

JINSA's Gemunder Center for Defense and Strategy

Evaluating the Danger from Gaza's Weapons Stockpile

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The fighting between Israel and Gaza that took place from May 10-21, known in Israel as Operation Guardian of the Walls (OGW), proved that Hamas and Palestinian Islamic Jihad (PIJ) maintain a large, diverse, and growing arsenal of projectiles of increasing range that can be fired in coordinated salvos intended to overwhelm Israel's robust air defenses. These advancements in Palestinian rocket technology threaten Israel's ability to deter future conflicts and defend against attacks when they occur; they are also a harbinger of the much more devastating potential conflict with Hezbollah on Israel's northern front.

Israel's ability to deter and defend itself against these growing rocket arsenals, while abiding by the law of armed conflict, requires pairing advanced air defenses with offensive capabilities that can accurately target rocket production sites, depots and launchers spread widely across Gaza and embedded within densely-populated zones. The United States should support Israel's deterrence by not only replenishing its supply of Iron Dome interceptors but also by expanding its air defense and precision munition capabilities.

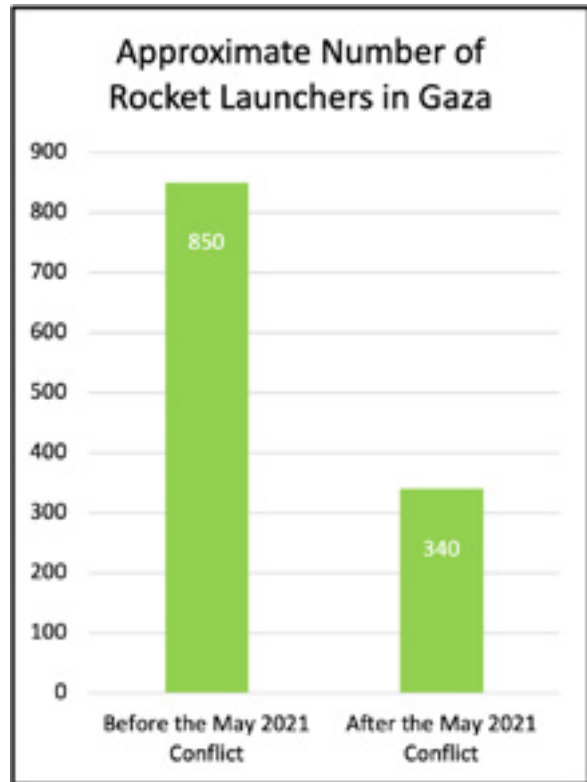
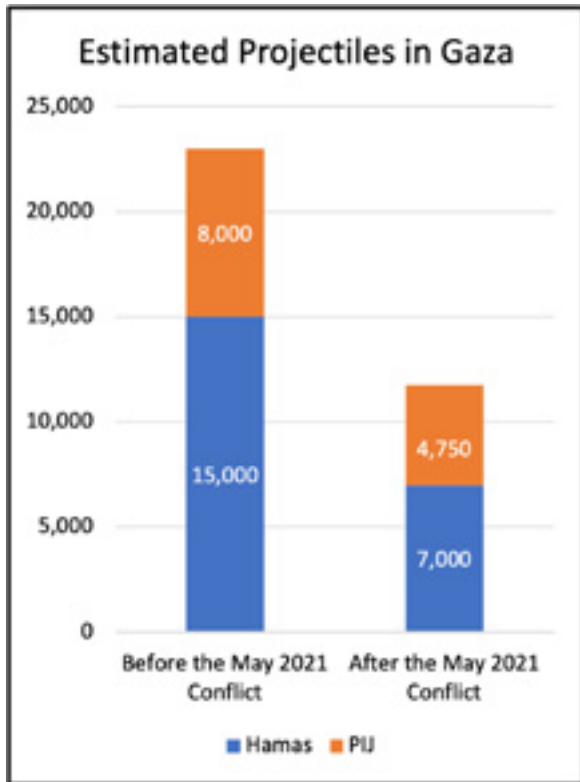
What Happened?

- On May 10, terrorist organizations Hamas and PIJ began firing rockets and other unguided projectiles at Jerusalem.
- In the 11-day conflict that followed, 4,428 rockets and missiles were fired from Gaza. Of these:
 - 540 projectiles landed in Gaza;
 - 1,577 were intercepted by Israel's Iron Dome air defense system – a roughly 90 percent success rate for projectiles headed toward built-up areas;
 - Roughly 250 hit populated areas inside Israel.

- Hamas and PIJ demonstrated that they have significantly expanded and improved their arsenal of high-trajectory weapons compared to the previous major conflict in 2014. They now have more numerous, more accurate, and longer-range rockets than before as well as the ability to fire more of them simultaneously from better shielded and dispersed locations.
 - The estimated 4,428 rockets fired during the 11 days of fighting in 2021 is roughly the same as the total number of rockets launched from Gaza during the entirety of the 51-day long conflict in 2014, and comparable to the number of rockets fired at Israel by Hezbollah in the entire 34-day Second Lebanon War in 2006.
 - More than 100 Palestinian rockets targeted Tel Aviv, a distance of 71 km (44 miles) from Gaza.
 - Salvos as large as 50-100 rockets at a time were fired from Gaza in an effort by the terrorists to swamp the Iron Dome. These unprecedentedly large barrages reveal a new Hamas tactic which will in turn will require technical and operational adaptations by the IDF.
 - Hamas fired rockets from launchers located underground and in proximity to civilian infrastructure such as schools, hospitals, mosques, and apartment buildings. With multiple dispersed sites, Hamas would use different launchers for each salvo, often fired by remote control.
- Israel's Operation Guardian of the Walls was highly effective in neutralizing Hamas' ability to successfully target Israeli population centers with projectiles and attack tunnels. IDF airstrikes also destroyed much of Hamas' infrastructure, including command and control and rocket manufacturing and storage sites, much of it underground.
- Yet, despite the high rate of rocket fire from Gaza and the accurate targeting of OGW, Hamas and PIJ appear to retain significant rocket arsenals and capabilities. Replenishing Israel's defensive and precision offensive capabilities against these threats, as well as blocking attempts to grow and improve Hamas' capabilities, will be crucial to maintaining the deterrence established by OGW.

Threat Assessment of Projectiles in Gaza

- JINSA's assessment based on available sources is that Hamas and PIJ retain roughly 40 percent of the rocket capabilities they had prior to OGW:
 - Roughly 11,750 missiles after the conflict compared to 23,000 prior;
 - Some 340 launchers in Gaza now compared to 850 prior to the conflict;
 - An estimated 60-70 percent of projectiles in Gaza are produced indigenously.

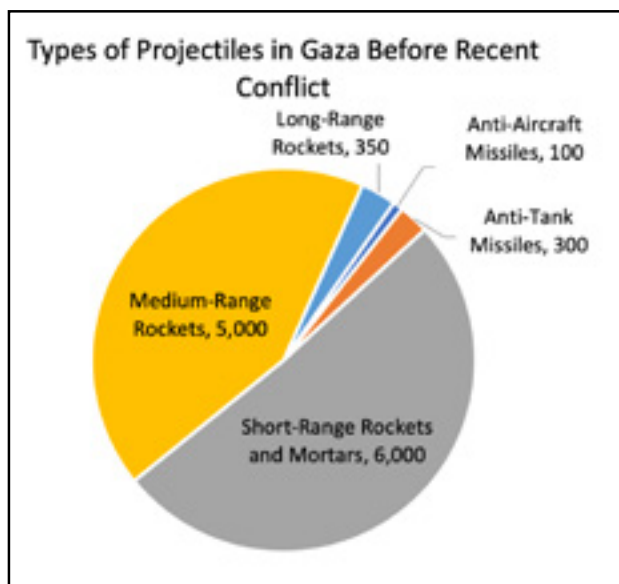


- These figures include a variety of different munitions, including mortars, short-, medium-, and long-range rockets, anti-tank and anti-aircraft missiles, and unmanned aerial vehicles (UAV):

- Unguided Mortars and Mortar Shells

- Prior to the conflict, Hamas [possessed](#) several thousand Russian 82-millimeter mortars—which are short-range high-trajectory artillery systems capable of rapid repeated fire—in addition to thousands of more powerful 120-millimeter HM-16 mortars produced by Iran. These are notoriously hard to intercept, though countermeasures are improving.

- Mortar rounds are difficult to intercept because of their short flight time (5-8 km range) and are particularly dangerous to Israeli communities and IDF formations within the Gaza envelope. This was a particular problem when Hamas switched to heavy mortar fire at the end of the 2014 conflict.



- Unguided Short-Range Rockets
 - According to missile expert Uzi Rubin, the [majority of Hamas' rocket stockpile](#) is unguided short-range Qassam rockets, which cost between 300 and 800 dollars to manufacture and have an [estimated range](#) of approximately 10 km.
 - Between Hamas and PIJ, JINSA estimates there were approximately 6,000 unguided short-range rockets and mortars in Gaza before OGW.
- Mid-Range Rockets
 - Hamas has between 5,000-6,000 rockets with an approximate range of up to 40-55 km, or 25-35 miles (Fajr-33 and Sejil-55), a conservative estimate given that very few were publicly recorded as having been used in the conflict.
- Long-Range Rockets
 - Although Hamas and PIJ fired approximately 4,000 rockets in the recent conflict, between May 10 and May 17 only around 300 were long-range rockets.
 - After the latest round of violence, Hamas likely retains approximately 200-300 M-75, J-80, J-90, Iranian-made Fajr-5, Syrian-made M302, and a second-generation M-75 rockets with ranges between 70-80 km (40-50 miles).
 - PIJ likely has a small number of Boraq-70 rockets with a range of around 70 to 80 km (40 to 50 miles).
 - Israeli intelligence believes that PIJ may have [stockpiled](#) a “very small number” of Boraq-100 and Boraq-120 rockets, which have ranges of over 100km (approximately 60-65 miles).
 - Hamas had stockpiled dozens of rockets with a range of 100-160 km, or 62-100 miles, (R-160, A-120, SH-85, Iranian-made M-302, and Ayyash 250). After the latest fighting, it most likely has 30-50 rockets with a range of greater than 100 km.



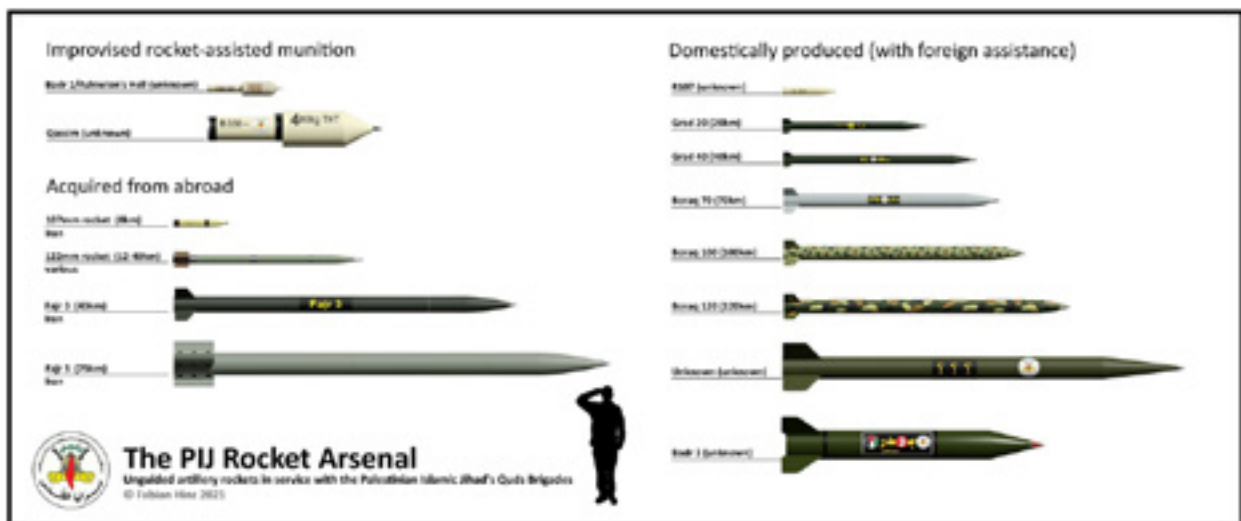
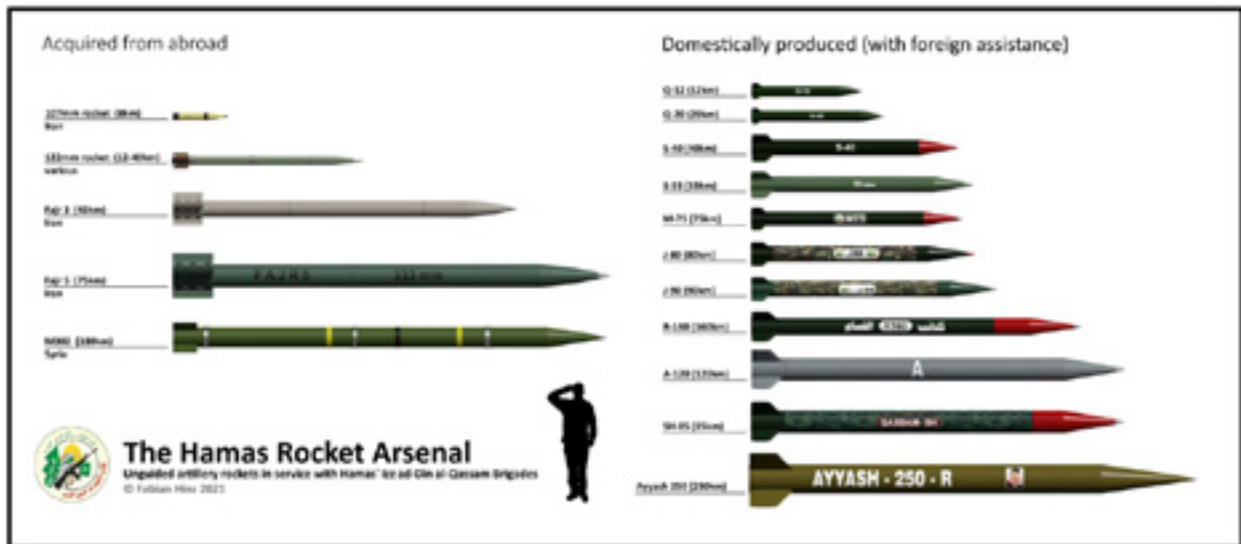
**Short Range 10-30km
[6-18 miles]**

**Mid-Range 40-50km
[25-35 miles]**

**Long Range 70-180km
[62-110 miles]**

- UAVs, Anti-Tank Missiles, and Anti-Aircraft Missiles
 - Hamas is estimated to possess [dozens of UAVs](#), also commonly referred to as drones, 100 anti-aircraft missiles, and around 300 anti-tank missiles.
 - Hamas [launched](#) six attack UAVs in the recent conflict, all of which were GPS-guided, loaded with explosives, and carried a range of over 100 km (62 miles). Israel successfully intercepted all six either from the ground or air, including the first such intercept by Iron Dome. At least one UAV targeted an offshore energy platform and was intercepted.
 - On May 12, Hamas [launched an anti-tank Kornet missile](#), made by Russia and considered highly accurate, against an IDF patrol vehicle.

The [graphics below](#) from open source intelligence expert Fabian Hinz depict the diverse range of projectiles that Hamas and PIJ can field.



Why is it Important?

- Most of Hamas' heavy rocket arsenal is still believed to be unguided, but efforts are underway to make these weapons more accurate—a “precision project” patterned on Hezbollah's similar efforts in Lebanon.
 - The targeting and elimination of key Gazan rocket experts during the operation may slow these upgrades.
 - Hamas demonstrated its capability to launch an accelerated rate of sustained fire and salvo attacks compared to recent conflicts in 2014, 2018 and 2019, and there is incremental evidence of greater precision that mirrors Hezbollah and Iran's efforts. With Iranian encouragement, Hamas also sought to launch large salvos to stress-test the Iron Dome and if possible (but unsuccessfully) overwhelm it.
- Deterring and defending against projectile attacks requires Israel to precisely target launch locations in Gaza and intercept the diverse array of munitions that terrorists can fire at Israel.
 - During the fighting, the Israeli Air Force employed new methods and systems to rapidly transmit targeting data on rocket launchers from its sensors to strike aircraft in order to destroy the launch sites before firing or reloading.
 - JINSA assesses that the IDF's ability to conduct a large number of precise attacks in a short timeframe was due to their successful fusion of intelligence and operations, including through technological advancements in artificial intelligence (AI) processing of sensor data.
 - Palestinian Islamic Jihad (PIJ) and Hamas often work in close coordination, but the former group has also drawn Hamas into conflicts with Israel by launching rockets from its independent arsenal.
- According to initial IDF assessments, Hamas has been set back in their near-term rocket-production efforts. The degree of setback caused by the loss of human capital is not entirely clear, but is likely appreciable in the near-term.
 - As far as indigenous production capacity for long-range rockets, it appears that a number of Iranian-trained Hamas members with experience in aerodynamics, propulsion, and engineering were killed in the recent conflict.
 - Notably, Iran has already begun to re-arm Hamas with new rockets, which makes estimates of overall stockpiles even more difficult.
 - IDF Chief of Staff Lt. Gen. Aviv Kohavi [stated](#) that “we attacked three times more every day, and with high-quality and accurate targeting, than in previous operations. This shows the capabilities of the IDF that we will continue to develop.”

- Compared to the 2014 conflict, IDF operations in OGW were much more intense from the outset, striking an estimated 1,428 military targets overall, though it is still not clear how many were weapons production sites.
- Despite Israel dropping thousands of precision munitions on Gaza, Palestinian militants demonstrated their ability to continuously fire on Israel, occasionally circumvent or breach the Iron Dome air defense system, and repeatedly stress-test the system for potential weaknesses.
 - Kohavi [cautioned](#) that deterrence is an “an elusive concept subject to the cruel judgment of the time” and “we need to be modest about what deterrence effect it will produce. The Six Day War was a sharp and smooth victory but shortly after the War of Attrition began.”
 - Iron Dome intercepted around 90 percent of the rockets that reached Israeli airspace and would have fallen on population centers. But Israel reportedly has [10 Iron Dome batteries](#), forcing it to strategically choose which population centers or infrastructure to cover and leaving other vital areas relatively vulnerable. In OGW, the IDF had to redeploy batteries from the north and move them to central and southern Israel.
 - Hamas [heavily utilized mortars](#) during the recent conflict. A mortar barrage of over 50 shells on May 18th injured over 10 civilians and killed two individuals in the Eshkol region of Israel.
 - Hamas appears to have utilized new rockets with greater range than in previous conflicts, attempted to use six explosive-laden UAVs, all of which were intercepted, and fired dozens of mortar shells that caused casualties.
 - For the first time, Iron Dome proved capable of intercepting the UAVs but there is potential for groups to launch larger UAV barrages that could penetrate Israel’s air defenses.
- In a conflict with Hezbollah and/or Iran, Israel’s adversaries would be able to launch significantly larger bombardments of rockets, missiles, drones, and other projectiles at Israel that could overwhelm its air defenses.
 - A large-scale multifront conflict with Hezbollah and/or Iran would severely deplete Israel’s stockpiles of air defense interceptors and precision munitions.
 - The IDF believes that Hezbollah could sustain a rate of fire four times that of Hamas in recent conflict while also using larger and longer-range rockets and missiles.

What Can the United States Do Next?

- It is imperative that Congress quickly fund [President Biden's promise](#) to replenish the IDF's supply of Iron Dome Tamir interceptors, similar to the emergency funding it provided when Israel faced similar challenges in 2014.
- With Hamas and PIJ demonstrating their increased range and firepower, Congress should provide additional funding so that Israel can purchase 3-5 additional Iron Dome batteries.
- President Biden should upgrade America's supply of prepositioned weaponry in Israel for IDF use in an emergency, named WRSA-I. The stockpile has become obsolete and lacks the munitions that Israel will need in a major conflict, such as Joint Direct Attack Munitions (JDAM) tailkits that convert unguided bombs into precision munitions, and precision-guided GBU-39 and GBU-53/B small diameter bombs.
 - With Israel recently being reassigned to the area of responsibility for U.S. Central Command (CENTCOM), the United States also should consider [expanding WRSA-I](#) into a regional hub for both Israeli emergency needs and CENTCOM's projected wartime requirements, in contrast to European Command's bilateral concept for the stockpile.
 - The Pentagon can use its Special Defense Acquisition Fund (SDAF) or the United States could loan the weapons to Israel on a temporary basis.
- The United States could also provide emergency funding for JDAM replenishment to directly restock Israel at a level similar to its replenishment of Tamir interceptors, since "more routine limited strikes could strengthen Israeli deterrence and possibly delay a major Hamas-Israel war" as JINSA President and CEO [Mike Makovsky recently argued](#).
- The United States and Israel should cooperate on research and development programs to improve the Iron Dome' capabilities and explore other possible air defense options that could improve cost efficiency or better counter mortar fire, such as directed energy.
 - The IDF made significant improvements to Iron Dome since the 2014 conflict, enabling the air defense system to hold up with a 90 percent effectiveness rate despite unprecedented rocket fire from Gaza.
 - The U.S. Army has acquired two Iron Dome batteries, so any improvements to the system a direct benefit for U.S. deterrence capability as well.

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