URBAN SKIES: ISRAEL'S AIR STRATEGY IN GAZA AND CHALLENGES FOR THE FUTURE

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The ongoing Israel-Hamas conflict sheds light on the enduring and emerging challenges in employing offensive air power in urban settings against adversaries deeply embedded within civilian infrastructure. In reply to the October 7, 2023 attack on Israel, the Israel Defence Forces (IDF) demonstrated rapid and effective use of its air power. Israel's actions underscore a strategy honed through experience and adaptation over time. Examining Israel's past experiences is essential to grasp Israel's approach to dealing with adversaries in urban environments.

Air Power in IDF Military Strategy

Israel's security strategy was shaped by its exposed borders, limited resources, and the need to avoid prolonged conflicts. Hence, it emphasised swift, lethal operations and relied heavily on air power to keep battles short and off its soil. Furthermore, progressively decreasing acceptance of the human costs of war made Air Power the preferred instrument of choice and cornerstone of Israel's military strategy.

Shifting Sands of Conflict

The nature of adversary has changed for Israel since 1982. While Israel's participation in conventional battlefields gradually diminished after Becca Valley Operations in 1982, its engagements with irregular forces increased incrementally. From the Golan Heights and the Sinai Peninsula, battlefields in the 21st century

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shifted to civilian population centres in Gaza and Lebanon. Here, adversaries were not neighbouring Arab nations but irregular forces like Hamas and Hezbollah. They chose a battlefield in a crowded urban environment to deprive IDF of its full conventional military advantage, severely limiting the effectiveness of its air power.

After the second Lebanon war in 2006, Israel carried out four significant operations in Gaza against Hamas in 2008, 2012, 2014 and 2021. Each of these operations incrementally refined Israel's approach to dealing with adversaries like Hamas and Hezbollah. To prevail over emerging battlefields, the IDF developed technological and doctrinal solutions. New intelligence doctrine advocated real-time tactical intelligence to ensure minimal collateral damage. The targeting philosophy incorporated concepts like 'roof knocking' wherein low yield munitions were fired to signal subsequent main strike. Experiments with munition effects were conducted to minimise fragmentation in warheads.

Operation Cast Lead (2008)

Changes made in training, equipment and doctrine were tested against a new hybrid opponent—Hamas—in Gaza. Hamas enjoyed the advantage of ruling over one of the most densely populated areas in the world. It meant that battles would now be fought in urban areas where Hamas and its allies took measures to prepare the battlefield of their choosing with the help of networks of tunnels, arms depots, IEDs, and sniper positions.

A ground offensive was considered a necessary part of the effort to defeat a hybrid opponent. Preceding ground operations by seven days, air operations shaped the battlefield. To minimise collateral damage, optimum weapon to target matching was ensured. Intelligence gathering was through ground operators and airborne sensors. Through Roof Knocking, people in the targeted area were warned of impending attacks along with automated calls. Infrastructure and leadership were two pillars of Hamas' operations. The IDF targeted both. However, Israel's objective in the operation remained only to restore deterrence and degrade Hamas's military infrastructure. Israel considered Hamas a terrorist organisation. Hence, Israel's actions emanated from counterterrorism policy and not through any comprehensive assessment of a hybrid adversary. Figure 1 illustrates the factors shaping Israel's approach going into Operation Cast Lead and its subsequent responses.

Figure 1: Op Cast Lead (2008)
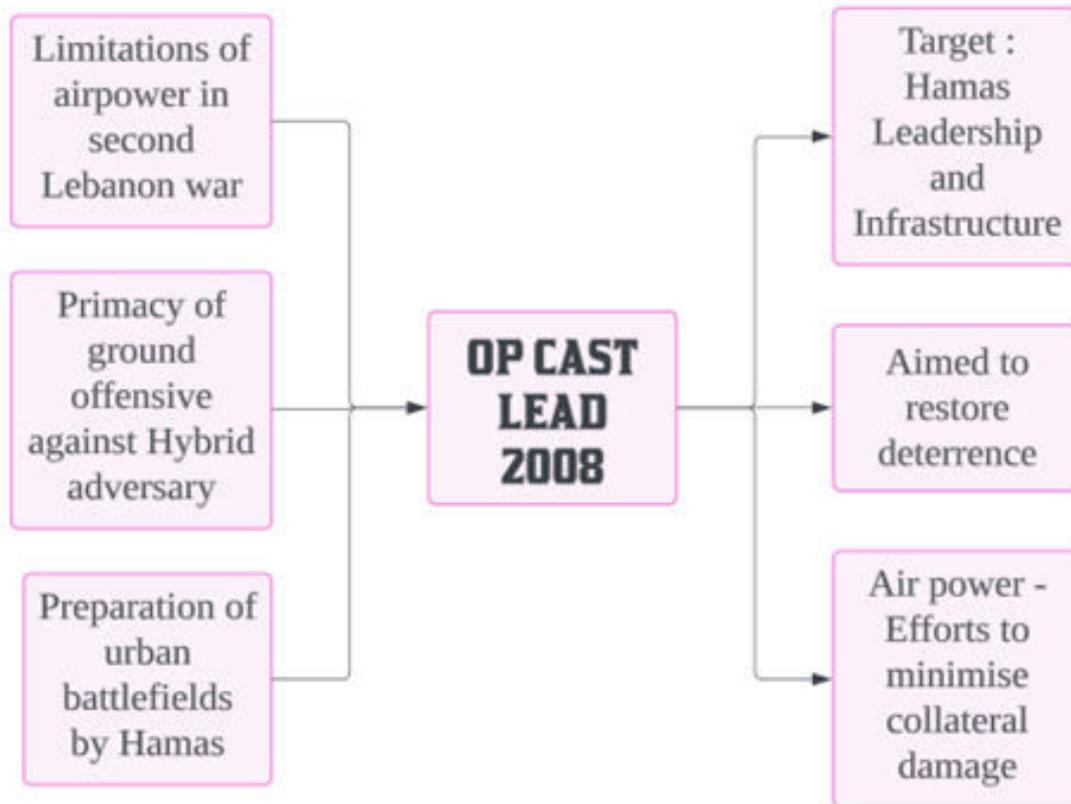
Source: The author created this figure based on his analysis of Operation Cast Lead.

Operation Pillar of Defence (2012)

By 2012, Israel had deployed its new Iron Dome anti-rocket system. It enabled Israel to neutralise Hamas' rocket fire on population centres. It gave decision-makers time to figure out the future course of action.

Building on previous operations, the IDF made greater use of manned and unmanned aircraft to create situational awareness. All efforts that were used previously in 2008 to minimise civilian casualties continued. In addition, legal vetting of targets was made mandatory before engaging them. In response to heavy rocket attacks by Hamas, the Israeli Air Force struck more than 1,500 targets in Gaza, including rocket launchers, weapon stocks, and Hamas government infrastructure.[1] While Israel mobilised a total of 57,000 reservists and deployed ground forces along Gaza's border, a ground incursion ultimately never occurred.[2]

Air Operations demonstrated the utility of using air assets in an urban environment and the effectiveness of air defence systems against rocket attacks in 2012. However, Hamas also, through its subterranean network of tunnels, was able to protect its assets and launch attacks. Figure 2 below summarises the key event markers before the commencement of operations and the outcomes of the IDF strategy.

Figure 2: Op Pillar of Defence (2012)
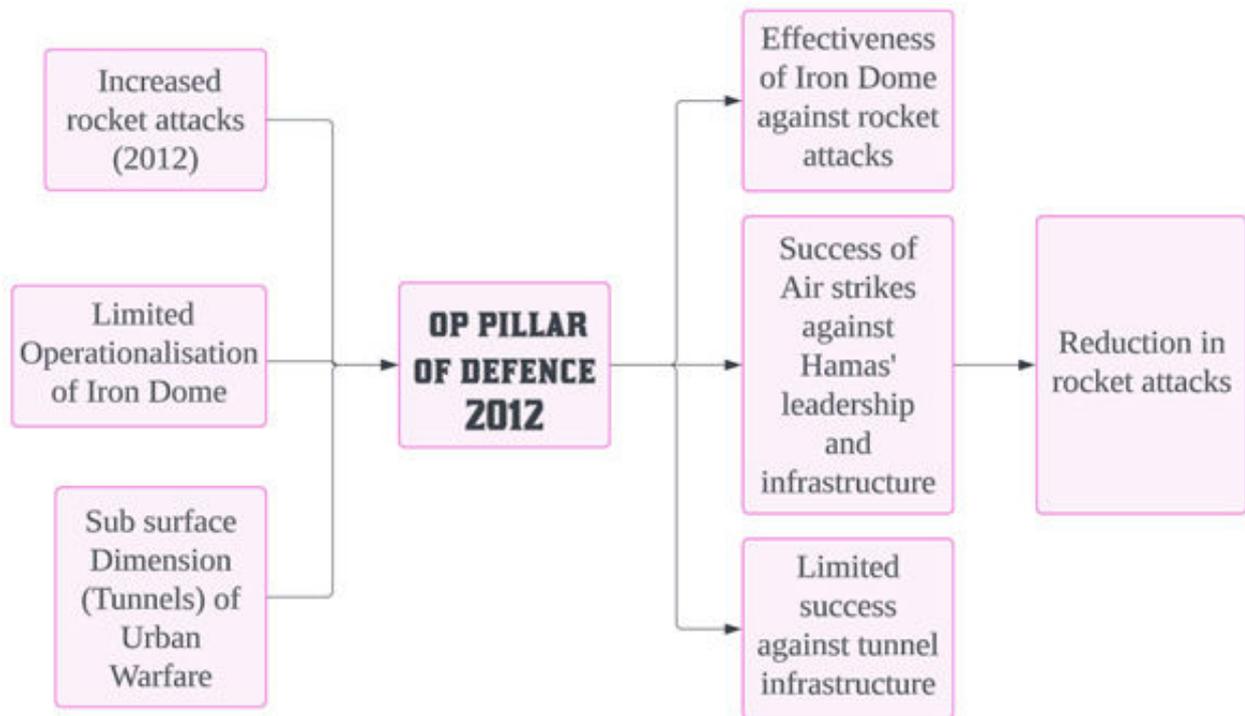
Source: The author created this figure based on his analysis of Operation Pillar of Defence.
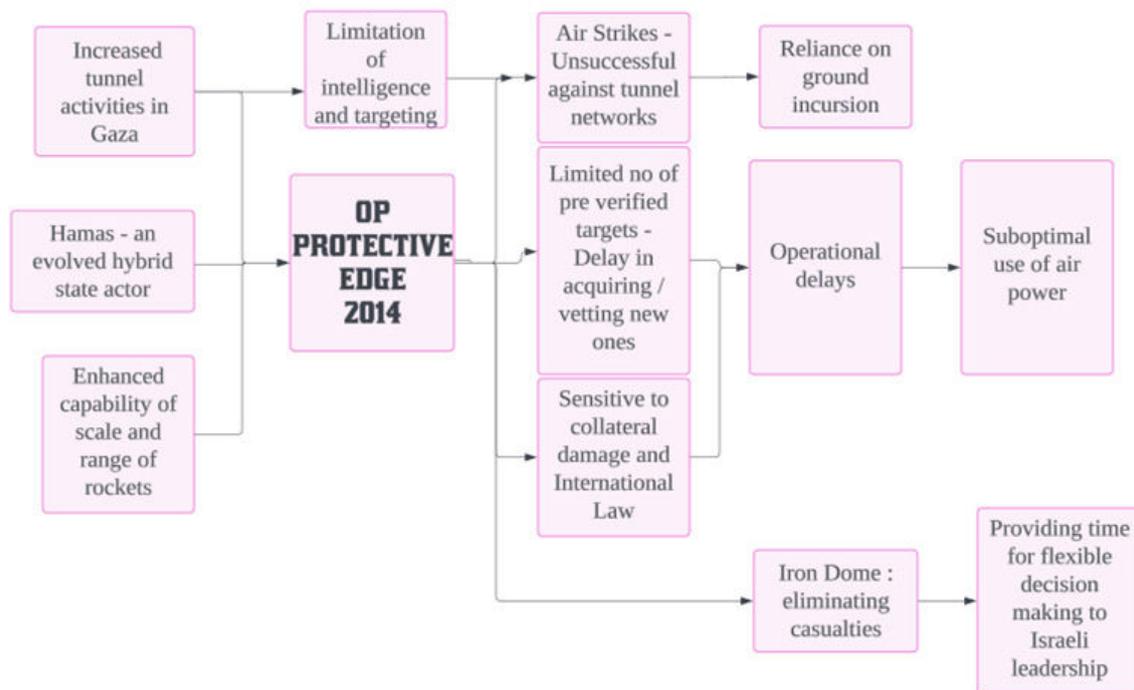
Operation Protective Edge (2014)

At the onset of hostilities, Hamas launched rockets with a reach not previously seen—targeting Jerusalem, Tel Aviv, and Haifa.[3] Just as in Operation Pillar of Defense, the Air Force went into Operation Protective Edge with an operational concept akin to the 'shock and awe' concept—the idea that "the operation should begin with a surprise air strike that can then create conditions for ground manoeuvre targeting Hamas assets and individual Hamas commanders.[4] However, Hamas identified the requirement of moving its assets and command and control underground, making them comparatively less vulnerable to air strikes. The more Hamas adopted this Concept of Operations (CONOPS), the more Israeli air operations became ineffective. Despite improvements in the Israel Air Force's technical capabilities and concepts, this shift to moving assets underground made intelligence and targeting much more difficult during Protective Edge than during Pillar of Defense.[5]

The IDF faced another challenge: insufficient numbers of authorised targets. Once all pre-approved targets were hit (approximately 1000 at the beginning of the conflict), it took some time for the IDF to acquire new targets and vet them, causing operational delays. Even with these challenges, Israel's approach to targeting within the urban battlefields had begun to develop by then. It was primarily driven by the need to minimise collateral damage. The core attributes were target classification, collecting intelligence, and then finalising options for a strike.

Hamas also improvised and developed the capacity to attack Israel via tunnels. Operation Protective Edge in 2014 aimed at the destruction of the tunnel network. Still, only about 30 tunnels that ran into Israel were discovered and destroyed.[6] The need to neutralise the tunnels transformed Operation Protective Edge from primarily an air campaign into a limited ground incursion.[7] Figure 3 highlights the strategy of Hamas leading up to 2014 and Israel's response and outcomes in Operation Protective Edge.

Figure 3: Op Protective Edge (2014)

Source: The author created this figure based on his analysis of Operation Protective Edge.

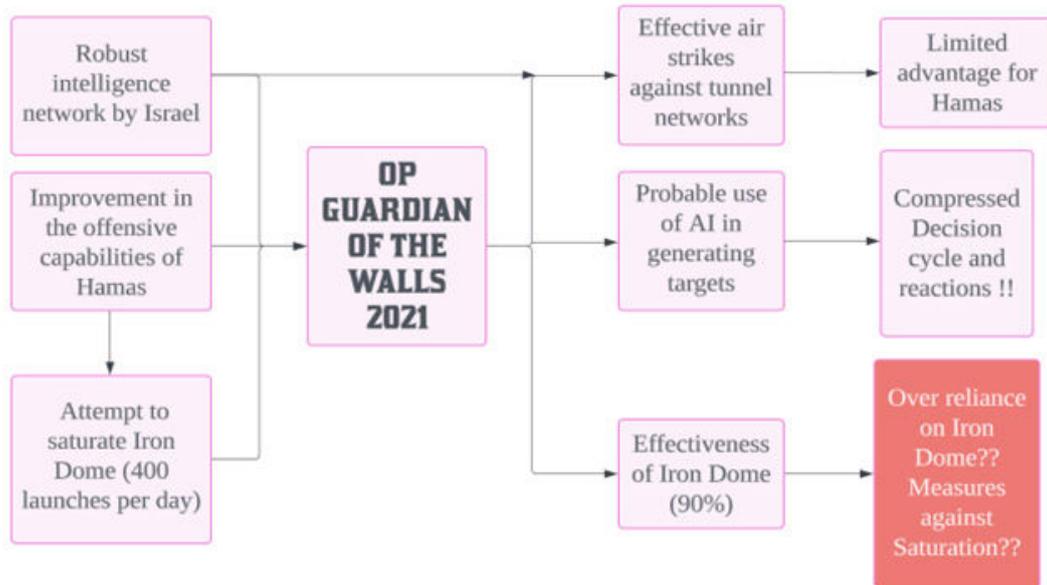## Operation Guardian of the Walls (2021)

Iron Dome nearly eliminated Israel's civilian casualties, allowing for flexible decision-making. In 2021, the IDF preferred precision strikes over urban ground operations, perfecting intelligence and precision targeting to minimise civilian casualties. Hamas effectively used tunnels for hiding rockets and maintaining command systems.

Hamas and the Palestinian Islamic Jihad (PIJ), two terror organisations within the Gaza Strip, fired almost 4,400 rockets at Israel. Israel planned to protect its population via a combination of bomb shelters and the Iron Dome Aerial Defense System, which successfully intercepted 90 per cent of the rockets.[8] Following the 2014 conflict, Israel set out to neutralise the tunnel threat. It built a 'smart wall' along the Gaza Strip extending deep underground to block tunnels from entering into Israeli territory. Figure 4 highlights

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two key aspects of the operation: robust intelligence networks and artificial intelligence-driven target identification. The effectiveness of the Iron Dome also signalled over-reliance on the system for air defence and the growing capability of Hamas to saturate the system in future.

Figure 4: Op Guardian of The Walls (2021)

Source: The author created this figure based on his analysis of Operation Guardian of The Walls.

Operation Iron Hand (2023)

Israel went to Op Iron Hand in response to the October 7 attack, using the varied approaches learnt in all its operations till then. In Op Iron Hand, a clear political mandate drove Israel's military and air strategy in Gaza. Earlier operations in Gaza or the West Bank aimed to restore strategic deterrence in the so-called 'Mowing the Lawn' approach. In 2023, with the political aim of destroying Hamas, the approach became 'Ploughing the Lawn'. This approach governs the application of military and air strategy in the present context.

In line with Israel's evolving operational doctrine, air power remained the first responder in Op Iron Hand. In just the first week of the conflict, the air force engaged thousands of targets in Gaza. This time, the air campaign lasted for three weeks before the launch of the ground offensive, significantly longer than earlier. This starkly contrasts with all previous operations when IDF's ground operations began much earlier. Earlier strategies were for short and swift wars to eliminate interferences from other actors in the region, primarily focusing on degrading terrorist organisations and achieving deterrence against future threats.

However, this time, air operations were significantly larger in scale and intensity.

The key characteristics of air power application in the ongoing war in Gaza that have emerged so far are as follows:

Exploitation of Air Defence Shortcomings against Saturation

Post-2021 operations, the IDF assessed that Hezbollah might possess enough capability to scale up its rocket attacks to the tune of 3,000-4,000 rockets per day, a scale unseen before; and if that happens, the air defence apparatus will saturate. The same happened, though not through Hezbollah but Hamas. While the saturation of the air defence system is a known shortcoming, the fact that it occurred through cheap and accessible rockets in the hands of near-state actors was surprising. Also, Hamas showed that even cheap weapons like drones armed with small bombs can cause substantial damage, even to the costliest defensive options.

Unrestrained Application of Offensive Air Power

From its accumulated learnings of past operations, Israel applied its offensive air power element for one of the most prolonged durations before the launch of a ground offensive. The unprecedented scale of bombings in effectively uncontested air space was in tune with the political objectives. It aimed at destroying Hamas' infrastructure to minimise friction during subsequent ground offensive and to shape future operations.

Joint Operations

Once the ground offensive began, strike missions were closely coordinated with ground forces. Such was the level of coordination that the air force conducted strikes while its troops were positioned less than 100 metres from the target. Synergy in executing joint plans has once again become a hallmark of Israel's military strategy.

Targeting: Network-Centric and AI-Enabled

Israel developed procedures to target fast-emerging and elusive threats, which used to disappear fast after launching attacks. It aimed to reduce sensor-to-shooter time with comprehensive surveillance capability over a limited geographical area. Also, to overcome the delay in obtaining targets faced in 2014 operations, Israel started working on an AI-based solution in 2021. In current operations, an AI target-creation platform, 'The Gospel', has significantly improved the availability of shortlisted targets. Through the rapid and automatic extraction of intelligence, the Gospel produced targeting recommendations "with the goal of a complete match between the recommendation of the machine and the identification carried out by a person."[9]

As per the data released by the IDF in November last year, during the first 35 days of the war, Israel attacked 15,000 targets in Gaza, a considerably higher number

than in previous military operations. By comparison, in 2014 operations, which lasted 51 days, the IDF struck between 5,000 and 6,000 targets.[10] The notable increase in targets engaged in the first month of OP Iron Hand is graphically represented in Figure 5.

Figure 5: AI Enabled Targeting (2014 vs 2023)
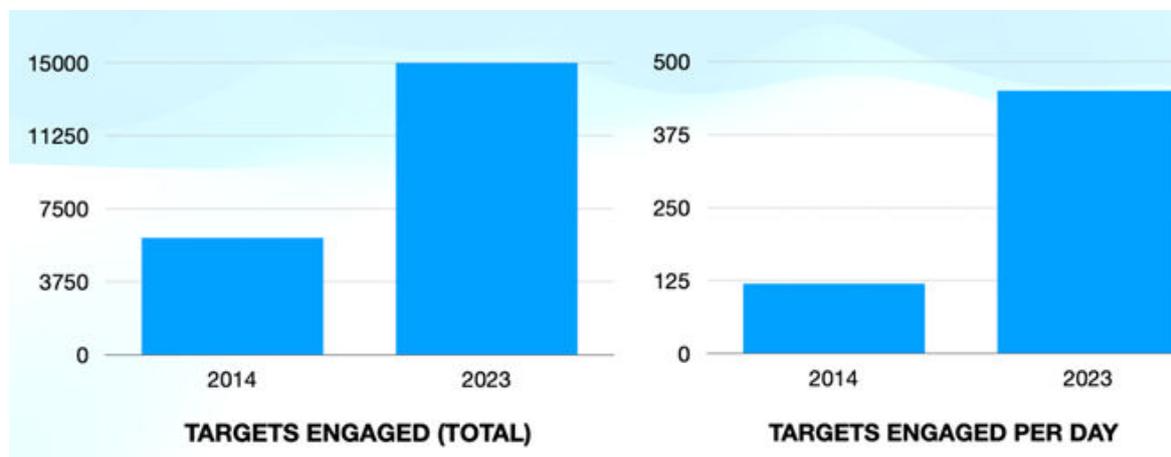
Source: Created by Author

Challenges for Future

Air Power, particularly in Gaza and against irregular threats in dense urban battlefields in general, face the ultimate test of transforming 'Tactical Efficiency' into 'Operational Success', enabling 'Strategic Victory'. Air strategy needs to mitigate emerging challenges to meet these ends. Some of these challenges are discussed as follows:

Targeting Dual-Use Infrastructure

Hamas, in the past, has been well known to use human shields and hide in civilian infrastructures to minimise its casualties. An adversary deeply embedded within the civilian population is a nightmare for targeting through the air. The images released by the IDF show rocket launch sites over civilian and UN buildings in Gaza. Although Israel is known to employ procedures to warn civilians in advance, it reduces the element of surprise. It is, at best, suited to destroy only infrastructure and not eliminate terrorists and their leadership. Targeting in such an environment is bound to cause collateral damage. The acceptable extent of such damages will be governed by political mandate and must be suitably justified through comprehensive information superiority over the adversary.

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Air Defence Saturation

Air Defence saturation by low-cost options available to adversaries necessitates that threats posed at the

lower end of technology should not be overlooked while adopting complex technological solutions. In 2021, Hamas showcased its capability and intent to saturate the Iron Dome. However, Israel failed to comprehend the possibility of the Iron Dome failing to withstand saturation through sheer numbers of rockets. This also highlights the success of cheaper offensive options by a hybrid actor against a billion-dollar defence.

Sustenance of War Efforts

Challenges also exist for sustaining long-drawn, intense conflicts amidst large-scale dependence on foreign arms. Israel could maintain the tempo of air strikes only because of the US' unwavering military supply. Replicating this anywhere else may not be feasible unless backed by military alliances or indigenous capabilities.

Collateral Damage

The evolution of air-delivered precision munitions has been the most significant development for air power to minimise collateral damage. The future must look beyond existing precision weapons to target an adversary like Hamas. Development in warheads, such as the modified Hellfire (R9X) for pinpoint strikes with no explosion, and further refinement in procedures or fusing techniques should continue to be pursued. Air weaponry has to constantly evolve to mitigate the challenge of collateral damage and its probable effect on the overall strategic objective.

Conclusion

The potency of threats from non-state actors has only grown in contemporary times. Technological advancements have democratised the battlefield. Eternal vigilance is the price of liberty in these scenarios.

The challenge in targeting has consistently been hitting the right target with the right weapon for the right effect. Air strategy should remain sensitive to collateral damage in urban environments, especially when dealing with threats emanating from civilian infrastructures being used by the enemy. Political and diplomatic efforts will be crucial for achieving lasting success in battlefields like that in Gaza, along with a balanced, synergistic military approach that integrates air power with ground forces.

Notes:

[1] Nidal al-Mughrabi, "Factbox: Gaza Targets Bombed by Israel," *Reuters*, November 21, 2012, https://www.reuters.com/article/idUSBRE8AK0H9/. Accessed on March 18, 2024.

[2] Raphael S. Cohen et al., "Lessons from Israel's Wars in Gaza," RAND, October 18, 2017, https://www.rand.org/pubs/research_briefs/RB9975.html. Accessed on March 19, 2024.

[3] "Hamas Claims Rocket Fire on Jerusalem, Tel Aviv and Haifa," *Times of Israel,* July 8, 2014, https://www.timesofisrael.com/liveblog_entry/hamas-claims-rocket-fire-on-jerusalem-tel-aviv-and-haifa/. Accessed on March 12, 2024.

[4] Cohen, n. 2.

[5] Ibid.

[6] Sanjib Kr Baruah, "Hamas's tunnels will facilitate full-blown urban guerrilla warfare", *The Week*, October 29, 2023, https://www.theweek.in/theweek/more/2023/10/21/israel-will-have-to-fight-in-the-terrain-of-hamas-s-choosing.html. Accessed on March 15, 2024.

[7] Cohen, n 2.

[8] Israel Defence Forces, "Operation Guardian of the Walls", June 14, 2021, https://www.idf.il/en/mini-sites/wars-and-operations/operation-guardian-of-the-walls/operation-guardian-of-the-walls-1/. Accessed on March 01, 2024.

[9] Harry Davies et al., "The Gospel': How Israel Uses AI to Select Bombing Targets in Gaza", *The Guardian,* December 01, 2023, https://www.theguardian.com/world/2023/dec/01/the-gospel-how-israel-uses-ai-to-select-bombing-targets. Accessed on March 20, 2024.

[10] Ibid.