

# How Israeli Military Technology Continues to Improve the US Military

John Spencer and Liam Collins<sup>1</sup> | No. 1975 | April 27, 2025

After the 1973 Yom Kippur War, the US Department of Defense undertook an [extensive evaluation](#) of the conflict, commissioning no fewer than 37 separate studies, including a still-classified seven-volume report on weapon systems. American military personnel walked the battlefields alongside Israeli commanders who had fought there, analyzing the strategies and technologies that enabled Israel to prevail against overwhelming odds. The lessons drawn from Israel's battlefield successes would profoundly shape US military doctrine, directly influencing the development of [AirLand Battle doctrine](#) and the "[Big Five](#)" weapon systems—Apache helicopters, Bradley Fighting Vehicles, Patriot missile systems, Abrams tanks, and Black Hawk helicopters. These advancements, combined with new operational approaches emphasizing speed, firepower, and joint-force coordination, would redefine modern warfare.

Since that study, the US military's enduring engagement with Israeli defense innovations continues to influence the US military's combat strategies and systems. From tank protection systems to artificial intelligence-powered warfare solutions, Israeli defense firms and research institutions have consistently delivered cutting-edge innovations that have found their way into the American military. Many of these technologies were born out of Israel's unique security challenges and its need for rapid innovation in urban and asymmetric warfare. The US military has adopted many of Israel's systems and integrated them into combat operations in Iraq and Afghanistan and various counterterrorism operations worldwide.

## The Israeli Emergency Bandage: A Battlefield Lifesaver

While Israeli innovations have shaped military doctrine and force structures, they have also had a direct impact on individual warfighters, as seen in battlefield medical advancements. The [Emergency Bandage](#)—a simple yet highly effective hemorrhage control dressing developed by an Israeli military medic—has saved countless American lives. First introduced

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in the 1990s, the bandage features a built-in pressure applicator that allows soldiers to treat severe wounds with one hand.

The US military adopted the Emergency Bandage in the early 2000s, particularly as it faced increasing casualties in Iraq and Afghanistan due to IEDs and small arms fire. It is now standard issue in the individual first aid kits of American soldiers, special operations forces, and first responders.

### **Armored Bulldozers: A Critical Urban Warfare Tool**

The Israeli military's adaptation of the D9 bulldozer into a heavily armored combat bulldozer offered a battlefield-tested model that directly influenced American operations in Iraq. In 2003, the [US military procured 14 Israeli-armored D9s](#), developed by Israel's military engineering corps, for use in combat zones like Iraq. While it remains uncertain where these specific units were deployed in Iraq, their acquisition illustrates the growing recognition of Israeli expertise in modifying heavy equipment for urban warfare. Some [reports indicate](#) that armored D9s were used in the Second Battle of Fallujah, possibly equipped with Israeli-designed armor kits that enabled US forces to breach barricades, demolish fortified positions, and reduce the risk to dismounted troops. In Israeli service, the D9 has been heavily [employed in Gaza](#), where it has been used to clear booby-trapped buildings, uncover tunnel shafts, and breach barricades under fire—often while under threat from IEDs and anti-tank missiles. To further protect operators and sustain the platform's urban utility, Israel developed a remote-controlled version of the bulldozer. This unmanned variant allows forces to conduct critical combat engineering tasks in high-risk zones without exposing soldiers to direct fire, demonstrating how the D9 continues to evolve as a life-saving tool on the modern battlefield.

### **Active Protection Systems: Trophy's Battlefield Impact**

Israeli advancements in force protection have dramatically increased the survivability of armored platforms in combat. The [Trophy Active Protection System](#) (APS) is one of the most significant Israeli contributions to armored warfare. Developed by Rafael Advanced Defense Systems, the Trophy APS provides a layered defense against incoming anti-tank guided missiles and rocket-propelled grenades (RPGs), automatically detecting, tracking, and intercepting threats before they reach the vehicle. First battle-tested by the Israel Defense Forces [in 2011](#), the Trophy APS quickly proved its effectiveness in combat situations.

One of the greatest challenges in urban warfare is the vital need for mobile protected firepower—tanks and armored vehicles must operate in dense environments where threats lurk behind every corner and through every window. Traditionally, urban combat has exposed these vehicles to devastating RPG ambushes launched from concealed positions in buildings, alleyways, subterranean networks, and elevated vantage points like upper stories and rooftops—highlighting the multidimensional threat posed by the urban battlespace. The Trophy APS revolutionized urban warfare by reducing this vulnerability, allowing tanks to maneuver through the labyrinth of dense urban combat with far greater survivability. The system's ability to neutralize RPG fire before impact has greatly contributed to the restored utility of heavy armor in close-quarters battle, a critical capability that modern militaries, including the United States, have sought to preserve.

Recognizing the increasing threat of modern anti-tank weapons, the US Army integrated the Trophy APS onto M1 Abrams main battle [tanks beginning in 2018](#). By 2020, Trophy-equipped Abrams tanks had been [deployed in Europe](#). Its ability to keep tanks in the fight by neutralizing anti-tank guided missiles has significantly influenced armored warfare for both nations.

Furthermore, as unmanned aerial threats evolve, the Trophy APS is now [being adapted](#) to counter drone-based attacks. Israeli defense developers are integrating drone-detection sensors and electronic countermeasures into the system, ensuring that armored vehicles are protected not only from ground-launched projectiles but also from loitering munitions and swarm drone attacks—a growing concern in modern battlefields, particularly in urban combat zones where drones are increasingly used for reconnaissance and precision strikes.

### **Countering IEDs**

During the Iraq War, improvised explosive devices (IEDs) [produced a majority](#) of US casualties. They were so devastating that General John Abizaid, the commander of US Central Forces Command, asked for a “[Manhattan project-like](#)” effect to counter the threat in 2004. One of the first places the United States turned to for help was Israel. Having faced IED threats for years from Hamas, Hezbollah, and other terrorist organizations, Israel’s counter-IED capability far exceeded that of the United States. Israel shared these technologies with the United States, providing it with vehicle-mounted microwave devices called [Dragon Spike and Dragon Spike II](#) to test in Iraq and Yuma Proving Ground in Arizona. These devices were not a silver bullet to the IED problem, but they did help jump-start the United States’ counter-IED efforts.

### **Military Working Dogs: K9 Corps**

Israel’s combat experience in dense urban areas has shaped its highly specialized use of dogs, and these operational lessons have increasingly informed US military practice. The IDF’s Oketz Unit began refining off-leash, with the handler using radios to pass commands beyond line of sight, canine tactics [in the 1990s](#), where handlers faced environments too dangerous or constrained to accompany their dogs directly. In response, Oketz developed techniques to train dogs to operate independently—entering buildings, tunnels, or ambush-prone corridors to detect and neutralize threats without direct handler oversight. During operations in Iraq and Afghanistan, US forces began to adopt similar methods, sending dogs ahead to scout confined spaces and reduce risks to personnel. The IDF’s success using dogs to locate tunnel shafts, detonate traps, or even engage combatants contributed to a renewed appreciation within the US military for the life-saving potential of military working dogs in high-risk environments. Joint training exchanges, particularly among US Special Operations Forces and Israeli counterparts, [have reinforced](#) this bond, with Israeli doctrine and battlefield experience helping refine how American handlers prepare for modern urban combat.

### **Counter-Tunneling Technologies: Lessons from Israel’s Underground War**

Israel has long faced the challenge of subterranean threats, particularly from Hamas and Hezbollah, which have developed extensive tunnel networks for smuggling, infiltration, and

surprise attacks. In response, Israel has pioneered cutting-edge counter-tunneling technologies, integrating ground-penetrating radar, seismic sensors, AI-driven detection systems, and rapid tunnel-neutralization techniques. For almost a decade, the United States and Israel have collaborated on developing anti-tunnel technology to address these complex challenges. This partnership has led to the [United States–Israel Anti-Tunnel Cooperation Enhancement Act](#), which authorizes \$80 million annually—matched dollar for dollar by the Israeli government—to scale up essential anti-tunnel cooperation. This collaboration has directly influenced US border security strategies, particularly along the US–Mexico border, where drug cartels and human smugglers have constructed increasingly sophisticated underground passages.

By leveraging Israeli-developed sensors and detection methodologies—many tested and refined in high-threat environments like Gaza and Lebanon—US Customs and Border Protection has [enhanced its ability](#) to locate and dismantle these tunnels before they become operational. The enduring cooperation between the United States and Israel in countering subterranean threats underscores how battlefield-driven innovation can have broader applications beyond war zones, securing borders, protecting critical infrastructure, and denying adversaries the strategic advantage of underground warfare.

### **Targeting Pods and Precision Rockets: An Israeli-American Airpower Advantage**

Originally developed by Israel’s Rafael Advanced Defense Systems and now co-produced with Northrop Grumman, the [LITENING targeting pod](#) has become a cornerstone of precision airstrike capability for the US Air Force. Designed for real-time target acquisition, tracking, and laser designation, the pod is [now being used](#) aboard F-16s in a novel role: enabling the use of laser-guided Hydra-70 rockets, upgraded through the Advanced Precision Kill Weapon System (APKWS). In [current operations](#) against Houthi-launched one-way attack drones, US aircraft are pairing the LITENING targeting pod with APKWS to destroy drones at a fraction of the cost of traditional air-to-air missiles. Each APKWS shot costs approximately [\\$35,000–\\$40,000](#), compared to the \$400,000–\$500,000 cost of an AIM-9 Sidewinder or the [\\$1 million](#) price tag of an AIM-120 Advanced Medium-Range Air-to-Air Missile (MRAAM). This innovative pairing of Israeli-developed targeting systems with affordable US precision munitions reflects a growing shift toward cost-effective, scalable solutions for countering drone threats—challenges that have become a hallmark of modern airpower.

### **Israeli Enhancements to the F-35: Improving US Air Superiority**

Israel has also played a crucial role in enhancing US airpower. The [F-35 Lightning II](#), considered the [most advanced stealth fighter](#) globally, has benefited from Israeli-driven modifications that have expanded its capabilities. The **Israeli Air Force** was the first international operator of the aircraft, designating the F-35I the [“Adir,”](#) and quickly adapted the platform to its unique operational environment. Israel integrated **enhanced electronic warfare systems, upgraded sensors, and domestically developed weapons**, all of which have influenced broader F-35 advancements.

One of the most significant adaptations occurred when Israeli engineers, working with **Lockheed Martin and the Pentagon’s F-35 Program**, developed a [new capability](#) allowing the

**external carriage of large-diameter precision-guided munitions** on the aircraft's wings. Originally designed to carry munitions solely in its internal weapons bay to maintain stealth, the **Adir is now the only F-35 in the world to have conducted operational strikes using externally carried munitions**. This modification has increased the jet's **strike capacity**, providing an advantage in sustained air campaigns while offering valuable lessons for the broader F-35 program.

### **Iron Beam: Addressing the Drone Threat**

One of the greatest emerging threats on the battlefield is the widespread use of enemy drones, particularly in swarming attacks that overwhelm traditional air defense systems. In response, Israel has developed the [Iron Beam](#), the world's first high-energy laser air defense system. Developed by the Israeli defense technology company Rafael Advanced Defense Systems, the Iron Beam complements Israel's existing [Iron Dome](#) air defense system with a cost-effective, near-limitless means of intercepting drones, rockets, and mortars. Unlike missile-based defense systems such as the Iron Dome, which require expensive interceptors, the Iron Beam neutralizes threats using laser energy. Expected to be fielded in Israel this year, the system has the potential to be a game-changer for defending critical military infrastructure and urban areas.

The United States has expressed strong interest in this technology as low-cost, high-volume drone attacks become a greater challenge. As the US military and its allies increasingly face drone swarm attacks, integrating laser-based defenses like the [Iron Beam](#) could provide a much-needed solution to this growing problem.

### **AI-Powered Warfare: The Future of Combat**

Israeli artificial intelligence (AI)-driven innovations are reshaping modern warfare, influencing military advancements worldwide. The US military is also actively developing AI-driven technologies, sometimes leading the way and, at other times, drawing insights from Israeli advancements:

1. **Harpy and Harop Loitering Munitions.** Israel Aerospace Industries (IAI) developed these AI-enabled [autonomous drones](#), capable of detecting and striking enemy targets without direct operator input. The US military has increasingly tested similar AI-powered loitering munitions for [counter-radar](#) and counter-vehicle applications.
2. **Fire Weaver Battle Management System.** Rafael's [Fire Weaver](#) enables real-time target acquisition and optimized engagement using AI-powered coordination. The United States has experimented with similar sensor-to-shooter networks for improving battlefield situational awareness.
3. **AI-Powered Counter-Drone Systems.** Rafael's [Drone Dome](#) is an AI-powered counter-drone system designed to detect, classify, and neutralize enemy drones. As drone threats from non-state actors continue to rise, the US military has adopted similar AI-driven counter-drone technologies to enhance the protection of bases and forward-operating units.

4. **CARMEL AI Armored Vehicle.** Israel's [CARMEL project](#) integrates AI into armored fighting vehicles for semi-autonomous operations. The US Army's [Next-Generation Combat Vehicle](#) program is evaluating AI-assisted technologies similar to those pioneered in the CARMEL project.
5. **AI-Based Cyber Defense and Signals Intelligence.** Israeli defense firms, many led by [Unit 8200](#) veterans, have pioneered AI-enhanced cybersecurity and signals intelligence solutions. The US military and intelligence agencies have likely worked closely with Israeli firms to integrate [AI-driven tools](#) and predictive threat analysis into their operations.

These AI advancements underscore the broader evolution of Israeli defense technology, which continues to shape the future of warfare in partnership with the United States.

From kinetic defense systems like the Trophy APS and the Iron Dome to cutting-edge AI applications in battle management and cyber warfare, Israel's military innovations have significantly enhanced US combat capabilities. The unique challenges faced by the Israeli Defense Forces—urban warfare, asymmetric threats, and high-tech adversaries—have led to significant advancements that align closely with the needs of US forces. Additionally, Israeli modifications to the F-35 and the development of the Iron Beam showcase how the US–Israeli defense partnership is not just about adoption but also co-evolution, advancing military technology to stay ahead of emerging threats.

As warfare evolves, the US–Israeli defense partnership will remain at the forefront of military innovation, ensuring both nations stay ahead of emerging threats and shape the battlefields of the future.

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