military personnel; stay in their jobs longer, resulting in deeper expertise; and have a more flexible personnel system in that health and age requirements are not as stringent as for the military.

This planned increase is at odds with the Navy’s recent announcement about cutting 1,000 civilian jobs from installations as a budget-saving move. Because the cuts would affect popular support activities (beaches and gyms) as well as ship operations, expect continued discussion in this area.83 (A later chapter in this series will consider the civilian workforce DOD-wide.)

---

The Navy, like DOD in general, emphasizes that most civilians work outside Washington and are a critical element of readiness because of the work they do on facilities and maintenance.

**Fleet Size in FY 2022**

To understand the future fleet, the place to start is the FY 2022 budget proposal. The president’s budget proposes to construct only eight ships in FY 2022: two SSN-774 submarines, one DDG-51 destroyer, one FFG-62 frigate, one oiler, two towing/salvage/rescue ships, and one ocean surveillance ship. Although all count as battle force ships, only four are combatants. Congress might add ships in its final bills as it customarily does, another destroyer being the most likely addition, but the number of ships funded in FY 2022 will be low compared with recent shipbuilding budgets.84

The reason for the low number is that the Navy shipbuilding account declines from $23.3 billion in FY 2021 to $22.6 billion in FY 2022. This reflects the overall decline in the DOD budget. (For more information on this point, see the budget and strategy overview chapter.)

**Table 2: Implied Fleet Size for Shipbuilding Rate and Service Life**

<table>
<thead>
<tr>
<th>Ship Construction/Year</th>
<th>Average life of 30 yrs</th>
<th>Average life of 35 yrs</th>
<th>Average life of 40 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 (FY 2022 rate)</td>
<td>240</td>
<td>280</td>
<td>320</td>
</tr>
</tbody>
</table>


Table 2 calculates fleet size with different assumptions about service life. Although building rates will change over time, the calculation gives insight into the implied long-term fleet size given today’s budget. The table shows that the Navy will need to increase its building rate unless it holds onto its ships for a long time. Historically, the Navy has tended to retire ships early because of obsolescence or budget pressures.

This tendency to retire ships early appears in the FY 2022 budget. To save money over the long term, the budget proposes early retirement for five CG-47 cruisers, one dock landing ship (LSD), and four littoral combat ships (LCSs). The Navy has wanted to retire these cruisers and amphibious ships for many years, arguing that they are too expensive to modernize. Congress has often pushed back, arguing that the Navy needs numbers to meet its global commitments (see discussion below).

The LCSs proposed for retirement are not old, one being commissioned in 2017. The Navy argues that upgrading them to the current configuration would be too expensive. That the Navy is proposing to retire them so early is a statement of the program’s shortfalls.

The “divest to invest” strategy—whereby the services retire current capabilities and invest the funds in future capabilities—may work in the long term, but in the short term, the Navy has the worst of both worlds: a constrained shipbuilding plan and a smaller fleet. The first chapter in this series, the budget and strategy overview, describes this strategy in detail.

Rightly or wrongly, the ship count is often used as a measure of Navy capacity, so Figure 5 gets a lot of attention. The total number of ships in the fleet increases slightly in FY 2022, from 294 in FY 2021 to 296, as previously funded ships join the fleet, but the FY 2021 plan had been to grow to 306.

In the short term, the Navy has the worst of both worlds: a constrained shipbuilding plan and a smaller fleet.

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Figure 5: Total Navy Active Ships, 1999–2022


Figure 6: Ship Count and Tonnage of Navy Battle Force, 1988, 1996, 2022

In part, the decline in ship numbers resulted from Navy decisions to buy bigger, more capable, and more expensive ships. As the chart on tonnage shows, the FY 2022 fleet will have 52 percent of the number of ships of 1988 (296 versus 565) but 83 percent of the tonnage. Today’s DDG-51 destroyer (Flight IIA) displaces 9,700 tons, twice the tonnage of a 1980s Charles F. Adams-class destroyer and four times the tonnage of a World War II Fletcher-class destroyer (2,500 tons). Indeed, the DDG-51 has the tonnage of a World War II cruiser. The increased size produces greater capability in the individual ship, but ships can only be in one place at a time.

In part, the decline in ship numbers resulted from Navy decisions to buy bigger, more capable, and more expensive ships.

The Unrelenting Demands of Current Operations

Fleet size matters because it supports the level of naval deployments, but it is in tension with the “divest to invest” strategy. In their statements to Congress, both the acting secretary of the Navy and the chief of naval operations noted that the Navy is a “global force with global responsibilities.”86 The CNO NAVPLAN makes the broad argument: “Deployed forward, we provide U.S. leaders with quick response options for nearly any challenge—from confronting rivals to helping local populations recover from natural disasters. Our combat-credible presence creates and maintains influence abroad and ensures critical waterways remain open for commerce.”87 As a result, the average number of ships deployed has remained at the current level of about 100 for three decades, even though the number of ships has declined over time. The recent need to deploy to Europe (including in the Arctic and Mediterranean), theaters largely ignored since the end of the Cold War, adds to demands. To better cover Europe and the Atlantic, the Navy reactivated the Second Fleet headquarters in Norfolk.


The Navy reports that it can fulfill only about half of the theater commanders’ requests for ships.\textsuperscript{88} Because these theater requests are not resource constrained, it is unsurprising that the requests greatly exceed what is available.

Nevertheless, this shortfall engenders a concern that the Navy is too small for the tasks that it is being asked to perform, hence the drive to expand. Admiral Michael Gilday was explicit: “It is my military advice that America needs a larger Navy.”\textsuperscript{89} Many naval strategists echo this perspective: “The U.S. Navy is on the verge of strategic bankruptcy. Its fleet is not large enough to meet global day-to-day demands for naval forces.”\textsuperscript{90} Congress has been sympathetic. Elaine Luria (D-VA), who represents the Norfolk area, with its heavy naval presence, has been particularly vocal in this regard, but there is a bipartisan consensus that the Navy needs to get larger.\textsuperscript{91}


\textsuperscript{89} Harker and Gilday, “Department of the Navy Fiscal Year 2022 Budget Request, 8.


The Navy reports that it can fulfill only about half of the theater commanders’ requests for ships. . . . this shortfall engenders a concern that the Navy is too small for the tasks that it is being asked to perform.

The concern about numbers and deployments conflicts with guidance in the Interim National Security Strategic Guidance and the Trump administration’s National Defense Strategy (NDS), both of which focus on great power conflict, especially against China, and call for capability, not capacity (size). Indeed, Admiral Gilday has stated explicitly that readiness and modernization come before capacity.

This tension appears in the secretary of the navy’s recent guidance. On the one hand, it says that “the top priority for the Department of the Navy will be to develop concepts of operations and capabilities that bolster deterrence and expand our warfighting advantage vis-à-vis the People’s Republic of China.” On the other hand, its “top enduring priority” is “expanded forward presence . . . [and to] promote sustained, persistent mobile operations forward.”

Future Fleet Architecture: A Work in Progress

The future fleet architecture—its size and composition—is a work in progress. The FY 2022 budget does not show any future years. That awaits the results of the ongoing strategic review and will appear in the FY 2023 budget documents. However, the Biden administration did publish an illustrative 30-year shipbuilding plan. Further, two plans are left over from the Trump administration: the 355-ship fleet, the Trump administration’s official goal, and a Navy 30-year shipbuilding plan from December 2020 (“late Trump”). Together these plans give insight into what the future fleet might look like.

Compared to the 355-ship goal, which reflected long-time naval concepts, the recent fleet architectures share several characteristics:

▪ A larger fleet size but with more small ships, reflecting concepts of distributed operations;
▪ A larger submarine force, reflecting the need for stealth to operate within Chinese and Russian defensive zones;
▪ More logistics ships, reflecting a smaller ship design that can support widely distributed operations and sustain losses; and
▪ A large number of unmanned surface and subsurface vessels, but with uncertainty about the design and role of such vessels.

92 Carlos Del Toro, One Navy-Marine Corps Team: Strategic Guidance from the Secretary of the Navy (Washington, DC: Department of the Navy, October 2021), https://media.defense.gov/2021/Oct/07/2002870427/-1/-1/0/SECNAV%20STRATEGIC%20GUIDANCE_100721.PDF.

93 The Navy generally uses “manned” and “unmanned” to describe its systems. To avoid confusion, this report follows the Navy usage rather than “crewed” and “uncrewed” that are taking hold in the broader community.
All these fleet architectures require far more resources than have historically been allocated to shipbuilding. As a result, the actual fleet will likely be substantially smaller than these plans envision. Shrinking plans to fit the funds available will require some difficult and unpopular decisions such as the early retirement of ships and slowing construction of some ship types. Navy program guidance recognizes that “the Navy cannot afford to simultaneously develop the next generation of air, surface, and subsurface platforms and must prioritize these programs balancing the cost of developing next-generation capabilities against maintaining current capabilities.” However, these decisions are deferred to the FY 2023 budget and its associated five-year plan.94

The table below shows the different fleet architectures. It displays a total for “combatant force” because the large variations in support vessels make the totals for the different fleets look much larger than they are. The table also shows unmanned vessels separately because their numbers are large, uncertain, and far in the future. Detailed descriptions for each force element follow later in this chapter.

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94 Secretary of the Navy, “Sec. of the Navy Strategic Guidance for Revised Program Objective Memorandum 2023,” June 4, 2021.
### Table 3: Future Fleet Structures

<table>
<thead>
<tr>
<th>Ship Type</th>
<th>Current Fleet (2022)</th>
<th>355-Ship Goal</th>
<th>Late-Trump</th>
<th>Emerging Biden</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircraft Carriers (CVNs)</td>
<td>11</td>
<td>12</td>
<td>11 (8–11)</td>
<td>9–11</td>
</tr>
<tr>
<td>“Light Carriers”</td>
<td>–</td>
<td>–</td>
<td>0 (0–6)</td>
<td>–</td>
</tr>
<tr>
<td>Ballistic Missile Submarines (SSBN)</td>
<td>14</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Attack Submarines (SSNs/SSGNs)</td>
<td>55</td>
<td>66</td>
<td>72 (72–78)</td>
<td>66–72</td>
</tr>
<tr>
<td>Large Surface Combatants (CGs/DDGs)</td>
<td>89</td>
<td>104</td>
<td>74 (73–88)</td>
<td>63–65</td>
</tr>
<tr>
<td>Small Surface Combatants (FFs/LCSs/mine warfare)</td>
<td>31</td>
<td>52</td>
<td>66 (60–67)</td>
<td>40–45</td>
</tr>
<tr>
<td>Landing helicopter assault/dock (LHA/LHD)</td>
<td>9</td>
<td>12</td>
<td>9 (9–10)</td>
<td>8–9</td>
</tr>
<tr>
<td>Other Large Amphibious Ships</td>
<td>22</td>
<td>26</td>
<td>57 (52–57)</td>
<td>19–19</td>
</tr>
<tr>
<td>Small Amphibious Ships</td>
<td>–</td>
<td>–</td>
<td>57 (52–57)</td>
<td>24–35</td>
</tr>
<tr>
<td><strong>Combatant Force</strong></td>
<td><strong>231</strong></td>
<td><strong>284</strong></td>
<td><strong>301 (286–329)</strong></td>
<td><strong>238–268</strong></td>
</tr>
<tr>
<td>Combat Logistics Force</td>
<td>30</td>
<td>32</td>
<td>69 (69–87)</td>
<td>56–75</td>
</tr>
<tr>
<td>Command and Support Ships</td>
<td>35</td>
<td>39</td>
<td>33 (27–30)</td>
<td>27–29</td>
</tr>
<tr>
<td><strong>Total Battle Force</strong></td>
<td><strong>296</strong></td>
<td><strong>355</strong></td>
<td><strong>403 (382–446)</strong></td>
<td><strong>321–372</strong></td>
</tr>
<tr>
<td>Large Unmanned Undersea Vessels</td>
<td>–</td>
<td>–</td>
<td>119 (119–166)</td>
<td>59–89</td>
</tr>
<tr>
<td>Large and Medium Unmanned Surface Vessels</td>
<td>–</td>
<td>–</td>
<td>24 (24–76)</td>
<td>18–51</td>
</tr>
</tbody>
</table>


### THE 355-SHIP FLEET

After candidate Trump, who had called for a 350-ship Navy, won the 2016 election, the Navy did a quick force structure assessment and came up with a goal of 355 ships. Compared with the 2014 goal of 308 ships, the Navy’s 355-ship goal added numbers in several categories but especially submarines (+18) and large surface combatants (LSCs) (+16). It focused on existing and proven ship types and included none of the nontraditional ships that appear in many recent alternative force structure proposals. The intention was to get ships built quickly, without the delay and risk of development.
programs. (Congress endorsed the Navy’s 355-ship goal: “It shall be the policy of the United States to have available, as soon as practicable, not fewer than 355 battle force ships.”)

However, the 355-ship goal collapsed because of strategy and money. The strategic problem was that it did not explicitly include unmanned systems, which were attracting a lot of attention. By focusing on large and expensive ships, it seemed inconsistent with a developing strategy of dispersed operations for combat in the Western Pacific.

The other problem was that the goal was too expensive. Both the Congressional Budget Office (CBO) and the Congressional Research Service (CRS) concluded that building such a fleet would require much larger shipbuilding budgets.

Nevertheless, a fleet of about this size will be the goal cited by naval advocates, even if the specifics of the composition vary.

THE LATE TRUMP FLEET
Recognizing these problems, the Trump administration struggled to develop a new fleet architecture to replace the 355-ship structure. A Navy proposal in December 2019 failed to gain traction because of its high cost. DOD repeatedly delayed publication, greatly annoying Congress. Finally, on October 7, 2020, Secretary Mark Esper presented the outline of a future fleet. This future fleet, which he called “Battle Force 2045,” described the major elements but lacked detail. There was no written product to back up his oral presentation. In developing this future fleet, Esper took inputs from the Navy, the Office of Cost Assessment and Program Evaluation (CAPE), and a study by the Hudson Institute.

Building on Secretary Esper’s proposal, the Navy published a shipbuilding plan on December 9, 2020. As this was published after the election and when the Trump administration was ending, the plan represented a statement of policy rather than a roadmap for implementation. This plan differed from

Esper’s earlier statements in one important respect: whereas Esper had been positive about light carriers, this plan reflected the Navy’s skepticism, saying only that they were under consideration.

The plan also reflected DOD’s inability to settle on a path forward. The Navy’s report contained both a “Plan FY 45,” which had a specific number for each major fleet element, and a “future fleet architecture,” which had a range for each major fleet element.

CBO’s analysis of this fleet concluded: “The December 2020 plan would require average annual shipbuilding appropriations almost 50 percent larger than the average over the past five years.”

Larger numbers more than offset savings from procurement of smaller and less expensive ships.

**THE EMERGING BIDEN FLEET**

The Biden administration will not make a definitive statement about fleet architecture until it completes its various strategic reviews. However, it did publish a long-range shipbuilding plan with ranges for the various fleet elements. This fleet architecture looks a lot like that of the late Trump administration but with each fleet element squeezed to produce a smaller overall size.

The range may also reflect dueling architectures within DOD because the Navy is apparently conducting one assessment and the Office of Cost Assessment and Program Evaluation (CAPE) is conducting another. In the past, the Navy’s architectures were larger, with some concern about day-to-day deployments, while CAPE’s architectures were smaller and more tightly focused on China.

CBO estimated the cost of this plan as “$25 billion–$33 billion (in 2021 dollars) per year over 30 years compared with an average of about $23 billion per year over the past five years.” At the low end of the range for fleet size, the larger proportion of small ships would almost offset the cost of the increased fleet size. At the high end of the range, the budget demands would be far more than what has recently been available.

**CARRIERS**

The carrier force has long been the centerpiece of the fleet, but recent force structure assessments have implied a reduction in the number of carriers. However, because of contractual commitments and political constraints, the Navy may be locked into the present carrier force for many years regardless of strategic considerations.

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104 Labs, “An Analysis of the Navy’s Fiscal Year 2022 Shipbuilding Plan.”
Strategists have long criticized aircraft carriers because of their high cost and perceived vulnerability. Many strategists see large aircraft carriers as “legacy” systems, which the Biden administration has pledged to cut. A recent House Armed Services Committee study tentatively suggested to “shift funding from a single aircraft carrier and instead use multiple unmanned aerial vehicles.”

The many problems of the new Ford class have strengthened these criticisms. Although commissioned in 2017 and conducting at-sea operations, the Ford has not yet deployed. Although the Navy has resolved most technical problems and is confident that it can overcome the remaining challenges with the weapons elevators, the Ford’s inability to deploy casts a shadow over the program.

However, the highly visible usefulness of aircraft carriers for day-to-day crisis response and regional conflicts gives them a lot of support. Pushed by Congress and an attractive offer from Huntington  

Ingalls Industries (the carrier builder), the Navy executed a two-carrier procurement in January 2019.\textsuperscript{108} This double procurement had the effect of locking in carrier construction for a decade regardless of what strategists might desire.

Because of contractual commitments and political constraints, the Navy may be locked into the present carrier force for many years regardless of strategic considerations.

The debate is important because the size of the carrier force drives Navy force structure and budgets: carriers and their escorts take up most of the shipbuilding budget and providing aircraft for the carriers takes most of the aviation budget.

Congress established a requirement for a minimum operational carrier force of 11. The Navy’s “2016 Force Structure Assessment” ("355 ships") had a goal of 12, but this is nearly impossible to achieve because of the long lead time needed to build carriers.\textsuperscript{109}

Although the “late Trump” fleet goal gave a range of 8 to 11, Secretary Esper implied that the number would go down. Press reports indicated that the secretary's staff had recommended 9 carriers.\textsuperscript{110} However, Admiral Gilday later stated, “when the report comes out, you’ll see the same numbers for the supercarrier force.”\textsuperscript{111} The Navy and the Office of the Secretary of Defense seemed to be in different places here. The “emerging Biden” fleet goal shows a similar range of between 9 and 11 and offers the supportive description that aircraft carriers provide “the joint force’s most survivable and adaptable aviation basing option.”\textsuperscript{112}

Faced with an institutional, political, and industrial need to continue building large nuclear-powered aircraft carriers, the Navy has periodically proposed retiring old carriers early, instead of doing a midlife extension, and may propose the same in the future. However, Congress rejected both previous proposals to do this, for the USS George Washington (CVN-74) and USS Harry Truman (CVN-75),


\textsuperscript{112} Office of the Chief of Naval Operations, Construction of Naval Vessels for Fiscal Year 2022, 4.
and the Navy quickly backed down. The incongruity of buying new carriers while retiring old ones early was hard to justify. Further, such an approach constituted the highest-cost strategy for carrier procurement since a year of operational life gained from a midlife extension is much less costly than a year gained from new construction.\textsuperscript{113}

The Navy could propose building carriers on a slower timeline, for example, every eight years rather than every five years, but carrier advocates and the shipbuilding industry have prevailed against such a slowdown in the past.\textsuperscript{114}

\textbf{“Light” Carriers:} The idea of a “light” carrier—something smaller than the large CVN—has been around for decades. Recently, a RAND study indicated that such carrier options might be attractive, as have many commentators.\textsuperscript{115} Senator John McCain in 2017 proposed building smaller carriers on the America-class landing helicopter assault (LHA) design. Esper’s future Navy had “up to six” light carriers to supplement the CVN “supercarriers.” He similarly suggested using the USS America “as a model.”

If future fleet architectures include small carriers, using the LHA design as a basis makes sense. LHAs have large flight decks from which the short-takeoff and landing version of the F-35 (B model) can fly. This approach also makes sense from a budget perspective because it avoids the huge costs and resulting delays of a new ship design. Strategists have long proposed using these ships as aircraft carriers for non-amphibious missions such as power projection and sea control.

The uniformed Navy has never supported small carriers, arguing that large carriers are the most cost-effective to put aircraft to sea. Thus, the “late Trump” fleet and the “emerging Biden” fleet both show light carriers as “under discussion.” Rear Admiral Gregory Harris, the Navy’s director of air warfare, was blunt in his opposition: “It will be good for us to [study light aircraft carriers], but I’m confident that over the long run we will find there is not a compelling return on investment to make a small carrier.”\textsuperscript{116} Admiral Gilday also signaled his opposition.\textsuperscript{117} Unless the Biden administration forcefully pushes this concept, smaller carriers will recede into the background once again.

\textbf{LARGE SURFACE COMBATANTS}

Large surface combatants (LSCs) are destroyers and cruisers. Historically, these constituted the backbone of the fleet. However, new concepts for distributed operations and attritable platforms favor

\begin{itemize}
\item[114] Unlike the construction of other ships, Navy carriers are incrementally funded over many years. Thus, the Navy refers to the current carrier construction rate as “five-year centers” because there is no single year when the carrier is funded. However, Congress does officially authorize the carrier in an early year of that stream of funding.
\end{itemize}
small surface combatants and unmanned platforms rather than the large, capable, and expensive LSCs.

**Figure 9: Target Inventory for Large Surface Combatants**

![Figure 9: Target Inventory for Large Surface Combatants](image)


The current inventory is 94, and the Navy had been building toward the 355-ship goal of 104. The Biden administration’s goal is an extremely narrow band between 63 and 65, showing a high degree of certainty. The disparity between current inventory and fleet goals is so great that bringing them together will require brutal decisions on retirements and new builds.\(^{118}\) This will produce a political firestorm.

To begin closing the gap in FY 2022, the Navy proposes to retire seven of the cruisers. The Navy will also not extend the service lives of the older DDG-51s. Concerned about a shrinking ship inventory, Congress has repeatedly balked at retiring these ships in the past.

CBO did an excellent analysis of Navy options, portions of which are reproduced below with permission.

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The Navy could reduce its large surface combatant force by shortening the service life of existing destroyers, by decreasing the rate at which it procures new destroyers, or by combining both methods.

Under Scenario 1, the Navy would retire ships quickly to meet force goals by 2030 and would maintain the size of the force with a steady-state build rate of 1.8 destroyers per year.\textsuperscript{119} Maintaining the current building rate would make industry happy. However, this requires retiring about 35 ships 1 to 12 years early. As with aircraft carriers, there is an incongruence in retiring ships early and building similar ships at an undiminished rate.\textsuperscript{120}

Under Scenario 2, the Navy would maintain a steady-state build rate of 2 destroyers per year and would reduce the size of the force with retirements by 2035.\textsuperscript{121} This has all the drawbacks of Scenario 1 but delays most of the pain to the 2030s. That is attractive politically because the pain falls in a later administration. The number of early retirements would be even larger than in Scenario 2 because of the continuing construction.

Under Scenario 3, the Navy would maintain the 35- to 40-year service life for destroyers and buy one new destroyer per year through 2036 and 2 new destroyers per year thereafter.\textsuperscript{122}

\textsuperscript{119} Labs, “An Analysis of the Navy’s Fiscal Year 2022 Shipbuilding Plan.”
\textsuperscript{120} The number of retirements calculated from the December 9, 2020 shipbuilding plan, accelerating planned retirements to get from the projected FY 2030 level (100) to the target level (65).
\textsuperscript{121} Labs, “An Analysis of the Navy’s Fiscal Year 2022 Shipbuilding Plan.”
\textsuperscript{122} Ibid.
This would be the most cost-effective way of getting to the target inventory. Ships already built would operate for their full service life while industry continues to build new destroyers, though at a slower rate. This mostly affects Maine (Bath Iron Works) and Mississippi (Huntington Ingalls Industries) because they are the prime contractors for destroyers, but suppliers are all over the country. At a building rate of one destroyer per year, these shipyards would have to alternate, resulting in a substantial reduction in activity and workforce. It would be particularly difficult for Bath Iron Works because destroyers are its principal output. Huntington Ingalls Industries produces other ships and thus could absorb the reduction more easily. However, Congress has viewed two a year as a minimum in the past.

In theory, the Navy could stop destroyer production altogether and get to the target level more quickly without retiring ships early. However, this is not viable from an industrial base and political perspective. The Navy needs to buy some destroyers every year.

Under Scenario 4, the Navy would maintain the 35- to 40-year service life for destroyers and buy two new destroyers per year (the current rate of purchase). This is, essentially, the recent policy and would be comfortable for Congress and industry. However, it does not get close to the target goal.

Next-Generation LSC: Shipbuilding plans continue to show some version of a next-generation LSC (DDG(X)). The Navy envisions a larger ship with room to accommodate growth in combat systems. However, most of the funding is in the future beyond the five-year planning period, indicating that such plans are in flux. Although the Navy will eventually need a new design for an LSC, the program will have a hard time competing for resources when the Navy is making such large reductions in the number of LSCs. Near-term resources for the DDG(X) are modest, with the Navy requesting $122 million in FY 2022. Several earlier attempts to start a new cruiser/destroyer program faded away as the Navy focused on upgrading the DDG-51 class, now on its Flight III variant.

Fewer Missile Launchers: A major effect of cuts to the LSC force is that the number of missile launchers would decline. CBO concluded: “Under the Navy’s 2022 plan, the surface forces (manned and unmanned) would eventually have between 3 percent and 24 percent fewer vertical launch system cells than today’s fleet.” This is a difficult trade-off because many naval observers identify missile capacity as a better measure of naval capability than ship numbers or tonnage and initial missile salvos are widely seen as potentially decisive in fleet engagements. Further, as described later in the unmanned surface vessel (USV) section, retirements of LSCs and their missile capacity may occur before large numbers of USVs join the fleet to replace the capacity.

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123 Ibid.
SMALL SURFACE COMBATANTS

Small surface combatants (SSCs) are frigates, littoral combat ships (LCSs), and mine countermeasures ships. Although smaller and less capable than cruisers and destroyers, they cost half as much. Their role dimmed with the end of the Cold War and the failure of the LCS class but has revived with the strategic interest in distributed operations and attritable platforms.

During the Cold War, SSCs had a wartime mission of escorting convoys. This mission disappeared after the Cold War, and SSCs went out of favor. However, interest has renewed in an environment of great power competition where adversaries can reach out extended distances and threaten U.S. sea lines of communication. SSCs are also useful for providing a more distributed naval force structure to operate within an adversary’s defensive zone and for conducting gray zone activities in peacetime when large naval forces would be inappropriate. They can operate in shallower waters such as the South China Sea and increase total fleet numbers, therefore allowing the Navy to be present in more places globally.

All the future fleet architectures show an increase in SSCs, the only question being by how much.

The LCS class is now entering the fleet in large numbers, typically two to three per year. However, the performance of this class is widely regarded as disappointing, and the Navy proposes retiring the first

126 The Navy includes patrol craft in this category but not in the battle force inventory, so they are excluded here. The general rule is that ships must be able to deploy overseas on their own to count, and patrol craft are too small.
four ships instead of upgrading them. At the same time, the Navy also proposes to upgrade LCSs with naval strike missiles, antisubmarine modules, and anti-mine capabilities, all of which will improve their capabilities.\textsuperscript{127} Nevertheless, whether to retire more LCSs early will be a continuing issue. In particular, the Navy may move to retire the Freedom-class LCSs, which have serious, class-wide problems with their propulsion plants.

Because LCSs with mine countermeasure modules are now entering the fleet, the Navy proposes to phase out the eight remaining mine countermeasures ships (MCM-1 Avenger-class), retiring all by 2024.

Replacing the LCS program is a follow-on frigate program, the FFG-62 Constellation class, which will be multi-mission like the earlier FFG-7 class and not single-mission like the LCSs. To speed introduction of the class and to reduce risk—both driven by the experience of the LCS program—the Navy required the use of an existing design. A team led by Fincantieri/Marinette Marine won the competition with a modified European design.\textsuperscript{128}

Table 4: Shipbuilding Plans for FFG-62 Class

<table>
<thead>
<tr>
<th>FY 2021 Five-year Plan (February 2020)\textsuperscript{129}</th>
<th>FY 2021</th>
<th>FY 2022</th>
<th>FY 2023</th>
<th>FY 2024</th>
<th>FY 2025</th>
<th>FY 2026</th>
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</thead>
<tbody>
<tr>
<td>Trump Administration’s Final Plan (December 9, 2020)\textsuperscript{130}</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Biden FY 2022 Plan (June 2021)\textsuperscript{131}</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: For more details, please reference the corresponding footnotes.

All these plans show a rapid increase in production. If implemented, the SSC fleet would reach the inventory goal relatively quickly. However, as noted earlier, the late Trump plan and the emerging Biden plan assume a large increase in shipbuilding resources, which may not materialize.


Using an existing design may mitigate technical risk, but there is also risk of cost growth. The CBO places the cost per ship at potentially 40 percent higher than the Navy is currently estimating. That would be a major challenge for the program.132

AMPHIBIOUS SHIPS

The amphibious fleet, like the LCSs, is in a state of flux as a result of new operational concepts and plans for smaller ships. If fully implemented, these plans will reduce the number of large amphibious ships that the Navy and Marine Corps have become accustomed to and disrupt the associated shipbuilding industry. However, long-range shipbuilding plans have not yet caught up with these planned changes.

Figure 12: Target Inventory for Large Amphibious Ships (LSD/LPD/LHA/LHD)

Note: Numbers for “late Trump” fleet were estimated because the plan used different categories.


The Biden administration’s fleet would have 8 to 9 landing helicopter assault/docks (LHAs/LHDs) and 16 to 19 dock landing platforms (LPDs), for a total of 24 to 28 large amphibious ships. Figure 12 shows the problem: target fleet size is smaller than the current fleet and previous fleet architectures.

This situation arose because the Marine Corps radically changed its plans for amphibious operations. For many years, the Navy and Marine Corps goal was 38 large ships. Driving this goal was the need

to launch an amphibious operation of two Marine expeditionary brigades (17 ships each) plus a 10 percent margin for maintenance.

Marine Commandant General David Berger rejected this methodology in his initial commandant’s guidance (described in detail in the Marine Corps chapter). He argued that large amphibious ships were vulnerable in a great power conflict and that the ability of the Navy and Marine Corps to execute a classic landing in the high-threat environment foreseen by the NDS seemed doubtful: “Visions of a massed naval armada nine nautical miles off-shore in the South China Sea preparing to launch the landing force in swarms of ACVs [amphibious combat vehicles], LCUs [landing craft utilities], and LCACs [landing craft air cushions] are impractical and unreasonable.”

Instead, he proposed smaller amphibious ships that would focus on the narrow mission of moving forces into China’s “weapons engagements zone” in the Western Pacific. Increased numbers would also make the loss of any individual ship less catastrophic. This approach would reverse a long-standing trend toward larger and more capable amphibious ships, which are more efficient for moving Marine forces and for peacetime presence but expensive and limited in number.

The Marine Corps originally planned that these small amphibious ships would be in addition to the planned number of large amphibious ships, an assumption reflected in the Esper and the late Trump fleet architectures. However, a trade-off was inevitable. The FY 2022 shipbuilding plan states, “the overall number of amphibious warships grows to support the more distributed expeditionary force design, with light amphibious warships (LAWs) complementing a smaller number of traditional amphibious warships.”

The shipbuilding problem is that the fleet already includes nearly all the large amphibious ships that the new plan requires. Completed or under construction are 8 LHDs/LHAs, 13 LPDs, and 2 LPD Flight IIs—a total of 23 of the needed 24 to 28.

As a previous CSIS analysis concluded:

At the low end of the range [8], the Navy would stop building LHDs for about a decade because the current inventory is sufficient. At the high end [9], the Navy would build an LHD every four to five years. Neither level requires replacing the Bonhomme Richard (LHD-6), which was destroyed in a fire. That is just a loss to the fleet.

The [Biden administration’s] plan implies curtailing the LPD-17 Flight-II program at three to six ships, far below the expected 13 ships. Indeed, at the lower level, the Navy would build just one more LPD-17 Flight-II in addition to the two already under construction.


This is bad news for HII [Huntington Ingalls Industries], which builds both the LHDs and the LPDs. The company has wisely proposed a multi-year buy of LPDs and an LHD, seeking to lock in the programs for the near term.\textsuperscript{135}

As with the LSCs, industrial base and constituency interests will clash with the new shipbuilding goals.

\textbf{The [amphibious] shipbuilding problem is that the fleet already includes nearly all the large amphibious ships that the new plan requires.}

The new class of light amphibious warships has its own set of issues. The 2022 shipbuilding plan cites a range of 24 to 35, roughly comparable to what the late Trump administration had shown.\textsuperscript{136} The Navy is still considering designs and probably will not build the first LAW until FY 2023 at the earliest.

These LAWs would indeed be small, carrying 30 to 40 crew and 70 Marines. This would make them about the size of a World War II landing craft infantry (LCI), much smaller than the De Soto County-class tank landing ship (LSTs) of the 1960s to 1990s, and even smaller than World War II LSTs.\textsuperscript{137}

If the Navy diverted some LHAs/LHDs to operations as light carriers, the amphibious force would look even more different in the future, but as noted in the carrier discussion, the fielding of light carriers, at least officially, is looking increasingly unlikely.

\textbf{ATTACK SUBMARINES}

Attack submarines (SSNs) and cruise missile submarines (SSGNs) receive strong support from strategists because their firepower and covertness are useful in great power conflicts. However, submarines are expensive (about $3.5 billion each in the current Block V version), and the submarine industrial base is producing at its maximum rate, so increasing the size of the submarine fleet is difficult.


Figure 13: Target Inventory for Attack Submarines (SSNs and SSGNs)


Figure 13 shows how support for submarines has increased. The current fleet reflects the lower production rates of the 1990s and 2000s when the focus was on regional conflicts and the Navy built one or fewer submarines a year. The large inventory from the Cold War kept the fleet size high. The increased SSN goal in the 355-ship fleet reflected a renewed focus on great power conflict. The “late Trump” administration goal and the “emerging Biden” administration goals are even higher.

The problem is getting to these higher goals. The obvious solution is to build more submarines, but having two submarine construction programs operating simultaneously (Columbia-class SSBNs and Virginia-class SSNs) puts pressure on the shipbuilding account and the submarine industrial base.

Building two SSNs and one SSBN per year costs about $13 billion in a Navy’s shipbuilding account that totals $18.1 billion for new construction in FY 2022.

Further, there were only two yards that build submarines, Electric Boat in Groton, Connecticut, and Huntington Ingalls Industries in Norfolk, Virginia. The FY 2020 Navy 30-year shipbuilding plan showed a capacity for three total submarines per year, SSNs or SSBNs. The FY 2022 shipbuilding plan states: "We

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139 This analysis of shipbuilding capacity appeared only in the FY 2020 shipbuilding plan. Subsequent plans do not include that exhibit.
continue to evaluate the industrial base capacity increase required for more consistent delivery of two SSNs per year during the Columbia serial production and subsequent potential increases to SSN procurement. In other words, the Navy needs to invest money in the shipyards, both for facilities and workforce, just to achieve the planned building rate of two SSNs and one SSBN per year. Expanding production capacity beyond this would be even more expensive, and having made that expansion, the Navy would be committed to funding the higher level of production.

The recently announced Australia-United Kingdom-United States agreement to build nuclear submarines for the Australian Navy could put additional pressure on the U.S. submarine industrial base, depending on what arrangements come out of the 18-month planning phase.

In the near term, the attack submarine fleet is stable, with numbers staying in the fifties. The problem is longer term. Numbers dip in the mid-2020s, bottoming at 42 boats as Los Angeles-class boats built during the 1980s retire.

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141 The Navy has a plan for improving public shipyards, which do maintenance, but no current plan for expanding private yards.
143 Chief of Naval Operations, Construction of Naval Vessels for Fiscal Year 2020.
To mitigate this trough, the Navy will extend the service life of some older Los Angeles-class submarines and may expand that program. However, the Navy tends to retire old ships early in order to buy new ships, and the Biden administration’s “divest to invest” strategy would drive them in this direction.\textsuperscript{144}

This prospective submarine shortfall will happen when Russian and Chinese submarines are becoming more capable and active.\textsuperscript{145} Retirement of the Ohio-class SSGNs (converted ballistic missile submarines with 154 tactical missiles each) in the late 2020s greatly reduces the undersea strike capability and exacerbates the numbers shortfall. The missile compartments of the newest Virginia-class submarines, with the Virginia Payload Module, will mitigate the capability shortfall but not fully replace it for many years.

Figure 14 shows two alternative futures. One line assumes that the Navy builds two SSNs per year, which has been its target level for many years (solid line). Fleet size recovers as these new ships join the fleet, reaching the bottom of the Biden target range in the late 2040s.

The alternative (dotted line) assumes that the Navy builds three SSNs per year once production of the Columbia class ends. Under these circumstances, the submarine fleet reaches the lower level of the Biden fleet four years earlier and at the upper level of the range in the late 2040s.

The fundamental problem is that neither approach gets to the target size until far into the future. Regardless of what strategists may want, the submarine fleet has severe limits on its size.

\textit{Regardless of what strategists may want, the submarine fleet has severe limits on its size.}

\textbf{BALLISTIC MISSILE SUBMARINES}

The Columbia-class SSBN program (SSBN 826)—which will replace the existing Ohio-class submarines—continues as planned. Because the program is the Navy’s highest priority, enjoys strong bipartisan support, and has little schedule slack, it will likely be unaffected by any changes in future shipbuilding plans. All the different fleet architectures—the 355-ship, late Trump, and emerging Biden administration plans—have the same goal of 12. (This is lower than the current inventory of 14 because the Columbia class will spend less time in overhaul. Thus, 12 Columbia-class boats will have the same operational coverage as the current 14 Trident boats.)

\textsuperscript{144} The December 9, 2020, shipbuilding plan assumed an extended service life for many Los Angeles-class submarines and a higher building rate for submarines—three SSNs per year in some years. Since neither of these initiatives were reflected in the Trump administration’s final five-year program, the projection here uses the earlier shipbuilding plan.

\textsuperscript{145} For example, Kathleen H. Hicks et al., \textit{Undersea Warfare in Northern Europe} (Washington, DC: CSIS, July 2016), https://www.csis.org/analysis/undersea-warfare-northern-europe.
Despite the program’s strong position, it has three challenges: affordability, funding mechanisms, and potential cost growth.

The affordability challenge comes from the substantial budget demands—$5.0 billion in FY 2022 (procurement plus research, development, testing, and evaluation [RDT&E])—and these demands have more than doubled from FY 2020.146 Affordability of the $110 billion program, long identified as a challenge for Navy shipbuilding, has become a near-term, rather than long-term, issue. The Navy has gained permission to incrementally fund the class, which spreads the costs over more years, but the bill must still be paid eventually.

There have been proposals to find other funding mechanisms for the Columbia class, for example, through a National Sea-based Deterrence Fund. However, none of these mechanisms have resulted in substantially increased funds for Navy shipbuilding.147

CBO has questioned the Navy’s cost estimates, noting that the cost per ton for submarines has been higher than what the Navy is planning. CBO’s cost estimate is 10 percent higher, or $700 million,

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per Columbia-class submarine than the Navy’s estimate. The Government Accountability Office has similarly questioned DOD’s cost estimate.\textsuperscript{148} Problems with welds and electric motors caused some program delays. So far, the Navy has acknowledged $637 million in design cost increases but has not changed cost estimates for production, although it acknowledges the risk. Reports that the Navy is looking at ways to extend the Ohio-class submarines for a few years indicate possible schedule problems with the Columbia class. With schedule delays come cost increases.\textsuperscript{149}

Because of this program’s high priority, it will be fully funded. However, any substantial cost growth here would severely disrupt every other shipbuilding program as resources flow from them to the Columbia class. This would, in turn, affect the structure of the future fleet.

\textbf{UNMANNED SHIPS}

Unmanned systems, both surface and undersea, currently exist in various forms, from essentially conceptual to working prototypes. However, none (with one minor exception) yet constitute a program of record whereby the Navy commits to a certain number and builds all the needed support and infrastructure. How unmanned systems will operate in the fleet, whether the network can handle the bandwidth, and where these vessels will be based are all unanswered questions.

The Navy released its \textit{Unmanned Campaign Framework} in March 2021, delineating its priorities for all forms of unmanned systems. The goal is to move to a more “distributed system” in which unmanned systems will perform the “three D” missions: “dangerous, dirty, and dull.”\textsuperscript{150} In this campaign framework, the Navy breaks its unmanned systems into four domains: air, surface, undersea, and ground. While both the ground and air domains have unmanned vehicles that have passed into regular serial production, unmanned surface vehicles (USVs) and unmanned undersea vehicles (UUVs) remain at the prototype phase.

\begin{quote}
\textit{Unmanned systems, both surface and undersea, currently exist in various forms, from essentially conceptual to working prototypes. However, none (with one minor exception) yet constitute a program of record whereby the Navy commits to a certain number and builds all the needed support and infrastructure.}
\end{quote}


**Unmanned Surface Vehicles:** The Navy envisions this technology as an important element of its “distributed maritime operations,” moving from a fleet of large combatant ships to a mixture of large combatants, small combatants, and unmanned vessels. This move will distribute sensors and payloads broadly, providing both remote sensors and “mobile magazines” to the larger combatants.

Figure 16: Navy Surface Force Architecture

This also implies a reduction in large surface combatants as small surface combatants and unmanned vessels replace sensors and magazines.\(^{151}\) All future naval architectures reflect this shift, as noted earlier. The challenge for the Navy is that it may retire the large surface combatants before large numbers of unmanned vessels are available to replace their capabilities.

Navy efforts in developing USVs focus on large (LUSV) and medium (MUSV) USVs.\(^{152}\)

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An LUSV is defined as a vehicle 200 to 300 feet in length, about the size of a corvette. The Navy plans to use them as “mobile adjunct magazines,” adding their missile loads to those of regular surface forces in the strike warfare and anti-surface warfare missions.\(^{153}\)

An MUSV is 45 to 190 feet long, about the size of a patrol craft.\(^{154}\) The MUSV and smaller platforms will act as remote sensor platforms, focusing on antisubmarine and mine warfare applications. The prototype Sea Hunter is an example; the Navy requested funds for a second prototype in the FY2022 budget.

The large and medium USVs remain in an experimental phase for the foreseeable future, structured as “build, test, learn.”

There are also small USVs, the primary mission of which is mine warfare, with the platform forming an integral part of the LCS’s mine countermeasures (MCM) mission module. However, the Navy is exploring other uses and applications for these small USVs apart from the LCS mission. The Marine Corps is developing a long-range USV “to enhance maritime reconnaissance and long-range precision fires.”\(^{155}\)

Figure 17 shows the planned acquisition timeline for unmanned surface warfare platforms.\(^{156}\)
The Navy calls this experimentation program Ghost Fleet Overlord, a partnership with DOD’s Strategic Capabilities Office. The program uses converted civilian vessels as testbeds. During this past summer, for example, Ghost Fleet Overlord ships completed a mostly autonomous crossing of the Pacific Ocean, conducting 98 percent of a 4,421 nautical mile journey without human intervention. To facilitate this experimentation process, the Navy set up a new operational command, Unmanned Surface Vessel Division.

Table 5 below describes each USV program and its funding status. The “FY 2022 (Projected)” column represents the amount that was planned for FY 2022 in the FY 2021 budget. The “FY 2022 (Requested)” represents the amount in the FY 2022 budget. All funding for these systems is in the RDT&E account since the systems are still experimental.

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Table 5: Budget and Status of Unmanned Surface Vessels

<table>
<thead>
<tr>
<th>Program</th>
<th>Mission</th>
<th>FY 2021</th>
<th>FY 2022 (Projected)</th>
<th>FY 2022 (Requested)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>LUSV</td>
<td>“Adjunct Magazine”</td>
<td>69.6</td>
<td>377.2</td>
<td>144.8</td>
<td>Four development units have been acquired, with further production delayed until FY 2027.</td>
</tr>
<tr>
<td>MUSV</td>
<td>“Distributed Sensor”</td>
<td>55.5</td>
<td>30.0</td>
<td>60.0</td>
<td>One vessel was acquired in FY 2019, and another is scheduled to be acquired in FY 2023, with option for additional units as they become technically feasible.</td>
</tr>
<tr>
<td>SUSV</td>
<td>Mine Countermeasure/ Mine Hunting</td>
<td>19.1</td>
<td>16.3 (As minesweeping replacement)</td>
<td>20.3</td>
<td>This a key component of the LCS MCM mission package, along with the Knifefish UUV. Currently, it is pending a full-rate production decision.</td>
</tr>
</tbody>
</table>


Funding for the LUSV is down substantially from what was planned (~$233 million), reflecting congressional skepticism about the proposed speed of acquisition and its $341 million (60 percent) cut in the program’s FY 2021 budget.159 The new plan is to use the four Ghost Fleet Overlord units already appropriated as testbeds to ensure the maturity of core technologies before further production. This is a major change from last year’s planning, which projected buying 10 units over a five-year period.

Although the platform budgets may be down overall, development of USV “enabling technologies” would increase to $170 million in FY 2022, up from $22 million in FY 2021.

Also apparent from the table is that, despite the attention that USVs receive in discussions about the future Navy, the amount of funding is remarkably small.

*Despite the attention that USVs receive in discussions about the future Navy, the amount of funding is remarkably small.*

**Unmanned Undersea Vehicles:** The Navy is approaching UUVs similarly to USVs, with a variety of programs, a robust program of experimentation but no immediate production plans for the larger vessels, a measured pace, and relatively little funds invested.

A key difference is that there seems to be a different philosophy on how UUVs will be used. Whereas USVs will supplant some manned systems, UUVs will be a force multiplier for their motherships, which will not decrease in numbers.

UUVs come in four sizes, from extra large to small. Extra-large UUVs (XLUUVs), vehicles with a diameter larger than 84 inches, are unique in being pier launched from a forward port rather than launched from a mothership, which is characteristic of all smaller UUVs. The Orca project, the only XLUUV program, will initially provide a minelaying capability, with the platform deploying a successor version of the CAPTOR antisubmarine mine.160

Large UUVs (LUUVs) are defined as platforms between 21 inches and 54 inches in diameter, too large for heavyweight torpedo tubes, necessitating launch from submarines equipped with a dry dock shelter or a surface ship boat davit. The only LUUV system is the Snakehead, designed to provide intelligence preparation of the ocean environment (IPOE).161

Medium UUVs (MUUVs) are systems with a diameter larger than 10 inches but less than 21 inches, allowing torpedo tube deployment. The two MUUV missions are IPOE and MCM.

Last are the Small UUVs, which are smaller than 10 inches and perform simple sensor functions, generally on a tether.

Figure 18 shows current plans for Navy UUV programs.162 As with the USVs, the larger UUVs remain in an experimental stage for the foreseeable future, funded in the RDT&E appropriation. Some of the smaller UUVs have entered production.

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160 O’Rourke, *Very Large Unmanned and Undersea Vehicles*, 16.
161 IPOE is the process of reconnoitering a section of ocean during an extended period. This is designed to establish “cycle of life” for the ocean environment, shipping traffic density, and biosphere.
Table 6 shows funding and status for the larger systems. The “FY 2022 (Projected)” column represents the amount planned for FY 2022 in the FY 2021 budget. The “FY 2022 (Requested)” represents the amount in the FY 2022 budget. All funding for these systems is RDT&E since the systems are still experimental. Funding for the smaller systems, not shown, are individually below $20 million each.

FY 2022 funding is roughly in line with what had been planned last year. However, as with the USVs, the total amount of funding is small compared with, for example, the $3.3 billion cost of a single Virginia-class submarine.
Table 6: Funding and Status of Larger Unmanned Undersea Vessels

<table>
<thead>
<tr>
<th>Program</th>
<th>Mission</th>
<th>Funding ($, millions)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>FY 2021</strong></td>
<td><strong>FY 2022 (Projected)</strong></td>
</tr>
<tr>
<td>Orca</td>
<td>Multi-mission, initially mine warfare</td>
<td>89.3</td>
<td>43.0</td>
</tr>
<tr>
<td>Snakehead</td>
<td>Intelligence preparation of the ocean environment (IPOE)</td>
<td>62.2</td>
<td>88.4</td>
</tr>
</tbody>
</table>


Naval Aviation Modernization: The Future Air Wing

Navy aircraft provide the striking power of the aircraft carrier, the central weapon system in the U.S. Navy, and thus play a larger role in the U.S. Navy than in other navies. For the U.S. Marine Corps, aviation provides firepower and heavy lift for its ground forces. (Marine aviation will be discussed in detail in the next chapter.)

In FY 2022, naval aviation (Navy and Marine Corps) proposes to procure 107 aircraft of all kinds, down from 144 in FY 2021. Naval aviation is in generally good shape. Inventories have been stable, the average age for most elements is good, and the Navy has been buying enough aircraft to maintain its inventory.

The bad news is that the Navy needs to increase aircraft procurement in the future to maintain current inventories, faces ever higher costs to maintain its aircraft inventory, and has been slow to field unmanned aerial vehicles (UAVs).

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### FY 2022 PROCUREMENT

**Table 7: Department of the Navy Aircraft Procurement in FY 2022**

<table>
<thead>
<tr>
<th>Fixed Wing</th>
<th>FY 2022 (Proposed)</th>
<th>First Procurement</th>
<th>Last Procurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-35C (CV)</td>
<td>20</td>
<td>2011</td>
<td>~2031</td>
</tr>
<tr>
<td>F-35B (STOVL)</td>
<td>17</td>
<td>2008</td>
<td>~2031</td>
</tr>
<tr>
<td>FA-18E/F</td>
<td>0</td>
<td>1995</td>
<td>2021 (Congress may add some aircraft in 2022 to keep the line going)</td>
</tr>
<tr>
<td>E-2D Advanced Hawkeye</td>
<td>5</td>
<td>2014</td>
<td>2023 (planned)</td>
</tr>
<tr>
<td>KC-130J</td>
<td>6</td>
<td>2005</td>
<td>TBD</td>
</tr>
<tr>
<td><strong>Rotary Wing</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CH-53K (HLR)</td>
<td>9</td>
<td>2018</td>
<td>~2028</td>
</tr>
<tr>
<td>MV-22B / CMV-22B</td>
<td>8</td>
<td>1997</td>
<td>2022 (planned small buys in 2023 and 2024)</td>
</tr>
<tr>
<td>TH-73</td>
<td>36</td>
<td>2020</td>
<td>2024</td>
</tr>
<tr>
<td><strong>UAV</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MQ-4C Triton</td>
<td>0</td>
<td>(2023 production restart)</td>
<td>TBD</td>
</tr>
<tr>
<td>MQ-25 Stingray</td>
<td>0</td>
<td>(2023 planned)</td>
<td>TBD</td>
</tr>
<tr>
<td>MQ-9A Reaper (USMC)</td>
<td>6</td>
<td>2020</td>
<td>TBD</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>107</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Year of first/last procurement is the budget year.


For many years, naval aviation has been procuring mature systems with predictable costs and schedules (with the significant exception of the F-35). As Table 7 shows, that stability is coming to an end. Long-established production lines have recently finished (UH-1Y/AH-1Z, P-8, MQ-8B/C, VH-92A) or soon will (FA-18, E-2D, V-22, highlighted in gray); new systems will eventually replace them, but there will be a gap. Particularly striking is the plan to end F-18 production after nearly 40 years, a long-forecasted change. F-35 production does not increase enough to make up for lost F-18 production. According to Navy statements, the planned end to F-18 procurement reflects a reduction in planned fighter/attack inventories as a result of smaller numbers onboard each aircraft carrier, extended service lives, and mission shifts that free up fighter/attack aircraft. It may also reflect an expectation that there will be fewer carriers in the future. Despite the Navy’s justification, Congress has been skeptical and will likely add aircraft in its final action on the FY 2022 budget.\(^{163}\)

Although there is a next-generation fighter in development (Next Generation Air Dominance, or NGAD), procurement is not expected until the 2030s. (See Air Force chapter for further discussion of NGAD.)

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The other challenge is that the total number of aircraft procured goes down. In part, this reflects the fact that Congress routinely adds aircraft to the Navy budget. In FY 2021, for example, Congress added 20 aircraft above the Navy’s request. The Senate and House National Defense Authorization Acts would add 12 to 17 aircraft, but there is no final bill yet and the additions depend on a higher top line, which the appropriations committees might not support. 164

Table 8: Aircraft Inventory Replacement Rate

<table>
<thead>
<tr>
<th>Total Inventory to be Replaced</th>
<th>Number of Aircraft Procured</th>
<th>Years Required to Replace Inventory</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,053</td>
<td>144 (FY 2021 actual)</td>
<td>28 years</td>
</tr>
<tr>
<td></td>
<td>107 (FY 2022 proposed)</td>
<td>38 years</td>
</tr>
<tr>
<td></td>
<td>162</td>
<td>25 years</td>
</tr>
</tbody>
</table>


Table 8 shows the number of years required to replace the current aircraft inventory at various procurement rates. The FY 2022 level is far below that required to maintain the target average age of the fleet. The rate would need to increase to 162 aircraft procured per year to get to a target of 25 years. Congress has routinely added enough aircraft to maintain fleet age, a practice which may not continue in the future.

THE HIGH COST OF STABLE INVENTORIES

Figure 19: Department of the Navy (DON) Aircraft Inventory


164 Although both chambers would add aircraft, their lists do not overlap. The Senate NDAA adds 12 aircraft, including 5 F-35s but no F-18s. The house adds F-18s but no F 35s.
Threatening the long-term health of Navy aviation (and Marine Corps and Air Force aviation, as described later) is the high cost of sustaining fleet numbers. As the chart above shows, funding for procurement of naval aviation has increased by about 50 percent since the early 2000s to maintain a somewhat smaller inventory.

The reason is that each generation of aircraft costs more than the generation before it. For example, the E-2C costs $116 million per aircraft (in FY 2021 dollars) when last procured in the early 2000s. Its replacement, the E-2D, has a more powerful radar and enhanced command linkages but costs $227 million (FY 2021 dollars).\textsuperscript{165}

Figure 20: Navy and Air Force Medium/Large UAV Inventories


THE (SLOW) FIELDING OF UAVS

Rhetorically, the Navy puts great emphasis on UAVs, stating that they could someday comprise 40 percent of the aircraft in a carrier air wing.\textsuperscript{166} However, the Navy’s actions do not support its rhetoric.

The Navy’s FY 2022 procurement of large UAVs (6) is more than the Air Force’s (0), but this low procurement is a problem for both services. The Navy’s inventory of medium and large UAVs (60, MQ-8 and MQ-4) is far behind the Air Force’s (361, MQ-9 and RQ-4). The Air Force’s UAVs are also larger and more capable in general. This reflects the Navy’s relative emphasis on manned systems and, in the view of some, a lack of interest in unmanned systems. The Navy’s tepid action with unmanned aviation systems stands in contrast to its aggressive experimentation with unmanned surface and subsurface systems.

The Marine Corps MQ-8B/C Fire Scout program, an autonomous reconnaissance helicopter, has completed its procurement at 60. The Marine Corps will divest the disappointing RQ-21s, a small reconnaissance UAV.

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The Navy’s tepid action with unmanned aviation systems stands in contrast to its aggressive experimentation with unmanned surface and subsurface systems.

The MQ-4C Triton long-range surveillance UAV (a relative of the Air Force’s RQ-4 Global Hawk), which began production in FY 2020, continues its pause in production until FY 2023. The Navy will divest its remaining four BAMS-Ds, the MQ-4C predecessor/prototype.

The MQ-25 is the Navy’s first carrier-capable unmanned aircraft, growing out of a series of experimental programs such as the Unmanned Carrier Launched Aerial Surveillance and Strike (UCLASS) program. In 2017, the Navy announced its plan to develop the aircraft as a tanker with some intelligence, reconnaissance, and surveillance (ISR) capabilities, rather than as a strike platform. The program remains stable, with advance procurement funding in FY 2022 and first procurement planned for FY 2023. Nevertheless, controversy lingers about the program because many observers see it as having been sidelined to a support mission when it should constitute a frontline attack capability.167

The Marine Corps continues a major restructuring to develop capabilities for great power conflict in the Pacific after two decades of conducting counterinsurgency operations ashore. The budget cuts units and personnel to pay for these new capabilities. The restructuring remains controversial and a work in progress.

**KEY TAKEAWAYS**

- General David Berger’s *Force Design 2020* initiative aims to restore the Marine Corps to its naval roots after two decades of operations ashore, invest in capabilities focused on great power conflict in the Pacific, and divest forces unneeded for these conflicts. The Marines intend to be a “stand-in” force that can operate inside an adversary’s (China’s) defensive bubble.

- To pay for new capabilities and accommodate a flat budget top line, the Marine Corps cuts active-duty end strength on a path to about 172,000, the level before the wars in Iraq and Afghanistan.

- Ground forces gain long-range precision fires but give up three infantry battalions, tanks, and most counterinsurgency capabilities. Most artillery convert from cannon to missile units. These changes are all underway. Final designs for logistics, reserve, and reconnaissance forces are still under development.

- Marine aviation gets smaller, consistent with cuts in the ground forces. Emerging concepts imply cuts to manned aircraft, particularly the F-35, but such plans are still under development.

- In FY 2022, the Marine Corps buys six MQ-9 Reaper unmanned aerial vehicles (UAVs), its first major such acquisition, but is far behind the Air Force in this area.

- The future amphibious fleet will include large numbers of light amphibious warships (LAWs) and fewer traditional large amphibious ships (LPDs, LSDs, LHAs, and LHDs). These small LAWs will
provide more distributed capabilities to implement the new warfighting concept. The trade-off is that, because of the LAW’s small size, they will not be able to support the customary level of global forward deployments, which may decline as a result.

- The restructuring has been criticized for focusing too much on a maritime campaign in the Western Pacific, ignoring other global conflicts, and relying on unproven operational concepts.

The FY 2022 budget is an interim step as the Marine Corps implements a major restructuring. This restructuring would shed capabilities for counterinsurgency and sustained operations ashore and cut a slice across the entire Marine Corps to pay for new capabilities designed for conflict in the Western Pacific against China. Full implementation is expected in the FY 2023 budget and its associated five-year plan.

## End Strength in FY 2022

Table 1: Marine Corps – Active, Reserve, and Civilians

<table>
<thead>
<tr>
<th></th>
<th>Marine Corps Active Duty</th>
<th>Marine Corps Reserve</th>
<th>Civilian Full-Time Equivalents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Authorized End Strength</td>
<td>Authorized End Strength</td>
<td></td>
</tr>
<tr>
<td>FY 2021 Enacted</td>
<td>181,200</td>
<td>36,200</td>
<td>22,792</td>
</tr>
<tr>
<td>FY 2022 Request</td>
<td>178,500</td>
<td>36,800</td>
<td>22,921</td>
</tr>
<tr>
<td>Change</td>
<td>-2,700</td>
<td>+600</td>
<td>+129</td>
</tr>
</tbody>
</table>

Source: Department of the Navy, *Highlights of The Department of the Navy FY 2022 Budget* (Washington, DC: Department of the Navy, 2021), Active-duty end strength data in Figure 7.5; Reserve end strength data in figure 7.7; Civilian data in Figure 7.10, https://www.secnav.navy.mil/fmc/fmb/Documents/22pres/Highlights_Book.pdf.

In FY 2022, the Marine Corps cuts active-duty end strength by 2,700, continuing an end strength decrease to pay for the restructuring and to accommodate a budget top line projected to be flat. In this, the Marine Corps takes a diametrically different approach from the Army, which held onto end strength in FY 2022. (See Army chapter of this series for details.)

To accommodate this lower end strength, the Marine Corps cuts another infantry battalion, bringing the total down to 22 from a pre-restructuring level of 24. (A later section of this chapter describes all the force structure changes taking place.)

Marine Corps Reserve end strength appears to increase. However, this seems to be a response to a bad recruiting and retention year in FY 2020, when reserve end strength sank to 35,500. Typically, reserve end strength has been about 38,500, a level that historically has been both achievable and sufficient to fill the target structure. FY 2022 may be building back to that level. The number of infantry battalions remains at eight.

General Berger’s original planning guidance hints at some reserve structure changes in the future: “We will explore the efficacy of fully integrating our reserve units within the Active Component, as well as other organizational options.”

combined active/reserve unit for UAVs, something common in the Air Force but novel for the Marine Corps. However, final decisions about a new reserve concept are still pending. Unlike all the other services, the Marine Corps Reserve is structured nearly identically to the active force and not as a complementary capability that fills gaps (with a few minor exceptions such as civil affairs, which exists in the reserve force but not in the active force).

Marine Corps civilians increase slightly, as with DOD civilians overall. This likely reflects a focus on rebuilding readiness and the substitution of civilians for military personnel in support activities. Marine Corps civilian strength levels have been relatively level for several years. However, General Berger has initiated a review aimed at cutting 15 percent of personnel in headquarters and the supporting establishment, so civilian strength might drop in the future. If the Marine Corps cuts functions in these supporting organizations, civilian reductions will follow. If the functions remain, but the civilians get cut, military personnel may be diverted to backfill, with an outcome contrary to the intention of the guidance.

Figure 1: Marine Corps Active-Duty End Strength 1999–2025 (000s)

Recently, the Marine Corps had talked about expanding the active-duty force to 194,000. That level would have allowed the Marine Corps to build new capabilities without sacrificing the old. However, flat budgets required trade-offs.


The FY 2022 budget contained no future projections for Marine Corps end strength or elsewhere. Figure 1 shows the projection from the FY 2021 budget and reflects General Berger’s recent statements to cut active-duty end strength by “about 12,000” to pay for the new capabilities envisioned. The FY 2022 budget is on track with that projection. Even at 172,000, the Marine Corps would be coming out of the wars at about the same level that it went in (172,600).

The McKenzie Group of 2013 (named after its leader, then-lieutenant general Kenneth F. McKenzie, now General McKenzie, commander of CENTCOM) argued that forward presence and crisis response were the Marine Corps’ primary force drivers because of the strain from deployments. This reflects the time—10 years of high wartime operational tempo—but also the traditional Marine Corps focus on forward deployments.

That argument has disappeared. General Berger, in his annual posture statement to Congress, did not mention high OPTEMPO or personnel stress. That is a change from statements pre-2016, when the commandants routinely cited the stress of multiple deployments.

A New Force Structure

When General Berger became commandant, he issued planning guidance with four major themes: (1) to reestablish the Marine Corps’ naval roots after years of operations ashore in Iraq and Afghanistan; (2) to build structure and weapons for great power conflict, particularly in the Pacific (“We are laser focused on the Pacific”); (3) to eliminate capabilities that did not fit with a new concept; and (4) to maintain a high level of individual warfighting prowess. These themes were consistent with the National Defense Strategy and previously published Marine concepts such as Expeditionary Advance Base Operations and Littoral Operations in a Contested Environment. The Marine concepts envision a shift to distributed operations and the Marine Corps contributing to sea control in a naval campaign through forward deployed aircraft and shore-based fires, not just by projecting power ashore.


In March 2020, the Marine Corps announced the specifics of the restructuring in Force Design 2020. Subsequent guidance publications have elaborated and, in some cases, modified the original guidance.\(^{175}\) In addition, the Marine Corps has built out a broader doctrinal base with the Tentative Manual for Expeditionary Advance Base Operations, Marine Corps Doctrinal Publication 1-4 Competing, and Marine Corps Doctrinal Publication 7 Learning.

Unlike the Navy’s proposed restructuring, General Berger stated, “I seek no additional resources for this effort.”\(^{176}\) Thus, the restructure cuts many force elements to create savings to acquire new capabilities. The Marine Corps does acknowledge that there is a window of risk, as previous capabilities are drawn down before new capabilities become available.

Implementation is underway, with an initial operating capability planned for 2023 and a full operating capability planned for 2030. The documents emphasize that this is an ongoing process of experimentation and wargaming, even as major elements take shape. In particular, the logistics structure, reserves, reconnaissance, and some components of aviation are unresolved.

Indeed, in his FY 2022 posture statement, General Berger hints that major acquisition changes may be ahead:

> With the new procurement of large weapon systems like the F-35B/C, CH-53K, MV-22, JLTV, and ACV—to name but a few—we should be prepared to modify programs of record to ensure affordability and viability throughout the entire lifecycle of each program. Prioritizing high end platforms without resourcing the supplies and infrastructure needed to sustain its operational capability is fundamentally irresponsible; the result would be a hollow force.\(^{177}\)

General Berger has proposed a revised definition of readiness: “It is time for us to embrace a more sophisticated and balanced understanding of military readiness and cease using availability as the primary metric in our readiness evaluations.” The implication in the testimony is to get rid of “legacy” systems and not use scarce funds to sustain them.\(^{178}\) However, in the past, services have used arguments about focusing on “capability” rather than “readiness” as justifications to cut training and equipment maintenance. This will bear watching in the FY 2023 budget since readiness has been a hallmark of the Marine Corps as “first to fight.”

Recent descriptions of the concepts behind the restructuring have emphasized the reconnaissance/counter-reconnaissance aspects or “winning the hider/finder competition.” “It seems increasingly likely that [what the Navy and joint force might need most from the Marine Corps] is not lethal fires

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177. Ibid., 22.

as an in themselves but rather reconnaissance and counter reconnaissance applied in all domains and across the competition continuum.” The Marine Corps hypothesizes that such forces, used before hostilities, could deter conflict, which it calls “deterrence by detection.” As a result of this increased focus, the Marine Corps reconnaissance structure of the future is in flux.

As justification for its new warfighting concept, the Marine Corps points to the second Nagorno-Karabakh war “in which the victor imposed their will primarily through the use of unmanned systems and loitering munitions.” It also notes that “wargame after wargame suggests fixed land bases and high signature land forces will be vulnerable to long-range precision munitions.”

General Berger’s original guidance and subsequent elaborations barely mention cyber and special operations, which raises questions about how they fit into his new concept for the Marine Corps. Both had been uncomfortable fits, with cyber Marines being hard to recruit and special forces Marines siphoning top talent from the regular line units.

The Army has taken a bifurcated approach to Force Design 2030 and the concepts behind it. On the one hand, it has suggested that the Army might also provide distributed small units in the Pacific with long-range precision firepower. (See the Army chapter in this series for a description of the Army’s thinking.) On the other hand, it has doubled down on traditional firepower, increasing the number of armored brigade combat teams (BCTs) and continuing to maintain a large force of cannon artillery.

If fully implemented, the restructuring would have a major cultural impact on the Marine Corps. Hitherto, the infantry has been the centerpiece of the Marine Corps and the principal instrument by which it wins battles. Its mission has been clear: “locate, close with, and destroy the enemy.” Under the restructuring, the Marine Corps would win battles using long-range fires from artillery and aviation. The infantry role would be mostly defensive to protect these long-range fire assets. General Berger has been emphatic, however, about the need to maintain basic combat skills across the entire force.

**Ground Forces**

Table 2 lays out the major changes that the restructuring would make to Marine Corps ground forces. The Marine Corps emphasizes that experimentation is ongoing, so additional changes are possible.

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In particular, the Marine Corps is still formulating plans for logistics and the reserves. (For a detailed assessment of Force Design 2030, see Mark Cancian, “The Marine Corps' Radical Shift toward China.”)

### Table 2: Marine Corps Ground Force Structure

<table>
<thead>
<tr>
<th></th>
<th>Original Structure</th>
<th>2030 Structure</th>
<th>Recent Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infantry</strong></td>
<td>24 active-duty</td>
<td>21 active-duty infantry battalions, each about 15 percent, or 125 marines, smaller</td>
<td>Down to 22 battalions by end of FY 2022, future structure still under study</td>
</tr>
<tr>
<td></td>
<td>infantry battalions</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8 reserve infantry</td>
<td>6 reserve infantry battalions</td>
<td>Still at eight infantry battalions</td>
</tr>
<tr>
<td></td>
<td>battalions</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fire support</strong></td>
<td>21 cannon batteries;</td>
<td>5 cannon batteries; 21 missile/rocket batteries</td>
<td>In progress</td>
</tr>
<tr>
<td></td>
<td>7 rocket batteries</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tanks</strong></td>
<td>7 tank companies</td>
<td>0 tanks, no capability retained</td>
<td>All tank companies deactivated</td>
</tr>
<tr>
<td><strong>Bridge companies</strong></td>
<td>3 bridging companies</td>
<td>0 bridging companies</td>
<td>In progress</td>
</tr>
<tr>
<td></td>
<td>(active and reserve)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Law enforcement</strong></td>
<td>3 battalions</td>
<td>0 battalions</td>
<td>In progress, one retained in reserves</td>
</tr>
<tr>
<td>(military police)</td>
<td>units</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Regiments (MLRs)</strong></td>
<td>None</td>
<td>Conceptual in the original 2030 guidance</td>
<td>Three MLRs planned</td>
</tr>
</tbody>
</table>


**Infantry:** The cut of three infantry battalions appears to be a bill payer. The press release says that the remaining battalions will be more “mobile” and reportedly “commando-like.” That implies deleting some of the heavy weapons such as mortars and anti-tank missiles. On the other hand, the commandant’s memo to the secretary of defense cites “greater lethality.” Indeed, at the tactical level, the Marine Corps has replaced its 1980s-era Shoulder-Launched Multipurpose Assault Weapon with the M3E1 Carl Gustaf Recoilless Rifle. The Carl Gustav has a longer range and a wider variety of munitions.

The Marine Corps is also moving toward 100 percent fill of its infantry units. If fully implemented and the initiative survives the decrease in end strength, this would produce a major increase in readiness. Customarily, infantry units were understrength and lost both combat power and deployability as a result.

The Marine Corps is considering a variety of actions that would have a major effect on the infantry if fully implemented, including:

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• Extending the amount of training time at the School of Infantry from 9 to 14 weeks to ensure that Marines going to the fleet will be conversant with all weapons systems. This new approach is also designed to reinforce the critical thinking needed for distributed operations.

• Putting more experienced enlisted leaders at lower tactical levels. This would allow more versatile decisionmaking but age the force. The Marine Corps has customarily had the youngest enlisted force of all the services.

• Developing “kamikaze drones” that would be launched from mobile platforms like a mortar. These would provide precision fires to low-level infantry units, potentially replacing some long-range fires and antitank weapons.

Experimentation continues, so the organization of the infantry battalion is not a settled issue.

Cutting infantry battalions allows proportional cuts in supporting capabilities—aviation, logistics, and fire support—thus generating enough savings to pay for new capabilities.

The infantry has long been the heart of the Marine Corps, so this would be a major institutional as well as force structure change if implemented.

The three active-duty divisions will have 21 infantry battalions after the restructuring, compared with 27 at full strength. The infantry battalions have also been getting smaller over time. Having consisted of about 1,050 Marines until the mid-1980s, infantry battalions would shrink to about 725 under Force Design 2030. Thus, the total number of Marines in infantry battalions drops from 28,350 in the early 1980s to 15,200 in the future, a cut of 47 percent for a Marine Corps of about the same size.

Fire Support: The artillery community will be roughly the same size after the restructuring, but it will be dramatically different and have three kinds of units: some units will remain equipped with conventional cannon; some will be HIMARS, which fire long-range guided and unguided missiles at land targets; and some will be a new system that fires tactical Tomahawk anti-ship missiles or the Naval Strike Missile. With their guided munitions, missile and rocket batteries can hit ground targets and ships at long range. However, they do not support the infantry with massed and area fires as cannon batteries do. This shift is a statement that the Marine Corps does not plan to face adversary armies close up on the ground but will instead fight maritime campaigns at long distances.

Tanks: This has been the most visible change. Tanks have been part of the Marine Corps since World War II and have fought in every conflict since. As with changes to the artillery, it is a dramatic statement that the Marine Corps does not plan to participate in ground conflicts in the future as it did in, for example, Desert Storm, the 2003 invasion of Iraq, or even the Korean War of 1950–1953.

Bridge Companies: These units provided bridges that allowed large numbers of vehicles, including armored vehicles, to cross rivers and gaps. However, they are not useful on islands with the limited maneuver space and small units envisioned in the force redesign.

Law Enforcement Battalions: These units are useful for counterinsurgency but would have little role in a Pacific maritime campaign. Thus, the restructuring cuts nearly all of the capability. This shows a determination not to get involved in future counterinsurgency campaigns.

Reconnaissance: Reconnaissance has emerged as a key capability in the Marine Corps’ warfighting concept for the Western Pacific. Marine units will need to find adversary systems, on land, on the sea,
and in the air in order to strike them with long-range fires. The Marine Corps will also need to conduct counter-reconnaissance to screen the joint force. The 2030 Force Design notes the need for “multi-domain reconnaissance” from a variety of systems as well as a reevaluation of the 12 planned Light Armored Reconnaissance companies.

**Marine Littoral Regiments:** This new kind of unit is emerging as the centerpiece of the restructuring effort. It would deliver anti-ground and anti-ship fires and be able to survive inside an adversary’s (i.e., China’s) defensive bubble (which the Marine Corps calls “the weapons engagements zone”).

These new units harken back to a World War II capability, Marine Defense Battalions, which were designed to protect forward bases from naval and air attack. However, whereas the World War II units were defensive, the MLRs will provide an offensive fires capability. The Marine Corps has been experimenting on Hawaii using troops stationed there, and such experimentation continues. MLRs tentatively consist of a littoral combat team, a littoral anti-air battalion, and a littoral logistics battalion, though their exact structure is still being refined.188

Recent Marine Corps statements indicate that all three regiments of the Third Marine Division in the Pacific will convert to MLRs, with one each stationed on Okinawa, Guam, and Hawaii. The MLR on Hawaii will be a permanent unit. The MLRs on Okinawa and Guam (built from the 4th and 12th Marines) will be composite units with permanent headquarters, rotational subunits, and, possibly, flexible organization. Although MLRs look a lot like a specialized Marine Expeditionary Unit, the smallest of the Marine air-ground task forces, MLRs are not now characterized as task forces. They will apparently be permanent units. The first MLR will stand up in FY 2023.189

If the MLR plan is fully implemented, the number of infantry battalions in the Western Pacific will decline to three, one in each of the MLRs, as the Marine Corps cuts infantry to put personnel into other capabilities.

### Aviation Forces and Challenges

Table 3 shows the original (pre-restructuring) aviation structure, proposed changes under Force Design 2030, and recent actions.

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### Table 3: Marine Corps Aviation Force Structure

<table>
<thead>
<tr>
<th></th>
<th>Original Structure</th>
<th>2030 Structure</th>
<th>Recent Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rotary wing – tiltrotor</strong></td>
<td>17 squadrons</td>
<td>14 squadrons</td>
<td>Two squadrons deactivated, with a third planned in 2021</td>
</tr>
<tr>
<td><strong>Rotary wing – light attack</strong></td>
<td>7 squadrons</td>
<td>5 squadrons</td>
<td>Reductions in progress</td>
</tr>
<tr>
<td><strong>Rotary wing – heavy</strong></td>
<td>8 squadrons, currently transiting from aging CH-53Es to CH-53Ks</td>
<td>5 squadrons</td>
<td>Reductions in progress, target structure 5.25 squadrons</td>
</tr>
<tr>
<td><strong>Fixed wing – fighter attack (F-18, F-35)</strong></td>
<td>18 total squadrons; planned acquisition: 353 F-35Bs (STOVL version) and 67 F-35Cs (carrier version)</td>
<td>No change to number of squadrons, but number of F-35s per squadron reduced from 16 to 10</td>
<td>“Continued analysis”</td>
</tr>
<tr>
<td><strong>C-130 cargo aircraft</strong></td>
<td>3 squadrons</td>
<td>4 squadrons</td>
<td>Expansion being implemented as the Marine Corps takes most or all of the six C-130J aircraft that the Navy has requested in FY 2022.</td>
</tr>
<tr>
<td><strong>Unmanned aviation vehicles (UAVs)</strong></td>
<td>3 unarmed squadrons for ISR</td>
<td>Add 3 MQ-9 UAV squadrons,</td>
<td>MQ-9 procurement begun, RQ-21 fleet divested</td>
</tr>
</tbody>
</table>


The key points are that several capabilities—tiltrotor, light attack, and heavy attack—shrink as the size of the ground forces, particularly infantry, shrinks. The C-130 fleet increases to provide regional sustainment of distributed forces. UAVs increase to leverage new technologies for numbers and survivability. (See detailed discussion of UAVs below.)

The major unresolved question is the size and structure of the fixed-wing fighter attack fleet.

The 2030 plan envisions a reduction in aircraft per squadron that implies a cut of about 45 F-35s from the planned Marine Corps buy of 420 when training units and maintenance overhead are included. The restructuring report points to a pilot shortage and the Marine Corps’ continuing inability to fix the shortage as one reason for the reduction. The FY 2022 procurement budget does not show any reduction in F-35 procurement, though that could come in future years.
The commandant continues to signal a willingness to trade off expensive and manned fixed-wing aircraft. Last year he stated: “I am not convinced that we have a clear understanding yet of F-35 capacity requirements for the future force.”¹⁹⁰ In this year’s posture statement, he said: “I am convinced that we must be willing to critically assess the scope of current programs of record for our major defense acquisition programs.”¹⁹¹

The clear implication, and the recommendation of many strategists, is to cut F-35s and buy more UAVs. However, cutting F-35s will be controversial because of the program’s strong support in Congress, which has annually added aircraft to the budget. So far, the Marine Corps has hesitated to take that step.

Figure 2: Marine Corps Aircraft Inventory by Type

![Figure 2: Marine Corps Aircraft Inventory by Type](image)


Marine aircraft inventories have been stable for the last few years and have fluctuated within a relatively narrow band since the early 2000s. The rotary-wing fleet has recapitalized with the MV-22 and UH/AH-1 procurements, making it modern and relatively young. The CH-53K program will complete that recapitalization. The fixed-wing fleet is in the process of recapitalization with the F-35. So, despite the high cost of modern aircraft, Marine aviation is in good shape, unlike the Air Force.

*Force Design 2030* implies some reduction in aircraft inventories. It will cut rotary-wing, tiltrotor, and fixed-wing fighter attack aircraft but with some offsetting increase in UAVs and C-130s. Such a change is just beginning and not fully incorporated into acquisition plans. The FY 2023 budget may take a major step in that direction with the mass retirement of Marine Corps F-18s. The Marine Corps still flies the older C and D models, never having acquired the newer E and F models as the Navy did.


**Lag in Fielding UAVs**

Despite having led the way on UAVs in the 1980s, the Marine Corps now lags far behind the Army and Air Force. General Berger vowed to change this, having spoken of a Marine Corps with “half our aviation fleet unmanned in the near to midterm.” The FY 2022 budget takes an initial (but small) step in that direction by acquiring six MQ-9s.

In recent years, the Marine Corps had acquired the use of a few MQ-9 Reapers through contractors and had procured two in FY 2020. The FY 2022 budget reflects a decision to make the MQ-9 fleet permanent, and ownership allows more flexibility in operations.

The MQ-9 decision also reflects the collapse of the large UAV (part of the overarching MUX program) developed by the Marine Corps. That program was attractive because of its shipboard capabilities, allowing operations at sea, a capability MQ-9s lack. However, the program proved infeasible from trying to meet too many requirements. This is a cautionary tale about letting the requirements process opt for the perfect (MUX) over the good (MQ-9). To the Marine Corps’ credit, it changed course when its ideal plan began to fail.

The Marine Corps has not specified a target size for the MQ-9 UAV fleet. Planning documents show a total of six squadrons, three MALE/MQ-9 squadrons and three more with composition yet to be specified, perhaps a “loyal wingman” such as the Air Force is developing. The MALE/MQ-9 squadrons would stand up by 2026.

As Figure 3 shows, the Marine Corps is still far behind the Air Force. Indeed, although the Air Force and CIA MQ-9s are armed, the Marine Corps currently plans to use their MQ-9s only for ISR but is considering arming them. The Air Force went through a similar process 20 years ago, ultimately recognizing the value of adding attack capabilities to its ISR UAVs (MQ-1 Predators at that time).

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193. The budget documents refer to this program as the Medium Altitude Long Endurance-Tactical (MALE-T) but later explain that the aircraft are MQ-9s. The MALE-T nomenclature may be an artifact of the older concept of a family of UAVs but might signal some limitations on making MQ-9s the permanent fleet. The FY 2023 budget might clarify this point.


196. Department of the Navy, *Department of Defense Fiscal Year (FY) 2021 Budget Estimates, Aircraft Procurement, Book*
As indicated in the Navy chapter, the Marine Corps’ RQ-21 Blackjack has completed fielding, with a total of 58 systems. This UAV performs reconnaissance and surveillance functions but has no attack capability. However, its performance is apparently disappointing because the FY 2022 budget announced that all will be divested early.197

The Marine Corps also fields a wide variety of smaller UAVs (RQ-11, -12, -20) for tactical reconnaissance and targeting and is experimenting aggressively with integrating such capabilities into small unit operations. None of these systems have attack capabilities, however. A tactical “kamikaze” UAV, called “Switchblade,” is under development for the infantry, as described earlier.

Despite the rhetoric, the Marine Corps, like the Navy, has focused on manned aircraft and is far behind the Army and the Air Force in fielding UAV capabilities. The Marine Corps’ FY 2022 investment in UAVs is substantial, about $300 million, but that is about the cost of two F-35s. In FY 2022, the Marine Corps spends about 13 times as much on procurement of manned aviation as on unmanned. General Berger wants to go in a different direction, but he faces decades of aviation culture built around manned aircraft.198

**Reaction to Force Design 2030**

The proposed restructuring has met with both support and doubts. Support comes from strategists who see China as the primary threat and would focus defense efforts tightly on that adversary. They endorse the new technologies and operational concepts.199 The new secretary of the Navy has indicated his support, which likely signals support in the Biden administration’s forthcoming National Defense Strategy. Indeed, the emerging focus on China strengthens the argument for the Marine Corps’ restructuring. (For a full discussion of the Biden administration’s emerging strategy, see the overview chapter in this series.)

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197. Divestment was announced in the Force Design 2030: Annual Update as well as in the budget documents. However, there was no explanation about why the early retirement occurred.

198. UAVs include the MQ-8, MQ-9, and STUASLO. Manned aviation includes the CH-53K, F-35, and KC-130J. Department of the Navy, Highlights of The Department of the Navy FY 2022 Budget, A-7.


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Despite the rhetoric, the Marine Corps, like the Navy, has focused on manned aircraft and is far behind the Army and the Air Force in fielding UAV capabilities.
Nevertheless, doubts persist from five primary concerns:

- The focus on China downplays the possibility of conflicts elsewhere. Since World War II, the United States has fought many regional conflicts but never a great power conflict. Thus, James Webb—a former senator, former secretary of the navy, and a Marine combat veteran—criticized a narrow focus on China: “If history teaches us anything in combat, it is that the war you get is rarely the war that you game.”

- The new warfighting concepts are unproven. The restructure assumes that, in a conflict with China, Marine forces could move into the Chinese defensive bubble, survive, and be supported. That may not work in a contested environment where logistics must move continuously and adversary firepower can strike isolated Marine outposts. Further, the forward locations that the Marine Corps concept requires exist on the sovereign territory of other nations that might not be involved in the conflict or be unwilling to have Marines fighting from their territory.

- A force designed for an island campaign in the Western Pacific will not be successful if deployed to another region and employed in a different kind of campaign. The Army of the 1960s that was designed to fight the Soviets on the plains of Germany was poorly positioned to fight insurgents in the jungles of Southeast Asia.

- Conflicts against China and Russia are likely to be in the gray zone, not high-intensity and kinetic. The new force design is not well suited for these demands because of reductions to counterinsurgency capabilities and the reorientation of training to focus on a high-end fight.

- All warfighting requires close-in firepower. The new structure focuses on long-range precision fire, but the need for close-in fires, including tanks and cannon artillery, has not gone away.


Congress has been equivocal. On the one hand, it has offered rhetorical support for the restructuring. On the other hand, it cut substantial resources in FY 2021 because of doubts regarding the maturity of technologies and related concepts.

Looking Ahead

As part of the restructure effort, the Marine Corps is developing a variety of new capabilities. These are at different levels of maturity but will have substantial impact on force structure when deployed. These capabilities and structures will also affect how the Marine Corps operates in the future.

**Long-Range Fires:** The Marine Corps already has the capability for long-range precision fires on ground targets with GMLRS rockets fired from existing HIMARS units in the artillery. It is on the cusp of deploying capabilities for long-range anti-ship fires. This capability is central to the new warfighting concept because it can strike at Chinese ships that sustain the defensive bubble around Chinese territory. The Marine Corps’ system, called NMESIS, consists of an antiship naval strike missile on the chassis of the Joint Light Tactical Vehicle (JLTV). A functioning prototype exists and development continues.206

**Unmanned Ground Vehicles:** The Marine Corps, like the Army, has been experimenting with a variety of such systems, mainly for logistics, but also with unmanned weapon systems (for example, the Remote Operated Ground Unit Expeditionary [ROGUE], which uses the JLTV chassis). None are quite ready for fielding due to a variety of command and control questions and technical challenges.

**Air and Missile Defense:** These capabilities are also central to the new warfighting concepts since Marine aviation will be unable to neutralize all adversary air threats, unlike in the post-Cold War regional conflicts. Some ground-based capability will be needed. The Marine Corps had such capabilities in the past but, like the Army, disestablished most of them when the focus shifted to regional conflicts. Now that capability will be coming back. In particular, the Marine Corps focuses on point defense rather than area defense. The Marine Corps will leave area air defense—which the Marine Corps had in the past with the Hawk system (deactivated in 2002)—to the Army and Air Force. The Marine Corps is in the process of upgrading its two air defense battalions, currently equipped with portable Stingers, with vehicle-mounted Stingers and improved command and control (called the Marine Air Defense Integrated System).

**Long-Range Unmanned Surface Ship:** The Marine Corps is developing a long-range unmanned reconnaissance surface vessel to provide sensors and possibly offensive weapons through long-range precision strike assets. Experiments continue. Whether this will produce a fielded system is unclear, since such a capability, if truly long range, would seem to fall into the Navy’s mission set and not the Marine Corps’.

**Global Deployments:** The projected amphibious fleet, with fewer large amphibious ships and a large number of small ships, will not sustain the current structure of seven Marine Expeditionary Units (MEUs) (one in Japan, three on the West Coast, and three on the East Coast) and their long-standing forward deployments. The small amphibious ships (called light amphibious warships, or LAWs) are intended for relatively short voyages, such as transit from point A to point B, and not for long-

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term deployments. (See the Navy chapter in this series for an extended discussion of the emerging amphibious fleet.)

Further, the MLR structure in the Pacific is not well designed for peacetime day-to-day deployments. The full MLR is too large for routine long-term deployments, deploying just the combat team would leave the rest of the unit incomplete, and deploying a proportional slice would not produce the wide variety of capabilities that forward-deployed Marine units have traditionally had. Instead, the Marine Corps may move to periodic but limited-duration deployments for exercises and engagements with allies and partners.

The Marine Corps might fill the gap with special-purpose Marine air-ground task forces (SP-MAGTFs). Although not new, SP-MAGTF units represent a different capability for the Marine Corps. Traditionally, the smallest unit that the Marine Corps deployed was an MEU. To provide rapid response and persistent presence in AFRICOM and CENTCOM and periodic theater engagement in SOUTHCOM, the Marine Corps established smaller, special-purpose units, which are smaller than the MEU. That made them both more agile and easier to deploy, though at the cost of logistics and firepower. Although these units are typically land-based and not naval, the Marine Corps seems to be making them a routine capability, satisfying a deployment task without putting too many demands on the structure.  

The Navy and Marine Corps may use non-amphibious ships, such as Maritime Prepositioning Force ships (TAK-Es), high-speed vessels (Expeditionary Fast Transports), and mobile landing platforms/afloat forward staging bases (now called Expeditionary Sea Base and Expeditionary Transfer Dock). General Berger used them extensively when he was the Marine commander in the Pacific, but the concept does not appear in his guidance or in any discussion of the future amphibious fleet.

207. The Marine Corps has long prided itself on being able to task organize—that is, to put existing units together into temporary groups for a particular purpose. The Marine Corps has a standard set of task force templates for what it calls Marine Air-Ground Task Forces. Each of the standard templates has four elements: a command element, a ground combat element, an aviation element, and a logistics element. The largest, a Marine Expeditionary Force (46,000–90,000 Marines) is built around the Marine division and air wing. The middle-sized force, the Marine Expeditionary Brigade (4,000–16,000 Marines) is built around an infantry regiment and air group. The smallest, the Marine Expeditionary Unit (or MEU, ~2,200 Marines) is built around an infantry battalion and composite squadron. U.S. Marine Corps, Expeditionary Operations, Marine Corps Doctrinal Publication 3 (Washington, DC: Department of the Navy, 1998), 69–77, https://www.marines.mil/News/Publications/MCPEL/Electronic-Library-Display/Article/899839/mcdp-3/.

Air Force

The Air Force continues developing and procuring next-generation aircraft to meet the demands of great power conflict. Fielding of new aircraft has slowed the increase in fleet age, but the Air Force is not buying enough new aircraft to sustain its force structure at its current size. Deep cuts are likely in the future.

KEY TAKEAWAYS

- Air Force active and reserve military personnel levels are essentially unchanged in FY 2022. Force structure is also essentially unchanged.

- Air Force official documents have ceased describing operational demands and have downplayed stress associated with current operations. This may reflect a reduction in operations as the Middle East conflicts wind down but may also reflect a strategic decision to shift emphasis to great power conflict.

- Aircraft inventories have stabilized in the near term. However, the Air Force is not buying enough new aircraft to maintain the inventory over the long term. Increasing procurement to the levels needed to sustain the inventory would require historically high costs.

- Fleet aging has slowed but not stopped. The average age of some fleets is high, at 45 years for bombers, 49 years for tankers, and 29 years for fighter/attack aircraft.

- Under the “divest to invest” concept, the Air Force will likely close this gap by retiring older aircraft and shrinking the force, possibly substantially. However, Congress has been reluctant to do this in the past.

- Unresolved is how the Air Force will meet operational demands with a shrinking fleet if these demands continue at the high level of recent years.
The FY 2022 budget procures 91 manned aircraft but no remotely piloted aircraft, so the unmanned fleet has plateaued at 6 to 7 percent of the force.

Nuclear forces require a greater share of the Air Force budget as Reagan-era systems reach the end of their service lives. Nevertheless, the Biden administration, despite rhetorical support for arms control, provides strong budget support for nuclear modernization.

### End Strength in FY 2022

**Table 1: Air Force End Strength – Active and Civilian**

<table>
<thead>
<tr>
<th>Combat Coded Squadrons</th>
<th>End Strength</th>
<th>Air Force (“Blue”)</th>
<th>Non-Air Force</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2021 Enacted</td>
<td>40</td>
<td>327,000</td>
<td>139,300</td>
</tr>
<tr>
<td>FY 2022 Request</td>
<td>40</td>
<td>328,300</td>
<td>140,600</td>
</tr>
<tr>
<td>Change</td>
<td>0</td>
<td>+1,300</td>
<td>+1,300</td>
</tr>
</tbody>
</table>

Note: Figures rounded to the nearest hundred.


**Table 2: Air Force End Strength – Reserve and Air National Guard**

<table>
<thead>
<tr>
<th>Combat Coded Squadrons</th>
<th>End Strength</th>
<th>Combat Coded Squadrons</th>
<th>End Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2021 Planned</td>
<td>3</td>
<td>70,300</td>
<td>21</td>
</tr>
<tr>
<td>FY 2022 Request</td>
<td>3</td>
<td>70,300</td>
<td>20</td>
</tr>
<tr>
<td>Change</td>
<td>0</td>
<td>0</td>
<td>-1</td>
</tr>
</tbody>
</table>


Changes in personnel levels are small. The active-duty Air Force has a net increase in personnel even as it loses some personnel to the Space Force. Budget documents attribute this increase to the retention of medical personnel to cope with the pandemic. Active-duty personnel and the Air Force Reserve maintain the major elements of force structure. The Air National Guard loses one squadron.

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209 The Air Force budget distinguishes between “blue” and “non-blue” activities. “Blue” activities are those that pertain to the Air Force. “Non-blue” activities are those that relate to other organizations that are funded in the Air Force budget but not related to the Air Force, such as intelligence organizations.

Air Force civilian personnel increase, with budget documents citing training, network protection, and diversity and inclusion initiatives. Non-Air Force civilians increase substantially, by 8.6 percent, but the budget documents give no explanation.

A continuing bright spot is active/reserve relations. By working closely with its reserve components and maintaining their end strength, the Air Force has avoided the internal conflicts that had marred earlier budgets and required a 2014 force structure commission to make peace.\(^{211}\)

Another bright spot is that the pandemic eased the pressure from the Air Force’s long-standing and, until recently, severe pilot shortage. Neither the budget documents nor the posture statement reference the pilot shortage. With the commercial travel industry still in recession, the airlines have stopped hiring, at least in the near term, so pilots are staying in the service.\(^{212}\)

**Figure 1: Air Force – Active End Strength, 1999–2022**

As Figure 1 shows, end strength rose in the wake of the invasions of Afghanistan and Iraq. After 2004, however, the Air Force adopted a strategy of retiring older aircraft and reducing personnel to shift funds to modernization. Active-duty end strength fell from a high of 377,000 to a low of 316,000. That decrease harmed readiness and reduced the pilot inventory.\(^{213}\) Thus, the Air Force began increasing end strength in FY 2016.

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The FY 2021 budget projected that personnel levels would stay constant through FY 2025. This was likely a hedge against an uncertain budget future. The Air Force was reluctant to add personnel that it could not sustain but was not at the point of major cuts either.

The FY 2022 budget has no out-year projections, pending publication of the Biden administration’s National Defense Strategy (see the previously published “strategy and budget overview section of this series for more detail). The FY 2022 level is slightly below the FY 2021 projection (-1,700), but that likely reflects the vagaries of recruiting, retention, and minor organizational reshuffles. The bottom line is that the future structure of the Air Force is still undetermined.

The FY 2022 level [for active-duty military personnel] is slightly below the FY 2021 projection (-1,700), but that likely reflects the vagaries of recruiting, retention, and minor organizational reshuffles. The bottom line is that the future structure of the Air Force is still undetermined.

For many years, including FY 2021, the Air Force described how many missions it flew, weapons it dropped, and personnel it deployed. In a dramatic change from past practice, neither the posture statement nor the budget documents for FY 2022 contain this information. The posture statement does have a brief note that, “The core missions of the Air Force continue to be in constant demand around the world. And because the many capabilities we provide are exclusive to our Service, our forces have been under strain for two decades. The strain negatively impacts readiness and our ability to modernize.” The budget documents do not contain a similar concern.

This may reflect a reduction in operational tempo from the height of the bombing campaigns against the Islamic State in Syria and Iraq and against the Taliban in Afghanistan. It also may reflect a desire to focus on great power competition and downplay day-to-day operations. Nevertheless, the problem has not gone away.

Many commentators have noted the tension between operational tempo and inventory. Mark Gunzinger and Carl Rehberg of the Mitchell Institute observed that “retiring aircraft doesn’t retire real-world demand for them.” Mackenzie Eaglen noted that the “bias toward getting smaller and

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older—but no less busy—without sufficient replacements will exacerbate the Air Force's readiness challenges.”  

A RAND study concluded that “since the 1990s, the U.S. military has operated at a tempo more akin to war than peace,” that “prolonged operations are driving contemporary [Air Force] capacity shortfalls,” and that these would continue in the four notional futures that RAND analyzed.  

In short, the operational demands and the stress they create may reappear in the future.

**Force Structure in FY 2022 and Beyond**

**Figure 2: Air Force – Aircraft Inventory**

The Air Force has stabilized its force structure at about 5,500 aircraft after a sharp decline from 2002 to 2009. The Air Force has maintained its inventories by allowing the average aircraft age to increase (to 30.6 years).  

This happened because the Air Force took a procurement holiday in the late 1990s and, for its large fighter/attack fleet, planned to move directly to an all fifth-generation force fleet. This plan collapsed in the early 2000s when DOD curtailed the F–22 buy at 187 aircraft, and the F–35 program was delayed many years because of development problems.  

Thus, Stephen Kosiak, a long-time budget commentator, has argued that these trends—shrinking inventories and aging fleets—arise from deliberate choices: “Historical trends in the U.S. military’s force structure and modernization plans are largely the result of policy and programmatic choices made by Department of Defense (DoD) and service leadership. Contrary to widely held belief . . . the

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size and shape of today’s forces are not simply a byproduct of budgetary or other pressures beyond DoD’s control.\textsuperscript{220}

The good news is that fleet aging overall has slowed as new aircraft enter the force and old aircraft retire. The bad news is that the Air Force cannot maintain its current inventories and stabilize aging at recent procurement levels. It can achieve only two out of the three goals: inventory, aging, or procurement level. In recent years, the Air Force has chosen to maintain its inventory and procurement level while letting age increase. General Charles Q. Brown, Jr., chief of staff of the Air Force, would cut inventory to reduce age.\textsuperscript{221}

Although the Navy and Army also face challenges with aircraft aging and maintaining their aircraft fleets, the Air Force is in far worse shape regarding aging and the slow acquisition of replacements.\textsuperscript{222} (See the Navy and Army chapters of this series for detailed discussion.)

Figure 3: Air Force – Aircraft Average Age and Inventory

![Air Force – Aircraft Average Age and Inventory](image)

Note: 2000 and 1995 years calculated by averaging the average age of the active, reserve, and air national guard fleet aircraft.


Some fleets are in relatively good shape: the transport fleet (21 years, on average) because of acquiring C-17s and C-130s; the special operations fleet (12 years) because of its high priority; and the unmanned aerial vehicles/Remotely Piloted Vehicles (UAVs/RPVs) (6 years) because of large wartime purchases. Other fleets are old: fighter/attack (29 years old), bomber (45 years), tanker (49 years), helicopter (32 years), and trainers (32 years).[223] All the older fleets (except for some specialty aircraft) have programs in place for modernization, but the programs have been delayed, are expensive, and may take years to implement fully.

Unfortunately, the FY 2022 procurement level is far too low to sustain the Air Force’s current inventory.

Table 3: Air Force Aircraft Acquisition in FY 2022

<table>
<thead>
<tr>
<th></th>
<th>FY 2021 Request</th>
<th>FY 2021 Enacted</th>
<th>FY 2022 Request</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-35A</td>
<td>48</td>
<td>60</td>
<td>48</td>
</tr>
<tr>
<td>MC-130J</td>
<td>4</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>HH-60W</td>
<td>19</td>
<td>19</td>
<td>14</td>
</tr>
<tr>
<td>KC-46A</td>
<td>18</td>
<td>18</td>
<td>14</td>
</tr>
<tr>
<td>F-15EX</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>MH-139</td>
<td>8</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>CV-22</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>106</strong></td>
<td><strong>128</strong></td>
<td><strong>91</strong></td>
</tr>
</tbody>
</table>


Assuming a 30-year service life, aircraft procurement requested for FY 2022 will sustain an inventory of 2,730 aircraft.

91 aircraft procured in FY 2022 x 30-year service life = 2,730 total inventory

The current inventory is 5,451. To sustain that inventory requires doubling the number of aircraft acquired per year.

5,451 target inventory ÷ 30-year service life = 182 aircraft acquired per year

Even at the FY 2021-enacted level (128 aircraft), which included congressional adds, the implied service life required to maintain the fleet size is 43 years.

5,451 target inventory ÷ 128 aircraft acquired per year = 43 years average life

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Fundamentally, to sustain its current inventory without excessive aging, the Air Force will have to buy many more aircraft or less expensive aircraft. Alternatively, the Air Force will need to greatly reduce its aircraft inventory and sharply cut its force structure.

**Size of the Future Force: “Divest to Invest”**

Not long ago, the Air Force talked about increasing its size. In 2018, then-secretary of the Air Force Heather Wilson proposed an almost 25 percent expansion of force structure, describing it as “the Air Force we need.”\(^\text{224}\) This would have increased the number of operational squadrons from 312 to 386. However, the Air Force, unlike the Navy, never made any concrete moves to implement its proposed expansion. Now, that discussion has become a historical curiosity.

Instead, the question today is how much the Air Force will contract. The Air Force has two reasons to reduce its aircraft inventory and associated force structure. First, as described above, is its inability to maintain the structure with the number of aircraft that it has been able to procure recently and will procure in the foreseeable future. Second is its desire to save money in order to make a wide variety of expensive investments in advanced systems, aircraft, weapons, sensors, and networks that would be suitable for conflict with a great power such as China.

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\(^{227}\) Roth, Brown, and Raymond, Posture of the Department of the Air Force, 2.
invest in modernization—“freeing ourselves from the tyranny of short-term operational readiness concepts.”

However, such a trade-off does not appear in the Air Force’s FY 2022 budget. The new National Defense Strategy and FY 2023 budget will indicate how the Air Force implements this new readiness concept.

Table 4: Proposed Air Force Aircraft Retirements in FY 2022

<table>
<thead>
<tr>
<th>Aircraft</th>
<th>Proposed Retirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>KC-10</td>
<td>-14</td>
</tr>
<tr>
<td>KC-135</td>
<td>-18</td>
</tr>
<tr>
<td>C-130H</td>
<td>-8</td>
</tr>
<tr>
<td>RQ-4</td>
<td>-20</td>
</tr>
<tr>
<td>A-10</td>
<td>-42</td>
</tr>
<tr>
<td>E-8</td>
<td>-4</td>
</tr>
<tr>
<td>F-15C/D</td>
<td>-48</td>
</tr>
<tr>
<td>F-16C/D</td>
<td>-47</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>-201</strong></td>
</tr>
</tbody>
</table>


This capability argument is an analog to the naval debate about ship counts. Counting platforms is easy and a convenient shorthand for force structure and military power, but it does not capture all the elements of capability. Indeed, many “non-iron futures” focus on artificial intelligence, mesh networks, cyber, space, and sensors rather than platforms.

As a result of these discussions, the Air Force has repeatedly proposed to retire aircraft. The proposed retirements for FY 2021 are substantial (Table 4). Congress, however, has often balked at retirements, noting that the Air Force says it is already too small for the tasks it has been given. When the Air Force proposed eliminating the A-10 fleet, for example, Congress forbade such an action. Similar retirement restrictions appear in the House and Senate versions of the National Defense Authorization Act (NDAA) for FY 2022. (There is no enacted FY 2022 NDAA yet.)

A CSIS report laid out the savings that the Air Force might achieve by retiring certain aircraft fleets. The fleets most likely to be retired are the KC-10 tanker, the B-1 and B-2 bombers, the A-10 close air support aircraft, the E-8C surveillance aircraft, the U-2 spy plane, and the E-3 airborne warning and control plane. The report argued that the greatest savings arose when entire fleets were retired, thus eliminating the fixed costs of training and maintenance infrastructure.

However, the report also noted that such retirements would leave gaps in Air Force capabilities. Retiring the B-2 bombers, for example, would leave the United States without a stealthy penetrating bomber until the B-21 was fielded in strength.

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A variety of outside commentators have criticized prospective cuts to the Air Force and argued for increasing resources devoted to airpower. The Heritage Foundation, for example, downgraded its assessment of the Air Force from “marginal” to “weak” because of readiness challenges caused by the pandemic as well as insufficient capacity for more than one conflict and the slow pace of modernization.\(^{232}\) Similarly, retired Air Force lieutenant general Dave Deptula of the Mitchell Institute argued that “the Department of the Air Force has become the indispensable force and therefore requires immediate prioritization.”\(^{233}\)

Prospective force structure trade-offs drive a series of strategic choices about airpower:

- **What kinds of conflicts should the Air Force prepare for: those against great powers or a spectrum of air operations, including in less-demanding environments?** In lower-threat air environments—for example, against North Korea—the Air Force can use legacy aircraft extensively. These fleets also provide the numbers needed to cover a high level of day-to-day operational deployments. For conflicts against great powers such as China and Russia, with their sophisticated air defenses, the Air Force would need to focus on advanced capabilities, at least in the early phases of the conflict.

- **How can airpower achieve the greatest effects?** Will the greatest effects come from attacks on enemy forces—that is, through close air support and battlefield interdiction? The ground forces are strong advocates here, arguing that these effects are immediate and tangible.\(^{234}\) Airpower advocates argue that the greatest effect comes from the deep attack on strategic—command and control, economic, and political—targets and the deterrent effects that such capability has. The Air Force has historically leaned toward the latter for a variety of organizational and doctrinal reasons.\(^{235}\)

- **What is the value of stealth in modern air warfare?** Stealth—needed to penetrate heavily defended airspaces—is expensive to develop, procure, and sustain.\(^{236}\) Further, there is an operational penalty. Proponents argue that the cost and performance trade-offs are worthwhile because of rising air

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236 Technically not “stealth” but “low observability,” since nothing is actually invisible. The additional cost of stealth is difficult to estimate since aircraft are bought in different quantities, have different characteristics beyond stealth, and costs can include different elements (e.g., development). One data point is from the Navy, which has bought both fourth-generation F-18Es/Fs and fifth-generation F-35s in quantity. The average recurring procurement cost of F-35B/Cs over the life of the program is about 30 percent more than an F-18 in FY 2021. Adding non-recurring costs for manufacturing and development would greatly increase the cost differential.
Opponents argue that only a small part of the fleet needs to be stealthy, while the rest can be non-stealthy.238

**Does the future lie with manned or unmanned aircraft?** For the foreseeable future, fleets will have a mix of manned and unmanned aircraft, just as the Air Force possesses today. However, will the future be primarily unmanned, thus allowing higher numbers because of their lower overall cost and higher-risk mission? Or will the future still be primarily manned, which offers human judgment and control? This debate parallels discussions about the definition of “legacy capabilities,” discussed in the overview chapter of this series.

The answers to these questions go far beyond the scope of this report, but the questions show that there are difficult strategic decisions behind inventory numbers. There is more substance here than the caricature of future visionaries versus parochial traditionalists often portrayed by commentators.

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**The State of the Fleets**

In general, the Air Force has programs in place to modernize the individual fleets, but this modernization has been delayed and will take time. As a result, today’s aging fleets will be around for a long while. Nevertheless, each fleet faces its own circumstances and therefore deserves individual consideration.239

**THE BOMBER FORCE**

The bomber force consists of B-52s, B-1s, and B-2s. The long-range plan is for the B-21 Raider to replace the B-1s and B-2s. The B-52Hs, which the Air Force flies today, originally entered service in

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1961 and will continue in service at least into the 2040s. The last B-52 pilot has probably not yet been born.

Bombers are central to an Air Force roles-and-missions argument that aircraft are better at providing long-range strike than Army ground-based missiles. The debate is taking place behind closed doors in the Pentagon, but the results will likely emerge in the next National Defense Strategy and FY 2023 budget.

Since no new aircraft are being procured, the bomber force continues to age (currently 45 years on average), though various upgrade programs keep the aircraft flying and operationally relevant, for example, new engines for the B-52s and a new defensive system for the B-2s. The Air Force has retired some B-1s, so that fleet is down to 44 aircraft.

The B-21 Raider program continues in development but edges toward procurement. The FY 2022 requests $2.981 billion, of which $108 million is for advance procurement. The relatively low amount of advance procurement indicates that the first production is still a few years away. Nevertheless, five test articles were funded in the research, development, test, and evaluation (RDT&E) account and should be flying soon. The program seems to be progressing smoothly, but its classified nature makes such judgments uncertain.

Because the B-21 has a mid-2020s fielding date (“Initial Operating Capability”), the legacy B-52s, B-1s, and B-2s will comprise the bomber force for many years to come.

THE FIGHTER/ATTACK FORCE

The fighter/attack force (A-10s, F-15s, F-16s, F-22s, and F-35s) has been the central element of the Air Force since the end of the bomber era in the early 1960s. Therefore, it requires detailed examination. The bottom line is that the fighter/attack force’s total inventory, age, and procurement rate do not produce a stable force. Only two of these characteristics are achievable. One must change. Under the “divest to invest” strategy, inventory will likely decline.

The average age of the fighter/attack force has increased from 8 years at the end of the Cold War in 1991 to 29 years today. Because this is the average age, about half the fleet is older, with some aircraft approaching 50 years of age. Fleet size has decreased from 4,000 in 1991 to 2,094 today. Kosiak’s observation is applicable here. Both fleet aging and reduced numbers result from an Air Force decision to cease production of fourth-generation aircraft (F-15s and F-16s) in the 1990s and instead wait for production of the fifth generation (F-22s and F-35s). This was the opposite of the Navy’s decision to continue production of the F-18. Unfortunately, production of the F-22 was curtailed at 187 aircraft during the budget drawdown in the late 2000s, and the F-35 was delayed many years from its original schedule.

241 For one description of this argument, see Mark Gunzinger, Lukas Autenried, and Brian Clark, “Understanding the Long-Range Strike Debate,” Mitchell Institute, April 2021, https://mitchellaerospacepower.org/understanding-the-long-range-strike-debate/.
Table 5 lays out the long-term trade-offs of the fighter/attack fleet. The Air Force cannot sustain the current fleet size and attain the desired average age without a large increase in procurement quantities. With production of the F-15EX, however, the Air Force gets close to or attains the 72 aircraft procured per year needed to maintain the current average age and fleet size.

F-35s: The Air Force again requests 48 F-35 aircraft in FY 2022, about the same as for the last four years, although Congress routinely increases the buy (to 60 in FY 2021) out of a concern that the aircraft are being fielded too slowly. According to the procurement budget documents, 48 will be the long-term procurement level, rather than the 60 aircraft per year that the Air Force had intended.243

After several years of making good progress in maturing technologies, the aircraft are operational, but the program has still not achieved the planned levels of reliability and capability. Problems with simulators have delayed completion of operational testing.244

Table 5: Fighter/Attack Fleet Trade-Offs

<table>
<thead>
<tr>
<th></th>
<th>Fleet Size</th>
<th>Average Age</th>
<th>Annual Procurement Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Today’s fleet</td>
<td>2,094</td>
<td>29</td>
<td>60</td>
</tr>
<tr>
<td>Long-term fleet size at annual procurement quantity and current age</td>
<td>1,740</td>
<td>29</td>
<td>60</td>
</tr>
<tr>
<td>Long-term fleet size at target fleet age and current procurement quantity</td>
<td>1,200</td>
<td>20</td>
<td>60</td>
</tr>
<tr>
<td>Long-term average age at current fleet size and annual procurement quantity</td>
<td>2,094</td>
<td>35</td>
<td>60</td>
</tr>
<tr>
<td>Long-term procurement quantity needed to maintain current average age and fleet size</td>
<td>2,094</td>
<td>29</td>
<td>72</td>
</tr>
<tr>
<td>Long-term procurement quantity needed to achieve target average age (20 years) and current fleet size</td>
<td>2,094</td>
<td>20</td>
<td>105</td>
</tr>
</tbody>
</table>


Fielding of F-35s is beginning to ease the aging of the fighter/attack fleet (as will production of F-15EXs). Nevertheless, at 48 aircraft per year, it would take another 27 years to reach the F-35 inventory objective of 1,763—FY 2049. Even at the Air Force’s goal of 60 aircraft per year, it would take 21 years—FY 2043. The average age of the fighter/attack fleet will, therefore, remain high for a long time, perhaps indefinitely.

The future of the F-35 program was thrown into doubt by the announcement of a tactical aviation study that was connected to the Biden administration’s broader defense strategy review. Some reports hinted at reduced numbers in the program.245 The House Armed Services Committee complained vigorously about the program’s high sustainment cost. Nevertheless, there are few alternatives immediately available. Current UAVs cannot fulfill this mission, and the Next Generation Air Dominance (NGAD) program, described below, is not ready for procurement.

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**The Air Force cannot sustain the current fleet size and attain the desired average age without a large increase in procurement quantities.**

**F-15EX:** In a major change of acquisition strategy, the Air Force proposed buying a new version of the F-15E dual-role aircraft in the FY 2020 budget, the F-15EX, because of its 40 percent lower sustainment costs.

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cost than the F-35. Although the proposal was initially controversial, Congress has gone along with the plan. Numerically, this is a minor shift since the Air Force proposes to buy only 12 F-15EXs in FY 2022 and 144 in total. The Air Force is buying four to five times as many F-35s. Nevertheless, the step will ease fleet aging.

**A-10s:** The Air Force has surrendered to the will of Congress (and to real-world operations) by re-winging the A-10 fleet and extending fleet life into the late 2030s rather than retiring the fleet in the near term. Nevertheless, Congress and the Air Force continue to spar over how large the fleet should be, the Air Force wanting to shrink it to about 240 while Congress pushes to retain all current 281 A-10s.

**F-15s and F-16s:** Although the Air Force plans to retire large numbers of older F-15s and F-16s, the slow rate of acquiring new aircraft requires sustaining some of these aircraft for many years. F-16s still provide 40 percent of the Air Force fighter fleet. In FY 2022, the Air Force proposes $617 million for F-16 modifications and upgrades, particularly for advanced radars. For the F-15, it proposes to spend $234 million for a variety of upgrades, particularly for an improved radar.

**F-16 Replacement?** As part of the fighter/attack reviews described above, General Brown announced “a clean sheet assessment of a new F-16 follow-on, that he characterized as a four and a half generation or fifth generation minus aircraft.” He also noted that, “a revamped mix of high, medium, and low-end fighters could take the pressure off the service to over-deploy the F-35 and help defray its huge operations and maintenance costs.”

That approach makes a lot of sense given the high cost of F-35 operations (currently $36,000 per flight hour) and the mismatch between fighter/attack inventories, age, and procurement rate. A spectrum of capabilities also makes sense given the many demands on the fighter/attack force, not all of which will require the highest level of capability, as described in the overview chapter of this series. However, the Air Force terminated its participation in the light attack aircraft program. Its only other aircraft program, NGAD, described below, is shaping up to be at least as expensive as the F-35. Whether something tangible comes out of the Air Force reviews will be seen when the Biden administration unveils its National Defense Strategy.

**Next Generation Air Dominance (NGAD):** Coming up over the horizon is NGAD, the next-generation fighter/attack program for both the Navy and Air Force. Funding in the FY 2022 budget reaches $1.5 billion. Because the program is classified, its exact nature is unclear. The Air Force talks about the program as an aircraft—a sixth generation and a follow-on to the F-35—plus associated technologies and enablers. Indeed, the program received a lot of attention last year when the Air Force reported...

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that a “full-scale flight demonstrator” flew. At other times, the services talk about the program as a collection of technologies. The Air Force budget overview states that NGAD “is focused on fielding capabilities to mitigate identified gaps, not on creating a ‘next generation’ aircraft.”

The Air Force’s FY 2021 budget justification books show RDT&E rising to $2.7 billion in FY 2025 but no procurement in the five-year plan (at least in the published documents).

NGAD will raise the key question, what does “legacy” mean when talking about weapon systems? As discussed in the overview chapter of this military forces report, the military services define legacy as old systems in the inventory. They, especially the Air Force, would see NGAD as a new aircraft to replace old aircraft. Strategists, on the other hand, see legacy platforms as those that use old technologies and outdated operational concepts. They will likely question NGAD, arguing that developing another expensive manned aircraft is looking toward the past and not the future. Instead, these strategists would see NGAD as a collection of innovative technologies, including unmanned aircraft.

[Strategists] will likely question NGAD, arguing that developing another expensive manned aircraft is looking toward the past and not the future.

Perhaps for this reason, the Navy has indicated that it may be headed in a different direction. The Navy’s head of air warfare stated that the two services will have different airframes, though the systems inside the platforms will be similar.

THE TANKER FORCE: STILL STRUGGLING WITH THE KC-46
The KC-46 is replacing the Air Force’s aging tanker force; the current KC-135 tankers having an average age of 59 years and the KC-10s 36 years. The program was thought to be low risk since the airframe is a variant of Boeing’s widely used 767.

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252 USAF Financial Management & Comptroller, United States Air Force Budget Overview Fiscal Year 2022, 3.
However, the program has been troubled from the beginning, with first delivery not occurring until January 2019, three years late, and with years of technical problems and production delays.255 Boeing, the contractor, continues to execute the fixed price contract that it greatly underbid on and on which the company is taking large losses (over $5.1 billion so far).256

For many years, that underbidding strategy appeared to have paid off, as the Air Force planned to continue acquisition. However, the Air Force has recently announced that, because of increasing air threats, it will conduct a new tanker competition after procuring the initial 179 aircraft.257

The KC-46 program is gradually overcoming its difficulties, with deliveries of new aircraft being made and clearance having been obtained to refuel most types of Air Force aircraft. Nevertheless, given the slow pace of acquisition, the current tanker fleet, particularly the KC-135s, will be around for a lot longer.

TACTICAL MOBILITY
This large fleet consists mainly of C-130s, initially fielded in 1956 and now on the “J” model. (“Tactical mobility” also includes some specialty aircraft, mainly small VIP passenger aircraft, which are not discussed here.) The C-130 production line operates smoothly, producing aircraft every year for the Air Force, Navy, and Marine Corps. The Air Force inventory is large: about 200 C-130s for tactical mobility and another hundred or so aircraft in specialty roles.

The most recent mobility requirements study affirmed a fleet requirement of 300, about where the fleet is now.258 The problem is that the Air Force is not buying enough new aircraft to maintain its large inventory. The FY 2022 budget requests only three aircraft. The intention is likely to retire many of the older C-130H models and reduce the size of the fleet, despite the recent requirements study.

The challenge in cutting the fleet is that large numbers of these aircraft reside in the reserve components, and members of Congress are loath to lose flying squadrons in their districts.

STRATEGIC MOBILITY
This fleet consists of C-17s, upgraded C-5s (which were originally built in the 1970s and 1980s), and KC-10s (also classed as refuelers because they have dual missions). No production lines are currently operating, the last C-17 having been delivered in 2013. However, the fleet is relatively healthy because of the large investments made in the 2000s.

The most recent strategic mobility study, *Mobility Capabilities and Requirements Study 2018*, completed in February 2019, found that the fleets were sized adequately.259 A relatively young fleet that is properly sized would seemingly indicate a lot of stability.

However, the National Defense Strategy’s focus on great power conflict raised the possibility of wartime attrition being a consideration for sizing the strategic airlift and sealift fleets, something that earlier studies had not considered. The Government Accountability Office (GAO) reports 11 recent studies that considered contested mobility. The collective insights may push this mobility fleet toward smaller and more numerous platforms, though current acquisition plans do not yet reflect such a shift.260

259 Ibid.
In September 2021, the U.S. Transportation Command completed the Mobility Capabilities and Requirements Study 2020. These periodic studies have specified strategic mobility requirements, including airlift, sealift, and pre-positioning. However, the Department of Defense (DOD) has released no details of the study findings.261

REMOTELY PILOTED AIRCRAFT (RPA)
Figure 4: Remotely Piloted Aircraft versus Manned Aircraft, 2005, 2010, 2022

For the Air Force, this revolution is over. Whereas the Navy’s efforts to integrate unmanned systems into its aviation fleet are still controversial, slow, and limited, as described in this project’s corresponding chapter on the Navy, the Air Force’s incorporation of unmanned aircraft into its force structure—after strong resistance during the 1990s and early 2000s—has become routine.262

The Air Force’s incorporation of unmanned aircraft into its force structure . . . has become routine. However, the Air Force has stalled in its effort to bring more RPAs into the force.


262 The Air Force is emphatic that these are aircraft and not “unmanned” but instead “remotely piloted.” Hence, the Air Force uses the term “Remotely Piloted Aircraft.” There are cultural reasons for this distinction, the Air Force being run by pilots. However, there is also a substantive argument in that, although there are no humans in the aircraft itself, there is a large ground-based support structure to launch, fly, and recover the aircraft.
However, the Air Force has stalled in its effort to bring more RPAs into the force. The RPA proportion of the force has leveled off at 5 to 7 percent for 10 years, and current procurement plans show no change in the future. The FY 2022 budget procures no RPAs and retires the block 30 RQ-4 Global Hawk fleet in favor of the manned E-11. By contrast, the Air Force’s FY 2022 budget procures 91 manned aircraft.263

The Air Force is experimenting with “loyal wingman” RPAs under the umbrella of “Skyborg.” The program has produced the XQ-58A Valkyrie as a demonstrator aircraft. The Low-Cost Attritable Aircraft Technology program explores low-cost, autonomous, and attritable systems, thus allowing the Air Force to operate within an adversary’s defensive zone. The Air Force is emphatic that these complement, rather than replace, manned aircraft. A study by the Air Force Association’s Mitchell Institute reinforced this point: “[drones] are complementary, force multiplying capabilities, not replacements for fifth-generation stealth aircraft.”264

General Brown has stated that the Air Force is seriously considering building a fighter fleet with more drones than piloted aircraft.265 Existing RPA initiatives, plus any new programs that might come out of the ongoing aircraft reviews, might change the inventory balance in the future. However, none of these RPA programs are yet an official “program of record.”

A major issue is whether to buy RPAs for permissive or non-permissive environments. MQ-9 Reapers can only operate in permissive environments. That has been fine for the kinds of conflicts the United States has fought recently. However, in a conflict with a high-end adversary such as Russia or China, these aircraft would be vulnerable because of their slow speed, high visibility, and lack of defensive systems. That vulnerability was illustrated dramatically in July 2019 when the Iranians shot down a Navy RQ-4.

Will the Air Force develop and procure stealthy and largely autonomous UAVs to operate inside these challenging air defense environments? That may already be occurring. One stealthy unmanned aircraft, the RQ-170 Sentinel, an Air Force/CIA collaboration, is known to exist because one was shot down over Iran in 2011 and exhibited to the public. A larger RQ-180, a high-altitude, unmanned long-range reconnaissance system, is also reported to be flying and likely operating.266 However, both appear to be for reconnaissance, not attack.

**The Curse of Short Range**

A recent concern is that the Air Force tactical aviation fleet is too short ranged for great power conflicts. Combat ranges of current aircraft run from 550 to 750 miles. NGAD might have a range of up to 1,000 miles, but the program is mostly conceptual at this point.

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The problem is that demands on the fleet have changed. During the Cold War, short range was not a problem because the forward fighter bases in NATO were close to the front line. It was not a problem after the Cold War because adversaries did not have anti-air capabilities that could reach much beyond their own borders. As a result, U.S. tactical aircraft could refuel as often as they needed.

However, in potential conflicts with China and Russia, operational range matters. The Pacific is vast. Although Kadena Air Force base on Okinawa is close enough to Taiwan (400 miles), it is 1,400 miles from the South China Sea, where conflict is also possible. Anderson Air Force Base on Guam is 1,400 miles from the South China Sea and 1,700 miles from Taiwan.

U.S. bases in Europe, even forward bases in Eastern Europe, are still far from potential battlefields. RAF Lakenheath, for example, is nearly 1,000 miles from the Baltic states and Spangdahlem Air Force Base in Germany is 850 miles. Further, airbases are again vulnerable, so U.S. aircraft may need to be based further away from their targets, and adversary air defenses may make aerial tanking risky.

As a result, many analyses recommend actions to increase standoff range and reduce vulnerability: an emphasis on bombers because of their long range; the curtailment of F-35 procurements because of their short range; the dispersion of basing; and the development of long-range strike, especially unmanned systems. For example, in a congressionally directed study, the Center for Strategic and Budgetary Assessments (CSBA) recommended, “the Air Force should rebalance its combat forces in favor of long-range, penetrating bombers.” CSBA also recommended developing a new, long-range fighter/attack aircraft (“penetrating counter-air”) to substitute for some F-35 inventory.267 Similarly, in another congressionally directed study, the MITRE Corporation recommended “an increase in available long-range aircraft and bases [to] strengthen the conventional deterrence posture of U.S. forces.”268

The Air Force argues that long-range munitions such as the Joint Air-to-Surface Standoff Missile (JASSM) can compensate for short-ranged aircraft. Such munitions do allow standoff, which is helpful, but they are also expensive. JASSM XR has a range of 1,200 miles but costs $1.25 million.269

The Air Force has also instituted a new deployment concept, Agile Combat Employment, which spreads aircraft out from large and vulnerable fixed bases. That helps greatly with the vulnerability problem and may help with the range problem, though the shorter the aircraft range, the deeper it must be based inside an adversary’s defensive bubble.

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The Navy suffers from the same range limitation but has the advantage of being able to move its airfields (aircraft carriers) around, so this affects the Air Force more intensely.\textsuperscript{270}

DOD's ongoing reviews of aircraft programs in capabilities may pick up on this point and recommend a change in direction.

**Nuclear Enterprise**

After decades of stability and low visibility, the nuclear force is getting attention again as the cost of modernization programs makes them more visible and controversial.

In 2018, the intercontinental ballistic missile (ICBM) force leveled off at the New START limit of 400, where it remains. The nuclear bomber force (B-2s and B-52s) holds steady at 96 (Total Active Inventory). The Trump administration’s Nuclear Posture Review (NPR), published in February 2018, affirmed the need for the nuclear triad to deter nuclear and non-nuclear aggression and assure allies and partners.\textsuperscript{271}

However, after nearly three decades of low public visibility and relatively low cost, the nuclear enterprise is getting more attention because the systems acquired during the Reagan buildup of the 1980s are now reaching the end of their service lives and must be replaced. That brings opposition from arms-control advocates. The Biden administration’s Interim National Security Strategy Guidance endorses arms control, citing “the need to reduce the role of nuclear weapons” and pledging “to head off costly arms races and re-establish our credibility as a leader in arms control.”\textsuperscript{272}

The Biden administration is conducting a nuclear posture review, which will lay out its direction for nuclear forces. That review will be published at the end of calendar year 2021 or the beginning of 2022.

Table 6 shows FY 2022 budget plans for DOD’s two most controversial nuclear modernization programs. Especially striking, when combined with the Biden administration’s support for the B-21 bomber and the Columbia-class ballistic missile submarine, is the strong budget support for nuclear programs despite rhetoric about arms control. It may be that the Biden administration is supporting nuclear programs pending a new round of arms-control negotiations.\textsuperscript{273}

One piece of good news is that in response to scandals several years back and several outside reviews, the Air Force (and the Navy) implemented a wide variety of actions to improve the standards and quality of their nuclear enterprise, both personnel and operations. The absence of any recent incidents indicates success. Here, no news is good news.


\textsuperscript{273} The Biden administration FY 2022 budget also supported two smaller Navy nuclear modernization programs despite criticism by arms control advocates: the Sea Launched Cruise Missile – Nuclear and the W76-2 small yield warhead.
Table 6: Nuclear Modernization Programs

<table>
<thead>
<tr>
<th>Program</th>
<th>FY 2021 enacted ($, millions)</th>
<th>FY 2022 proposed ($, millions)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground-Based Strategic Deterrent (GBSD)</td>
<td>1,447</td>
<td>2,564</td>
<td>ICBM replacement, in development. DOD has strongly endorsed maintenance of the nuclear triad. However, GBSD has been controversial among arms-control advocates and some budget hawks who see it as unnecessary and would reduce the nuclear forces to a “dyad” or even a “monad.”</td>
</tr>
<tr>
<td>Long-Range Standoff (LRSO) weapon</td>
<td>385</td>
<td>609</td>
<td>In development. LRSO, a nuclear-armed cruise missile, provides standoff for nuclear attack. It has been controversial because bombers already have one nuclear munition, the B61 bomb.</td>
</tr>
</tbody>
</table>


**Creation of the Space Force**

The Space Force is now a reality as the fifth DOD military service (the sixth U.S. military service, including the Coast Guard). By the end of FY 2022, the Space Force will have 8,400 military personnel, most transferred from the Air Force. This includes the transfer of 23 units. A later chapter will describe these actions in more detail.

So far, the split has been amicable. The Air Force has supported the establishment of the new service and facilitated its stand-up. Nevertheless, some elements of the division of personnel, facilities, and organizations remain. The split has been facilitated by the increase in personnel. Originally, the Space Force was not going to increase the number of billets in the DOD. That goal has been abandoned, with both the Air Force and Space Force increasing in size.
Military forces include the Space Force (fully established but still defining itself), Special Operations Forces (shifting their strategic focus), Department of Defense (DOD) civilians (still growing because of linkage to readiness), and contractors (a permanent element of force structure despite some criticism).

**KEY TAKEAWAYS**

**U.S. Space Force**

- Major elements of the U.S. Space Force (USSF), such as a service headquarters, appropriations accounts, training and educational commands, operational headquarters, and systems command, have been established. The shape of the acquisition organization and related acquisition processes are major unresolved questions.
- Personnel and organizations continue to transfer to the new service, though there may be controversy about remaining transfers as the Army and Navy seek to retain some space capabilities.
- Major space issues include creation of a guard and reserve component, the balance of offensive and defensive capabilities, international agreements on “responsible” behavior, and the balance between commercial and military capabilities.
- The USSF’s small size will require heavy reliance on other services, particularly the Air Force, for support functions as well as a different approach to personnel management.

**Special Operations Forces**

- Special Operations Forces (SOF) continues its gradual expansion and shifts focus away from counterinsurgency toward great power conflict.
Nevertheless, the strategic shift raises questions about SOF’s long-term size.

- SOF has (so far) successfully transitioned its funding away from heavy dependence on war funding accounts.
- Institutional arrangements shifted briefly to a status like a military service, then back, but the debate continues.
- A broad set of actions to counter recent instances of ethical misconduct by its personnel seems to be having a positive effect.

**Department of Defense Civilians**

- The number of DOD civilians rises slightly in FY 2022, reflecting the civilian workforce’s contribution to readiness and lethality.
- However, civilians are often seen as overhead and targeted for reduction in management reform efforts. The Biden administration’s position here is not yet clear.

**Contractors**

- Contractors have become a permanent part of the federal workforce but remain controversial due to enduring questions about cost and what contractors should or should not do.
- Operational contractors continue to play a vital role in U.S. Central Command (CENTCOM), though reduced with the end of operations in Afghanistan. DOD’s ongoing strategy review is unlikely to recommend more use of contractors. However, that could be the effect if DOD cuts troop numbers without reducing operational requirements.

**Space Force**

The USSF, officially created on December 20, 2019, continues to mature. The split from the Air Force has been smooth, with about half the expected personnel transferred to the new service. New USSF organizations are established, and personnel transfers from the other services have begun. The new service will need to create a new organizational culture, and its small size means that it will operate much differently from the other military services.

**Table 1: Space Force Personnel**

<table>
<thead>
<tr>
<th></th>
<th>Active-Duty Military</th>
<th>Civilians</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2021 Enacted</td>
<td>6,434</td>
<td>3,545</td>
</tr>
<tr>
<td>FY 2022 Request</td>
<td>8,400</td>
<td>4,364</td>
</tr>
<tr>
<td>Change</td>
<td>+1,966</td>
<td>+819</td>
</tr>
</tbody>
</table>


The Space Force and the Air Force set up a process by which individuals can opt to leave one service and join the Space Force. The Space Force has been very attractive, with 3,700 personnel from the Army, Navy, and Marine Corps applying for transfer. Fifty transferred in FY 2021. A total of 670 personnel will transfer from these services in FY 2022—603 soldiers, 49 sailors, and 18 marines—along with 259 civilian billets and $2.5 billion in funding over the five-year period. Some transfer as individuals, some as a result of organizational transfers. The current size (8,000 military personnel) is about half the final size (16,000), so more transfers will occur, but these are still being determined.

The Space Force has been very attractive, with 3,700 personnel from the Army, Navy, and Marine Corps applying for transfer. Fifty transferred in FY 2021. A total of 670 personnel will transfer from these services in FY 2022.

The Space Force has started its own recruiting in FY 2022, planning to add 500 enlisted guardians and 260 officers through direct accession.

BUILDING SPACE CAPABILITIES AND A NEW MILITARY SERVICE
The United States Space Force is a separate branch of the armed forces within the Department of the Air Force (motto “Semper supra,” “Always above”). It is “organized, trained, and equipped to . . . provide freedom of operation for the United States in, from, and to space [and] conduct space operations.” As space operations are currently structured, the USSF is, in effect, a satellite force. It acquires satellites and the launch services, oversees two launch facilities, and operates constellations of satellites through ground stations in the United States and around the world.

Last year, the administration implemented a wide variety of organizational changes to stand up the new service and emphasize the national security space enterprise. These actions included establishing U.S. Space Command (SPACECOM), redesignating Air Force Space Command (AFSPC) as the first element of the Space Force, publishing a capstone doctrine manual (Spacepower), and establishing a new assistant defense secretary for space policy and an assistant secretary for space acquisition and integration (ASAF/SP) within the Air Force. The Space Force emphasizes its digital nature. General John W. Raymond noted, “As the only U.S. military service to be established during the Information Age, the United States Space Force (USSF) has the unique opportunity to be ‘born digital.’”

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DOD announced that SPACECOM, a joint command that is not part of USSF but closely connected to it, will move to the Army’s Redstone Arsenal in Alabama. The controversial decision is under review by the DOD inspector general.

The National Space Council, reestablished in 2017, has responsibility to coordinate space activities across the entire federal government, including DOD. Vice President Kamala Harris was named the administration’s lead and held the first meeting on December 1, 2021, a year after the previous meeting. This first meeting under the new administration focused on “promoting rules and norms, addressing the climate crisis, [and] building on our STEM workforce.” Several members denounced Russia’s recent antisatellite test which produced a large amount of debris. The administration expanded the membership of the council to include departments of education, labor, interior, and agriculture. It also published at the same time the United States Space Priorities Framework, which laid out a broad space agenda.

As space operations are currently structured, the USSF is, in effect, a satellite force. It acquires satellites and the launch services, oversees two launch facilities, and operates constellations of satellites through ground stations in the United States and around the world.

In addition to transferring more personnel into the Space Force, actions in FY 2021 and into FY 2022 focus on the acquisition organization. The Air Force Space and Missile Systems Center was redesignated as Space Systems Command (SSC) on August 13, 2021. A Space War Fighting Analysis Center stood up inside SSC. A new Space Operations Center will coordinate with the combatant commanders.

It is unclear whether the Space Development Agency and the Space Rapid Capabilities Office—both now part of the Air Force—will be aligned with the new command. Regardless of the organizational alignments, however, the intention is to establish a more rapid and agile acquisition system, which requires congressional approval. DOD has not yet proposed specific legislation. However, USSF is leveraging the mid-tier acquisition authorities (section 804) that allow more rapid acquisition by bypassing many of the acquisition system’s requirements.

The Space Force will not send astronauts into orbit. That is the exclusive purview of the National Aeronautics and Space Administration (NASA), a civilian agency, although Space Force personnel could

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be loaned to NASA to serve as civilian astronauts, as has been the case historically with the other military services. When the Space Age began, the United States intentionally made human spaceflight a civilian rather than a military function, and as a result, the military has never operated crewed spacecraft.

Neither will the Space Force control the satellites of the intelligence community. These fall primarily under the National Reconnaissance Office (NRO). However, the Space Force and the NRO have exchanged liaison cells.

**USSF BUDGET**

Although this paper is not a budget analysis, a few budget issues bear discussion because they affect structure.

USSF is in the process of gaining control of its resources. Personnel funding is still in Air Force military personnel accounts. Other USSF appropriations—operations and maintenance; research, development, testing, and evaluation (RDT&E); and procurement—transfer in the FY 2022 budget.

The Space Force has a massive RDT&E appropriation ($11.3 billion) for such a small service. Much of the effort is focused on maintaining and modernizing existing satellite constellations. The RDT&E appropriation seems out of proportion with the procurement account ($2.8 billion), though accounting rules allow the services to build some satellites in RDT&E rather than procurement.

The largest element in the Space Force RDT&E account ($4.5 billion, or 40 percent) is classified, so it is difficult to state exactly what is going on.281

**A DIFFERENT ORGANIZATIONAL STRUCTURE**

The Space Force’s culture, organization, and personnel structure will be unique because of its specialized mission and small size.

For example, unlike the other military services, USSF will conduct almost all its operations from large facilities in the United States. As USSF describes its operations, it will “provide diverse combat effects from tactically independent elements which in many cases are not deployed into or employed from the affected area of responsibility.”282 That leverages USSF expertise and capabilities without needing to transport personnel and equipment during a crisis. However, it also means that USSF personnel will not share the dangers and discomforts of warfighting deployments that the other services experience.

The guidance establishing the Space Force states that it will “remain mission-focused by leveraging infrastructure of the U.S. Air Force, except in performing those functions that are unique to space or central to the independence of the new Armed Force.”283 That means that the Space Force will rely on

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a lot of Air Force organizations, as the Marine Corps does with the Navy. However, because of its small size, the Space Force will need to go much further in its reliance, so functions such as recruiting will likely come from Air Force organizations with Space Force personnel embedded.

The comprehensive plan notes that the Space Force will receive more than 75 percent of its critical support functions from the Air Force. This structure may have the advantage of focusing the Space Force on core activities rather than having attention diverted by bureaucratic demands. Nevertheless, there will likely be continuing institutional tensions between the need to rely on the Air Force structure and the desire to stand up the full set of training, doctrine, personnel, installation, acquisition, and education organizations that the other military services have. The other military services devote thousands of personnel to these functions, numbers that the Space Force cannot match. Instead, it may use government civilians and contractors to a greater degree than the other services.

Another unique aspect is the rank structure. Currently, the Space Force consists of 46 percent officers (3,859 officers out of a total strength of 8,400), up from 43 percent in FY 2021. That ratio might change a little as more personnel and organizations are incorporated, but it is unlikely to change very much. Because so few Space Force officers will have the experience of leading large organizations and large numbers of personnel, the culture will likely evolve into one of officers as highly skilled technicians rather than as leaders.

Table 2: Officer Percentage among the Services

<table>
<thead>
<tr>
<th></th>
<th>Space Force</th>
<th>Army</th>
<th>Navy</th>
<th>Marine Corps</th>
<th>Air Force</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>46%</td>
<td>19%</td>
<td>16%</td>
<td>12%</td>
<td>19%</td>
</tr>
</tbody>
</table>


The ability of the Space Force to produce the requisite number of joint qualified officers and senior leaders from such a small base will be a challenge that will take years to resolve.

MEANWHILE, UP IN SPACE

In FY 2022, the Space Force will procure five national security space launches as it transitions away from its dependence on the Russian RD-180 engine used on the Atlas V and the costly Delta IV family of vehicles. Currently, there are four eligible launch vehicle types in operation: Atlas V, Delta IV Heavy, Falcon 9, and Falcon Heavy. Under the National Security Space Launch program, the military plans to transition to the Falcon 9, Falcon Heavy, and the yet to fly Vulcan launch vehicle. USSF also procure two GPS III satellites.


Based on open-source data, planned launches include one more launch in calendar year 2021, with three planned for the first half of calendar year 2022.\(^{286}\) The president’s budget has funding for seven launches in FY 2022.\(^{287}\)

USSF maintains several major satellite constellations and the ground stations, satellite relays, and space launch facilities required to establish and sustain these constellations, including:

- Advanced Extremely High Frequency (AEHF) system for protected communications;
- Wideband Global SATCOM System (WGS) for global high-data-rate communications;
- Global Positioning System (GPS) for global positioning and timing;
- Defense Meteorological Satellite Program (DMSP) for weather;
- Space-Based Infrared System for missile warning (USSF is developing a follow-on, the Next-Generation Overhead Persistent Infrared system);
- Geosynchronous Space Situational Awareness Program (GSSAP) for tracking and characterization of objects in geostationary orbit; and
- Mobile User Objective System (MUOS), a constellation of five satellites recently transferred from the Navy which provides global narrowband communications.

**LOOKING AHEAD**

The USSF has surmounted a key challenge, its permanence. Although some progressives have recommended that the Space Force be abolished as part of a broader effort to reduce defense spending, the Biden administration has not even hinted at restudying the question.\(^{288}\) The Space Force is permanent.

Nevertheless, many issues remain, and how those play out will shape the Space Force of the future.

**A Dedicated Military Department:** Early concepts included eventual creation of a new military department for space, thus breaking the Space Force out from the Department of the Air Force and moving the NRO into this new department. So far, there has been no movement in that direction, and DOD’s concept does not include it.\(^{289}\) This idea appears to be dead.

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**Reserve Components**: Currently, there is no reserve component to the USSF, but there likely will be one. The politically powerful National Guard has argued for having a role since several existing guard and reserve units perform space functions. However, the states have no authorities in space, so the exact nature of a “Space Guard” needs to be determined. A reserve component would provide strategic depth for U.S. space operations and a mechanism to retain personnel with space-related skills. The FY 2022 National Defense Authorization Act does not contain provisions in this area, but pressure from the guard and reserve components will keep the issue alive.

**The Final Composition of the Space Force**: The easy transfers have occurred. The Air Force has mostly completed its transfers. Seven Army and four Navy organizations have moved into the USSF, including the Army’s Space Operations Brigade and the Navy’s Satellite Operations Center. However, the Army and Navy want to retain some space capability to ensure that their forces receive adequate support. Apparently, this is producing some contentious discussions inside the Pentagon, though the disagreements occur internally and only hints have leaked out. These discussions about where to draw the line between the USSF and service space capabilities will continue through the coming year.

**The Role of Offensive Operations Space**: Space weapons can include space-to-space, ground-to-space, and space-to-ground capabilities. The Space Force has talked about “warfighting in space,” “space power,” and “space superiority.” There are hints that the United States has developed an antisatellite capability in the classified world beyond the antisatellite capabilities inherent in some existing missile defense interceptors. This may be making officials in the Biden administration nervous. There are long-standing criticisms about the “militarization” of space even though space has had a military function since the first human activity in that domain (what critics actually mean is the “weaponization” of space).

Space Command became a “geographic” combatant command with responsibility above 100 km, rather than a “functional” command as it had been previously. This implies a warfighting role rather than a support role.

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Instead of offensive capabilities, the Biden administration may emphasize resilience and supporting operations to the other warfighting components. The forthcoming National Defense Strategy will likely give some insights here.

**Threats from Space Debris:** Fears that space debris could render certain orbits unusable have engendered calls for restrictions on debris-producing antisatellite weapons. A recent Russian test that destroyed an inactive satellite has exacerbated these fears. A CSIS report noted that “continued tests of such systems appear to be normalizing the behavior.”297 Russia claims such tests are in response to creation of the USSF. The United Nations moved to set up guidelines about responsible behavior in space, but Russia and China have frustrated such efforts so far.298

**Arms Control and International Agreements about Activities in Space:** Currently, there are restrictions on nuclear weapons in space, but that is about all.299 The Biden administration is likely to push for a variety of agreements on “responsible” space behavior, driven by concerns about space debris and attacks on satellites. There is a precedent in that the United States and the Soviet Union/Russia developed a series of agreements about how their air and naval forces would interact during peacetime to avoid collisions and escalation. The same could occur in space. The United Nations has approved a new working group to develop “rules of the road for military activities in space,” though Russia and China could frustrate these as they seek to expand their space activities.300

**Reliance on Commercial Satellites versus Custom-Designed Military Satellites:** This is a perennial discussion. Military satellites offer a variety of protections, both physical and electronic, that commercial satellites typically do not offer. However, commercial satellites are often much less expensive and can be launched more rapidly. Further, when the government uses purchased services, it can adjust capacity as needed, buying more or less as the situation demands. The strategic review will give insights into where the new administration intends to draw the line between the two capabilities.

**Relations with the NRO:** The intelligence community successfully fought to be excluded from the Space Force. That means that about half of U.S. military launches and satellites do not fall under the Space Force. A classified government agreement delineates the responsibilities of the NRO, Space Force, Air Force, National Geospatial-Intelligence Agency, and Space Command.301 Nevertheless, there many points of potential friction.

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299 Harrison, *International Perspective on Space Weapons*.


**USSF Uniforms:** Finally, the discussion of the USSF cannot avoid mentioning the great debate over uniforms, which seems to overshadow issues about warfighting capabilities at times. The USSF wants its uniforms to be distinctive, but publicly revealed prototypes have engendered extensive commentary about their sci-fi character.302

**Special Operations Forces (SOF)**

One long-time theme continues—gradual force growth. However, stress on the force has faded as a publicly stated concern, as is true of the rest of the department. Deployment-to-dwell numbers approach department goals. Special Operations Command’s (SOCOM) budget transitioned smoothly from its previous dependence on the wartime overseas contingency operations (OCO) funding to base funding. Strategic focus is shifting to great power conflict. Unclear is whether SOCOM can retain funding and personnel over the long term as the strategy shifts. Ethical misconduct—a disturbing theme that arose in recent years—has disappeared after extensive efforts to educate and discipline the force. Institutional arrangements shifted briefly to full status as a military service, then back to quasi-independence.

**FY 2022 STATUS**

SOCOM consists of service component commands from four services—Army (Special Forces, Ranger Regiment, Special Operations Aviation, Civil Affairs, Psychological Operations), Navy (SEALs, Special Warfare Combatant-craft Crewmen), Air Force (Special Purpose Aircraft and Combat Control teams), and Marine Corps (one “Raider” regiment). Joint Special Operations Command and seven Theater Special Operations Commands conduct operations. SOCOM develops joint doctrine and has the Joint Special Operations University, while extensive service-specific school and doctrine activities reside within the service components.

Table 3: Special Operations Forces – Military, Civilians, and Contractors

<table>
<thead>
<tr>
<th></th>
<th>Military End Strength (<em>active and reserve</em>)</th>
<th>Civilian FTEs</th>
<th>Contractors</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2021 Enacted</td>
<td>67,095</td>
<td>6,831</td>
<td>5,892</td>
</tr>
<tr>
<td>FY 2022 Request</td>
<td>67,524</td>
<td>6,917</td>
<td>6,006</td>
</tr>
<tr>
<td>Change</td>
<td>+429</td>
<td>+86</td>
<td>+114</td>
</tr>
</tbody>
</table>

Note: SOCOM’s military and civilian personnel are reported in the respective service tables. The numbers in this table are therefore not additional to what is shown in the service numbers.


As Table 3 shows, SOCOM continues to grow, though slowly. The additional personnel in FY 2022 will close “manning gaps for combat service/combat service support (CS/CSS) personnel to alleviate operational tempo stress on certain enablers.”

FORCE GROWTH OVER TIME

Figure 1: SOCOM Military Personnel, 1999 to 2022, Active and Reserve Component

Note: The irregular pattern in Army numbers from 2006 to 2008 arises because some reserve civil affairs units transferred into SOCOM and then out again.


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SOCOM grew greatly during the wars in Iraq and Afghanistan, from 29,500 military personnel in 1999 to 67,524 today. It is now approaching the size of the regular forces of the British army (81,800 in 2021). This large post-2001 increase was primarily in response to demand for counterterrorism operations in CENTCOM. DOD also steadily increased the number and type of missions assigned to SOCOM. SOCOM has provided DOD’s core direct action and counterterrorism capabilities, in addition to conducting other SOCOM missions, such as foreign internal defense, irregular warfare, and civil affairs. Demand for all these missions grew globally as well. In addition to its traditional missions, SOCOM became DOD’s Coordinating Authority for Countering Violent Extremist Organizations, Countering Weapons of Mass Destruction, and transregional Military Information Support Operations. In effect, the additional responsibilities make SOCOM a “global COCOM.”

This expansion has not been without controversy. The lack of transparency in SOCOM operations and ease of committing SOCOM forces to operations bothers many commentators. As one critic observed, “The power to order pinpoint strikes and killings, often cloaked in secrecy, enables a president to act with minimal public scrutiny, and can tempt the president to substitute a few small, dramatic exploits for a more sustained strategy.” Nevertheless, presidents have found the capability useful and will continue to rely on it.

SOCOM grew greatly during the wars in Iraq and Afghanistan, from 29,500 military personnel in 1999 to 67,524 today. It is now approaching the size of the regular forces of the British army . . . [However,] this expansion has not been without controversy.

The challenge for continuing expansion, as the Congressional Research Service observed, will be “how much larger USSOCOM can grow before its selection and training standards will need to be modified to create and sustain a larger force.” So far, SOCOM has not signaled any quality problems.

PERSONNEL STRESS: NOW A MANAGEABLE CHALLENGE
High operational tempo plagued SOCOM in the past, putting stress on personnel and their families, resulting in retention challenges and an increase in suicides. However, withdrawals from conflicts in the Middle East over the last few years have eased this stress. Figure 2 shows how SOCOM deployment levels have declined substantially since a surge at the beginning of the Trump administration, likely caused as
part of an effort to stabilize the military situation in Afghanistan before pulling out U.S. troops. Budget documents show SOCOM deployments down from 7,533 in FY 2021 to 4,450 in FY 2022.307

Figure 2: SOCOM Deployments

![Figure 2: SOCOM Deployments](https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2022/budget_justification/pdfs/01_Operation_and_Maintenance/O_M_VOL_1_PART_2/SOCOM_DWE.pdf)

The current posture statement notes “nearly 5,000 SOF deployed to 62 countries” but “our deployed forces are down 15% from last year — the lowest since 2001. . . . [W]e expect to achieve a sustainable balance of deployed forces . . . and reach the DOD’s directed 1:2 deployment to dwell ratio for all SOF.” Programs such as Preservation of the Force and Family and Warrior Care have also helped ease stress.308

**SUCCESSFUL TRANSITION OF FUNDING AND STRATEGY . . . SO FAR**

With the reduction of U.S. troop commitments to conflicts in the Middle East and a defense strategy reorientation toward great power conflict, particularly China, SOCOM faced three major challenges: reducing dependence on the controversial wartime funding account, refocusing on great power conflict and away from counterterrorism and direct-action campaigns, and maintaining its size. So far, these efforts have been successful, but size and funding are vulnerable during the strategic review.

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308 Richard D. Clarke, *Posture Statement of Gen. Richard D. Clarke*, Statement before the Senate Armed Services Committee, 117th Cong., 2nd sess., March 25, 2021, https://www.armed-services.senate.gov/imo/media/doc/Clarke_03-25-21.pdf. It is unclear why the posture statement cites a 15 percent reduction while the budget documents show a 41 percent reduction, as shown in Figure 2.
Table 4: SOCOM Funding

<table>
<thead>
<tr>
<th>($ Millions)</th>
<th>FY 2020</th>
<th>FY 2021</th>
<th>FY 2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations and Maintenance</td>
<td>13,330</td>
<td>12,779</td>
<td>12,272</td>
</tr>
<tr>
<td>Research, Development, Testing, and Evaluation</td>
<td>852</td>
<td>813</td>
<td>696</td>
</tr>
<tr>
<td>Procurement</td>
<td>2,568</td>
<td>2,403</td>
<td>2,169</td>
</tr>
<tr>
<td>Military Construction</td>
<td>494</td>
<td>389</td>
<td>304</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17,244</strong></td>
<td><strong>16,384</strong></td>
<td><strong>15,441</strong></td>
</tr>
</tbody>
</table>

Source: From FY 2021 and FY 2022 Defense-wide budget materials.309

During the wars, SOCOM was highly dependent on wartime funding, called overseas contingency operations (OCO) funding. In FY 2021, 28 percent of its total funding ($3.7 billion) was in OCO, nearly three times the department’s rate overall (10 percent). The Biden campaign and many commentators had criticized OCO, so SOCOM’s budget was highly vulnerable.

However, as DOD’s wartime funding transitioned into the base budget, SOCOM seems to have retained adequate funding for enduring activities and not suffered in the process. Some of the funding reductions in FY 2021 and FY 2022 appear tied to wartime activities, which have declined. Other cuts resulted from Secretary Mark Esper’s FY2021 Defense Wide Review for the FY 2021 budget. Despite these cuts, the SOCOM posture statement does not complain about budget cuts. The FY 2023 and future budgets will be important indicators, however. The budget should stabilize as the level of overseas activities stabilizes.

During two decades of conflict in the Middle East, SOCOM focused on counterterrorism and stability operations. There was little bandwidth available to think about or prepare for the kind of great power conflicts that the National Defense Strategy has been moving toward since 2014.

However, the most recent posture statement emphasizes how SOCOM is changing its focus, noting that “nearly 40% of our deployed forces will focus on [great power conflict] requirements.” These efforts emphasize competition “below the threshold of armed conflict,” such as “irregular warfare, foreign partner capacity building, clandestine activities, and information operations.” Given the high interest in this kind of competition, SOCOM seems to be on solid ground. Nevertheless, some commentators described this as an “identity crisis,” because it is such a radical shift from what these forces have done for the last 20 years. Unstated, perhaps because of classification, are SOCOM’s planned activities in kinetic great power conflicts.

Whether SOCOM can maintain its funding and size under the new strategy remains to be seen. The decline in deployments means that force size is no longer as critical for maintaining acceptable personnel tempo. The shift in strategy makes SOCOM a supporting player rather than the central player. During the wars in the Middle East, SOCOM capabilities were at the center of the campaigns. Although special operations forces will have a role in a conflict with China, that role will be secondary given the air and maritime characteristics of the theater.

**ETHICAL CHALLENGES OVERCOME?**

A few years ago, ethical misconduct emerged as a new and disturbing theme for SOF, raising broader questions about SOF professional attitudes and marring the reputation of SOF, especially the SEALs. The risk with any special force is that personnel come to believe that they are not restricted by the ethical rules that bind other servicemembers.

SOCOM’s internal ethics review concluded that the force did not have a “systemic ethics problem.” However, it found that the emphasis on sustained deployments “impacted our culture in some troublesome ways.” The review recommended a variety of actions to improve leadership, discipline, and accountability.

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There is always some question when an institution investigates itself and finds that there are no fundamental problems. Nevertheless, the lack of recent incidents indicates that new policies may be working.

**ACQUISITION INNOVATION: LIGHT ATTACK AIRCRAFT**

In FY 2022, SOCOM requests $2.17 billion of procurement, mostly to modify service aircraft to SOCOM configurations (e.g., MH-47Gs and MH-60s). The major SOCOM unique acquisition is the light attack aircraft program that the Air Force dropped. Called “Armed Overwatch,” the program will acquire propeller-driven aircraft for attack and reconnaissance that can operate from remote, austere locations. This aircraft would operate in relatively permissive environments where sophisticated jets are not needed but rapid response and forward basing are. Congress delayed the program, allowing only one aircraft in FY 2021, but SOCOM proposes to buy six in FY 2022.

In addition to operating from remote and austere locations, a key advantage is that the aircraft would be much less expensive to acquire and operate. The budget allocates about $25 million per aircraft, with estimates of operating cost at $500 per flying hour. By contrast, an F-35 costs about $100 million per aircraft and $30,000 per flight hour. This addresses the inconsistency of having hundred-million-dollar jet aircraft laden with sophisticated electronics and survivability features to drop bombs on insurgents armed with rifles.

The program still faces some skepticism in Congress, which is calling for additional reviews and certifications. However, this program, if implemented, would be a radical change in the way air support is provided. The historical trend has been toward multirole jet aircraft, which can operate in both high-end and permissive environments, although at extremely high cost. It would also provide SOCOM with a new kind of capability and some independence from support by the Air Force.

**ORGANIZATION: ONE STEP TOWARD STATUS AS AN INDEPENDENT SERVICE, THEN PARTIALLY BACK**

Over the years, Congress has taken action to make SOF like a separate service. The commander of SOCOM has many more authorities than other combatant commanders, having influence over budgets, acquisition requirements, doctrine, promotions, and personnel assignments. The assistant secretary of defense for special operations and low-intensity conflict, or ASD(SO/LIC), has authorities like a service secretary for exercising administrative and policy control over designated forces. As a result, SOCOM operates much like a military service and unlike the other combatant commands.

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In FY 2017, Congress included a requirement in the National Defense Authorization Act to “elevate special operations forces to a level on par with military departments as authorized and directed by Congress.” On November 18, 2020, acting secretary of defense Christopher Miller announced that ASD(SO/LIC) would report directly to the secretary of defense instead of through the undersecretary for policy, as had been the long-standing structure.316

On May 5, 2021, Secretary of Defense Lloyd Austin reversed this decision, returning the office to its previous organizational position. However, the office did retain some special authorities, including a direct report to the secretary on special operations’ peculiar administrative matters, and the ASD(SO/LIC) would remain a member of the senior leader forums.317 The debate continues about how best to provide both operational flexibility and adequate civilian oversight, so this issue will return.318

**DOD Civilians**

The number of DOD civilians will continue to grow in FY 2022. The relative strength of DOD civilian numbers occurs because civilians help readiness, most being in maintenance, base operations, and supply functions, not in headquarters (as is often believed).

**Table 5: Department of Defense Civilians (Full-Time Equivalents)**

<table>
<thead>
<tr>
<th></th>
<th>Total DOD Civilians (Excluding Foreign Indirect Hires)</th>
<th>Total DOD Civilians (Including Foreign Indirect Hires)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2021 Enacted</td>
<td>777,400</td>
<td>807,400</td>
</tr>
<tr>
<td>FY 2022 Request</td>
<td>786,000</td>
<td>815,500</td>
</tr>
<tr>
<td>Change</td>
<td>+ 8,600</td>
<td>+ 7,900</td>
</tr>
</tbody>
</table>

Note: Full-time equivalents rounded to the nearest hundred. Total excludes civilians under cemeterial expenses, which are funded outside the DOD budget.


318 For one opinion disagreeing with the recent change, see Betsy Woodruff Swan and Laura Seligman, “Internal Study Highlights Struggle over Control of America’s Special Operations Forces,” Politico, May 7, 2021, https://www.politico.com/news/2021/05/07/internal-study-defense-special-operations-forces-485825.

319 Full-time equivalents rounded to the nearest hundred. Total excludes civilians under cemeterial expenses, which are funded outside the DOD budget. "Foreign indirect hires" are defined as follows: "The host government serves as the legal employer of U.S. forces’ foreign nationals. Although the host government is the official legal employer of the foreign national personnel, it grants operational control to U.S. forces for the day-to-day management of such personnel." Personnel may be paid by either the United States or the host government. "DOD Instruction 1400.25, DoD Civilian Personnel Management System: Employment of Foreign Nationals," DOD, July 5, 2011, https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/140025/1400.25-V1231.pdf.
The United States is unusual for having many civilians work in its defense establishment, a role other countries usually reserve for military personnel. DOD's civilians perform a wide variety of support functions in intelligence, equipment maintenance, medical care, family support, base operating services, and force management. The department does this because civilians provide long-term expertise, whereas military personnel rotate frequently. Further, for all its limitations, the civilian personnel system is more flexible than the military system in that civilian personnel do not need to meet the strict standards for health, fitness, combat skills, and worldwide assignments that military personnel do.

Civilians are often viewed as “overhead” that staff Washington headquarters. Civilians do work mostly in support activities, but DOD considers them readiness assets since most work in supply, maintenance, and base operations. Thus, most civilians (93 percent) are outside Washington. Only about 4 percent (33,300) work in management headquarters. Most civilians (74 percent) are in the military departments, not in Defense-wide activities.320

DOD argues that “Effective and appropriate use of civilians allows the Department to focus its Soldiers, Sailors, Airmen, and Marines on the tasks and functions that are truly military essential—thereby enhancing the readiness and lethality of our warfighters.”321

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The large increase in civilian numbers since 2017 occurred for two reasons:

- A long-standing initiative to move functions from higher-cost, and difficult-to-recruit, military personnel to lower-cost civilian personnel; and
- Recent DOD efforts to remedy readiness shortfalls, for example, in maintenance and supply, which require more people.

This increase in civilian personnel is controversial in many quarters, particularly among Republicans. Representative Ken Calvert (R-CA), ranking member on the House Appropriations Committee defense panel, introduced a bill to cut 15 percent of DOD’s civilians. He argued that the number of civilian workers compared to military servicemembers is the highest in history and unsustainable. The bill will go nowhere given DOD and administration opposition, but it does indicate a continuing skepticism about the civilian workforce.322

### CIVILIAN PAY, BENEFITS, AND CONDITIONS OF SERVICE

The second key metric on how civilians are faring, after employment numbers, is the annual pay raise. For many years, parity with military pay raises was the norm, but that practice broke down in 2010. In most years since then, government civilians have received a smaller pay raise than military personnel.

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Figure 4: Civilian and Military Pay Raises

In FY 2021, civilians received a 1.0 percent civilian pay raise (government-wide), whereas the military received a 3.0 percent increase, both levels being consistent with the Trump administration's proposal. The Trump administration had planned that this disparity would continue into the future, with the military projected to receive pay raises of 2.6 percent in FY 2022 to FY 2025, whereas civilians would receive 2.1 percent. However, in 2022, the Biden administration proposed a 2.7 percent pay raise for both, and Congress seems likely to go along.

The Biden administration took several other actions that rescinded Trump initiatives. It restored several union privileges such as “administrative time” and office space and interpreted the Civil Rights Act of 1964 as prohibiting workplace discrimination on the basis of sexual orientation and gender identity.

A great relief to senior government civilians came with elimination of the Trump administration’s proposed “Schedule F,” which would, in effect, have made some civil service positions more like political appointments without many civil service protections.

NEW PERSONNEL STRUCTURES?

Government agencies always chafe at civil service rules, which make the hiring process slow and often unattractive to skilled or highly qualified applicants. As a result, agencies constantly propose processes and structures to get around these rules. The latest is a proposal for a civilian cyber reserve program.

Creation of such a program has bipartisan support and builds on recommendations in the National Commission on Military, National, and Public Service and direction in the FY 2021 National Defense Authorization Act. The proposal would allow private sector cyber workers to serve short-term assignments in the federal government. If implemented, this program might give DOD access to highly-skilled cyber experts without having to drive them through the cumbersome and restrictive military and civilian personnel processes. Whether this proposal will be enacted remains to be seen.

**Contractors**

Contractors have become a permanent element of the federal workforce. The number of service contractors seems to have stabilized at about 400,000 after several years of decline. The number of operational or battlefield contractors has also declined with the end of combat operations in Afghanistan. However, these contractors outnumber military personnel in Iraq and Syria.

Service and operational contractors remain controversial because of unresolved questions about cost and the appropriate delineation of functions. So far, the Biden administration has not shown the hostility to contractors that the Obama administration did when it entered office.

**Contractors have become a permanent element of the federal workforce. . . . [However,] contractors remain controversial because of unresolved questions about cost and the appropriate delineation of functions.**

**SERVICE CONTRACTORS**

These contractors provide services to the government and are distinct from contractors that provide products.

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Figure 5: DOD Service Contractor Full-Time Equivalents (FTEs)

Note: Annual data are not entirely consistent as DOD works to improve its reporting.


Figure 5 indicates that the number of service contractors has leveled off after declining from the wartime peak. Unfortunately, DOD’s accounting for service contractors is evolving. Recent data appears to be relatively consistent, but historical data is erratic.328

Service contractors are controversial because they raise questions about what the government should do and what the private sector should do. Many commentators also regard contractors as “the invisible government” that lacks visibility and oversight.329 Government policy is bifurcated. On the one hand, government regulations (OMB Circular A-76) state that only government employees should conduct “inherently governmental” activities. On the other hand, the same document states the government should not compete with its citizens and therefore should buy from the private sector whenever it can.330

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328 Numbers for FY 2019 to FY 2022 come from an annual budget exhibit on contractor services. However, the numbers exclude service contractors in military construction, RDT&E, and classified activities. Although the reason for excluding classified activities is clear, the reason for excluding military construction and RDT&E is not. Numbers for previous fiscal years are inconsistent with numbers for later fiscal years. Numbers for FY 2012, FY 2014, and FY 2015 come from the Defense Manpower Requirements Reports for those respective years. However, they do not include classified organizations, and reporting stopped with FY 2015. These numbers appear to be inconsistent with the later numbers.


Outsourcing had been an element of the Clinton and Bush administrations’ “reinventing government” initiatives, but in 2008 to 2010, the Democratic-dominated Congress effectively shut this effort down, and then the Obama administration blocked conversions permanently. This shutdown occurred partly because of concerns about disruptions to the workforce, partly because of questions about the actual achievement of savings, and partly in response to complaints by unions anxious to protect their members’ jobs. The Obama administration believed that it would save money by bringing activities in-house. However, these savings did not materialize when all the costs of “insourcing” were considered, and the effort ended. Thus, the balance between contractors and the federal workforce has reached a position of equilibrium—there are restrictions against moving in either direction.

The analytic problem arises from the allocation of indirect costs such as management overhead, facilities, personnel administration, security, and capital costs. Private sector prices must include all these costs if an organization is to remain in business over the long term. In government, these costs are widely distributed, so their identification and allocation are difficult. A valid comparison requires developing fully burdened costs—that is, personnel costs with all benefits and support included. DOD and the broader community have made progress on the theoretical constructs about what costs to include, but actual numbers do not exist.


The balance between contractors and the federal workforce has reached a position of equilibrium—there are restrictions against moving in either direction.

There is broad agreement, however, that the DOD and the government as a whole do not have a clear strategy for allocating activities among the different elements of its workforce: active-duty military, reserve military, government civilians, and contractors. Organizations as diverse as the Project on Government Oversight, the Defense Business Board, and CSIS have made this point. While there is extensive literature on the active/reserve mix, there is much less on government civilians and contractors, largely because of the lack of an assessment of the full costs of each workforce element.

OPERATIONAL CONTRACTORS

Operational contractor support (OCS) provides “supplies, services, and construction from commercial sources in support of combatant commander-directed operations.” These are the contractors found on overseas battlefields who do many things that military personnel did in the past.

OCS now forms a permanent element of U.S. forces overseas, along with active-duty personnel, reservists, and government civilians. These contractors exist worldwide in all the combatant commands. However, attention focuses on contractors in CENTCOM because they have been the most numerous and have the most data available.

As Figure 7 shows, contractor numbers in CENTCOM have tracked with the level of military personnel and operations since 2011, when reporting began.


The major change over the last year has been the end of operations in Afghanistan. As Figure 8 shows, the number of contractors in Afghanistan peaked in FY 2012 with the surge and declined after that as troop strength declined, and the U.S. mission narrowed, gradually moving away from nation building. The level remained at 20,000 to 25,000 until the final drawdown began last year.
Contractor numbers in Iraq and Syria are down from a peak of 166,900 in 2008 and 2009 to 4,487 today. The ratio of military to contractors has also changed. When the United States was conducting major combat operations, the ratio was close to 1 to 1. The ratio for Iraq and Syria today is 1:1.3.336

As Table 6 shows, contractors outnumber military personnel in Iraq and Syria. Forty-five percent of operational contractors are U.S. citizens, 53 percent are third-country nationals, and the remainder are locals. The small number of local contractors reflects the difficulty in vetting candidates and the threat of adversary infiltration.

Table 6: Department of Defense Military and Contractor Personnel in CENTCOM Area of Responsibility, October 2021

<table>
<thead>
<tr>
<th>Area of Responsibility</th>
<th>Total Military</th>
<th>Total Contractors</th>
<th>U.S. Citizens</th>
<th>Third-Country Nationals</th>
<th>Local/Host-Country Nationals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan Only</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Iraq/Syria Only</td>
<td>3,400</td>
<td>4,487</td>
<td>2,587</td>
<td>1,505</td>
<td>395</td>
</tr>
<tr>
<td>Other Locations</td>
<td>43,900</td>
<td>15,930</td>
<td>6,582</td>
<td>9,271</td>
<td>77</td>
</tr>
<tr>
<td>AOR Total</td>
<td>47,300</td>
<td>20,417</td>
<td>9,169</td>
<td>10,776</td>
<td>472</td>
</tr>
</tbody>
</table>


Other contractors in Iraq and Syria work for organizations outside DOD—including the Department of State, U.S. Agency for International Development (USAID), and the intelligence community—but numbers for these are no longer published.

The high proportion of contractors in CENTCOM now and during the wars reflects several factors:

- **Recent Decrease in Number of Deployed Military Personnel:** However, contractor numbers typically lag, since the contractors stay on longer to close bases and ship out equipment.

- **Troop Caps:** Because presidents often restrict the number of military personnel but typically not the number of contractors, contractors pick up some tasks formerly done by the military.

- **Limited Troop Strength:** Although the Army and Marine Corps grew during the wars, theater demands for troops far outstripped what military forces could provide.

- **Nature of the Mission:** The more stability related and less combat focused, the more the ratio tilts toward contractors, who do support and logistics functions.

- **Low Visibility:** Contractor numbers and casualties get less attention than those of servicemembers.

- **Ease of Elimination When Operations Cease:** Cutting military personnel can be traumatic and a political problem if the numbers exceed what can be accomplished through regular attrition.

Contractors depart quietly when their contract ends. There has been no uproar, for example, about all the contractors who were suddenly fired when operations in Afghanistan ended.

As Table 7 shows, about half of contractors in Iraq and Syria perform logistics and maintenance functions, and most of the rest do base operations and administrative tasks. This has been typical in Iraq, Syria, and Afghanistan throughout the conflicts. Only a small number of contractors do security tasks, all likely internal. Personnel Security Detachments (PSDs), which were used in Afghanistan, are not used in Iraq and Syria. PSDs are highly sensitive because these contractors carry weapons, interact with the civilian population routinely, and have committed highly publicized abuses in the past. In general, their function is to protect high-value individuals.

About half of contractors in Iraq and Syria perform logistics and maintenance functions, and most of the rest do base operations and administrative tasks. . . . Only a small number of contractors do security tasks.

Table 7: Contractor Numbers in Iraq and Syria by Function, October 2021

<table>
<thead>
<tr>
<th>Category</th>
<th>Iraq and Syria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>1,287</td>
</tr>
<tr>
<td>Construction</td>
<td>238</td>
</tr>
<tr>
<td>IT/Communications Support</td>
<td>247</td>
</tr>
<tr>
<td>Logistics/Maintenance</td>
<td>1,287</td>
</tr>
<tr>
<td>Management/Administrative</td>
<td>229</td>
</tr>
<tr>
<td>Medical/Dental/Social Services</td>
<td>18</td>
</tr>
<tr>
<td>Other</td>
<td>99</td>
</tr>
<tr>
<td>Security</td>
<td>117</td>
</tr>
<tr>
<td>Training</td>
<td>9</td>
</tr>
<tr>
<td>Translator/Interpreter</td>
<td>431</td>
</tr>
<tr>
<td>Transportation</td>
<td>525</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4,487</strong></td>
</tr>
</tbody>
</table>


With the decline of operations in Afghanistan and Iraq and Syria and stronger controls and oversight in place, contracting scandals have virtually ceased. DOD requires all contractors to conform with either U.S. or international standards for training, recruiting, and conduct. The industry is participating through its professional organizations—the Professional Services Council, the International Stability Operations Association, and the International Code of Conduct Association. The fact that no major incidents have arisen recently indicates that the oversight and controls instituted in the last decade have been effective.337

DOD recognizes that operational contractors are a permanent element of its force structure. As a result, DOD has standardized and institutionalized the contracting process that supports not just conflicts but also peacetime needs, such as natural disasters and humanitarian assistance. For example,

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DOD conducts operational contracting exercises, incorporates operational contract support into combatant command plans, and systematically gathers lessons learned.

The use of battlefield contractors, once a major political issue that entailed contentious congressional oversight and hearings, has thus receded into the background. Contractor visibility will fade further with the withdrawal from Afghanistan. Nevertheless, the use of contractors could flare up again as a political issue if some incident occurs or if the U.S. conducts a major force deployment.338

DOD’s ongoing strategy review is unlikely to recommend more use of contractors. However, that could be the effect if DOD cuts troop numbers without reducing operational requirements.339


Mark F. Cancian (Colonel, USMCR, ret.) is a senior adviser with the CSIS International Security Program. He joined CSIS in April 2015 from the Office of Management and Budget, where he spent more than seven years as chief of the Force Structure and Investment Division, working on issues such as Department of Defense budget strategy, war funding, and procurement programs, as well as nuclear weapons development and nonproliferation activities in the Department of Energy. Previously, he worked on force structure and acquisition issues in the Office of the Secretary of Defense and ran research and executive programs at Harvard University’s Kennedy School of Government. In the military, Colonel Cancian spent over three decades in the U.S. Marine Corps, active and reserve, serving as an infantry, artillery, and civil affairs officer and on overseas tours in Vietnam, Desert Storm, and Iraq (twice). Since 2000, he has been an adjunct faculty member at the Johns Hopkins School of Advanced International Studies, where he teaches a course on the connection between policy and analysis. A prolific author, he has published over 40 articles on military operations, acquisition, budgets, and strategy and received numerous writing awards. He graduated with high honors (magna cum laude) from Harvard College and with highest honors (Baker scholar) from Harvard Business School.