

Guam: Defense Infrastructure and Readiness

August 3, 2023

Congressional Research Service

<https://crsreports.congress.gov>

R47643



Guam: Defense Infrastructure and Readiness

Guam is the westernmost U.S. territory in the Indo-Pacific region and is home to about 170,000 U.S. citizens. The U.S. Department of Defense (DOD) owns about 25% of the land on Guam and maintains a force of about 6,400 active-duty servicemembers on the island. Guam's geographic position—it is closer to Beijing than to Hawaii—gives it an important role in national defense for supporting air and naval operations in the western Pacific region. The island's location also places it within range of nuclear-capable missiles maintained by the militaries of the People's Republic of China and North Korea.

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DOD is planning to make additional investment in military infrastructure on Guam and to increase the number of servicemembers on the island. DOD's five-year plan outlined in the Future Years Defense Program (FYDP) calls for spending about \$7.3 billion on Military Construction on the island from FY2024 through FY2028. The Missile Defense Agency is planning an additional \$1.7 billion to implement an integrated missile defense system on Guam. The Marine Corps is planning to move 5,000 Marines currently stationed in Okinawa, Japan, to a new Marine Corps Base on Guam that opened in 2020. DOD may need to move additional servicemembers to Guam to support a new missile defense system, expanded ship repair facilities and other military activities. Congress and DOD also face questions about Guam's civilian infrastructure – electricity, roads, water, housing – that affect U.S. military readiness on the island.

Congress and DOD face numerous decisions during the next five years about force posture and infrastructure investments on Guam. These decisions may impact broader defense strategies throughout the Indo-Pacific Command (INDOPACOM) Area of Operations. The interrelated and evolving variables affecting DOD plans for Guam include the military services' warfighting strategies and doctrines, the military capability and strategies of adversaries in the INDOPACOM region, relationships with allies and access to overseas bases in friendly countries, and tradeoffs involving investment decisions in other regions of the world.

Related oversight issues for Congress may include

- Policies and investment strategies related to the defense of Guam, including missile defense programs.
- Prioritization of funding for investment in military and civilian infrastructure.
- Oversight of DOD strategy, force structure, and basing decisions for military units on Guam.
- Policies and funding related to civil-military relationship between DOD and residents of Guam.

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Introduction

Congress is facing a host of defense-related policy, budgetary, and oversight issues regarding Guam. Annual budget authorizations and appropriations are likely to be setting priorities for an infrastructure build-up—construction spending on the island is projected to peak in FY2025. The U.S. government faces unresolved force structure decisions about Guam that could affect U.S. alliances and military strategy in the Indo-Pacific region. An increase in military presence and activity on Guam may raise domestic policy issues and oversight requirements to mitigate strain on the island’s civilian infrastructure as well as to maintain support for the U.S. military among the residents of Guam. These policies involve many interrelated and evolving variables, and implementing them could require congressional direction or oversight to ensure effective coordination within the Department of Defense (DOD) and across the federal government.

This report provides information about existing military infrastructure, units, and personnel on Guam (including missile defense), and outlines the island’s role in national security strategy in the Indo-Pacific region. The report provides information about funding and development of an expanded missile defense program for Guam and examines Guam-related issues and oversight questions for Congress. The report provides an overview of selected challenges and issues related to Guam’s role in DOD’s execution of the current National Defense Strategy and provides a summary of some complex issues. These include the technology underlying the missile defense system planned for Guam, unresolved issues related to plans for moving thousands of U.S. Marines from Okinawa to Guam, and the potential military dynamics of a 21st-century great power conflict in a Pacific theater. National security issues of military strategy, force posture, and readiness across the broader Indo-Pacific region are beyond the scope of this report. (For regional issues, see CRS Report R47589, *U.S. Defense Infrastructure in the Indo-Pacific: Background and Issues for Congress*, by Luke A. Nicastro.)

Background

Guam is the westernmost U.S. territory in the Pacific, located more than 3,300 nautical miles west of Hawaii. The island, approximately 30 miles long, is part of the Commonwealth of the Northern Mariana Islands (CNMI), an unincorporated U.S. territory.¹ A nonvoting Delegate represents the territory in the U.S. House of Representatives. The U.S. military owns about 25% of the land on Guam and maintains a force of about 6,400 active-duty servicemembers on the island (**Table 1**).² Senior military leaders have emphasized the significant role Guam plays in U.S. national security strategy.³ Since 2011, the U.S. military has sharpened its focus on the Pacific region, in part by increasing military infrastructure investment and forward-deployed

¹ The Guam Organic Act of 1950 conferred U.S. citizenship on Guamanians, codified in Title 48, Sec. 1421 et seq of the *U.S. Code*.

² Defense Manpower Data Center, DOD Personnel, Workforce Reports & Publications, Military and Civilian Personnel by Service/Agency by State/Country, September 2022 and March 2023, at <https://dwp.dmdc.osd.mil/dwp/app/dod-data-reports/workforce-reports>. Also see Defense of Department, Military One Source, “Joint Region Marianas - Naval Base Guam In-depth Overview,” at <https://installations.militaryonesource.mil/in-depth-overview/joint-region-marianas-naval-base-guam>.

³ For example, see Statement of Adm. John C. Aquilino, U.S. Navy Commander, U.S. Indo-Pacific Command, before the House Committee on Appropriations Subcommittee on Defense, U.S. Indo-Pacific Command Posture, May 17, 2022, p. 13, at <https://docs.house.gov/meetings/AP/AP02/20220517/114752/HHRG-117-AP02-Wstate-AquilinoJ-20220517.pdf>. Also see 2022 National Defense Strategy, Missile Defense Review, which states: “Guam is home to key regional power projection platforms and logistical nodes, and is an essential operating base for U.S. efforts to maintain a free and open Indo-Pacific region.”

assets on Guam.⁴ Due primarily to its geography—Guam is closer to Beijing than to Hawaii—the island plays an important role supporting U.S. naval and air operations in the Pacific region (**Figure 1**).⁵ U.S. Indo-Pacific Command (INDOPACOM) leaders say the island is important for the command’s strategy to provide presence, deterrence, and power projection in the region. In May 2022, Navy Admiral John C. Aquilino, Commander of INDOPACOM, testified that “Guam’s strategic importance is difficult to overstate.”⁶

Senior Department of Defense officials have also said Guam’s location and strategic value makes it vulnerable to attack.⁷ Guam is within range of some Chinese and North Korean ballistic and nuclear-capable missile systems, including the Chinese People’s Liberation Army’s DF-21 ballistic missile (which some China-based media reports have dubbed the “Guam killer”).⁸ To defend Guam against missile attack, the U.S. Missile Defense Agency (MDA) is developing and constructing an air and missile defense system on the island and MDA officials say some components of a new missile defense system may be operational by the end of FY2024.⁹

Some analysts argue that the effective defense of Guam is critical to deterring the People’s Republic of China (PRC or China) from military action against Taiwan.¹⁰ One analyst described Guam as an “indispensable strategic hub for the United States” that “allows the United States to successfully project power within the Indo-Pacific region and so makes credible U.S. security commitments to key US allies located there.”¹¹ While the United States has thousands of servicemembers based in Japan and South Korea, questions remain about whether the governments of Japan and South Korea would provide full cooperation and support for offensive

⁴ See Oriana Skylar Mastro, “Defense, Deterrence, and the Role of Guam,” in *Defending Guam*, Ed. Rebecca Heinrichs, Hudson Institute, July 2022), p. 44, at <https://fsi-live.s3.us-west-1.amazonaws.com/s3fs-public/defendingguamjuly2022.pdf>; and Kimberly Underwood, “The Growing Importance of Guam,” *Signal Magazine*, February 1, 2021, at <https://www.afcea.org/signal-media/growing-importance-guam>.

⁵ Mats Engman and Larissa Stünkel, “The Question of Guam: A Pivotal Island’s Changing Realities,” *Institute for Security and Defense Policy*, Dec. 18, 2020, at <https://isdpeu/publication/the-question-of-guam-a-pivotal-islands-changing-realities/>.

⁶ Statement of Adm. John C. Aquilino, U.S. Navy Commander, U.S. Indo-Pacific Command, before the House Committee on Appropriations Subcommittee on Defense, U.S. Indo-Pacific Command Posture, May 17, 2022, p. 13, at <https://docs.house.gov/meetings/AP/AP02/20220517/114752/HHRG-117-AP02-Wstate-AquilinoJ-20220517.pdf>.

⁷ For example, then-INDOPACOM Commander and Navy Admiral Philip Davidson testified before the Senate Committee on Armed Services that, “Guam is a target today. It needs to be defended, and it needs to be prepared for the threats that will come in the future, because [it’s] clear to me that Guam is not just a place that we believe that we can fight from, as we have for many decades. We are going to have to fight for it in order to be able to do that.” For more information, see Senate Committee on Armed Services, “United States Indo-Pacific Command,” hearing video, March 9, 2021, at <https://www.armed-services.senate.gov/hearings/21-03-09-united-states-indo-pacific-command>. See also Mark Montgomery, Riki Ellison and Bradley Bowman, “Guam Needs Better Missile Defenses—Urgently,” *Defense One*, May 23, 2022, at <https://www.defenseone.com/ideas/2022/05/guam-needs-better-missile-defensesurgently/367275/>.

⁸ Lee Jeong-ho, “China Releases Footage of ‘Guam killer’ DF-26 Ballistic Missile in ‘Clear Message to the US’,” *South China Morning Post*, January 28, 2019, at <https://www.scmp.com/news/china/military/article/2183972/china-releases-footage-guam-killer-df-26-ballistic-missile-clear>.

⁹ DOD, Office of the Under Secretary of Defense (Comptroller)/Chief Financial Officer, Defense Budget Overview: United States Department of Defense Fiscal Year 2023 Budget Request, March 2022, p. 10, at https://comptroller.defense.gov/Portals/45/Documents/defbudget/FY2023/FY2023_Budget_Request.pdf#page=11.

¹⁰ See, for example, Mats Engman and Larissa Stünkel, “The Question of Guam: A Pivotal Island’s Changing Realities,” *Institute for Security and Defense Policy*, December 18, 2020, at <https://isdpeu/publication/the-question-of-guam-a-pivotal-islands-changing-realities/>.

¹¹ See Rebecca Heinrichs, “Introduction,” in *Defending Guam*, Hudson Institute, July 2022, p. 7, at <https://fsi-live.s3.us-west-1.amazonaws.com/s3fs-public/defendingguamjuly2022.pdf>.

Oriana Skylar Mastro, “Defense, Deterrence, and the Role of Guam,” Stanford University, July 5, 2022, at <https://aparc.fsi.stanford.edu/publication/defending-guam>.

U.S. military operations in the event of a conflict over Taiwan.¹² Guam could be a target for a PRC military strike in the event of a conflict in Taiwan, a strike that the PRC military may intend as an effort to slow or limit the U.S. military's ability to operate in the western Pacific.¹³

Guam frequently host U.S. military engagements with allies in the Pacific region.¹⁴ In April 2023, the United States hosted a two-week joint military exercise in Guam with military units from Japan, Korea, India, and Canada.¹⁵ Reportedly, some Taiwanese troops have participated in urban combat training with the U.S. Marines on Guam.¹⁶ The Republic of Singapore Air Force (RSAF) has deployed units to Andersen Air Force Base for training.¹⁷ The RSAF is planning to base a permanent rotational presence of fighter jets (F-15SGs, F-16C/Ds and possible F-35Bs) starting in 2029.¹⁸ Coordination between the U.S. Air Force and the RSAF was ongoing in August 2022.¹⁹

¹² See, for example, Sungmin Cho, "South Korea's Taiwan Conundrum," *War on the Rocks*, December 31, 2021, at <https://warontherocks.com/2021/12/south-koreas-taiwan-conundrum/>. Also see Kiyoshi Sugawa, "Should Japan Defend Taiwan?", *Responsible Statecraft*, May 2023, at <https://responsiblestatecraft.org/2023/05/02/should-japan-defend-taiwan/>.

¹³ "PLA plans are built around the expectation that it could eventually neutralize Guam, denying US forces the logistics and basing hub needed to sustain air and naval operations in defense of, for example, Taiwan." See Bryan Clark, "Defending Guam," *Hudson Institute*, July 2022, p. 14, at <https://fsi-live.s3.us-west-1.amazonaws.com/s3fs-public/defendingguamjuly2022.pdf>.

¹⁴ Navy, "Six Indo-Pacific Nations begin Exercise Sea Dragon," press release, January 5, 2022, at <https://www.navy.mil/Press-Office/News-Stories/Article/2889948/six-indo-pacific-nations-begin-exercise-sea-dragon/>.

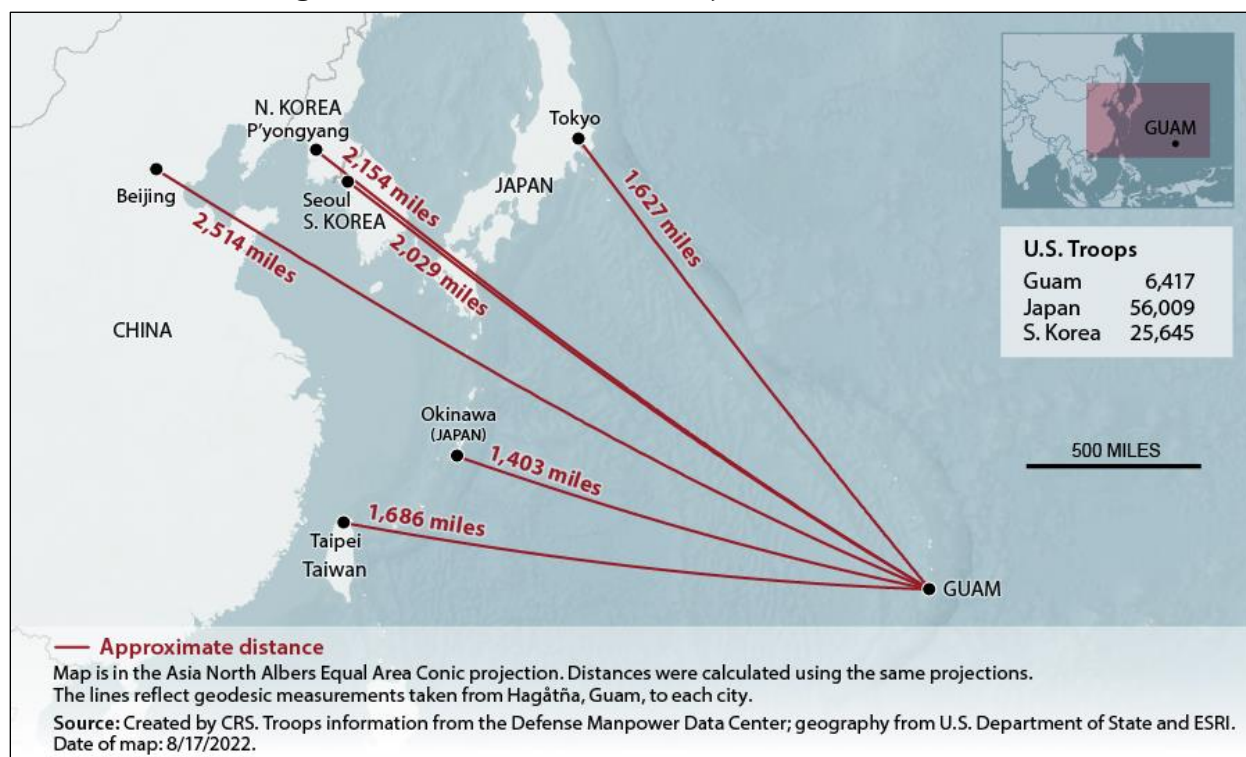
¹⁵ U.S. Navy press release, "Canada, India, Japan, Korea, and the U.S. Complete Multilateral Guam-Based Exercise Sea Dragon 2023," April 6, 2023, at <https://www.navy.mil/Press-Office/News-Stories/Article/3354063/canada-india-japan-korea-and-the-us-complete-multilateral-guam-based-exercise-s/>.

¹⁶ John Feng, "U.S. Marines Training Taiwan Elite Troops in Guam," *Newsweek*, November 2, 2021, at <https://www.newsweek.com/us-marines-training-taiwan-elite-troops-guam-1644810>.

¹⁷ Air Force, "Republic of Singapore Air Force deploys to Andersen AFB," May 30, 2021, at <https://www.af.mil/News/Article-Display/Article/2635749/republic-of-singapore-air-force-deploys-to-andersen-afb/>.

¹⁸ Based on CRS correspondence with Air Force officials, September 12, 2022, on file with the author.

¹⁹ Based on CRS correspondence with Air Force officials, September 12, 2022, on file with the author.

Figure 1. Guam: Distances to Major Pacific Rim Cities

Guam's Role in the Indo-Pacific Region

Military infrastructure on Guam provides a springboard for U.S. and allied military operations in the western Pacific, particularly for areas where military planners assess that major conflict could arise (such as Taiwan, the South China Sea, or the Korean Peninsula).²⁰ The island's airfields and fuel storage facilities could support U.S. bomber aircraft or tanker aircraft for missions to refuel the combat aircraft operating over the western Pacific or littoral regions.²¹ U.S. submarines operating from Guam could be important for countering PRC surface navy fleets and keeping shipping lanes open.²² Guam could support land-based aircraft for anti-submarine warfare (e.g., the use of P-8 Poseidon maritime surveillance aircraft to identify and target PRC submarines). U.S. Marines could use Guam as a hub for launching operations and establishing expeditionary bases on islands and shorelines throughout the region. Guam provides an outpost for a variety of sensors, missile defense systems, electronic warfare capabilities and satellite network systems that support U.S. military operations across the region. The island could also provide logistical support for humanitarian assistance and disaster relief and security cooperation. As one analyst

²⁰ Department of Defense, 2022 Missile Defense Review, p. 7, at <https://media.defense.gov/2022/Oct/27/2003103845/-1/-1/1/2022-NATIONAL-DEFENSE-STRATEGY-NPR-MDR.PDF>.

²¹ Based on CRS correspondence with Air Force officials, September 12, 2022, on file with the author.

²² Rich Abott, "Navy Expanding Guam Submarine Forces To Counter Growing Chinese Capabilities," *Defense Daily*, November 10, 2022, at <https://www.defensedaily.com/navy-expanding-guam-submarine-forces-to-counter-growing-chinese-capabilities/navy-usmc/>.

described, “Guam would be the gas station, repair shop, and command center for US naval and air forces during a confrontation with the [Chinese] People’s Liberation Army.”²³

DOD is executing a multi-year infrastructure buildup on Guam and the Commonwealth of the Northern Mariana Islands (CNMI); overall spending plans for Military Construction (MILCON) on the island between Fiscal Year (FY) 2015 and FY2028 total more than \$10 billion (**Figure 3**).²⁴ This includes enhancing Navy and Air Force infrastructure to support air and sea operations; the construction of a new Marine Corps base that is expected to garrison about 5,000 Marines; and installation of a new missile defense system and support for the personnel needed to operate the missile defense system.

In the event of a conflict, U.S. military forces on Guam may operate in coordination with U.S. forces permanently stationed in Japan and Korea.²⁵ Guam provides U.S. forces with a safer distance when compared with bases in Japan or South Korea, which are within range of more PRC or North Korean weapons systems. That safety comes with a trade-off, as U.S. forces based in Guam may have more limited effectiveness and response times when seeking to confront or deter PRC or North Korean military forces in the western Pacific or littoral regions.²⁶ Guam’s status as a U.S. territory may also provide an added level of political reliability, compared to allied governments such as Japan, South Korea, and the Philippines, whose acceptance of U.S. forces mounting offensive operations from their territories in the event of a regional conflict may be uncertain.²⁷

Military Infrastructure in Guam

DOD owns about 25% of the land on Guam (**Figure 2**). Several major MILCON projects are underway or planned, with Marine Corps facilities in particular slated to expand significantly.

²³ See Bryan Clark, “Defending Guam,” Hudson Institute, July 2022, at <https://s3.amazonaws.com/media.hudson.org/Defending+Guam+July+2022.pdf>.

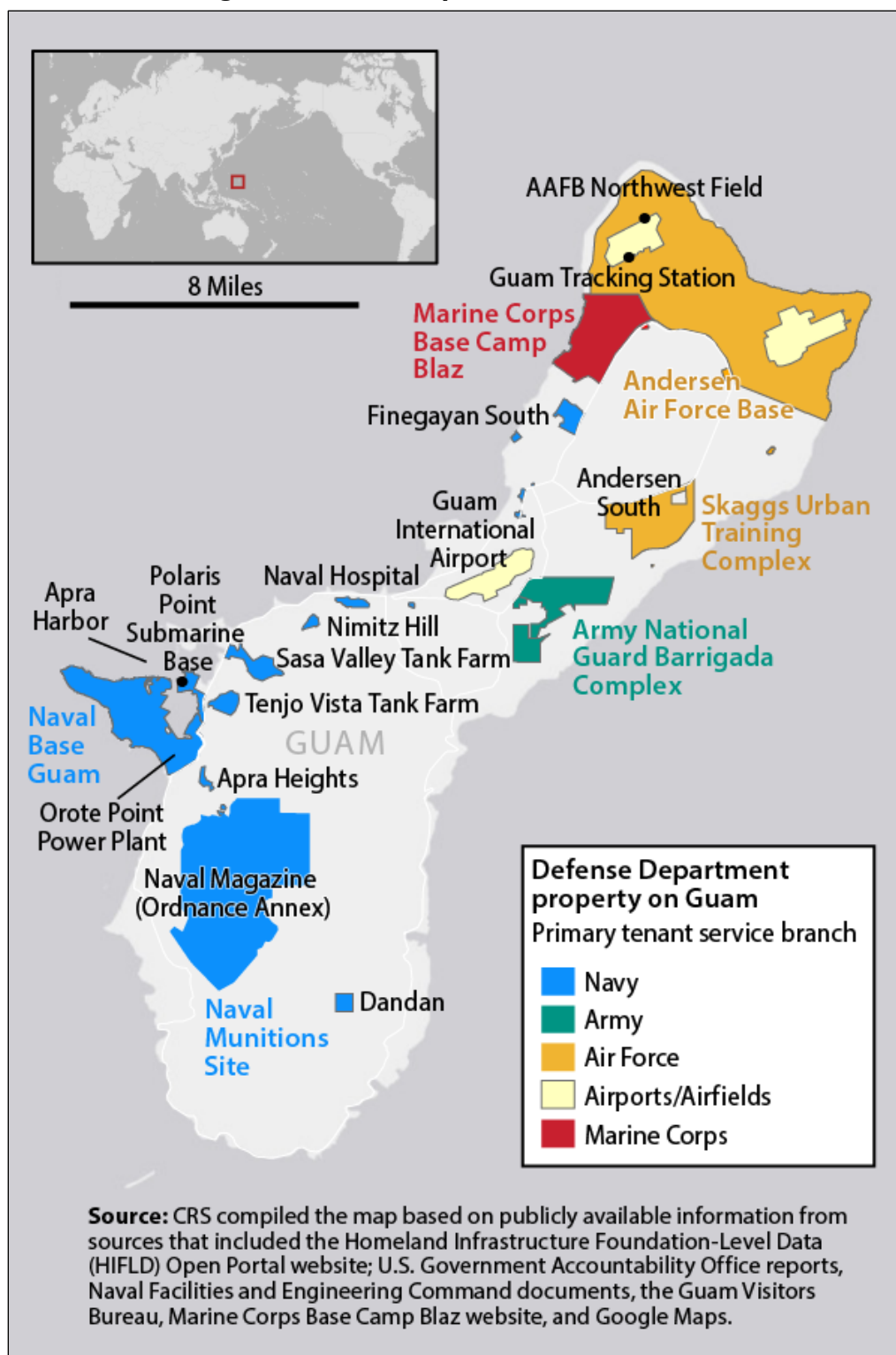
²⁴ DOD budget execution data and Future Years Defense Program plans provided to CRS by the DOD Under Secretary of Defense Comptroller’s office, May 2023. For more information about the MILCON programs and funding mechanisms, see CRS Report R44710, *Military Construction: Authorities and Processes*, by Andrew Tilghman.

²⁵ CRS Report R47589, *U.S. Defense Infrastructure in the Indo-Pacific: Background and Issues for Congress*, by Luke A. Nicastro.

²⁶ See, for example, Andrew Yeo and Michael O’Hanlon, “Geostrategic Competition And Overseas Basing In East Asia And The First Island Chain,” Brookings Institution, February 2023, at https://www.brookings.edu/wp-content/uploads/2023/02/FP_20230207_east_asia_basing_ohanlon_yeo.pdf.

²⁷ See for example, Kiyoshi Sugawa, “Should Japan Defend Taiwan?”, Responsible Statecraft, May 2023, at <https://responsiblestatecraft.org/2023/05/02/should-japan-defend-taiwan/>.

Figure 2. U.S. Military Installations in Guam



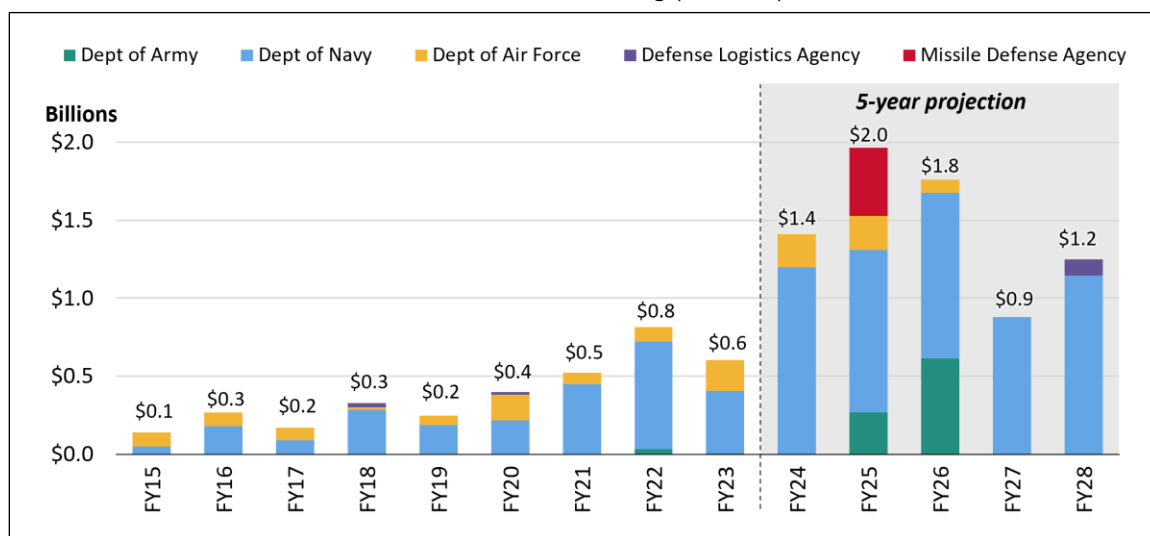
Notes: Map includes DOD installations and does not depict U.S. Coast Guard installations, which are administered by the Department of Homeland Security. Date of map: 7/5/2023.

Military Construction Funding on Guam

Congress appropriated more than \$3.4 billion for MILCON projects on Guam between FY2015 and FY2023 (**Figure 3**). DOD has indicated plans to request an additional \$7.3 billion for MILCON for the five-year period from FY2024 through FY2028.²⁸ MILCON spending on Guam is expected to peak in FY2025, as major construction for the planned missile defense system is executed.

DOD has indicated that its ability to execute construction projects on Guam is hampered in part by a labor shortage, which is also a factor contributing to rising construction costs in Guam.²⁹ Admiral Aquilino testified that “current military construction demands require a workforce more than three times as large as what currently exists in Guam. Anticipated levels of future military construction will further exacerbate consistent labor shortages that have already left private construction projects unable to meet their baseline needs.”³⁰

Figure 3. Military Construction Funding for Guam and Northern Mariana Islands
FY2015 to FY2023 funding (\$ billions)



Source: CRS graphic based on data from DOD Comptroller and CRS analysis.

Notes: Data for FY2015 through FY2023 reflect Military Construction (MILCON) appropriations of enacted budgets and budget execution adjustments as reported by the DOD Comptroller; FY2024 numbers reflect the President’s Budget Request; FY2025 – FY2028 reflect Future Years Defense Program as reported by the DOD Comptroller; budget numbers exclude family housing construction, Government of Japan funding, and planning and design accounts.

In December 2023, Congress directed DOD to provide a report to the congressional defense committees on future construction requirements for Guam and the Northern Marianas Islands.³¹

²⁸ Data regarding FY2024 through FY2028 was provided to CRS by the Department of Defense Office of the Comptroller.

²⁹ Vice Adm. John Aquilino, testimony before the Senate Armed Services Committee, April 20, 2023, p. 18, at <https://armedservices.house.gov/sites/republicans.armedservices.house.gov/files/2023%20INDOPACOM%20Statement%20for%20the%20Record.pdf>.

³⁰ Ibid.

³¹ See Joint Explanatory Statement accompanying the James M. Inhofe National Defense Authorization Act (P.L. 117-263) of Fiscal Year 2023, pp. 271-272, at <https://www.armed-services.senate.gov/imo/media/doc/> (continued...)

The report is to include projected construction costs and projected sustainment costs through 2030.³²

DOD Personnel on Guam

DOD reports a total of 11,616 personnel on Guam, including active-duty servicemembers, reservists, and civilian employees (see **Table 1**).³³ The numbers do not include contractors or personnel deployed to Guam on temporary duty.

Table 1. DOD Personnel on Guam

DOD Component	Active Component	Reserve Component	Civilian	Total
Army	207	1,657	185	2,049
Air Force/Space Force	2,250	648	435	3,333
Navy	3,825	177	1,350	5,352
Marine Corps	135	0	9	144
Other DOD Components ^a	—	—	738	738
Total	6,417	2,482	2,717	11,616

Source: DOD, Defense Manpower Data Center. The table reflects data in the most recent report available, from March 2023. Updated data for the Army active component and Army reserve components were not available in the March 2023 report, so the data for those components included in this table are drawn from a prior report, September 2022. Reserve component totals reflect both National Guard and reserve component servicemembers. Reports are available at <https://dwp.dmdc.osd.mil/dwp/app/dod-data-reports/workforce-reports>.

Note:

- a. Other DOD Components include civilians employed by the Defense Logistics Agency, Defense Commissary Agency, Defense Health Agency, or the Defense Finance and Accounting Service.

Military Command Structure and Major Commands in Guam

Joint Region Marianas

INDOPACOM headquarters in Hawaii exercises command and control for joint forces operating in its area of responsibility. Navy, Marine Corps, and Air Force units frequently visit Guam for logistics support and training exercises. Support and management of the military installations on Guam is provided through Joint Region Marianas (JRM), a joint command structure established in 2009 to combine regional Navy, Marine Corps, Army, and Air Force facilities under a single command.³⁴ JRM also includes the Commonwealth of the Northern Mariana Islands (CNMI),

fy23_ndaa_joint_explanatory_statement.pdf. The term “Congressional defense committees” is defined in 10 U.S.C. 101 as the Committee on Armed Services and the Committee on Appropriations of the Senate; and the Committee on Armed Services and the Committee on Appropriations of the House of Representatives.

³² Ibid.

³³ DOD, Defense Manpower Data Center. The table reflects data in the most recent report available from March 2023; however, updated data for the Army active component and Army reserve components were not available in the March 2023 report, so the data for the Army active component and Army reserve components included in this table are drawn from a prior report, September 2022. Reserve component totals reflect both National Guard and reserve component servicemembers. Reports are available at <https://dwp.dmdc.osd.mil/dwp/app/dod-data-reports/workforce-reports>.

³⁴ Joint Region Marianas Command, official history page, at <https://jrm.cnmc.navy.mil/About/History/>.

where DOD is planning to develop military infrastructure on the island of Tinian.³⁵ The Navy is the lead service for the command; JRM is supported by Commander, Navy Installations Command (CNIC), and Naval Facilities and Engineering Command (NAVFAC). The JRM Commander is a Navy Rear Admiral (Lower Half), who also serves as INDOPACOM's Senior Military Official for Guam, CNMI, the Federated States of Micronesia, and the Republic of Palau. The JRM deputy commander is an Air Force Brigadier General, who also serves as the Commander of Andersen Air Force Base and the 36th Wing. The Air Force, Marine Corps, and Army National Guard components retain day-to-day command over their respective sites.

In 2021, JRM issued a new Joint Base Memorandum of Agreement, which transferred some installation support functions for Andersen Air Force base from the joint command to the Air Force.³⁶ Some Air Force stakeholders have expressed concern about JRM's joint basing command structure, and one stated "the joint basing construct on Guam has impacted readiness and power projection due to critical infrastructure and improvement project prioritization by the lead service."³⁷

Selected Units in Guam

CRS has identified, through publicly available sources, at least 46 military units permanently based on the island. CRS does not purport to provide a definitive list of all military units that may be permanently or temporarily based on the island. The units CRS identified include the following.

Naval Base Guam

Subcommand Units and Tenants³⁸

- Navy Expeditionary Forces Command Pacific (CTF-75)
- Submarine Squadron 15 (COMSUBRON-15)
 - USS *Annapolis* (SSN 760)
 - USS *Ashville* (SSN 758)
 - USS *Jefferson City* (SSN 759)
 - USS *Key West* (SSN 722)
 - USS *Springfield* (SSN 761)
- USS Frank Cable (AS-40)
- USS Emory S. Land (AS-39)
- Naval Special Warfare Group One - Detachment Guam (SEALS)
- 30th Naval Construction Regiment
- Naval Mobile Construction Battalion (NMCB)

³⁵ Air Force, "CNMI signs \$21.9M 40-year lease with US DOD," press release, May 9, 2019, at <https://www.af.mil/News/Article-Display/Article/1841827/cnmi-signs-219m-40-year-lease-with-us-dod/>.

³⁶ Air Force, "330 Navy civilian employees transfer to Air Force," press release, April 9, 2021, at <https://www.pacaf.af.mil/News/Article-Display/Article/2576077/330-navy-civilian-employees-transfer-to-air-force/>.

³⁷ Based on CRS correspondence with Air Force officials, September 12, 2022, on file with the author.

³⁸ DOD, Military One Source, Naval Base Guam Subcommand Units, accessed August 17, 2022, at <https://installations.militaryonesource.mil/military-installation/joint-region-marianas-naval-base-guam/base-essentials/major-units>.

- Military Sealift Command Ship Support Unit Guam
- Explosive Ordnance Disposal Mobile Unit Five (EODMU-5)
- Navy Munitions Command Unit East Asia Division (NMC EAD), Unit Guam
- Naval Airborne Weapons Maintenance Unit One (NAWMU-1)
- Maritime Expeditionary Security Group One (MESG-1), Detachment Guam
- Naval Communications Station, Guam
- Naval Facilities Engineering Systems Command Marianas
- Naval Computer and Telecommunication Station Guam (NCTS)
- HQ Joint Region Marianas

Andersen Air Force Base

Subcommand Units and Tenants³⁹

- 36th Wing
 - 36th Operations Group
 - 36th Mission Support Group
 - 36th Maintenance Group and Squadron
 - 36th Medical Group
 - 36th Contingency Response Group and Squadron
 - 36th Maintenance Squadron
 - 36th Civil Engineer Squadron
 - 36th Communications Squadron
 - 36th Contracting Squadron
 - 36th Force Support Squadron
 - 36th Logistics Readiness Squadron
 - 736th Security Forces Squadron
- 734th Air Mobility Support Squadron
- 4th Regional Support Group
- Task Force Talon (THAAD capabilities)⁴⁰
- 21st Space Operations Squadron Detachment 2
- Air Force Office of Special Investigations Detachment 602
- Navy Helicopter Sea Combat Squadron Two Five (HSC-25)
- 554th Red Horse Squadron

Other Military Units on Guam

- Marine Corps Camp Ben Blaz

³⁹ Ibid. Also see 36th Wing at Andersen Air Force Base, at <https://www.andersen.af.mil/About-Us/Fact-Sheets/Display/Article/414606/36th-wing/>.

⁴⁰ The Terminal High Altitude Area Defense system, known as THAAD, is a missile defense system that provides ground-based missile interceptors.

- Naval Hospital Guam
- Army 3rd Battalion, 196th Infantry Brigade, Guam Army National Guard
- Naval Facilities Command Marianas
- Defense Logistics Agency (DLA) Indo-Pacific

Selected Military Infrastructure- and Readiness-Related Matters on Guam

U.S. Naval Forces and Infrastructure on Guam

Naval Base Guam in Apra Harbor operates a port that can accommodate the largest Navy warships, including aircraft carriers. Within the harbor, Polaris Point Submarine Base is the homeport for five *Los Angeles*-class nuclear-powered fast attack submarines, which are considered valuable for their ability to penetrate opponents' defenses.⁴¹ In the event of a conflict, submarines and their crews are trained and equipped to potentially sink enemy surface ships, break a maritime blockade, disrupt an amphibious assault, or prevent resupply of enemy positions.⁴²

In 2022, the Navy increased the number of attack submarines homeported at Guam to five submarines, up from three or four at various times during the past decade.⁴³ The Navy is also reportedly considering whether to eventually base some *Virginia*-class submarines in Guam.⁴⁴ Also based in Guam are two Navy tender ships, which are surface vessels that provide support and services for the submarines' forward-deployed operations.⁴⁵

The Navy's ship maintenance capabilities on Guam are limited, as some facilities were closed during the 1995 Base Realignment and Closure (BRAC) process.⁴⁶ A floating drydock—a trough-shaped structure used to lift ships out of the water for repairs—was removed in 2016.⁴⁷ A

⁴¹ Los Angeles-class submarines are powered by a nuclear reactor and can be equipped with missiles or torpedoes and intelligence-gathering equipment. Virginia-class submarines are newer, slightly larger than the Los Angeles-Class submarines and equipped with newer technologies. For more information, see CRS Report RL32418, *Navy Virginia (SSN-774) Class Attack Submarine Procurement: Background and Issues for Congress*, by Ronald O'Rourke.

⁴² Ibid.

⁴³ Mallory Shelbourne, "Navy Expanding Attack Submarine Presence on Guam as a Hedge Against Growing Chinese Fleet," U.S. Naval Institute, Nov. 2, 2022, at <https://news.usni.org/2022/11/02/navy-expanding-attack-submarine-presence-on-guam-as-a-hedge-against-growing-chinese-fleet>. Reference to prior count of three or four submarines on Guam reflects CRS analysis of Navy documents.

⁴⁴ Audrey Decker, "Five Navy subs to be in Guam by the end of 2022," *Inside Defense*, November 19, 2021, at <https://insidedefense.com/insider/five-navy-subs-be-guam-end-2022>.

⁴⁵ Submarine Force Pacific, Guam information page, at <https://www.csp.navy.mil/Go-Guam/About-Go-Guam/>.

⁴⁶ Defense Base Closure and Realignment Commission, 1995 Report to the President, July 1, 1995, p. 69, archived at <https://dcs9.army.mil/brac/RefDocs/General/1995%20BRAC%20Commission%20Report%20to%20the%20President.pdf#page=69>. For additional background on BRAC, see archived CRS Report R45705, *Base Closure and Realignment (BRAC): Background and Issues for Congress*, by Christopher T. Mann.

⁴⁷ DOD, Defense Visual Information Distribution Service, "Dry Dock 'Richland' removed from Naval Base Guam after 48 years," press release, January 28, 2016, at <https://www.dvidshub.net/news/187356/dry-dock-richland-removed-naval-base-guam-after-48-years>.

Navy-owned ship repair facility was closed in 2018.⁴⁸ However, the Navy reports that it is working to enhance the maintenance capabilities on the island by creating a new detachment from the Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility.⁴⁹ In October 2022, the Navy awarded a \$16.9 million contract for architectural and engineering services to build a submarine repair pier at Polaris Point Submarine Base in Guam, and that work is scheduled for completion in September 2024.⁵⁰ The detachment may be operational by 2025 and is expected to include about 400 permanently assigned military personnel.⁵¹

The Marine Corps has pointed to the naval base on Guam as an intermediate staging base to support its Expeditionary Advanced Base Operations (EABO) concept, which was developed for possible conflict scenarios in the western Pacific.⁵² That concept would rely on dozens of small, fast Landing Ship Mediums—until recently known as the Light Amphibious Warship (LAW)—a future Navy ship intended to support the Marines Corps’ amphibious landing operations.⁵³ Under current Navy plans, the first Landing Ship Mediums may join the fleet in 2028.⁵⁴ The Navy has not yet determined whether Landing Ship Mediums would be homeported at Guam or elsewhere.

U.S. Marine Corps Forces and Infrastructure on Guam

The Marine Corps has been present on Guam almost continuously since 1899.⁵⁵ The major Marine facility on Guam is Marine Corps Base Camp Blaz, which was activated on October 1, 2020,⁵⁶ and is the first new Marine Corps base activated since 1952.⁵⁷ Currently, the commanding officer for Camp Blaz is a Marine colonel; in March 2023, there were about 135 Marines

⁴⁸ Steve Limtiaco “Military work is driving the ship repair industry,” *Pacific Daily News*, July 3, 2021, at https://www.guampdn.com/news/military-work-is-driving-the-ship-repair-industry/article_0854ca52-dbbc-11eb-8561-e7e1ac7715fd.html.

⁴⁹ Department of the Navy (Navy), “Hafa Adai! Guam Detachment In Full Effect,” press release, November 30, 2021, at <https://www.navsea.navy.mil/Media/News/Article/2855754/hafa-adai-guam-detachment-in-full-effect/>.

⁵⁰ Department of Defense, Contract Announcements, Oct. 27, 2022, at <https://www.defense.gov/News/Contracts/Contract/Article/3202126/>.

⁵¹ Maureen N. Maratita, “Guam to get submarine maintenance facility,” *Marianas Business Journal*, Oct. 14, 2022, at <https://www.mbjguam.com/guam-get-submarine-maintenance-facility>.

⁵² Rich Abott, “Marines To Use ESBs, EPFs, and Commercial Vessels Until LAW Ready,” *Defense Daily*, May 11, 2022, at <https://www.defensedaily.com/marines-to-use-esbs-epfs-and-commercial-vessels-until-law-ready/navy-usmc/>.

⁵³ Mallory Shelbourne, “Marine Corps Requirements Call for 9 Light Amphibious Ships per Regiment,” U.S. Naval Institute, Feb. 14, 2023, at <https://news.usni.org/2023/02/14/marine-corps-requirements-call-for-9-light-amphibious-ships-per-regiment>.

⁵⁴ For more information, see CRS Report R46374, *Navy Medium Landing Ship (LSM) (Previously Light Amphibious Warship [LAW]) Program: Background and Issues for Congress*, by Ronald O'Rourke.

⁵⁵ “Marine Corps Activates Camp Blaz in Guam,” *U.S. Marine Corps*, October 1, 2020, at <https://www.marines.mil/News/News-Display/Article/2367980/marine-corps-activates-camp-blaz-in-guam/>.

⁵⁶ Emma Helfrich, “Marine Corps Activates Sprawling New Base on Highly Strategic Guam,” *The Drive*, Jan. 26, 2023, available at <https://www.thedrive.com/the-war-zone/marine-corps-activates-sprawling-new-base-on-highly-strategic-guam>. The base also hosted a “naming ceremony” in January 2023. See DOD press release, January 26, 2023, at <https://www.dvidshub.net/image/7602344/marine-corps-base-camp-blaz-reactivation-and-naming-ceremony>.

⁵⁷ Camp Blaz is named in honor of the late Brigadier General Vicente “Ben” Tomas Garrido Blaz, the first minority general officer in the Marine Corps and highest-ranking indigenous Chamorro to have served in the Marines. After his retirement from the Marines, he served four terms as Guam’s Delegate to the U.S. House of Representatives.

permanently assigned to the island.⁵⁸ In April 2023, the base had no tenant commands or subcommands, but Marine rotational units were using some of the newly constructed buildings.⁵⁹

Following a 2012 agreement with Japan, the United States committed to transferring approximately 5,000 Marines from Okinawa to Guam.⁶⁰ The agreement came amid growing Japanese public opposition and safety concerns regarding Marine Corps Air Station Futenma in Okinawa. A Marine Corps official stated that Marines and their families will begin moving from Okinawa to Guam in 2024.⁶¹ Reportedly, the Marine Corps plan calls for relocating 2,500 servicemembers to Guam by 2026, and the full 5,000-Marine contingent garrisoned by 2028.⁶² Relocated forces are expected to include a Marine Expeditionary Brigade (MEB) command element, a Marine Infantry Regiment, a Combat Logistics Battalion, and an Air Combat Element.⁶³ Reportedly, about 1,500 Marine Corps family members are also to be relocated to Guam.⁶⁴ Congress has appropriated more than \$1.7 billion for Marine Corps military construction on Guam and CNMI since FY2015 (see **Figure 4**).

In total, the Marines' Guam realignment is estimated to cost about \$8.7 billion, with about \$3.1 billion being paid for by the Japanese government.⁶⁵

⁵⁸ Department of Defense press release, "Marine Corps Reactivates Base on Guam," Jan. 26, 2023, at <https://www.dvidshub.net/news/437239/marine-corps-reactivates-base-guam>. For Marine Corps personnel data, see Table I.

⁵⁹ CRS correspondence with Marine Corps on April 26, 2023, on file with the author.

⁶⁰ For additional information, see CRS In Focus IF10672, *U.S. Military Presence on Okinawa and Realignment to Guam*, by Emma Chanlett-Avery, Christopher T. Mann, and Joshua A. Williams.

⁶¹ Testimony of Marine Corps Lt. Gen. Edward Banta, Senate Committee on Appropriations, subcommittee on Military Construction, Veterans Affairs and Related Agencies, April 19, 2023, p. 5, at <https://www.appropriations.senate.gov/imo/media/doc/04.19-%20LtGen%20Banta%20SAC-M%20Testimony.pdf>

⁶² Kyodo News, "U.S. Marines open new Guam base, troop transfer to start in '24," Jan. 26, 2023, at <https://english.kyodonews.net/news/2023/01/304c6e706f47-us-marines-open-new-guam-base-troop-transfer-to-start-in-24.html>. Also see Todd South, "Marine Corps Plan to Relocate from Okinawa to Guam Needs a Review, Commandant Says," *Marine Corps Times*, May 3, 2019, at <https://www.marinecorpstimes.com/news/your-marine-corps/2019/05/03/marine-corps-relocation-from-okinawa-to-guam-worthy-of-review-commandant-says/>. Also see Brad Lendon, "U.S. Marines officially opens first new base in 70 years on island of Guam," CNN, Jan. 27, 2023, at <https://www.cnn.com/2023/01/27/asia/new-us-marine-corps-base-guam-intl-hnk-ml/index.html>.

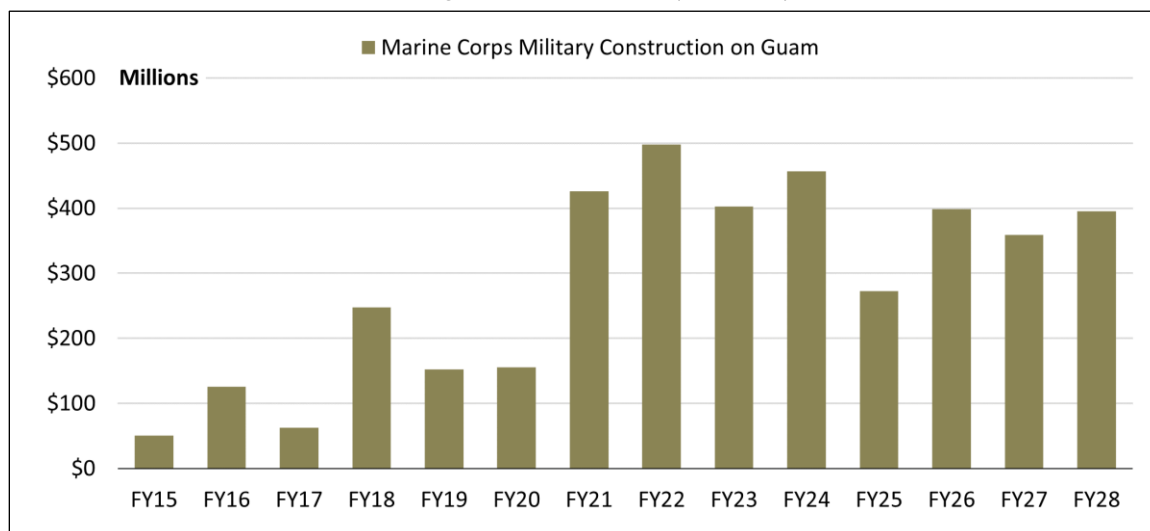
⁶³ Ibid.

⁶⁴ "Military: Development of Marine Corps Base on Guam on Track," *Guam Daily Post*, March 25, 2021, at https://www.postguam.com/news/local/military-development-of-marine-corps-base-on-guam-on-track/article_17f1b0a0-8d03-11eb-9c09-f7aebad6ea29.html.

⁶⁵ See CRS In Focus IF10672, *U.S. Military Presence on Okinawa and Realignment to Guam*, by Emma Chanlett-Avery, Christopher T. Mann, and Joshua A. Williams.

Figure 4. Marine Corps Military Construction Funding for Guam and Commonwealth of the Northern Mariana Islands

Funding FY2015 to FY2023 (\$ millions)



Source: CRS graphic based on Office of the Under Secretary of Defense, Comptroller.

Notes: Data for FY2015 through FY2023 reflect Military Construction (MILCON) appropriations of enacted budgets and budget execution adjustments as reported by the DOD Comptroller; FY2024 numbers reflect the President's Budget Request; FY2025–FY2028 reflect Future Years Defense Program as reported by the DOD Comptroller; budget numbers exclude family housing construction, Government of Japan funding, and planning and design accounts.

On the parcel of land known as Andersen South, the Marine Corps is nearing completion on the Skaggs Urban Training Complex, where Marines will be able to train for Military Operations in Urbanized Terrain (MOUT). The \$176 million training center was scheduled for completion by July 2023.⁶⁶ Construction has been delayed in part due to archeological findings in the area.⁶⁷ The training facility is being built on the site of an abandoned housing complex, and new construction aims to make the terrain more urban, with a mock embassy facility included.⁶⁸ It is to have two landing zones and accommodate training for squad to battalion-sized units.⁶⁹ Training there may include personnel insertion and extraction, embassy reinforcement, combat maneuver training such as hand grenade and breaching exercises, urban troop maneuvers, vehicle convoy maneuvers, and fixed/tilt-rotor drop zone training.⁷⁰

⁶⁶ Joint Region Marianas, Mariana Island Range Complex (MIRC) briefing slide, on file with the author.

⁶⁷ Navy, "2021 Secretary of the Navy Environmental Awards," 2021, at <https://denix.osd.mil/awards/2021secdef/cultural-resources-management-individual-team/gcrt-mcbc/#page=4>.

⁶⁸ Seth Robson, "New Base Expected to Host Thousands of Marines Begins to Take Shape," *Stars and Stripes*, March 12, 2020, at https://www.stripes.com/theaters/asia_pacific/new-base-expected-to-host-thousands-of-marines-begins-to-take-shape-on-guam-1.622106.

⁶⁹ Joint Region Marianas, Mariana Island Range Complex (MIRC) briefing, on file with the author.

⁷⁰ Navy, Naval Facilities Engineering Command, "Military Relocation to Guam and CNMI Programmatic Agreement Memo #1," project summary, August 23, 2019, at https://guamlegislature.com/index/wp-content/uploads/2019/08/PA-Memo-1_Ansersen-South-Operations_Public-final.pdf.

U.S. Air Force Forces and Infrastructure on Guam

Andersen Air Force Base on the northern tip of Guam (**Figure 2**) operates a major airfield that is a potential hub for the Air Force's Agile Combat Employment (ACE) concept.⁷¹ According to INDOPACOM, the concept "focuses on the ability to move aircraft rapidly to a network of smaller airfields in the Western Pacific to avoid being targeted by Chinese missiles in the event of war."⁷² North of Andersen Air Force Base's primary airfield, the Air Force also maintains an austere airfield, known as the Northwest Field, which was built during World War II. Northwest Field is currently used for training, but the Air Force has plans to develop it to provide more capacity for high-volume operations to include fighter, tanker, and cargo aircraft.⁷³

The 36th Wing serves as the host unit at Andersen Air Force Base. The wing has no permanent Air Force aircraft, rather, its mission is to equip and integrate joint airpower and logistics within INDOPACOM. Permanent air assets based at Andersen Air Force Base include Navy unmanned reconnaissance aircraft (e.g., MQ-4 and RQ-4 Global Hawks) and Navy helicopters (MH-60S Seahawks). The 36th Wing hosts a frequent rotational tanker task force (composed of units operating KC-135s) and rotational bomber task forces (composed of B-1 and B-52 units). By capacity, Andersen Air Force Base has more fuel and munitions storage than any other Air Force base.⁷⁴ An upgraded pipeline system can provide aircraft with more than 4 million gallons of jet fuel per day (enough fuel to supply more than 100 tanker aircraft sorties).⁷⁵ The Air Force expects rotational and transient aircraft and units to bring all the supplies and personnel needed for their operations.⁷⁶

An Air Force official told CRS that Guam's strategic importance requires infrastructure improvements to support growing demands placed on Andersen Air Force Base. A written statement provided to CRS by the Air Force Office of Legislative Affairs expressed concern about current readiness at Andersen, stating Andersen Air Force Base is "not equipped with the material and personnel necessary to be an effective hub."⁷⁷

Also on Andersen Air Force Base, the U.S. Space Force maintains the Guam Tracking Station, operated by the 21st Space Operations Squadron, Detachment 2. This unit is part of the Air Force Satellite Control Network (AFSCN), which provides support to military operations.⁷⁸

⁷¹ Air Force, "Air Force operationalizes ACE concept, addresses today's changing threat environment," press release, June 23, 2022, at <https://www.af.mil/News/Article-Display/Article/3072831/air-force-operationalizes-ace-concept-addresses-todays-changing-threat-environm/>. Also see Air Force Doctrine Note 1-21, Agile Combat Employment, at https://www.doctrine.af.mil/Portals/61/documents/AFDN_1-21/AFDN%201-21%20ACE.pdf.

⁷² Navy, "Andersen AFB Supports Agile Combat Employment Reaper," press release, October 26, 2021, at <https://www.pacom.mil/Media/News/News-Article-View/Article/2823304/andersen-afb-supports-agile-combat-employment-reaper/>.

⁷³ Based on CRS email correspondence with Air Force officials, September 12, 2022, on file with the author.

⁷⁴ Ibid.

⁷⁵ DOD, Defense Logistics Agency, "New pipeline revitalizes Guam fuel infrastructure," press release, March 13, 2018, at <https://www.dla.mil/About-DLA/News/Energy/Article/1464395/new-pipeline-revitalizes-guam-fuel-infrastructure/>.

⁷⁶ Based on CRS email correspondence with Air Force officials, September 12, 2022, on file with the author.

⁷⁷ Ibid.

⁷⁸ Air Force, Det. 2, 21st Space Operations Squadron, at <https://www.andersen.af.mil/Units/Wing-Tenant-Units/Det-2-21st-Space-Operations-Squadron/>.

U.S. Army Forces on Guam⁷⁹

Permanent U.S. Army presence on Guam consist of two organizations, an active-duty Terminal High Altitude Area Defense (THAAD) battery and the Guam Army National Guard.⁸⁰ As missile defense plans for Guam continue to evolve, assigning additional Army forces to Guam could become an option.⁸¹

The Army deployed a THAAD battery to Guam in 2013.⁸² The THAAD anti-missile defense system is designed to shoot down short-, medium-, and intermediate-range ballistic missiles by intercepting them in their final phase of flight.⁸³ The Army operates the THAAD battery on Guam under the command of Task Force Talon.⁸⁴ The THAAD unit was previously based at Andersen Air Force base, but was later moved to a nearby U.S. military site known as Finegayan South because, a former JRM commander reportedly said, the new location made the system more effective.⁸⁵

Air and Missile Defense Systems on Guam

Both the PRC and North Korea have nuclear weapons and missiles capable of reaching Guam (see **Figure 5**). Some observers assess that the island is vulnerable to attack because it is not well protected against ballistic, cruise, or hypersonic missiles.⁸⁶ Michelle Atkinson, MDA's director for operations, said in March 2023: "Current forces are capable of defending Guam against today's North Korean ballistic missile threats. However, the regional threat to Guam, including those from PRC, continues to rapidly evolve."⁸⁷

⁷⁹ Information in this section was derived from research prepared by Andrew Feickert, CRS Specialist in Military Ground Forces.

⁸⁰ The THAAD procurement program is overseen by the DOD's Missile Defense Agency (MDA) and the system is operated by the Army. See DOD transcript of MDA press briefing on FY2024 missile defense budget, March 14, 2023, at <https://www.defense.gov/News/Transcripts/Transcript/Article/3328637/missile-defense-agency-officials-hold-a-press-briefing-on-president-bidens-fisc/>

⁸¹ For more about the role of the Army and Marine Corps ground forces in the Pacific, see pp. 8-9 of CRS Report R47096, *U.S. Ground Forces in the Indo-Pacific: Background and Issues for Congress*, by Andrew Feickert.

⁸² Karen DeYoung, "U.S. to Deploy Anti-Missile System to Guam," *Washington Post*, April 3, 2013, at https://www.washingtonpost.com/world/national-security/us-to-deploy-anti-missile-system-to-guam/2013/04/03/b939ecfc-9c89-11e2-a941-a19bce7af755_story.html.

⁸³ Army, "Air Defenders deploy first THAAD remote launch capability," press release, March 16, 2022, at https://www.army.mil/article/254576/guam_air_defenders_deploy_first_thaad_remote_launch_capability.

⁸⁴ Andersen Air Force Base, Task Force Talon Mission page, at <https://www.andersen.af.mil/TaskForceTalon/>.

⁸⁵ Phill Leon Guerrero, "THAAD missile defense moving," *Guam Daily Post*, May 10, 2022, at https://www.postguam.com/news/local/thaad-missile-defense-moving/article_b181cad8-cf75-11ec-a897-cb60600d2827.html.

⁸⁶ See Government Accountability Office, *Missile Defense: Annual Goals Unmet for Deliveries and Testing* (GAO-23-106011), May 2023, p. 39, at <https://www.gao.gov/assets/gao-23-106011.pdf>. Also see Abraham Mahshie, "Guam Would Get Command Center with Integrated Air Picture in Missile Defense Agency Budget," *Air Force Magazine*, March 25, 2022, at <https://www.airforcemag.com/guam-to-get-command-center-with-integrated-air-picture-in-missile-defense-agency-budget/>.

⁸⁷ Department of Defense, DOD transcript of MDA press briefing on FY2024 missile defense budget, March 14, 2023, at <https://www.defense.gov/News/Transcripts/Transcript/Article/3328637/missile-defense-agency-officials-hold-a-press-briefing-on-president-bidens-fisc/>.

Currently, the U.S. military's missile defense capabilities for Guam include the THAAD anti-missile defense system.⁸⁸ The Army THAAD battery on Guam is manned by about 100 soldiers and consists of six launchers each with eight interceptor missiles.⁸⁹ The U.S. Navy provides additional missile defense capability for Guam on an as-needed basis through its deployment in the region of warships equipped with the Aegis missile defense system, which is designed to intercept incoming missile threats during their midcourse or terminal phases of flight.⁹⁰ The THAAD and Aegis systems are not currently integrated and rely on separate sensors and command and control systems.

In October 2022, MDA said that Indo-Pacific Command issued new requirements to upgrade Guam's missile defenses to include "360-degree coverage, and layered defense against regional ballistic, maneuvering ballistic, hypersonic glide, and cruise missile threats."⁹¹

Developing and implementing a missile defense system to protect the military servicemembers, infrastructure and U.S. residents on Guam from potential attack is a top priority for the INDOPACOM and MDA leadership.⁹² The INDOPACOM commander testified that "the Guam missile defense system remains the Indo-Pacific's Number One priority. That's based on the homeland defense mission that's most critical."⁹³

The 2022 Missile Defense Review highlighted the importance of Guam:

Within the context of homeland defense, an attack on Guam or any other U.S. territory by any adversary will be considered a direct attack on the United States and will be met with an appropriate response. Additionally, Guam is home to key regional power projection platforms and logistical nodes, and is an essential operating base for U.S. efforts to maintain a free and open Indo-Pacific region. The architecture for defense of the territory against missile attacks will therefore be commensurate with its unique status as both an unequivocal part of the United States as well as a vital regional location. Guam's defense, which will include various active and passive missile capabilities, will contribute to the overall integrity of integrated deterrence and bolster U.S. operational strategy in the Indo-Pacific region.⁹⁴

⁸⁸ Army, "Air Defenders deploy first THAAD remote launch capability," press release, March 16, 2022, at https://www.army.mil/article/254576/guam_air_defenders_deploy_first_thaad_remote_launch_capability.

⁸⁹ Center for Strategic and International Studies, Missile Defense Project, Terminal High Altitude Area Defense (THAAD), at <https://missilethreat.csis.org/system/thaad/>.

⁹⁰ CRS Report RL33745, *Navy Aegis Ballistic Missile Defense (BMD) Program: Background and Issues for Congress*, by Ronald O'Rourke.

⁹¹ Government Accountability Office, Missile Defense: Annual Goals Unmet for Deliveries and Testing (GAO-23-106011), p. 39, May 2023, at <https://www.gao.gov/assets/gao-23-106011.pdf>.

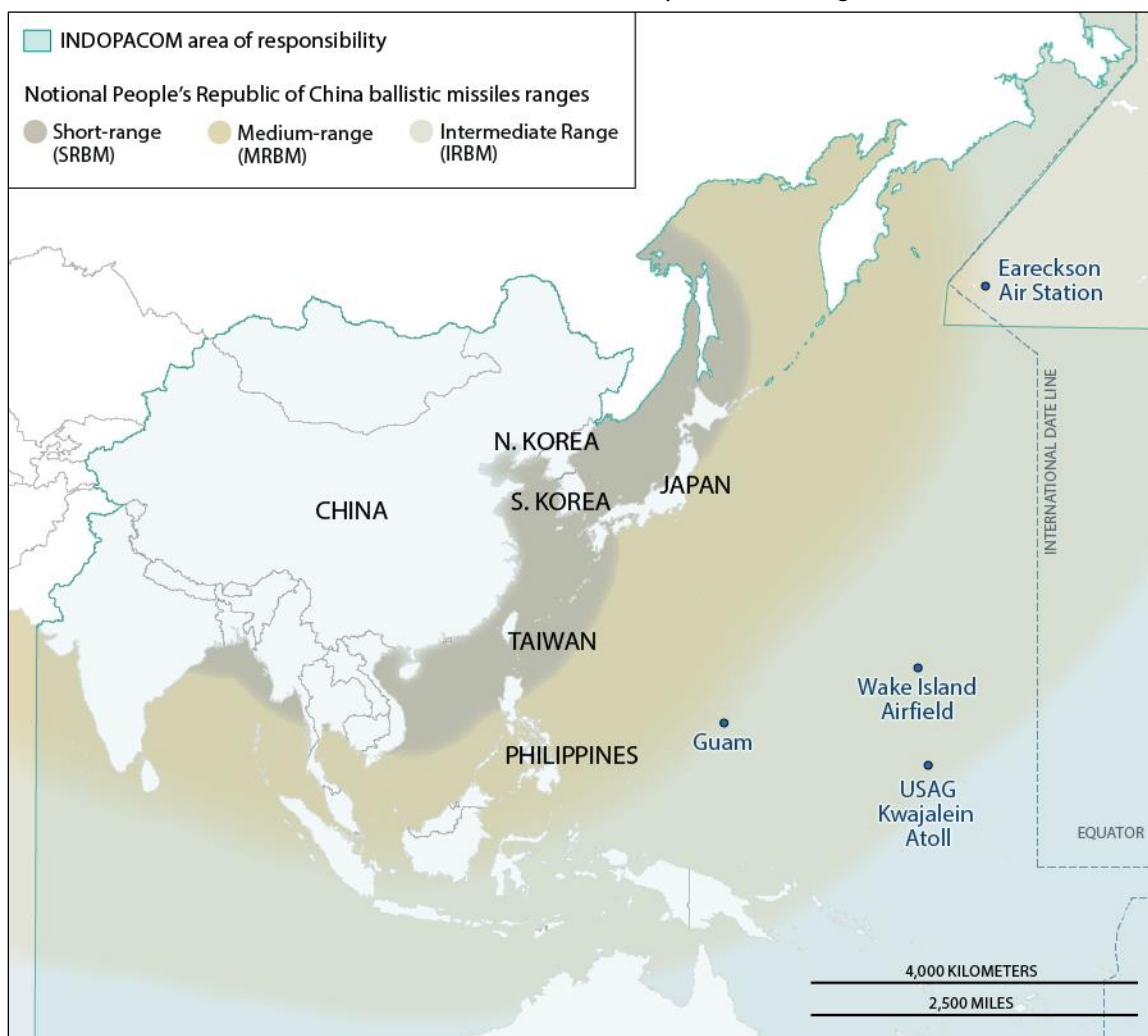
⁹² Transcript, Senate Committee on the Armed Services, Tuesday, May 9, 2023, at https://www.armed-services.senate.gov/imo/media/doc/23-46_05-09-2023.pdf.

⁹³ Vice Adm. John Aquilino, testifying before the Senate Armed Services Committee on April 20, 2023.

⁹⁴ Department of Defense, 2022 Missile Defense Review, p. 7, available at <https://media.defense.gov/2022/Oct/27/2003103845/-1/-1/1/2022-NATIONAL-DEFENSE-STRATEGY-NPR-MDR.PDF>.

Figure 5. Ballistic Missile Threat in the Indo-Pacific Region

The Chinese People's Liberation Army Rocket Force reportedly has an arsenal of more than 400 missiles capable of reaching Guam.



Source: CRS graphic based on Center for Strategic and International Studies (CSIS) map, “China’s Regional Missile Threats,” (available at <https://i2.wp.com/missilethreat.csis.org/wp-content/uploads/2020/01/Chinaregionalmap.jpg?ssl=1>), associated CSIS analytical products, DOD documentation, and location data.

Notes: Ranges are intended to be notional and reflective of a broad threat environment. USAG = U.S. Army Garrison.

MDA is developing the Enhanced Integrated Air and Missile Defense (EIAMD) System for the defense of Guam. Current plans aim to have certain elements (outlined below) of the new missile defense system in place by the end of FY2024. Congress has funded MDA’s program and implemented numerous oversight measures to track its progress and effectiveness.

Enhanced Integrated Air and Missile Defense (EIAMD) System for Guam

The new missile defense architecture for Guam, according to MDA budget documents, is projected to demonstrate “initial capability” in 2024, followed by “enhanced capability” in 2029, and to continue to develop into the 2030s.⁹⁵

The new system would involve a collaboration between MDA and the three military departments to create a system that relies on elements of the Army-operated THAAD missile systems, the Army’s PATRIOT missile defense system, and the Navy’s Aegis Weapons System and the Navy’s SM-3 and SM-6 missiles.⁹⁶ The system would integrate use of the Navy’s Aegis weapon system’s fire control capability and the Army’s Integrated Battle Command System (IBCS), a command and control system that connects sensors and shooters on the battlefield.⁹⁷ MDA officials say the system will include distributed MK-41 Vertical Launching Systems, Army Standard Missile Launchers, and an AN/TPY-6 (formerly AN/TPY-X) mobile radars.⁹⁸ The Guam missile defense system is to be controlled by a Joint Command Center using the IBCS; the Aegis Guam System; and a Command and Control, Battle Management and Communications (C2BMC) mission node providing local continuity of operations.⁹⁹ These systems rely in part on the network of satellites and space-based sensors maintained by the U.S. Space Force.¹⁰⁰

The Senate Armed Services Committee noted in 2022 that the Guam missile defense plan “involves the acquisition and system integration of three separate service-related missile defense programs at multiple sites across the island against a complex array of missile related threats relying on constrained infrastructure on the island of Guam.”¹⁰¹

In July 2022, MDA issued a “Notice of Intent” to award a sole source contract to install the “Aegis Guam System” as early as 2024.¹⁰²

On May 5, 2023, MDA published in the Federal Register a Notice of Intent to prepare an Environmental Impact Statement (EIS) to assess the potential environmental impacts and required mitigation associated with an EIAMD system for the defense of Guam.¹⁰³ The EIS will evaluate

⁹⁵ Department of Defense Fiscal Year (FY) 2024 Budget Estimates, Missile Defense Agency Defense-Wide Justification Book Volume 2b of 2 Procurement, Defense-Wide, March 2023, p. 2b-125, at https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2024/budget_justification/pdfs/02_Procurement/PROC_MDA_VOL2B_PB_2024.pdf. Additional detail may be available in classified versions of DOD budget justification documents.

⁹⁶ Jen Judson, “MDA’s plan to protect Guam relies on field-proven systems,” *Defense News*, March 30, 2022, at <https://www.defensenews.com/congress/budget/2022/03/30/mdas-plan-to-protect-guam-relies-on-field-proven-systems/>.

⁹⁷ Ibid.

⁹⁸ Ibid.

⁹⁹ Department of Defense Fiscal Year (FY) 2024 Budget Estimates, Missile Defense Agency Defense-Wide Justification Book Volume 2b of 2 Procurement, Defense-Wide, March 2023, see p. 2b 125.

¹⁰⁰ U.S. Space Force, U.S. Space Force Capabilities, at <https://www.spaceforce.mil/About-Us/About-Space-Force/Space-Capabilities/>.

¹⁰¹ S.Rept. 117-130, p. 286.

¹⁰² General Services Administration, System for Award Management (SAM), Notice of Contract Opportunity, “Notice of Intent to Award Sole Source Aegis Guam Weapon System Engineering and Integration,” July 1, 2022, at <https://sam.gov/opp/872785d477754f4b8f08b4a626a6991f/view>.

¹⁰³ Missile Defense Agency, Enhanced Integrated Air & Missile Defense (EIAMD) for the defense of Guam, Environmental Impact Statement, at <https://www.mda.mil/system/eiamd/eis.html>.

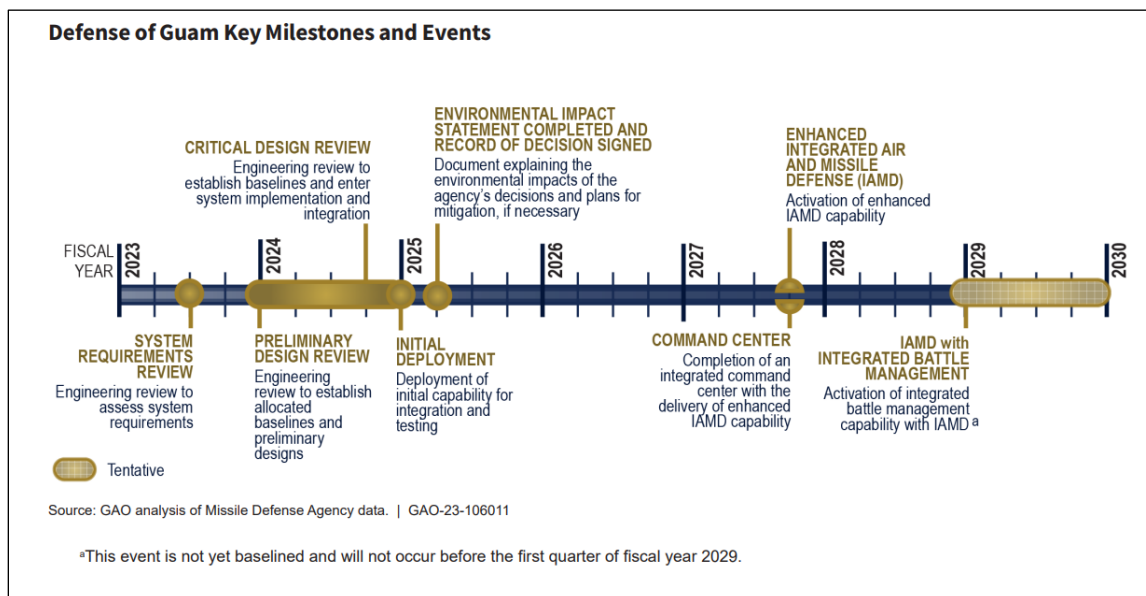
20 ground sites dispersed across the island for radars; sensors; missile launchers; missile interceptors; and command and control, battle management, and communications systems.¹⁰⁴

Vice Admiral Jon Hill, director of MDA, testified on April 18, 2023, before the House Armed Services Committee:

Working with the services and the agencies, we are driving to meet INDOPACOM's requirement for a persistent 360 degrees layered defense, that capability on Guam against simultaneous raids of cruise, ballistic, maneuvering, and hypersonic threats.¹⁰⁵

"Our total focus right now is on establishing the sites. We know what they are. We've done the early environmental work there. And as you mentioned, at the end of '24, our intent is to have the first radar, an engineering version of the command and control suite, and—a launcher system so that we can test in the environment, you know, just beyond signals and checkouts and those sorts of things. So, we'll be on island with capability at the end of '24."¹⁰⁶

Figure 6. Projected Timeline for Guam Missile Defense Program



Source: Government Accountability Office, "Missile Defense: Annual Goals Unmet for Deliveries and Testing," GAO-23-106011, May 18, 2023, p. 35.

Oversight of Guam Missile Defense Programs

In the Department of Defense Appropriations Act for FY2023 (P.L. 117-328), Congress directed MDA to provide quarterly updates to the congressional defense committees on the status of the Guam missile defense program.¹⁰⁷ In the James M. Inhofe National Defense Authorization Act

¹⁰⁴ Missile Defense Agency, Enhanced Integrated Air & Missile Defense (EIAMD) for the defense of Guam, Environmental Impact Statement Fact Sheet, at <https://www.mda.mil/system/eiamd/documents/eiamdaisfactsheet.pdf>

¹⁰⁵ Testimony of Missile Defense Director Vice. Adm. Jon Hill, in U.S. Congress, House Armed Services Committee, Subcommittee on Strategic Forces Hearing on Fiscal Year 2024 Budget Request for Missile Defense and Missile Defeat Programs, 118th Congress, April 18, 2023.

¹⁰⁶ Ibid.

¹⁰⁷ According to the Joint Explanatory Statement accompanying the FY2023 DOD Appropriations Act, "The update (continued...)"

(NDAA) for Fiscal Year 2023 (P.L. 117-263), Congress directed DOD to contract with a federally funded research and development center to conduct an independent assessment of the proposed architecture capability, and the military personnel and infrastructure needed for the Guam missile defense project.¹⁰⁸ The 2023 NDAA also directed DOD to appoint of a senior military official to oversee the coordination of designing the architecture of the missile defense system for defending Guam; oversee development of an integrated missile defense acquisition strategy for the missile defense of Guam; ensure the military department and defense agency budgets are appropriate for the strategy; site the integrated missile defense system; and oversee long-term acquisition and sustainment.¹⁰⁹ The 2023 NDAA directed the Secretary of Defense to set a goal to “rapidly procure and field up to three vertical launching systems that can accommodate planned interceptors operated by the Navy” on a timeline of “not later than December 31, 2023.”¹¹⁰

Table 2. U.S. Missile Defense Agency Budget for Defense of Guam Program

(Dollars in millions)

Fiscal Year	2022	2023	2024	2025	2026	2027	2028	Totals
RDT&E	110.6	393.2	397.6	291.3	272.2	238.8	232.1	1,935.8
Procurement	80	26.5	169.6	85.7	5.3	—	—	367.1
MILCON	—	—	—	438.0	—	—	—	438.0
Total	190.6	419.7	567.2	815.0	277.5	238.8	232.1	2,740.9

Source: Department of Defense Fiscal Year (FY) 2024 Budget Estimates, Missile Defense Agency Defense-Wide Justification Book Volume 2a of 5 Research, Development, Test & Evaluation, Defense-Wide, March 2023, see p. 2a 577. Also see Department of Defense Fiscal Year (FY) 2024 Budget Estimates, Missile Defense Agency Defense-Wide Justification Book Volume 2b of 2 Procurement, Defense-Wide, March 2023, see p. 2b 125. Military Construction (MILCON) data provided to CRS by the Under Secretary of Defense for Comptroller.

Notes: RDT&E = Research, Development, Test and Evaluation accounts; MILCON = Military Construction accounts. Budget data for FY2024 reflects the 2024 President’s Budget Request. Budget data for 2025 to 2028 reflect the Future Years Defense Program (FYDP). MDA budget documents indicated that costs for RDT&E related to the Guam Missile Defense system will continue beyond FY2028.

Effectiveness of Missile Defense Systems

Scientists and defense experts debate the effectiveness of U.S. missile defense technology.¹¹¹ An MDA report shows an 82% success rate for missile defense system tests.¹¹² However, some

shall include: the status of environmental impact statements and site surveys required to support placement of weapons systems supporting the Defense of Guam, the upgrades to Guam’s infrastructure required to support the mission. acquisition schedules of anticipated weapons systems and corresponding deployment schedules of such systems. manning requirements for the Defense of Guam mission, and obligation and expenditure data on all funding related to the Defense of Guam. These updates shall be provided at an unclassified and classified level as required.” See Department of Defense Appropriations Act, 2023, Division C, p. 6, available at <https://www.appropriations.senate.gov/imo/media/doc/Division%20C%20-%20Defense%20Statement%20FY23.pdf#page=6>.

¹⁰⁸ P.L. 117-263 §1660(a).

¹⁰⁹ P.L. 117-263 §1660(b).

¹¹⁰ P.L. 117-263 §1660(c)(1).

¹¹¹ Steve Trimble, “Multibillion-Dollar Guam Defense Poses New Missile Defense Challenges,” *Aviation Week*, March 30, 2023, at <https://aviationweek.com/defense-space/missile-defense-weapons/multibillion-dollar-guam-defense-poses-new-missile-defense>. For additional analysis of the effectiveness of missile defense systems, see below, “Issues for Congress” section and “Defense of Guam” subsection.

¹¹² MDA Fact sheet reports Overall Test Record: 86 of 105 hit-to-kill intercept attempts have been successful across all (continued...)

government audits and outside analysts have raised concerns about the quality and quantity of MDA testing programs.¹¹³ In the event of a conflict, some analysts speculate that the PRC military may be able to achieve at least 25% penetration rates against missile defenses.¹¹⁴ In the annual U.S. Missile Defense Review, DOD stated that the national security strategy does not rely on missile defense systems as the primary means to address missile threats from Russia and China; the report notes that instead, the United States “will continue to rely on strategic deterrence – underwritten by a safe, secure, and effective nuclear arsenal – to address and deter large intercontinental-range, nuclear-capable missile threats to the homeland from the People’s Republic of China and Russia.”¹¹⁵

Missile defense effectiveness in a real-world conflict would depend on numerous factors. For example, an adversary’s ability to deploy a large arsenal of missiles and fire multiple missiles simultaneously increases the likelihood of penetrating a missile defense system.¹¹⁶ The type of incoming missile and its underlying technology can increase or decrease its ability to evade defensive measures.¹¹⁷ Additionally, if a missile defense system is able to fire more than one interceptor missile at an incoming missile, the likelihood of successful defense is greater.¹¹⁸ The limited quantity of interceptor missiles available to current missile defense system architectures could be a factor in an attack from an adversary capable of firing numerous missiles, according to a 2021 report from the Congressional Budget Office (CBO) about U.S. missile defenses for countering land attack cruise missiles (LACMs).¹¹⁹ The CBO noted that its analysis was based on missile defense architectures that included eight missile-interceptor missiles per site. “Adversaries other than nonstate groups would probably have access to more missiles and might be able to overwhelm CBO’s notional defenses,” the CBO report concluded.¹²⁰ The U.S. may consider investing in additional interceptor missile capability. In this regard, the CBO noted:

programs since the integrated system began development in 2001. This record includes attempts by Aegis Ballistic Missile Defense (BMD), Ground-based Midcourse Defense (GMD), Terminal High Altitude Area Defense (THAAD), and PATRIOT Advanced Capability-3. See MDA Fact Sheet, January 17, 2019, at <https://www.defense.gov/Portals/1/Interactive/2018/11-2019-Missile-Defense-Review/ballistic-missile-defense-intercept-flight-test-record-UPDATED.pdf>.

¹¹³ See GAO, “Missile Defense: Annual Goals Unmet for Deliveries and Testing,” May 2023, at <https://www.gao.gov/products/gao-23-106011>. Also see John F. Tierney, “We May Not Be Able to Stop a North Korean Missile,” *New York Times*, June 1, 2017. Also see Jaganath Sankaran, Steve Fetter, *Defending the United States: Revisiting National Missile Defense against North Korea*. *International Security* 2022, 46 (3): 51–86, at https://doi.org/10.1162/isec_a_00426.

¹¹⁴ Michael O’Hanlon, “Can China Take Taiwan?”, Brookings Institution, August 2022, at <https://www.brookings.edu/wp-content/uploads/2022/08/Can-China-Take-Taiwan-v5.pdf>.

¹¹⁵ “2022 Missile Defense Review” Fact Sheet, at <https://media.defense.gov/2022/Oct/27/2003103921/-1/-1/1/MISSILE-DEFENSE-REVIEW-MDR-FACTSHEET.PDF>. Full report available at <https://media.defense.gov/2022/Oct/27/2003103845/-1/-1/1/2022-NATIONAL-DEFENSE-STRATEGY-NPR-MDR.PDF>.

¹¹⁶ Michael O’Hanlon, “Can China Take Taiwan?”, Brookings Institution, August 2022, p. 17, at <https://www.brookings.edu/wp-content/uploads/2022/08/Can-China-Take-Taiwan-v5.pdf>.

¹¹⁷ Congressional Budget Office, “National Cruise Missile Defense: Issues and Alternatives,” Feb. 9, 2021, p. 11 at <https://www.cbo.gov/system/files/2021-02/56950-CMD.pdf>.

¹¹⁸ The Center for Arms Control and Non-proliferation estimates that interceptor missiles for Ground-Based Midcourse Defense (GMD) system that the United States’ anti-ballistic missile system uses for intercepting incoming warheads in space has been effective 55% of the time in highly-scripted tests. To reach a confidence level of at least 90%, three interceptors would need to be fired at a single warhead. See <https://armscontrolcenter.org/issues/missile-defense/gmd-frequently-asked-questions/>.

¹¹⁹ Congressional Budget Office, “National Cruise Missile Defense: Issues and Alternatives,” February 2021, at <https://www.cbo.gov/system/files/2021-02/56950-CMD.pdf>.

¹²⁰ *Ibid.*, p. 40.

“[D]ecisionmakers would need to consider whether the cost of a wide-area cruise missile defense was proportionate to the overall risk posed by LACMs.”¹²¹

The 2022 Missile Defense Review, published by the White House as part of the National Defense Strategy, stated: “The evolution of offensive air and missile threat has accelerated greatly since the United States began developing its first ballistic missile defense system over fifty years ago. This trend represents a growing national security challenge expected to multiply in scope and complexity in the coming decade.”¹²²

Civilian Infrastructure

The readiness of U.S. military personnel and facilities on Guam are linked in numerous ways to the civilian-owned and -operated infrastructure outside of military installations. The U.S. military facilities on the island rely on the civilian-run electrical grid, which is powered by aging infrastructure and sometimes experiences rolling power outages.¹²³ Guam’s infrastructure that provides drinking water and wastewater treatment has required improvements in recent years and may not be sufficient to handle additional military and civilian population growth on the island.¹²⁴ Guam has a housing shortage that may affect military personnel seeking to live off-base on the island.¹²⁵ The island also faces a labor shortage—both U.S. military commanders and local elected officials in Guam have stated the need to bring in more temporary foreign workers for the current and future demand for military and civilian construction projects. The sections below describe these issues in greater detail.

Electrical Infrastructure

The Guam Power Authority (GPA) operates the island’s primary electrical grid.¹²⁶ The U.S. military accounts for about 20% of electricity use on Guam.¹²⁷ While DOD has some military-owned and -operated electrical power capability on the island, GPA is the primary provider of electrical power for the U.S. military.¹²⁸ The GPA’s 2022 Integrated Resource Plan concluded that GPA faces challenges in “keeping its aging, owned-plants reliable and in good working

¹²¹ Ibid., p. 2.

¹²² Department of Defense, 2022 Missile Defense Review, p. 12, available at <https://media.defense.gov/2022/Oct/27/2003103845/-1/-1/1/2022-NATIONAL-DEFENSE-STRATEGY-NPR-MDR.PDF>.

¹²³ Guam Power Authority 2022 Integrated Resources Plan, p. 1, at https://mail.guampowerauthority.com/gpa_authority/strategicplanning/documents/GPA2022IntegratedResourcePlan.pdf.

¹²⁴ Guam Waterworks Authority, Fiscal Year 2021 Report, https://gwosa2.opaguam.org/sites/default/files/gwa_ccr21.pdf. Also see Steve Limtiaco, “GWA, Navy agree to protect aquifer from growing population,” Guam Daily News, Oct. 21, 2022, at https://www.guampdn.com/news/gwa-navy-agree-to-protect-aquifer-from-growing-population/article_065108f8-5112-11ed-a326-57df6b92d1ca.html.

¹²⁵ Haidee Eugenio Gilbert, “‘Emergency crisis’: High demand, low inventory of housing units,” Pacific Daily News, October 4, 2022, at https://www.guampdn.com/news/emergency-crisis-high-demand-low-inventory-of-housing-units/article_2e1a3732-42cc-11ed-a972-9fe2c98b1347.html.

¹²⁶ American Public Power Association, “Guam Power Authority bolsters resilience and charts path to 50% renewables,” at <https://www.publicpower.org/periodical/article/guam-power-authority-bolsters-resilience-and-charts-path-50-renewables>.

¹²⁷ U.S. Energy Information Administration, Guam Profile, at <https://www.eia.gov/state/?sid=GQ>.

¹²⁸ Guam Power Authority, About Us page, at <https://www.guampowerauthority.com/corporate/about-us>.

condition.”¹²⁹ In March 2023, repair work on the electrical utility system prompted the GPA to warn the public and U.S. Navy about the possibility of rolling electrical outages.¹³⁰

For FY2023, Congress authorized \$34.4 million in Military Construction funds for the Energy Resilience and Conservation Investment Program to build an electrical distribution system for Guam.¹³¹ The project’s plan includes underground cables connecting Polaris Point Submarine Base on Guam to the Navy-owned power plant at Orote Point.¹³² The project also includes emergency back-up power generation capabilities and a SCADA-control system to create a microgrid that can operate independently of the island’s larger electrical grid.¹³³

The Joint Explanatory Statement accompanying the FY2023 NDAA directed DOD to provide a briefing to the congressional defense committees on DOD plans for updating and expanding existing infrastructure on Guam to support U.S. forces and facilities.¹³⁴ Specifically, the conferees stated that the report should include information about potential improvements to the island’s existing electrical grid and ways to improve energy resilience for DOD equipment and facilities; options to expedite the removal of unexploded ordnance; and possible improvements to roadways, the commercial airport, and the seaport.

Guam is also receiving money from other federal sources, including \$6.3 million for energy infrastructure improvements via the Infrastructure Investment and Jobs Act.¹³⁵

The electrical infrastructure on Guam includes the Dandan solar farm, which opened in 2015.¹³⁶ In 2022, an additional phase of the solar farm development was postponed when the Navy said it needed to use land previously designated for the solar farm as a location for new missile defense system sites.¹³⁷

Congress in 2022 authorized to the Department of the Interior to consider off-shore wind leases for Guam.¹³⁸ One challenge to widespread use of wind-generated power for Guam is the island’s

¹²⁹ Guam Power Authority 2022 Integrated Resources Plan, p. 1, at https://mail.guampowerauthority.com/gpa_authority/strategicplanning/documents/GPA2022IntegratedResourcePlan.pdf.

¹³⁰ *Ibid.*, p. 20.

¹³¹ P.L. 117-263 §2402.

¹³² DOD Budget Justification documents, Defense-Wide, Energy Resilience and Conservation Investment Program, see p. 45, at https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2023/budget_justification/pdfs/07_Military_Construction/13-Energy_Resilience_and_Conservation_Investment_Program.pdf.

¹³³ *Ibid.* SCADA refers to “Supervisory Control and Data Acquisition,” which is a term to describe a computerized system that is capable of gathering and processing data and applying operational controls.

¹³⁴ U.S. Congress, Joint Explanatory Statement, James M. Inhofe National Defense Authorization Act for Fiscal Year 2023, P.L. 117-263, p. 417.

¹³⁵ Guam Fact Sheet, White House, February 2023, at <https://www.whitehouse.gov/wp-content/uploads/2023/02/Guam-Fact-Sheet-E3.pdf>.

¹³⁶ Guam Power Authority, FY2027 report, at https://www.opaguam.org/sites/default/files/ccr-fy_2017-filing-gpa.pdf.

¹³⁷ John O’Connor, “Phase III solar project pending as Navy withdraws use of property,” Guam Daily Post, August 18, 2022, at https://www.postguam.com/news/local/phase-iii-solar-project-pending-as-navy-withdraws-use-of-property/article_fbb7ae98-16eb-11ed-81c7-a7985be1ce54.html.

¹³⁸ The Atlantic Council, “Does the IRA make US offshore wind the ‘next big thing?’” Joseph Webster and Elina Carpen, October 25, 2022, at <https://www.atlanticcouncil.org/blogs/energysource/does-the-ira-make-us-offshore-wind-the-next-big-thing/>. Also see Thomas Manglona, “Inflation Reduction Act has landmark implications for Guam, CNMI,” KUAM News, August 10, 2022, at <https://www.kuam.com/story/47063328/inflation-reduction-act-has-landmark-implications-for-guam-cnmi>.

risk for earthquakes and typhoons, which could make construction of reliable wind turbines difficult.¹³⁹

The GPA has considered nuclear power options as a way to support Guam's energy needs.¹⁴⁰ In 2012, the GPA entered into a memorandum of understanding with NuScale Power, LLC, a developer of nuclear power technology and small modular reactors, known as SMRs.¹⁴¹ NuScale proposed a modular SMR with the reactors installed underground. NuScale prepared some basic conceptual design and cost information, but the development and deployment of SMRs has not progressed.¹⁴² GPA has kept in contact with NuScale, which was a recipient of U.S. Department of Energy support for development of SMR technology.¹⁴³

Some analysts have also suggested that Guam is a good candidate for the mobile nuclear micro-reactors that DOD is developing under "Project Pele."¹⁴⁴

Water Resources

The Guam Waterworks Authority, which oversees water treatment and wastewater removal systems, has sought funding for capital investments.¹⁴⁵ DOD's construction of Marine Corps Base Camp Blaz required additional infrastructure to provide water services, including a \$173 million expansion to a wastewater treatment facility, completed in 2022, and improvements to existing potable water wells, a 5-million-liter tank with water treatment buildings, and three generator buildings.¹⁴⁶ The military command for Joint Region Marianas issued a "Precautionary Boil Water Notice for Camp Blaz" in June 2023 after a typhoon caused infrastructure damage across the island; the "boil water" notice reflected concerns about potential contamination to the drinking water supply.¹⁴⁷ Water management has been a subject of cooperation between DOD and Guam's civilian officials.¹⁴⁸

¹³⁹ U.S. Energy Information Administration, Guam Territory Profile and Energy Estimates, at <https://www.eia.gov/state/analysis.php?sid=GQ#69>.

¹⁴⁰ The Senate-passed version of the FY2024 National Defense Authorization Act reportedly directs DOD to provide a briefing on the status of the development of nuclear microreactors and the potential for using modular microreactors to supplement power generation in Guam.

¹⁴¹ *Ibid.*, p. 20.

¹⁴² Guam Power Authority 2022 Integrated Resource Plan, at https://mail.guampowerauthority.com/gpa_authority/strategicplanning/documents/GPA2022IntegratedResourcePlan.pdf.

¹⁴³ *Ibid.*, p. 148.

¹⁴⁴ DOD press release, "DoD to Build Project Pele Mobile Microreactor and Perform Demonstration at Idaho National Laboratory," April 13, 2022, at <https://www.defense.gov/News/Releases/Release/Article/2998460/dod-to-build-project-pele-mobile-microreactor-and-perform-demonstration-at-idah/>. For reference to Guam, see Army Deputy Chief of Staff G-4, Study on the use of Mobile Nuclear Power Plans for Ground Operations," Oct. 26, 2018. at <https://apps.dtic.mil/sti/pdfs/AD1064604.pdf>.

¹⁴⁵ See Guam Waterworks Authority projects, at <http://guamwaterworks.org/projects.html>. Also see John O'Connor, "GWA looking to borrow \$300M," Guam Daily Post, Dec. 1, 2021, at https://www.postguam.com/news/local/gwa-looking-to-borrow-300m/article_0d12b4ee-1b66-11ec-b273-5f0936f372e7.html.

¹⁴⁶ Pacific Island Times, "Utilities, infrastructure projects at Guam's Camp Blaz near completion," May 18, 2023, at <https://www.pacificislandtimes.com/post/utilities-infrastructure-projects-at-guam-s-camp-blaz-near-completion>.

¹⁴⁷ Notice was posted to JRM command website, accessed June 5, 2023, at <https://jrm.cnmc.navy.mil/>. Also see Nicholas Slayton, "Navy moves carrier strike group to Guam to help with the recovery from Typhoon Mawar," Task and Purpose, May 28, 2023, at <https://taskandpurpose.com/news/navy-carrier-group-coast-guard-guam-typhoon-mawar/>.

¹⁴⁸ Memorandum of Agreement for the One Guam Water Resource Program, at <https://guamccu.org/wp-content/uploads/2022/07/GWA-Resolution-23-FY2022-Relative-to-MOA-for-One-Guam-Water-Resource-Information-Program.pdf>.

Housing

Guam faces a housing shortage due to a combination of limited space on the island, an increase in U.S. military personnel assigned to the island, and high construction costs.¹⁴⁹

The total number of DOD personnel on the island—active and reserve servicemembers and civilian employees—has risen about 50% during the past seven years, from about 7,808 in September 2016 to about 11,647 in late 2022.¹⁵⁰ The military population is likely to grow as the Marine Corps plans to garrison about 5,000 additional Marines (along with their dependents) on the island, and the U.S. military’s missile defense system under development will likely require additional personnel to operate.

According to a 2020 Housing Needs Assessment Study commissioned by the Guam Housing and Urban Renewal Authority, the island had about 55,562 housing units in 2019 and would need an additional 6,650 housing units by 2025 to meet pent-up demand and projected population increases.¹⁵¹ Guam’s population is expected to reach 196,334 persons in 2040, an increase of 17.8% over 2019.¹⁵²

Local officials say Guam has a labor shortage that drives up construction costs, which in turn contributes to the housing shortage. While some development companies have sought to bring temporary workers to Guam using H-2B visas, those workers need housing, contributing to the shortage, which one real estate agent in Guam described as “a Catch-22.”¹⁵³

In January 2023, Joint Region Marianas announced a policy requiring military families at Naval Base Guam to live on base if family housing is available.¹⁵⁴ The JRM commander reportedly said the policy aims to “to maximize the use of on-base military family housing and minimize any real or perceived market pressurization created by the military’s need for off-base family housing.”

Foreign Temporary Workers

Military leaders have cited concerns about the ability of Guam’s finite workforce to carry out DOD’s military construction plans, and have asked Congress to change U.S. immigration policies to allow for more temporary workers to support construction projects on the island. Admiral John Aquilino, INDOPACOM Commander, testified to the House Armed Services Committee on April 18, 2023: “Without the ability to get workers, which are mostly from the Philippines ... It would delay the implementation and push us back years.”¹⁵⁵ Vice Admiral Jon Hill, director of MDA,

¹⁴⁹ Haidee Eugenio Gilbert, “Emergency crisis’: High demand, low inventory of housing units,” Pacific Daily News, October 4, 2022, at https://www.guampdn.com/news/emergency-crisis-high-demand-low-inventory-of-housing-units/article_2e1a3732-42cc-11ed-a972-9fe2c98b1347.html.

¹⁵⁰ DOD, Defense Manpower Data Center, Military and Civilian Personnel by Service/Agency by State/Country (Updated Quarterly); see reports from September 2016 and also September 2022 and December 2022. Reports are available at <https://dwp.dmdc.osd.mil/dwp/app/dod-data-reports/workforce-reports>.

¹⁵¹ Guam Housing and Urban Renewal Authority, Guam Housing Study and Needs Assessment, 2019, at https://www.ghura.org/sites/default/files/ghura_housing_needs_assessment.pdf#page=58.

¹⁵² Ibid.

¹⁵³ Haidee Eugenio Gilbert, “Emergency crisis’: High demand, low inventory of housing units,” Pacific Daily News, October 4, 2022, at https://www.guampdn.com/news/emergency-crisis-high-demand-low-inventory-of-housing-units/article_2e1a3732-42cc-11ed-a972-9fe2c98b1347.html.

¹⁵⁴ Dana Williams, “Naval Base Guam will require incoming families to live on base if housing available,” Pacific Daily News, Jan. 28, 2023, at https://www.guampdn.com/news/naval-base-guam-will-require-incoming-families-to-live-on-base-if-housing-available/article_01e6c654-9e1f-11ed-a8d8-5f14a724fe18.html.

¹⁵⁵ Testimony of INDOPACOM Commander Admiral John Aquilino, in U.S. Congress, House Armed Services Committee Holds Hearing on Indo-Pacific National Security Challenges, 118th Congress, April 18, 2023.

said visa policies may impact the timeline for Guam’s missile defense program and stated to the House Armed Services Committee that “once we get to military construction in the ‘25 timeframe, there will be an impact if we don’t come through the visa issue.”¹⁵⁶

Congress has taken temporary measures to address these concerns by expanding the number of H-2B nonimmigrant (temporary) visas for nonagricultural workers in Guam. There are about 4,000 H-2B workers in Guam.¹⁵⁷

The H-2B visa program allows foreign workers to enter the United States for a period of time to perform temporary work. A prospective H-2B employer must establish that its need for the worker is temporary and will end in the near, definable future. Generally, that period of need—and the H-2B worker’s period of admission—will be limited to a maximum of one year. An H-2B worker’s stay may be extended for additional periods if the worker secures other qualifying employment, up to a maximum total stay of three years.¹⁵⁸

H-2B visas are subject to a statutory annual cap of 66,000 across the United States.¹⁵⁹ For Guam, however, Congress has authorized an exception from the H-2B cap for foreign nationals performing work on Guam as H-2B workers until December 31, 2029.¹⁶⁰

A second exception for Guam and the CNMI concerns the H-2B visa’s temporary need requirement. The exception provides that a foreign national who seeks admission to Guam as an H-2B worker to perform specified types of work may be admitted for a period of up to three years (notwithstanding the H-2B visa’s temporary need requirement that otherwise limits such workers for admission up to one year). Among the specified types of work is

service or labor ... pursuant to any agreement entered into by a prime contractor or subcontractor calling for services or labor required for performance of a contract or subcontract for construction, repairs, renovations, or facility services that is directly connected to, supporting, associated with, or adversely affected by the military realignment ... with priority given to federally funded military projects.¹⁶¹

This exception is a temporary provision that currently applies to H-2B workers who are admitted in to the United States before December 31, 2024. The possible extension of this provision has been the subject of debate in Congress. In 2022, the provision granting this exception was set to expire on December 31, 2023. The draft of the James M. Inhofe National Defense Authorization Act (NDAA) for Fiscal Year 2023 (S. 4543), as reported by the Senate Armed Services Committee, contained a provision (§1047) to extend this exception for six additional years, until December 31, 2029. The House-passed version of the NDAA for FY2023 (H.R. 7900) did not

¹⁵⁶ Testimony of Missile Defense Director Vice. Adm. Jon Hill, in U.S. Congress, House Armed Services Committee, Subcommittee on Strategic Forces Hearing on Fiscal Year 2024 Budget Request for Missile Defense and Missile Defeat Programs, 118th Congress, April 18, 2023.

¹⁵⁷ KUAM News, “Guam Department of Labor welcomes 4,000th H-2B worker,” April 11, 2023, at <https://www.kuam.com/story/48693781/guam-department-of-labor-welcomes-4000th-h2b-worker>. Also see CRS Report R44849, *H-2A and H-2B Temporary Worker Visas: Policy and Related Issues*, by Andorra Bruno.

¹⁵⁸ For additional information about the H-2B visa, see CRS Report R44849, *H-2A and H-2B Temporary Worker Visas: Policy and Related Issues*; and CRS Report R44306, *The H-2B Visa and the Statutory Cap*.

¹⁵⁹ 8 U.S.C. §1184(g)(1)(B). Also see CRS Report R44849, *H-2A and H-2B Temporary Worker Visas: Policy and Related Issues*, by Andorra Bruno.

¹⁶⁰ 48 U.S.C. §1806(b)(1)(A).

¹⁶¹ 48 U.S.C. §1806(b)(1)(B).

include this language. The enacted version of the FY2023 NDAA (P.L. 117-263) contained a provision (§5901) that extended this exception for one year.¹⁶²

Admiral Aquilino, the INDOPACOM commander, stated in his testimony said he supported “extending the H-2B visas through ‘29.”¹⁶³

The governor of Guam, Lourdes Leon Guerrero, testified before Congress stating her support for the extension and expansion of H-2B visa exemptions for Guam.¹⁶⁴ Governor Guerrero has said a priority for her administration is addressing the labor shortage, which she said is driving up construction costs for nonmilitary projects.¹⁶⁵ In one example of the effect of labor shortages and construction costs, in March 2023 the Guam Power Authority canceled a planned new 41-megawatt diesel power plant, citing rising construction costs as the primary reason.¹⁶⁶

Environmental Concerns

Guam’s location creates risk for extreme weather events and the related potential for climate change to damage the island’s infrastructure.¹⁶⁷ The island is vulnerable to typhoons, which can disrupt routine activities on the island. For example, in May 2023, Typhoon Mawar resulted in electrical power and water outages on military installations; debris-covered airfields; and flooding in homes across the island.¹⁶⁸

Rising sea levels in the Pacific may pose some risk to coastal infrastructure in the form of flooding or erosion.¹⁶⁹ Rising sea temperatures may affect the health of the coral reefs surrounding Guam, which have provided some protection from waves and storm damage.¹⁷⁰ Damage to the coral reefs may also reduce the availability of freshwater on the island.¹⁷¹

¹⁶² U.S. Congress, Joint Explanatory Statement, James M. Inhofe National Defense Authorization Act for Fiscal Year 2023, P.L. 117-263, p. 698.

¹⁶³ Testimony of INDOPACOM Commander Admiral John Aquilino, in U.S. Congress, House Armed Services Committee Holds Hearing on Indo-Pacific National Security Challenges, 118th Congress, April 18, 2023.

¹⁶⁴ See Testimony of Guam Gov. Lourdes Leon Guerrero, in U.S. Congress, Senate Energy and Natural Resources Committee, State of the U.S. Territories, hearings, 118th Cong., 1st sess., February 9, 2023.

¹⁶⁵ Guam, Office of the Governor press release, “Leon Guerrero-Tenorio Administration Seeks Partnership with Guam Contractors Association Board Members to Strengthen Reform Efforts,” at https://governor.guam.gov/press_release/leon-guerrero-tenorio-administration-seeks-partnership-with-guam-contractors-association-board-members-to-strengthen-reform-efforts/.

¹⁶⁶ Steve Limtiaco, “Piti power project scrapped,” Pacific Daily News, March 1, 2023, at https://www.guampdn.com/news/piti-power-project-scrapped/article_e1e94804-b728-11ed-b6c3-2fad3998963c.html.

¹⁶⁷ “What Climate Change Means for Guam,” U.S. Environmental Protection Agency, August. 2016, at <https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-gu.pdf>.

¹⁶⁸ Diana Stancy Correll and Megan Eckstein, “Military prepares for disaster relief on Guam after massive typhoon,” Navy Times, May 26, 2023, at <https://www.navytimes.com/news/your-navy/2023/05/26/military-prepares-for-disaster-relief-on-guam-after-massive-typhoon/>.

¹⁶⁹ “Vulnerability Assessment for Built Infrastructure Near Costal base under Three Sea level Rise Scenarios – Guam,” Prepared for the Government of Guam, p. 25, https://bsp.guam.gov/wp-bsp-content/uploads/2022/09/Kingetal2019_CCVA_v5_DEC_FINAL-Compressed-1.pdf.

¹⁷⁰ “What Climate Change Means for Guam,” U.S. Environmental Protection Agency, August. 2016, at <https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-gu.pdf>.

¹⁷¹ Ibid.

Infrastructure Development and U.S. Military Access in the Western Pacific

The U.S. military strategy in the Indo-Pacific region includes the use of numerous locations where the U.S. maintains ownership or access to sites for military use. Some military leaders describe a “hub-and-spoke strategy” in which Guam is the hub that supports the U.S. military’s ability to potentially operate from more austere or temporary facilities across the region.¹⁷² Some of those locations may include the following.

Tinian

The U.S. military is investing in military infrastructure for the island of Tinian, a small volcanic formation about 100 miles north of Guam that is part of CNMI and JRM. Tinian is about 10 miles long and has a local population of about 3,100 people.¹⁷³ In 2019, DOD signed a 40-year lease to build a “divert airfield” that could provide an emergency alternative to Andersen Air Force Base.¹⁷⁴ U.S. Pacific Air Forces report the airfield on the island would “provide strategic operational and exercise capabilities.”¹⁷⁵ The \$162 million project for airfield development and a tarmac for parking aircraft has an expected completion date of October 2025.¹⁷⁶ Plans for port and roadway improvements are also underway.¹⁷⁷ The airfield would be primarily intended for tanker and mobility aircraft.¹⁷⁸ Also on Tinian, the Navy and Marine Corps are building a facility to train for operating in austere conditions. The area is currently used for training on emergency evacuation, reconnaissance, special warfare, and recovery of aircraft and personnel.¹⁷⁹

Aleutian Islands

Alaska’s Aleutian Islands are a chain of small islands in the northern Pacific about 1,000 miles west of Anchorage—closer to Russia than to mainland Alaska.¹⁸⁰ The island chain includes large radar facilities that support U.S. missile defense systems.¹⁸¹ Military facilities on the islands include World War II-era infrastructure that supported bomber and reconnaissance aircraft. The

¹⁷² Air Force press release, “Through hub and spoke: Pacific partners practice humanitarian assistance during Cope North 16,” Feb. 22, 2016, at <https://www.pacaf.af.mil/News/Article-Display/Article/671024/through-hub-and-spoke-pacific-partners-practice-humanitarian-assistance-during/>.

¹⁷³ U.S. Census Bureau, Commonwealth of the Northern Mariana Islands, at <https://www.census.gov/programs-surveys/sis/2020census/2020-resources/island-areas/cnmi/understanding-the-pop-cnmi.html>.

¹⁷⁴ Air Force, “CNMI signs \$21.9M 40-year lease with US DOD,” press release, May 9, 2019, at <https://www.af.mil/News/Article-Display/Article/1841827/cnmi-signs-219m-40-year-lease-with-us-dod/>.

¹⁷⁵ Ibid.

¹⁷⁶ DOD, Defense Visual Information Distribution Service, “NAVFAC Marianas Manages Tinian Divert Airfield Construction Projects,” press release, February 2, 2022, at <https://www.dvidshub.net/news/415278/navfac-marianas-manages-tinian-divert-airfield-construction-projects>.

¹⁷⁷ Ibid.

¹⁷⁸ Joseph Trevithick, “Construction Of Airbase On Tinian Island In Case Guam Gets Knocked Out Has Begun,” *The Drive*, June 15, 2022, at <https://www.thedrive.com/the-war-zone/construction-of-airbase-on-tinian-island-in-case-guam-gets-knocked-out-has-begun>.

¹⁷⁹ Joint Region Marianas, Mariana Island Range Complex (MIRC) briefing, on file with the author.

¹⁸⁰ DOD press release, “Tail end of the chain, tip of the sword: Eareckson Air Station,” July 21, 2009, at <https://www.jber.jb.mil/News/News-Articles/Article/291929/tail-end-of-the-chain-tip-of-the-sword-eareckson-as/>.

¹⁸¹ “Meet Cobra Dane: the U.S. Air Force’s Enormous Missile-Spotting Radar,” *Popular Mechanics*, at <https://www.popularmechanics.com/military/a20125373/meet-cobra-dane-the-usafs-enormous-missile-spotting-radar/>.

U.S. Air Force maintains a facility there known as Eareckson Air Station, which includes a 10,000-foot runway.¹⁸² While there are no servicemembers stationed full-time there, airmen from Joint Base Elmendorf-Richardson manage a team of DOD contractors at Eareckson Air Station.¹⁸³

U.S. Pacific Remote Island Area (PRIA)

U.S. possessions in the Pacific include seven small islands without permanent populations, collectively known as the U.S. Pacific Remote Island Area (PRIA). This includes Baker Island, Howland Island, Jarvis Island, Johnston Atoll, Kingman Reef, Palmyra Atoll, and Wake Island.¹⁸⁴ Wake Island has an airfield but has no ports (because of its reefs, anchorage areas for large ships are limited).¹⁸⁵

Palau

An archipelago of islands southwest of Guam and east of the Philippines, Palau is part of the Compacts of Free Association.¹⁸⁶ The compact agreement commits the U.S. to defend Palau and allows citizens of Palau to serve in the U.S. military.¹⁸⁷ The Pentagon has designated Palau as the possible site of a new military base and plans to build a \$118.4 million tactical radar system for Palau.¹⁸⁸

Federated States of Micronesia

Located between Guam and the Philippines, the Federated States of Micronesia (FSM) is part of the Compacts of Free Association.¹⁸⁹ The FSM reportedly has agreed to development of new U.S. military facilities.¹⁹⁰

Marshall Islands

The Marshall Islands, a collection of atolls and islands east of Guam, is part of the Compacts of Free Association.¹⁹¹ The Marshall Islands includes the U.S. Army Garrison at Kwajalein Atoll, the

¹⁸² DOD press release, “Tail end of the chain, tip of the sword: Eareckson Air Station,” July 21, 2009, at <https://www.jber.jb.mil/News/News-Articles/Article/291929/tail-end-of-the-chain-tip-of-the-sword-eareckson-as/>.

¹⁸³ Ibid.

¹⁸⁴ National Oceanic and Atmospheric Administration, Coral Reef Information System, U.S. Pacific Remote Island Area, at <https://www.coris.noaa.gov/portals/pria.html>.

¹⁸⁵ Wake Atoll information page, U.S. Department of the Interior, at <https://www.doi.gov/oia/islands/wakeatoll>.

¹⁸⁶ For more information about the Compacts of Free Association, see CRS In Focus IF12194, *The Compacts of Free Association*, by Thomas Lum.

¹⁸⁷ Paul McLeary, “As US Military Moves Into Palau, China Watches Intently,” *Breaking Defense*, October 23, 2020, at <https://breakingdefense.com/2020/10/as-us-military-moves-into-palau-china-watches-intently/>.

¹⁸⁸ Department of Defense, Contracts for Dec. 28, 2022, at <https://www.defense.gov/News/Contracts/Contract/Article/3255710/>.

¹⁸⁹ For more information about the Compacts of Free Association, see CRS In Focus IF12194, *The Compacts of Free Association*, by Thomas Lum.

¹⁹⁰ Reuters, “With China looming, U.S. signs assistance deal with Micronesia,” February 10, 2023, at <https://www.reuters.com/world/asia-pacific/with-china-looming-us-signs-mou-with-another-pacific-island-state-2023-02-10/>. Also see Reuters, “Pacific islands a key U.S. military buffer to China’s ambitions, report says,” September 20, 2022, at <https://www.reuters.com/world/asia-pacific/pacific-islands-key-us-military-buffer-chinas-ambitions-report-2022-09-20/>.

¹⁹¹ For more information about the Compacts of Free Association, see CRS In Focus IF12194, *The Compacts of Free Association*, by Thomas Lum.

location of the Ronald Reagan Ballistic Missile Defense Test Site.¹⁹² In January 2023, the U.S. signed a new memorandum of understanding with the Marshall Islands.¹⁹³

Midway

Midway Islands is a U.S. territory located east of Guam. A coral atoll that is part of the Hawaiian archipelago, Midway Islands consists of two main islands and has a total land area of 2.4 square miles.¹⁹⁴ The U.S. Navy operated an air facility on Midway until the facility closed in 1993.¹⁹⁵ The military infrastructure on the island that once supported air and naval operations and a population of about 5,000 have deteriorated over time.¹⁹⁶

During World War II, the U.S. Navy and Army Air Corps conducted military operations on the Midway Islands during World War II; it was the site of a major battle between the United States and Japan.¹⁹⁷ The islands were used as an air base and a submarine base.¹⁹⁸

During the Vietnam War, Midway was an aircraft and ship refueling station and supported the operation and maintenance of undersea cables used to detect the sounds of submarines in the Pacific Ocean.¹⁹⁹

Runways on the island continue to be used for emergency landings for military and civilian aircraft.²⁰⁰ The island is under the jurisdiction and control of the Fish and Wildlife Service of the U.S. Department of the Interior as part of the National Wildlife Refuge system.²⁰¹

American Samoa

American Samoa is an unincorporated U.S. territory represented in the House of Representatives by an elected Delegate. American Samoa consists of five islands, has a population of about 44,000 and is about 86 square miles.²⁰² The local government's Department of Port

¹⁹² DOD Press Release, "Austin Welcomes Marshall Islands President to Pentagon," September 27, 2022, at <https://www.defense.gov/News/News-Stories/Article/Article/3172294/austin-welcomes-marshall-islands-president-to-pentagon/>.

¹⁹³ U.S. Department of State, "The United States of America and the Republic of the Marshall Islands Sign Memorandum of Understanding," January 12, 2023 at <https://www.state.gov/the-united-states-of-america-and-the-republic-of-the-marshall-islands-sign-memorandum-of-understanding/>.

¹⁹⁴ Encyclopedia Britannica, Midway Islands, updated June 12, 2023, at <https://www.britannica.com/place/Midway-Islands>.

¹⁹⁵ Government Accountability Office, Midway Atoll: U.S. Fish and Wildlife Service Faces Many Competing Priorities, GAO-16-382, p. 52, June 2016, at <https://www.gao.gov/assets/gao-16-382.pdf>.

¹⁹⁶ *Ibid.*, p. 32

¹⁹⁷ National Park Service, World War II Facilities at Midway, at <https://www.nps.gov/articles/world-war-ii-facilities-at-midway.htm>.

¹⁹⁸ U.S. Navy, "World War II veterans remember the turning point of Battle of Midway," June 10, 2022, at <https://www.dvidshub.net/news/422719/world-war-ii-veterans-remember-turning-point-battle-midway>

¹⁹⁹ Government Accountability Office, Midway Atoll: U.S. Fish and Wildlife Service Faces Many Competing Priorities, GAO-16-382, p. 51, June 2016, at <https://www.gao.gov/assets/gao-16-382.pdf>.

²⁰⁰ Government Accountability Office, Midway Atoll: U.S. Fish and Wildlife Service Faces Many Competing Priorities, GAO-16-382, p. 57, June 2016, at <https://www.gao.gov/assets/gao-16-382.pdf>.

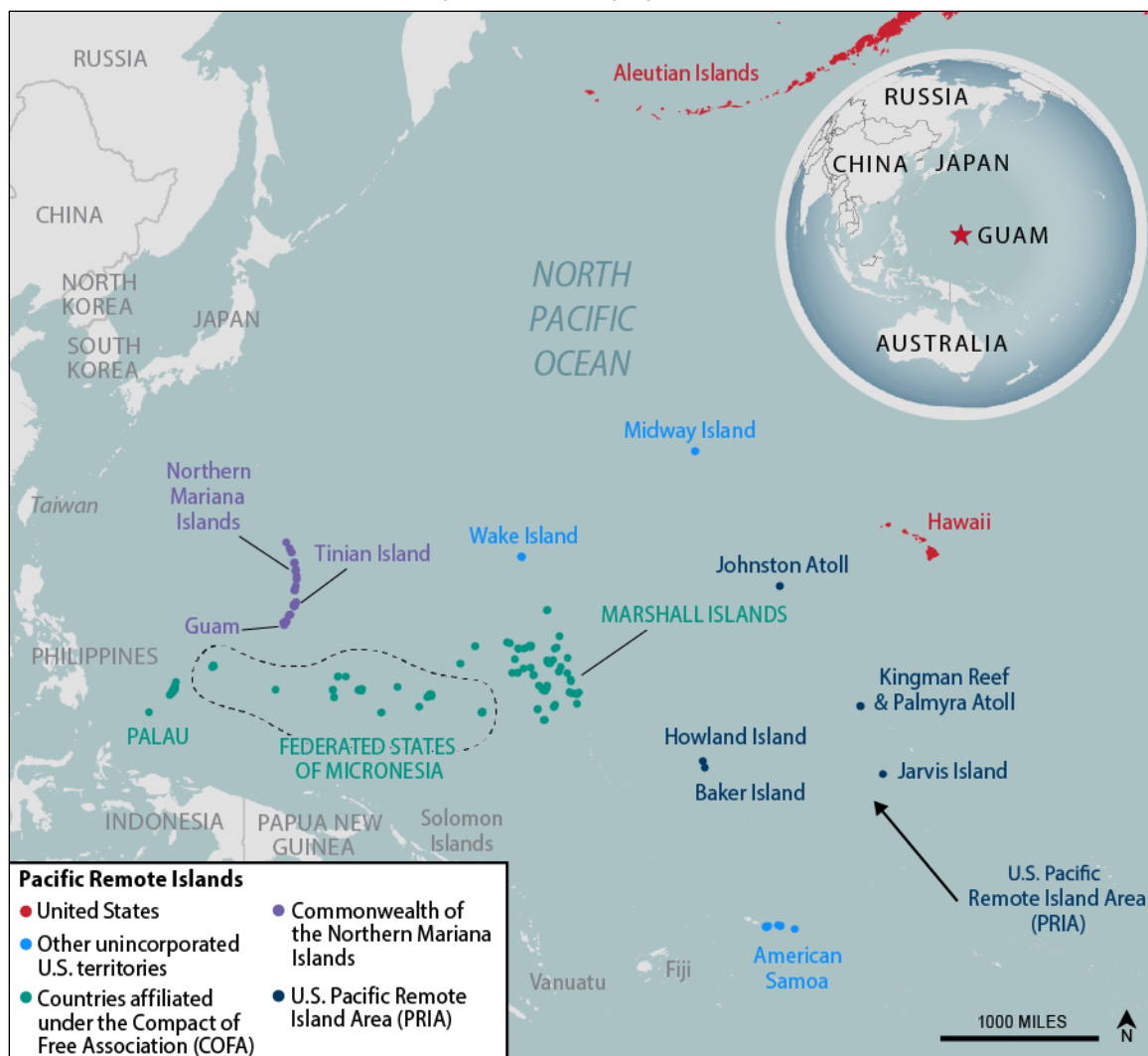
²⁰¹ National Park Service, World War II Facilities at Midway, at <https://www.nps.gov/articles/world-war-ii-facilities-at-midway.htm>.

²⁰² Central Intelligence Agency, World Factbook: American Samoa, last updated July 11, 2023, at <https://www.cia.gov/the-world-factbook/countries/american-samoa/>.

Administration oversees several airports and harbors.²⁰³ U.S. military officials and local elected officials in Guam have discussed the possibility of stationing U.S. troops on Samoa.²⁰⁴

Figure 7. Potential Locations for U.S. Military Operations in the Western Pacific

Map includes U.S. territories and allied countries where the United States maintains access agreements for potential military operations.



Source: Created by CRS using data from the U.S. Department of State Office of the Geographer, and ESRI.

²⁰³ American Samoan Government, Department of Port Administration, at <https://portadministration.as.gov/about-us/port-overview>

²⁰⁴ Office of the Governor of American Samoa, “Key Leader Engagement PartIII: USARPAC,” May 10, 2023, at https://www.americansamoa.gov/_files/ugd/4bfff9_af8ff45978174ecaa72cc544128ee868.pdf.

Issues for Congress

Congress faces numerous challenges and unresolved issues related to Guam and its role in U.S. national security strategy. Those challenges and issues include the following:

- What is the role of Guam within the broader U.S. national security strategy and military strategy in the Indo-Pacific Region?
- To what extent is Guam vulnerable to attack in the current environment and in the future?
- How might Congress seek to further fund, expedite, oversee or otherwise support the Guam missile defense program?
- In addition to the Guam missile defense system, what are Congress's options to support the defense of Guam and the resiliency of military infrastructure there?
- What is the optimal disposition of operational forces and military personnel within the limited space available on Guam?
- What is the optimal configuration of military infrastructure on Guam within the limited space available?
- Should Congress consider providing direct support for civilian infrastructure on Guam as a component of military readiness?
- Does climate change pose risks for military operations and infrastructure on Guam?
- How might U.S. immigration policy related to Guam support military readiness on the island?
- Is the current joint-basing structure for Joint Region Marianas supporting optimal military readiness?
- How might Congress support and ensure positive civil-military relationships between DOD and the U.S. citizens who live on Guam?

The sections below provide some discussion of these questions and the issues they raise. The potential issues for Congress concerning Guam are not necessarily limited to those discussed below.

Defense of Guam

Congress may consider Guam's potential vulnerability as a target when making decisions about how to fund and execute infrastructure projects and missile defense systems on the island. In the event of a conflict with the PRC, Guam could be subject to missile attack, which the PRC may view as a strategy to deny the U.S. military use of land-based aircraft in the western Pacific.²⁰⁵ The Chinese People's Liberation Army Rocket Force reportedly has an arsenal of more than 400 missiles capable of reaching Guam.²⁰⁶ In September 2020, the Chinese Air Force released a

²⁰⁵ Michael O'Hanlon, "Can China Take Taiwan?", Brookings Institution, August 2022, at <https://www.brookings.edu/wp-content/uploads/2022/08/Can-China-Take-Taiwan-v5.pdf>.

²⁰⁶ The People's Liberation Army Rocket Force includes 116 nuclear-capable intercontinental ballistic missiles, 110+ dual-capable intermediate range ballistic missiles, and 194 medium range ballistic missiles. See *The Military Balance 2022*, The International Institute for Strategic Studies (IISS), p. 255.

propaganda video that appeared to show a PRC bomber striking Andersen Air Force Base.²⁰⁷ A team of defense analysts at the Center for Strategic and International Studies (CSIS) developed a war game involving a hypothetical Chinese amphibious invasion of Taiwan and ran it 24 times to evaluate various scenarios that such a conflict might involve.²⁰⁸ The team reported in January 2023 that the result included a PRC attack on Andersen Air Force Base in all 24 iterations.²⁰⁹ Guam is also within range of North Korean missiles.²¹⁰ In 2017, North Korea made an explicit threat to strike Andersen Air Force Base.²¹¹

In light of Guam's vulnerabilities, Congress may also consider issues related to resiliency of the military infrastructure on the island, and DOD's ability to restore basic military functions and routine operations in the event of a crisis, which could include a direct attack, a cyberattack, a terrorist attack or an extreme weather event.

The section below outlines selected issues related to the defense of Guam in more detail.

Vulnerability assessments

Congress may consider whether or not to seek additional assessments of Guam's vulnerability to adversary threats. Options for pursuing further assessments could include requesting a report from DOD, requesting a National Intelligence Estimate from the intelligence community, or directing the Government Accountability Office to conduct an assessment of the current intelligence regarding Chinese or North Korean missile capabilities and intents compared to the effectiveness of current and future missile defense and air defense systems on the island. Congress may consider including in such a request or requests some evaluation of the resiliency of the island's military infrastructure.

Additional support for oversight of missile defense programs

Concerns about Guam's vulnerability to missile attack may lead Congress to consider providing additional support for the Guam missile defense program. One option could include funding the additional \$147 million for the Defense of Guam program listed in INDOPACOM's 2024 Unfunded Priorities List.²¹² Congress could also consider whether or not to legislate changes to

²⁰⁷ Reuters staff, "U.S. base commander calls Chinese Guam attack video 'propaganda'," Reuters, September 24, 2020, at <https://www.reuters.com/article/us-usa-security-guam/u-s-base-commander-calls-chinese-guam-attack-video-propaganda-idUSKCN26G01Z>.

²⁰⁸ Mark F. Cancian, Matthew Cancian, and Eric Heginbotham, "The First Battle of the Next War: Wargaming a Chinese Invasion of Taiwan," Center for Strategic and International Studies, January 9, 2023, at <https://www.csis.org/analysis/first-battle-next-war-wargaming-chinese-invasion-taiwan>.

²⁰⁹ Ibid.

²¹⁰ The Democratic People's Republic of Korea has tested intercontinental ballistic missiles, intermediate range ballistic missiles, and medium-range ballistic missiles that are likely capable of reaching Guam. See the Military Balance 2022, The International Institute for Strategic Studies (IISS), p. 280.

²¹¹ "U.S. Should Be Prudent under Present Acute Situation: Spokesman for KPA Strategic Force," North Korea Ministry of Foreign Affairs, August 8, 2017, accessed on NKNews' KCNA Watch. Also see "Backgrounder: North Korea Missile Capabilities," *Council on Foreign Relations*, June 28, 2022, at <https://www.cfr.org/backgrounder/north-korea-nuclear-weapons-missile-tests-military-capabilities>; DOD, *Military and Security Developments Involving the People's Republic of China*, 2021, at <https://media.defense.gov/2021/Nov/03/2002885874/-1/-1/0/2021-CMPR-FINAL.PDF>; and Jonathan Cheng, "North Korean Attack on Guam Would Be Attack on America, Says Island's Governor," *Wall Street Journal*, August 9, 2017, at <https://www.wsj.com/articles/north-korea-threatens-to-launch-missiles-at-guam-1502233479>.

²¹² See Unfunded Priorities List (UPL) submitted for FY2024 by Indo-Pacific Command, at https://insidedefense.com/sites/insidedefense.com/files/documents/2023/mar/03232023_indopacom.pdf.

immigration policies related to the H-2B visas that senior military leaders have cited as a potential barrier to military readiness on Guam (see section below on “Immigration policies”).

Congress may consider whether or not to seek additional oversight measures for the Guam missile defense program, which is not adhering to the traditional timelines of major program development. Admiral Jon Hill, MDA Director, said in March 2023 that his view of the program does not involve a specific date for declaring “Initial Operating Capability” (IOC), which is a key milestone in most defense projects. Instead, the program will follow “an incremental path,” the director said.²¹³ “There is no end state. ... If you ask me what the IOC is, I’ll look at you and say there is no IOC because we’re going to deliver capability as it’s ready and we’re going to continue to build it out,” Hill said.

In the Joint Explanatory Statement accompanying the DOD Appropriations Act for FY2023, Congress directed MDA to provide quarterly updates to the congressional defense committees on the status of the Guam missile defense program.²¹⁴ The 2023 NDAA directed DOD to appoint a single senior military official to oversee the project. Congress may identify additional oversight opportunities in the process of reviewing those reports or engaging directly with the senior military official overseeing the project.²¹⁵

Potential alternative defense measures

In addition to the missile defense program, Congress may consider whether or not to pursue alternative *passive defenses* to protect military infrastructure.²¹⁶ For example, Congress may consider providing Military Construction funding for construction of concrete, or “hardened,” air shelters for aircraft on Guam to increase the likelihood that U.S. aircraft could survive an attack. Guam currently has no hardened air shelter structures.²¹⁷ Some analysts say that passive air defenses such as concrete shelters may lack strong advocates in the military services, Congress, and the defense industry, and as a result may be overlooked in favor of active defenses.²¹⁸ A 2023 CSIS report stated: “Concrete (hardening) lacks influential constituencies within military bureaucracies, but the large benefit justifies a strong effort. Although [hardened air shelters] do not provide complete protection, they require China to expend more missiles to destroy each aircraft. If every aircraft were in a shelter, China would be unable to use missiles with submunitions that destroy several aircraft each.”²¹⁹

Congress may consider exploring options to fund additional resiliency capabilities that could help a military installation maintain or rapidly reestablish operations in the event of an attack or

²¹³ Ashley Roque, “Missile Defense Agency details evolving, ‘incremental’ vision for Guam air defenses,” *Breaking Defense*, March 16, 2023, at <https://breakingdefense.com/2023/03/missile-defense-agency-details-evolving-incremental-vision-for-guam-air-defenses/>.

²¹⁴ U.S. Congress, Joint Explanatory Statement, Consolidated Appropriations Act, 2023, Division C of P.L. 117-238, in the Senate section of the Congressional Record, daily edition, Vol. 168 (December 20, 2022), p. S8030

²¹⁵ P.L. 117-263 §1660.

²¹⁶ Military professionals make distinctions between “active defenses,” which involve intercepting or destroying an incoming attacker or weapon, and “passive defenses” which are solely designed to resist in place or minimize the effects of an attack against a specified area.

²¹⁷ CRS correspondence with Pacific Air Forces, June 27, 2023, on file with the author.

²¹⁸ See, for example, Stacie L. Pettyjohn, “Spiking The Problem: Developing A Resilient Posture In The Indo-Pacific With Passive Defenses,” *War on the Rocks*, at <https://warontherocks.com/2022/01/spiking-the-problem-developing-a-resilient-posture-in-the-indo-pacific-with-passive-defenses/>.

²¹⁹ See Mark F. Cancian, Matthew Cancian, and Eric Heginbotham, “The First Battle of the Next War: Wargaming a Chinese Invasion of Taiwan,” Center for Strategic and International Studies, January 9, 2023, p. 26, at <https://www.csis.org/analysis/first-battle-next-war-wargaming-chinese-invasion-taiwan>.

natural disaster. In addition to hardened air shelters for aircraft, this could include rapid runway repair or port repair capabilities, mobile air control centers, and portable fuel storage tankers. Congress may consider funding Research, Development, Test, and Evaluation programs or Procurement programs to optimize passive defenses.

Congress may also consider whether to scale back plans for investing in infrastructure on Guam and to distribute some of those resources in other Indo-Pacific region locations that are less vulnerable to direct attack. Some of those potential locations are outlined in the section above on “Infrastructure Development and U.S. Military Access in the Western Pacific.” Such a shift could involve a military strategy of increased reliance on naval aviation and aircraft carriers, Marine Littoral Regiments, and Air Force airlift capabilities to redistribute munitions and others supplies to other U.S.-controlled locations.

Force Posture and Readiness on Guam

Congress may evaluate military force posture on Guam and consider providing direction to DOD on the disposition of military personnel, units, and infrastructure on the island. Space on the island of Guam is limited, which forces the U.S. national security community to make careful decisions about land usage. Guam’s unique geography in comparatively close proximity to the potential zones of conflict in the INDOPACOM region—for example, Taiwan, the South China Sea or the Korean peninsula—makes force posture questions especially complex. When compared to stationing military units in Hawaii or the west coast of the United States, the decision to position more military personnel and capabilities on Guam can improve response times and military effectiveness in the event of a conflict, but it may also place them at greater risk of attack, degradation, or destruction. Moreover, in the absence of a direct conflict, U.S. decisions about the placement of military forces on Guam can have diplomatic or geopolitical effects. For example, a concentration of forces could be provocative to potential adversaries in the region, or a concentration of forces could create a deterrent effect.

Operational Forces

Congress may consider whether or not to exercise its oversight over Air Force and Navy decisions regarding the deployment of major military assets on the island of Guam. In the context of space on Guam being limited, Congress may seek information or provide direction on matters such as

- Air Force decisions about whether to deploy—either permanently or in rotation—bomber or fighter aircraft on the island.
- Navy decisions regarding the submarine fleet based on the island, specifically the number and type of submarines that constitute the optimal fleet for homeporting on Guam.
- Marine Corps decisions regarding the optimal size of the Marine force garrisoned on Guam and how to disperse Marines across the Indo-Pacific region that also includes Hawaii, Alaska, and other locations.
- Current and future homeporting decisions about Navy surface ships that may support Marine Corps operations, to include the future fleet of Landing Ship Mediums.

Congress may also seek information from or provide direction to the State Department and DOD regarding the use of Guam as a site for hosting allied or partner forces such as those from Singapore, Japan, or Australia. In considering those force posture questions, Congress may seek

input from the State Department or Intelligence Community about how potential adversaries may perceive any such additions or reductions, and the potential effect on the geopolitical environment.

Military Infrastructure

In authorizing and appropriating the annual Military Construction budget, Congress has a direct role in decisions about military infrastructure investments. Congress may consider whether or not to expedite or postpone potential plans to

- Invest in naval infrastructure in Apra Harbor to support additional surface ship and submarine operations. Investments could include additional ship repair facilities, such as a dry dock.
- Invest in the Northwest Airfield adjacent to Andersen Air Force base to support additional aviation operations.
- Invest in added capacity at the naval hospital on Guam, which could provide critical care for wounded servicemembers in the event of a conflict in the western Pacific.
- Invest in additional military housing to support a surge of personnel that may be needed in the event of a conflict.
- Invest in additional fuel storage capacity for Guam (especially in light of the closure of the Red Hill Bulk Fuel Storage Facility in Hawaii).²²⁰

Congress may consider seeking a report or evaluation of the resiliency of the infrastructure on Guam in light of the known military capabilities of potential adversaries in the region, or of DOD's plans for rapidly rebuilding or restoring essential military functions if major facilities are damaged in an attack.

Civilian infrastructure

Congress may consider whether or not to appropriate funding or otherwise support investment in critical infrastructure outside of military installations on Guam in an effort to enhance readiness and the resilience of the military facilities on the island. Congress would have numerous options for supporting Guam's civilian infrastructure. These options could include addressing weaknesses in the electrical system, the systems that provide drinking water and storm water management, the transportation infrastructure (e.g., roads or the civilian airport), and efforts to mitigate the risks related to extreme weather or climate change. Options for Congress may include

- Providing funding or support to Guam through the Economic Adjustment Committee (EAC), which is comprised of 22 Federal departments and agencies at the Cabinet level, to coordinate funding from other government agencies. Guam has received \$186 million in infrastructure investments outside military installations through the EAC in recent years.²²¹

²²⁰ For background on Red Hill closure, see Ellie Kaufman, "US military to close fuel storage facility in Hawaii where water was contaminated by leak," CNN, March 7, 2022, at <https://www.cnn.com/2022/03/07/us/hawaii-pearl-harbor-water-navy-red-hill/index.html>.

²²¹ DOD Office of Local Defense Community Cooperation press release, at <https://oldcc.gov/project/indo-pacific-build-guam-27m-delivers-territorys-continued-support-indo-pacific-build>.

- Authorizing and appropriating Military Construction funds under 10 U.S.C. §2815, which allows for funding and execution of projects outside military installations if the projects support the military mission of an installation.²²²
- Authorizing and appropriating funding for DOD to bolster existing or administer new grant programs for Guam; for example, through the Defense Community Infrastructure Pilot (DCIP) program, or other grant programs.
- Directing DOD to work with the territorial government in Guam to identify and prioritize infrastructure projects for funding.
- Convene oversight hearings to receive testimony from stakeholders and gather information to support other legislative strategies to support Guam's infrastructure.

Housing

Congress may consider measures to support expanding housing options in Guam. Housing affects military morale and readiness when servicemembers' need exceeds current on-base capacity, or when DOD needs to bring in an influx of military contractors to support emerging missions. This need may grow over time if the military population expands. Guam may also need housing to support the temporary labor force that senior military officials say is needed to execute the military construction plans for the next few years. Ensuring a supply of available and affordable housing could reduce strain on the relationship between the people of Guam and the military community by reducing the risk that locals will blame the military for a housing shortage or for rising housing costs.²²³

Congress may consider whether or not to pursue measures that support or expand housing development on Guam. Such options may include

- Providing funding and direction for traditional Military Construction funds in the annual defense budget to build additional on-base housing for servicemembers.
- Providing funding and direction to DOD to initiate development through the Military Housing Privatization Initiative, which involves partnerships with private housing companies.²²⁴
- Providing funding and direction to DOD to execute projects under existing authorizations that allow the Secretary of Defense to provide investment capital, direct loans, loan guarantees or rental agreements to incentivize the private housing market to create housing suitable for servicemembers or residents of Guam.²²⁵
- Providing funding and direction to DOD to work with the Department of Housing and Urban Development to identify options for housing support on Guam.

²²² For more in the Military Construction program, see CRS Report R44710, *Military Construction: Authorities and Processes*, by Andrew Tilghman.

²²³ See Pacific Island Times, "Civilian-military panel resumes talks on labor and housing solutions for Guam," July 7, at <https://www.pacificislandtimes.com/post/civilian-military-panel-resumes-talks-on-labor-and-housing-solutions-for-guam>. Also see Jon Letman, "Proposed US military buildup on Guam angers locals who liken it to colonization," *The Guardian*, August 1, 2016, at <https://www.theguardian.com/us-news/2016/aug/01/guam-us-military-marines-deployment>.

²²⁴ CRS In Focus IF12287, *Military Privatized Housing: Status of Legislative Reforms*, by Andrew Tilghman.

²²⁵ See authorizations under 10 U.S.C. §§2873, 2875, and 2876.

- Providing funding and direction to DOD to provide competitive grant programs for housing on Guam through the Office of Local Defense Community Cooperation (OLDCC).²²⁶
- Directing DOD to commission a federally funded research and development center or other third-party research organization to evaluate the housing needs of military servicemembers on Guam and their impact on the housing market on Guam. Additional policy considerations related to Guam

Joint basing structure

Congress may consider whether to assess the effectiveness of the current joint basing structure for Joint Region Marianas. Some Air Force officials have expressed concern about the JRM command's allocation of resources and have stated that readiness of Air Force facilities has suffered due in part to resource allocation decisions made by the Navy-led command's leadership.²²⁷ Certain components of the original joint basing agreement were renegotiated in 2021 to give the Air Force more authority over certain base operations at Andersen Air Force Base. Congress may seek to exercise oversight measures such as convening hearings about infrastructure spending on Guam or directing the Secretary of Defense or the Government Accountability Office to provide an assessment regarding the effectiveness of the joint basing structure. Congress may also consider the option of funding infrastructure projects for Guam through an alternative to the MILCON processes, by appropriating funding directly for Guam using Contingency Construction under 10 U.S.C. §2804. This authority contains unique planning and approval mechanisms that include the Joint Chiefs of Staff.

Immigration policies

Congress may consider whether or not to revise immigration policies related to Guam or extend existing exemptions related to Guam in an effort to increase the labor force available for construction projects. Legislation could include an extension of the temporary provision in 48 U.S.C. §1806(b)(1)(B), which could provide for more temporary workers to support construction work in Guam.²²⁸ Congress may consider granting an extension of the temporary provision for several years into the future; such an extension could potentially encourage private-sector construction companies and their subcontractors to make longer-term investments in Guam and the construction programs on the island.

Congress may also consider directing the U.S. Citizenship and Immigration Services to evaluate the options for alternative immigration policies that could support DOD military construction program or Guam's efforts to support the civilian housing and commercial construction programs. Some interagency collaboration with USCIS may exist under a Domestic Policy Council and the Task Force on New Americans created in 2021.²²⁹

²²⁶ For more on OLDCC, see <https://oldcc.gov/>.

²²⁷ Based on CRS correspondence with Air Force officials, September 12, 2022, on file with the author.

²²⁸ The exception in 48 U.S.C. §1806(b)(1)(B) concerns the H-2B visa's temporary need requirement. The statute provides that foreign nationals seeking admission to Guam as an H-2B worker may be admitted for a period of up to three years (notwithstanding the H-2B visa's temporary need requirement) for specified types of work that includes "labor required for performance of a contract or subcontract for construction, repairs, renovations, or facility services that is directly connected to, supporting, associated with, or adversely affected by the military realignment."

²²⁹ See Executive Order 14012, "Restoring Faith in Our Legal Immigration Systems and Strengthening Integration and Inclusion Efforts for New Americans," FR 8277, February 2, 2021.

Land use on Guam

Land use is a reoccurring issue on Guam,²³⁰ and the latest in a series of DOD land-use studies is currently underway.²³¹ The military's use of land for certain activities on the island can create noise and other environmental concerns, and Guam officials have repeatedly requested DOD to turn over ownership of excess lands to the government of Guam.²³²

Land-use negotiations led to the 2020 agreement for a new Navy live-fire training range on Guam.²³³ Some residents of Guam protested the construction of the new facility.²³⁴ The federal government provided \$186 million through the EAC in recent years to fund infrastructure investments outside military installations on Guam; DOD considered these investments an important step in persuading the governor of Guam to sign an agreement with the Navy to permit live-fire exercises on the island.²³⁵ The EAC support included a new medical facility, a new landfill, and other projects.²³⁶

Congress may consider exercising oversight of land-use management on Guam in an effort to reduce tensions over this issue.

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²³⁰ See Department of the Navy report to Congress, "Status of the "Net Negative" Policy Regarding Navy Acreage on Guam," June 2017, Chapter 4, at https://jrm.cnmc.navy.mil/Portals/77/JRM/Documents/June%202017_Report%20to%20Congress_Net%20Negative_Policy_Guam.pdf?ver=VBJIWbj0YxL6wBxpb2nvNQ%3D%3D.

²³¹ Based on CRS correspondence with INDOPACOM official, May 3, 2023 on file with the author.

²³² Pacific Island Times, "Guam seeks return of excess land currently under feds' control," August 12, 2019, at <https://www.pacificislandtimes.com/post/2019/08/13/guam-seeks-return-of-excess-land-currently-under-feds-control>.

²³³ U.S. Navy, "Navy Signs Agreement for Live Fire Training Range, Watches Conservation Mandate," May 14, 2020, at <https://www.navy.mil/DesktopModules/ArticleCS/Print.aspx?PortalId=1&ModuleId=763&Article=2283929>

²³⁴ Associated Press, "Guam residents push to prevent US military's new live-fire range," Aug. 30, 2017, at <https://www.airforcetimes.com/news/2017/08/30/guam-residents-push-to-prevent-us-militarys-new-live-fire-range/>

²³⁵ DOD press release, Office of Local Defense Community Cooperation, <https://oldcc.gov/project/indo-pacific-build-guam-27m-delivers-territorys-continued-support-indo-pacific-build>. Also see DOD press release, "Defense Department provides \$32M for Guam Public Health lab," Sept. 20, 2021, at <https://oldcc.gov/defense-department-provides-32m-guam-public-health-lab>.

²³⁶ Ibid.

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