

Palestinian Rockets versus Israeli Missiles in the Second Gaza War

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Brief Analysis

On December 18, 2012, Uzi Rubin addressed a Policy Forum at The Washington Institute. Mr. Rubin is president of the defense consulting firm Rubincon Ltd. and formerly served as founding director of the Israel Missile Defense Organization. The following is a rapporteur's summary of his remarks.

November's Gaza war was a watershed event for both Israel and the Palestinians. Militants in Gaza exhibited improved, though still unguided, rocket technology and a more robust command-and-control structure, while Israel employed active missile defenses on a widespread basis for the first time.

Palestinian operations featured larger numbers of more advanced rockets capable of striking population centers and economic hubs at greater ranges than before, including a few that reached as far as the outskirts of Tel Aviv and Jerusalem. Short-range rockets included the homemade Qassam, which the Palestinians have used since the early 2000s, and the more lethal and accurate Iranian 107-millimeter rocket, a portable weapon with a range of about ten kilometers.

Extended-range Grad rockets, acquired around 2009, have a range of over forty kilometers and are fired from underground launchers, which are electronically raised and lowered like those used by Hizballah in the 2006 Lebanon war. These launchers are often located in residential areas in order to use civilians as human shields.

Medium-range rockets acquired by the Palestinians in 2011 include the Iranian-made Fajr-5, which has a range of 75 kilometers, and the M-75, which is likely an Iranian design that is at least in part locally made. One M-75 is believed to have struck a vacant area south of Jerusalem, but the impact crater was too small to be the result of the 80-kilogram warhead claimed for that weapon.

The Palestinian rocket offensive was characterized by high-tempo, concentrated fire and the ability to shift aim points and engage targets of opportunity. Over eight days, more than 1,500 rockets were fired at Israel. Of those, 152 did not reach Israel and 875 struck empty areas; most of the remaining 479, or about 32 percent of total rockets fired, would have struck residential areas had they not been intercepted.

The attacks exhibited a trend seen in previous rocket campaigns: a high rate of fire at the outset of hostilities, followed by a decline over time, and then a spike at the very end to create an image of victory. This last-minute flurry of launches showed the Palestinians' ability to preserve their command-and-control capabilities even in the face of intense Israeli offensive operations. The conflict was also marked by the unprecedented targeting of Jerusalem, despite the risk of damaging Muslim and Christian holy places. In addition, the Palestinians took aim at Israeli troop concentrations, showing that they could fire at targets of opportunity.

The Israeli response involved airstrikes, effective passive defenses, and, for the first time, active defenses in the form of the Iron Dome system. Offensive operations consisted of preemptive strikes against medium-range rocket storage and launch sites, harassment of rocket launching teams and command centers, and counter fire against exposed launchers. The preemptive strikes were the most effective, as shown by the relatively limited use of

medium-range rockets afterward. Attacks on launch sites were somewhat less effective, possibly due to Israel's desire to minimize civilian casualties and collateral damage in the residential areas where many launchers are located.

Israeli passive defenses included an early warning system that was extremely effective in giving civilians enough time to find shelter. In fact, it is doubtful that a single rocket landed in Israel without prior warning. Even so, several problems emerged that will need to be addressed prior to the next war, such as controlling the crowds of spectators at impact areas and near Iron Dome batteries. Such high-risk behavior could result in casualties during future attacks.

One of the defining features of the conflict was the widespread use of Iron Dome, which was developed in record time after the 2006 Lebanon war -- in just four years. The first operational battery was fielded in April 2011; the costs of developing and producing the first two batteries were paid by Israel, but the United States financed subsequent production.

Iron Dome proved an effective, efficient, and affordable option for defending Israel from rocket attacks. Four batteries were operational before the fighting, with a fifth added during the conflict to defend Tel Aviv. These five batteries destroyed 421 rockets (or 84 percent of engaged threats) using only 500 interceptors, for a very efficient 1.2 interceptors per rocket (compared to 2.2 during engagements in March 2012). In addition, according to the Israel Missile Defense Organization, all Palestinian counter tactics -- including depressed trajectories, concentrated fire, and rapidly recurring salvos -- were ineffective. Iron Dome was able to take out entire salvos simultaneously, one of the key reasons that it was selected over other systems that could engage only one rocket at a time.

In the 2006 Lebanon war, Israel experienced one fatality for every 75 rockets fired. During the Gaza conflict, however, Iron Dome helped lower that figure to one fatality per 300 rockets fired. Moreover, the 500 expended interceptors cost \$25 million and were able to adequately defend against 1,500 rockets, proving that active rocket defense is extremely cost effective.

In strategic terms, the conflict was largely a "push-button war," allowing Israel to defend its territory from rockets and fulfill its stated objectives of minimizing casualties and damage, while also providing the breathing room needed to avoid ground operations. All three aspects of the Israeli response -- offense, active defense, and passive defense -- were crucial to protecting the homeland. Indeed, the outcome established active defense as a central pillar of Israel's ability to prevail in future conflicts.

The Gaza fighting may also be a harbinger of wars to come. Hamas military doctrine, with its focus on rockets and missiles, is a reflection of Iran's military doctrine, so any future war in the Gulf will likely unfold along similar lines. The United States should therefore invest in its own active defenses to protect population centers, national infrastructure, and military installations around the world.

Finally, despite being a relatively bloodless engagement, the Gaza conflict could well prove to be a watershed event in Israel's military history. Fierce dedication and creativity within the country's defense community, even in the face of stubborn opposition by decisionmakers, provided a timely and effective response to the asymmetric threat of rocket fire from Gaza. While Israel had the financial resources for full production of Iron Dome batteries, it lacked the time to debate such allocations, so U.S. financial support was invaluable in ensuring that it was prepared to counter the threat. Israelis are in debt to President Obama and Congress for their resolute and generous support of rocket defenses that saved the lives of many innocent civilians.

This rapporteur's summary was prepared by Rebecca Edelston. ❖

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