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Weapon of Terror: Development and Impact of the Qassam Rocket

By Margaret Weiss
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Qassam rockets -- unsophisticated weapons manufactured in garages and backroom laboratories -- have transformed the strategic equation of the Israeli-Palestinian conflict. These crude rockets give Palestinian terrorist organizations the capability to strike deep into Israeli territory, throwing the security assumptions behind future peace negotiations into doubt.

Background

Qassam rockets -- named after Izz al-Din al-Qassam, the militant Syrian preacher and Muslim Brotherhood member killed in 1935 while fighting British and Zionist forces in Palestine -- are the most recent innovation in attacks on Israeli civilians. Hamas first introduced them in Gaza in September 2001, about a year after the start of the second intifada. Although Hamas has the most advanced rocket manufacturing and launching capabilities, other groups have made similar weapons a staple of their arsenals, including Palestinian Islamic Jihad (Quds rockets), the al-Aqsa Martyrs Brigades (al-Aqsa rockets), and the Popular Resistance Committees (Nasser rockets).

These radical groups have used rockets with greater frequency in recent years to overcome the obstacle posed by Israel's Gaza security fence, which has proven to be extremely effective in preventing Palestinian infiltration from that territory since its completion in 2001. Ironically, these groups have exploited the Qassam's notorious inaccuracy, highlighting the random violence that it causes on its targets. For example, Hamas leader Mahmoud al-Zahar explained to London's *Sunday Telegraph* in August 2007 that Hamas prefers rocket attacks to suicide bombings because rockets "cause mass migration, greatly disrupt daily lives and government administration, and make a much [larger] impact.... We have no losses, and the impact on the Israeli side is so much."

According to Israeli government statistics, annual rocket attacks doubled from 2002 to 2003 and then nearly quadrupled -- from 225 to 861 -- between 2005 and 2006, totaling more than 3,000 since 2001. The turning point was Hamas's violent takeover of Gaza last summer -- Qassams have been raining on southern Israel at an increasing rate after initially dropping in the wake of Israel's 2005 disengagement. Already in 2008, the average is more than 200 per month, with more than 100 fired in the first week of March alone. And these numbers do not include other bombardment methods such as mortar attacks.

The targets of the rocket attacks have evolved over time. Prior to disengagement, Israeli settlements within Gaza were the preferred targets. Since then, the attacks have been directed mainly at Israeli towns, villages, and rural communities inside Israel proper.

Of the hundreds of rockets launched from Gaza, nearly half have targeted Sderot, a working-class Israeli town that -- like any other civilian community -- is virtually defenseless against such attacks. Israeli civil defense authorities use a "color red" system that gives citizens only a few seconds of warning to find shelter before the rockets hit. Twelve people, including children, have died as a result of such attacks, and more than 500 have been wounded.

Rocket Variations

Qassams have evolved over the years, improving in both range and payload. According to the Intelligence and Terrorism Information Center in Israel, the Qassam-1, first launched in autumn 2001, had a maximum range of three to four kilometers. Over the next six years, technological and engineering improvements extended this range to about ten kilometers. The Qassam-2, for example, is able to reach the southern outskirts of Ashkelon, a major industrial city on the coast.

Palestinian groups also have recently begun using imported Katyusha-type Grad rockets, which have a range of more than twenty kilometers (Katyusha is a family of rockets developed by the Soviet Union during World War II, while the Grad was first developed for the Soviet BM-21 rocket launcher during the 1960s). At least some of these rockets were produced in Iran -- there, they were specifically manufactured to fit the narrow confines of smuggling tunnels between Egypt and Gaza. It is unclear how many such weapons Hamas has in its arsenal.

With these improvements in range, nearly a quarter million Israeli civilians live within range of Palestinian rocket fire -- from the more than 100,000 in Ashkelon to the tens of thousands living in towns and villages throughout southern Israel and the western Negev.

Qassam Production

Qassams are manufactured primarily in Gaza, but Israel has uncovered a few makeshift rocket workshops in the West Bank as well. Although most of the raw materials used to manufacture the rockets come from basic civilian industries, other materials are imported or stolen from inside Israel or smuggled in through tunnels from Egypt. The fuel is made of a combination of potassium nitrate fertilizer and sugar. The rockets themselves are made of common metal pipes filled with explosives and propellants. The equipment used to manufacture them does not require advanced technology and can be found in simple metal shops and garages.

Future Development

With persistence, Hamas and other terrorist groups will continue to improve the range, accuracy, and lethality of their rockets. There have already been significant improvements in terms of production and assembly, the quality of motors, and the introduction of metal pellets to increase lethality. Better technology may also increase shelf life, allowing for greater stockpiling. Eventually, arsenals will be composed mainly of rockets with a range of more than twenty kilometers, compared to earlier arsenals limited to ten kilometers or less. This will greatly expand the number of civilian population centers vulnerable to sudden attack.

Israel has invested heavily in developing two long-term defensive capabilities against these threats: the "Iron Dome" and the "Magic Wand." The former, which should be operational by 2010, is intended to intercept smaller rockets with a range of up to seventy kilometers. "Magic Wand" is being designed to protect against the potential threat of longer-range missiles. Defense Minister Ehud Barak has linked Israel's willingness to withdraw from the West Bank to the successful development of such systems.

Conclusion

Qassams and other rockets have transformed the strategic balance between Israel and the Palestinians, giving terrorist groups an alternative means of attacking Israeli civilians and raising the level of fear among a large fraction of the population. In the long term, the presence of these rockets will force all parties to rethink the security arrangements for a permanent Israeli-Palestinian agreement, since this threat did not exist during previous peacemaking efforts at Camp David and Taba.

Margaret Weiss is a research assistant at The Washington Institute.

