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PATRIOT Air and Missile Defense System for Ukraine

The PATRIOT air and missile defense (AMD) system is an integral component of U.S. air and missile defense. The system and its interceptors are both expensive and limited in supply. On December 21, 2022, the Department of Defense (DOD) announced the United States would provide a PATRIOT battery to Ukraine as part of a larger $1.85 billion security assistance package. Since 2022, the United States has provided additional PATRIOT systems and interceptors to Ukraine.

What Is the PATRIOT System?

PATRIOT (**Figure 1**) is an acronym for "**P**hased **A**rray **T**racking **R**adar to **I**ntercept on **T**arget."

Figure 1. PATRIOT Launcher Stations

Source: Bloomberg, "US Finalizing Arms Upgrade to Ukraine With Patriot Missiles," December 13, 2022.

The U.S. Army Aviation and Missile Life Cycle Management Command (AMCOM) notes

> The PATRIOT is the U.S. Army's most advanced air defense system. Capable of defeating both high performance aircraft and tactical ballistic missiles, it is the only operational [U.S.] air defense system that can shoot down attacking missiles. A PATRIOT battery (the basic firing unit) consists of about 90 soldiers, but three soldiers in the engagement control station are the only personnel required to operate the battery in combat.

Raytheon Technologies manufactures PATRIOT radar and ground systems, and Lockheed Martin manufactures the interceptor missiles.

DOD's December 21, 2022, Ukraine Security Assistance Announcement

DOD's December 21, 2022, announcement appears to have represented a change in the Biden Administration's original position on the supply of PATRIOT units to Ukraine. Since Russia's February 2022 invasion, the Ukraine government repeatedly has asked the United States to supply PATRIOT systems. According to a DOD news article, "Ukraine Getting Patriot Battery, Other Defense Weapons," the United States was to transfer a PATRIOT battery under the provisions of Presidential Drawdown Authority (PDA), meaning PATRIOT battery systems, equipment, and associated interceptors could be taken from Army units/stocks (22 U.S.C. §2318(a)(1)). DOD further noted

> PATRIOT is one of the world's most advanced air defense systems, and it will give Ukraine a critical long-range capability to defend its airspace. It is capable of intercepting cruise missiles, ballistic missiles and aircraft.... Our goal is to help Ukraine strengthen a layered integrated approach to air defense. PATRIOT will complement a range of medium and short-range air defense capabilities [Stinger and National Advanced Surface-to-Air Missile System (NASAMS)] that we have provided and the allies have provided in prior donation packages.... PATRIOT is a sophisticated air defense system so training will be required and will take some time.

How PATRIOT Functions

PATRIOT battery components and how they function are summarized in a NATO fact sheet:

> A PATRIOT battery has six major components: a power plant [two vehicle-mounted 150 kilo watt (KW) generators], radar set, engagement control station, launcher stations, antenna mast group, and interceptor missiles (PAC-2s and PAC-3s).
>
> The Radar Set provides detection and tracking of targets as well as fire control. The phased array radar helps guide interceptors to their targets and is resistant to jamming.
>
> The Engagement Control Station calculates trajectories for interceptors and controls the launching sequence. It communicates with the launcher stations and other PATRIOT batteries. It is the only manned station in a PATRIOT fire unit.
>
> The Launcher Stations transport and protect the interceptor missiles and provide the platform for the physical launch of the missile. Each launcher station can accommodate four PAC-2 missiles or 16 PAC-3 missiles.
>
> The Antenna Mast Group is the main communications backbone for the PATRIOT unit.
>
> The Interceptor Missiles: **PAC-2** is a proximity-fusing missile, which explodes near an incoming missile, **PAC-3** has been specifically designed to

intercept and destroy missiles by impacting them directly with kinetic energy- known as "hit to kill."

Once the interceptor missile is launched, the phased array radar tracks it. As the interceptor approaches the target, its active seeker will steer it to the target. A PAC-2 interceptor will detonate near the threat missile whereas a PAC-3 will seek to impact the threat ballistic missile warhead.

PATRIOT Ranges and Coverage

Official PATRIOT ranges and coverages are not available. According to a NATO fact sheet, the PATRIOT's phase-arrayed radar system has a range in excess of 150 kilometers (km). The flight ceiling for PATRIOT interceptors is about 20 km, and PATRIOT can provide area coverage and defense for about 15 to 20 km for incoming ballistic missiles.

Other Nations with PATRIOT Systems

The U.S. Army notes 16 other nations have PATRIOT systems, including a number of NATO members—Germany, Greece, Netherlands, Spain, Sweden, Poland, and Romania—and other non-NATO nations, such as Japan, Republic of Korea, Israel, Kuwait, Qatar, Saudi Arabia, United Arab Emirates, Taiwan, and Bahrain (sale approved by U.S. State Department in May 2019).

PATRIOT System Costs

Official PATRIOT system cost figures are not publicly available. According to a December 16, 2022, Center for Strategic and International Studies (CSIS) article, "Patriot to Ukraine: What Does it Mean?," a newly produced PATRIOT battery costs about $1.1 billion, including about $400 million for the system and about $690 million for the missiles. CSIS further suggests future U.S. PATRIOT battalions (a U.S. PATRIOT battalion consists of four PATRIOT batteries) could cost up to $1.27 billion dollars apiece without missiles. PATRIOT interceptors are estimated to cost about $4 million per missile.

U.S. Army PATRIOT Units and Readiness Considerations

Because the PATRIOT batteries and associated interceptors being sent to Ukraine could be taken from existing Army units and stockpiles, an understanding of PATRIOT in the basic force structure and related readiness issues could prove useful to policymakers. Reportedly, according to General James Mingus, Vice Chief of Staff of the Army, there are presently

> fifteen Patriot battalions, really 14 that are available. Three in the Indo-Pacific, one in EUCOM, [the] rest service retained. [There are] plans on the table to increase to 18 battalions, not including those for Guam.

CSIS further notes

> PATRIOT is a low-density, high-demand asset to the U.S. air defense efforts and has one of the highest operational tempos of the joint force. Every battalion, battery, and firing unit is therefore a valuable commodity. The Ukraine war has further heightened this tempo, with additional U.S. units deployed in Eastern Europe. How sending a PATRIOT battery to Ukraine will affect operations depends on where the equipment comes from. If it is withdrawn from other operational forces, such as U.S. Central Command or U.S. Indo-Pacific Command, that transferring the system to Ukraine may create opportunity costs and potential risks in those theaters. If they are withdrawn from the U.S. homeland, that could impede training or modernization cycles. Out of the 15 Patriot battalions currently available, one is usually being modernized as part of a relatively slow, 15-or-so-year modernization cycle.

Additional PATRIOT Units for Ukraine

On July 14, 2025, during a White House meeting with the NATO Secretary General, President Donald J. Trump reportedly stated additional weapons would be supplied to Ukraine, including PATRIOT units. He reportedly noted that

> it's a full complement with the batteries. We're going to have some come very soon, within days ... a couple of the countries that have Patriots are going to swap over and will replace the Patriots with the ones they have.... Some or all of 17 Patriot batteries ordered by other countries could be sent to Ukraine very quickly.

Delayed Delivery of Swiss PATRIOT Batteries

According to a Swiss press release, DOD informed the Swiss government on July 16, 2025, it was reprioritizing the delivery of PATRIOT systems to support Ukraine, and Switzerland "will receive its production batches later than planned." In 2022, Switzerland ordered five PATRIOT systems, with delivery scheduled to begin in 2026 and completed in 2028. According to the news release, "It is currently unclear how many systems will be affected and whether the delivery of [PATRIOT] missiles will also be affected."

Potential Considerations for Congress

Oversight questions for Congress could include the following:

- What are the operational details of the Administration's decision to send additional PATRIOT units to Ukraine? It appears the plan involves sending PATRIOT units from other countries and also drawing from 17 PATRIOT batteries being manufactured for other countries. Are U.S. PATRIOT systems part of this plan?
- Is there a cost estimate associated with this plan?
- If U.S. PATRIOT systems are included in the plan, how might this affect overall PATRIOT operational availability? Could this decision result in additional risk and, if so, what operational theaters could be affected?
- Is the decision to deploy additional PATRIOTs to Ukraine a temporary or long-term measure, and what are the plans to sustain this deployment?

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