UK-ISRAEL AERIAL DEFENCE COLLABORATION: TOWARD A BRITISH 'IRON SHIELD'

LFI POLICY BRIEFING

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OCTOBER 2024

EXECUTIVE SUMMARY

- Israel has faced a multilayered, consistent threat to its security since its independence. Few other countries have had to defend their population and security infrastructure against domestic terrorism and adjacent threats from short-range missiles, as well as long-range ballistic missile attacks – at times from all sources simultaneously.

- Unlike Israel, British defence investment and planning for decades has been focused largely on expeditionary priorities. Despite Russia's leadership having intimated a desire to launch direct attacks against the UK and Europe, there remain significant gaps in Britain's ability to defend itself against aerial attacks.

- The British defence establishment has rightly focused on ameliorating the UK's domestic aerial defence capabilities as it contemplates a potential peer-to-peer conflict with a rival power. As the UK's closest ally in the Middle East, which faces parallel confrontation from allied authoritarian regimes, Israel's extraordinary defence of its homeland offers important lessons for Britain.

- As Finland and Germany have already recognised, Israel has a tested ability to defend its people from aerial threats. The Labour government should therefore put in place channels to learn from, and where appropriate adopt, Israeli strategies and technology to protect the homeland.

- The bilateral defence relationship should be formalised as the "UK-Israel Defence-Dialogue" with a dialogue chaired at ministerial level focused on technology and workstreams established to share best practises across domains.

- As part of the UK-Israel Defence Dialogue, the UK and Israel should establish a specific "Aerial Defence Dialogue" with the Ministry of Defence liaising directly with Israel's Missile Defence Organisation.

- The UK should explore which assets used and tested by Israel to defend the state and its civilians offer best practise consideration by UK armed forces.

INTRODUCTION: BRITAIN'S NEW THREATS

Since the end of the cold war and the Troubles in Northern Ireland, the UK's defence priorities have been largely expeditionary; time-limited missions well beyond its borders to stabilise conflicts, support peace and defeat threats, such as terrorism. Following Russia's invasion of Ukraine, British and European security is now facing a direct and urgent threat from an advanced military power. As a result of attention elsewhere, the UK's homeland defensive capabilities are now being forced to play catch up.

Since its creation, Israel's security threats have come from its immediate neighbours and directly outside its borders, necessitating a very different defensive posture than that taken by Britain and many of its allies in recent decades. Israel's military is almost entirely organised to defend its population and territory, to counter terrorism within and adjacent to its borders, and to respond to medium and long-range threats from within the Middle East.

In a new era of heightened geopolitical competition, the UK and Israel have shared interests and threats. With Iran's continued development of ballistic missile capabilities which can now reach NATO states, the threat to the UK and its allies from Iran is becoming more immediate. At the same time, Iran's well-advanced nuclear programme continues apace. Its stock of enriched uranium – "without any credible civilian justification," in the words of France, Germany and the UK in September – means its "breakout period" has now been reduced to around 7-14 days. Finally, Russia, China and Iran are strategically and militarily aligned, representing an adversarial alliance that endangers both the UK and Israel. Given the changing threats facing the UK, is Britain making the most of its ties to Israel and is it learning the right lessons when it comes to defence?

The UK is one of Israel's closest defence allies. As demonstrated by the war in Ukraine, the nature of warfare is changing and there are few better countries from which the UK can draw unique lessons on how to protect its people and fight a modern defensive war. As the UK explores new technologies and approaches to threats from Russia and Iran, this policy paper briefly outlines the longstanding, multifaceted and multi-front threats Israel and its people have faced and how the country's defences have evolved to counter them; it looks at the UK's current defence posture with particular attention to homeland defence against aerial threats; and it considers areas from which Britain can both learn and share best practise with Israel.

Britain's Ministry of Defence and defence establishment have closely observed Ukraine's defence against Russian aggression, both with a view to supporting Kyiv but also assessing how a future major war will be fought. With strong ties to Israeli defence, the UK should be similarly observing closely Israel's approach to defending its citizens from hostile forces.

THE "SHIELD OF THE STATE OF ISRAEL": DEFENCE SYSTEMS DESIGNED TO SAVE LIVES

Within a week of the State of Israel's declaration of independence in 1948, it was attacked by six neighbouring countries. Over the subsequent seven decades, Israel has remained under a constant threat of attack. It has been attacked by conventional state and non-state actors and been forced to fight more than half a dozen major wars with its neighbours. All the while, it has faced an unrelenting threat from terrorism. Israel has been attacked and threatened with assault by a range of actors: from the conventional armies of Arab states in the 20th century, to Iran since the 1979 revolution; from Palestinian terrorism within its borders, to terrorist organisations like Hamas and Hezbollah adjacent to it. No other modern state has faced such as range of threats, nor so persistent a threat, to its security.

For this reason, Israel's defensive systems have become more advanced and sophisticated, as well as more varied, as the nature of the threats have changed over the decades. Unlike its adversaries, Israel is committed to international law and the defence of its citizens – values shared by the UK – and this has inevitably had an impact on its defence posture. Given the fact that most incoming missiles are unguided or are aimed to target civilian areas, aerial defence systems are primarily operationalised to defend civilians as well as military assets. While outside the scope of this paper, Israel's offensive capabilities are equally sophisticated and aimed at causing maximum damage while minimising the impact on civilians.

In recent years, the most consistent threat facing Israel from outside its borders has come from the missiles fired at it by Iranian-backed terrorist groups, such as Hamas in Gaza and Hezbollah in Lebanon. At the same time, Iran itself, as well as its other allies in the "axis of resistance", continue to represent a major threat. Air defence systems became a priority for Israel during the 1991 Gulf war, when Saddam Hussein sought to bring Israel into the conflict through ballistic Scud missile attacks. Shortly afterwards, Israel established the Israel Missile Defence Organisation (IMDO) to develop missile defence capabilities. The IMDO continues to manage Israel's active defence systems. The Gulf war was followed by increased aerial threats from non-state actors, with Hezbollah first attacking Israel with rocket fire in 1996 and Hamas in 2001. Progress toward establishing the Iron Dome system accelerated following Israel's conflict with Hezbollah in 2006.

The logic of Israel's air defence system consists of a three-stage progression, from detection to disabling. The first is radar, which identify and track incoming projectiles and assess whether they are a threat. While missile speeds vary, the Iron Dome system may have as little as one minute to repel a missile attack from Gaza or Lebanon before it makes impact.

The second aspect is the battle control centre. This is the decision-making stage which determines the appropriate response to a confirmed threat – it decides from where an interceptor should be fired and how many missiles are required to bring down an incoming projectile. The Iron Dome is not fully automated and IDF operatives assess the type of threat and determine whether to deploy an interceptor missile.

Finally, the interceptor missile is deployed to intercept and destroy the incoming missile before it can make impact. The Iron Dome, for instance, uses hypersonic missiles with heat-seeking sensors, providing in-flight trajectory updates allowing it to adjust its course toward interception. It uses a proximity fuse activated by a radar to explode close to the incoming missile rather than relying on a direct hit.

Israel's aerial defence system is multilayered, owing to the diverse range of threats – from rudimentary, unguided, Qassam rockets, to ballistic missiles, which Israel fears may someday contain a nuclear warhead. This tiered system encompasses the Iron Dome, David's Sling, Arrow-2 and Arrow-3 and the development of a Tactical High-Energy Laser.

Israel's renowned Iron Dome has been in operation since 2011 and is designed to intercept lower-tier, shorter-range threats. Developed by Israel's state-owned Rafael Advanced Defence Systems with US support, the system is designed to destroy a range of different incoming threats including large calibre rockets and short-range ballistic missiles. Its range of effectiveness is between 2.5 to 43.5 miles. The US has been a critical backer of the system since its inception, contributing $1.6bn in funding between 2011 and 2021. Israel operates at least 10 mobile Iron Dome batteries containing between 60 and 80 Tamir interceptor missiles with an effectiveness rate of as much as 90 percent.

The second layer of Israel's aerial defence architecture is David's Sling, which began development with support from the US in 2006 and was activated in 2017. Like the US' own Patriot system, which were first deployed in Israel in 1991 to counter Saddam's Scud attacks, its primary targets are cruise missiles and lower-tier ballistic missiles fired from 100km-200km away. The threat of missiles fired from hostile countries such as Syria and Lebanon was the primary risk leading to the development of David's Sling. Unlike the mobile Iron Dome systems, David's Sling is stationary and can protect the entirety of Israel. David's Sling has been sold to Finland.

The top tier of Israel's multilayered air defences is the Arrow Weapon System (AWS), which is the world's first operational, national, stand-alone Anti-Tactical Ballistic Missile defence system. The Arrow modular air defence systems detect, track, intercept and destroy incoming tactical ballistic missiles carrying a range of warheads over a large territory. Unlike David's Sling, the long-range Arrow-2 and Arrow-3 system was developed to intercept ballistic missiles outside the earth's atmosphere. The Arrow 2 is designed to explode near a missile to bring down an incoming missile, but the Arrow 3 is a hit-to-kill missile.

Integrated to complement the existing AWS, Arrow III is designed to intercept the newest, longer-range threats including those carrying weapons of mass destruction. Operational since 2017, the Arrow III's first combat inception

brought down a threat over the Rea Sea in November 2023, likely fired by the Iranian-backed, Yemen-based Houthi movement.

Earlier this year, the AWS shot down a ballistic missile over the Rea Sea targeting the Israeli city of Eilat. Again, this was likely launched by the Houthis. In early October 2024, the AWS also brought down a surface-to-surface ballistic missile fired from Yemen. With Israel now planning work on an Arrow IV system, it recently sold the Arrow III system to Germany to counter the threat from Russia. This was the largest security deal in Israel's history and marks the first time Israel will export a missile system.

The greatest and most extensive test of Israel's aerial defence system thus far came this year when it intercepted two, unprecedented barrages of missile-fire from Iran and its proxies. A ballistic missile from Iran can reach Israel in 12 minutes. In April, over 300 missiles of many varieties – including some 170 drones, 30 cruise missiles, and 120 ballistic missiles – were fired by the Islamic Revolutionary Guard Corps, Hezbollah and Iran's other regional proxies. Along with Israel's defence systems, interception was assisted by Israeli allies the US, UK, French and regional interceptions. In October, a further 180 ballistic missiles were fired from Iran, resulting in the death of a Palestinian man in the West Bank town of Jericho, but minimal damage to defence infrastructure.

The Israeli navy also plays an important role in Israel's aerial defence systems. In August, alongside the Directorate of Defence Research and Development, a joint Ministry of Defence-IDF body, and Israel Aerospace Industries, it completed an interception test using a long-range interceptor (LRAD). Israel's Sa'ar class corvette ships are equipped with wide aerial defence layers, including the Barak Magen system and the LRAD, to manage aerial threats. Barak Magen is an advanced aerial defence system which has the ability to deal with a range of threats including ballistic, cruise missiles, unmanned aerial vehicles (UAVs), and more.

Israel's adversaries can currently inflict damage through barrages of inexpensive rockets, coupled with more sophisticated, long-range missiles. While Iron Dome interceptor missiles cost about $60,000 each, Hamas' less sophisticated missiles can cost as little as $600. A new system expected to be operational within a year, the Iron Beam is aimed at intercepting incoming threats at a fraction of the cost of Israel's existing systems.

However, Israel's air defence systems are not impervious, as demonstrated by Hamas' attack on 7 October, when the terrorist group fired thousands of missiles and overwhelmed the Iron Dome. By 8 November, Hamas had fired 9,500 rockets at Israel. The importance of a coalition response to defend Israel against massive attacks from Iran and its allies was demonstrated in April and again in October. While Israel is better defended against a uniquely diverse array of threats than most states, solidarity on the part of the UK and other regional and international allies offers critical additional defence capability, vital deterrence and sends a signal that the west will stand with its allies against threats to peace.

UK-ISRAEL DEFENCE COLLABORATION: LEARNING FROM SHARED CHALLENGES

Britain's military leadership has been outspoken on the immediate threat facing the UK from Russia, one of Iran's closest allies. This comes in the form of both direct Russian aggression in the Baltics and Eastern Europe and direct attacks against western and central European countries by ballistic missiles. As a 2024 House of Commons defence select committee report argued starkly, Russia has "both the capability and intent to prosecute a war in Europe".The UK government has recognised this evolving threat and is moving toward a wholesale culture change away from the peace-time mentality allowed by the post-cold war dividend.

European governments are also grappling with the fact that the US security umbrella is potentially not as dependable as it was during the cold war. Despite its ongoing and significant commitment to defending Ukraine, there is an expectation on the part of American policymakers, not confined to the Republican party, that Europe should share more of the burden for its defence than was the case in the past. With a clear and present Russian and Iranian threat, along with the need for a more independent defence posture, the UK and its allies should look closely at battle-tested defence systems to prepare for what was once considered unthinkable.

Despite the perilous nature of this evolving threat, the last government left the UK seriously underprepared to defend the homeland. Much has been made of the British army being smaller than at any other time since the Napoleonic era and facing "significant capability deficiencies", with similar reservations expressed about the capabilities of the RAF and Royal Navy. Former members of the armed forces leadership and other defence experts and analysts have warned that the UK is underprepared and ill-equipped to fight a "peer-on-peer" direct conflict or to defend itself from attack.

In his comments to a defence select committee inquiry, Professor Michael Clarke noted: "British forces over the past 30 years have done a great deal of operating, but have not prepared for war fighting." The former director of the Ministry of Defence's office of net assessment and challenge, Rob Johnson, noted in June that Britain "cannot defend the British homelands properly" and that air defences were "insufficient" to stop long-range missile strikes. A recent defence select committee report found that the UK has "inadequate domestic air and missile defence capabilities," relying on "one medium-range and one short-range SAM regular regiment, plus one short-range Army Reserve regiment". The RAF does not have kinetic ground-based air defence systems or an antiballistic missile capability. Key allies have also questioned Britain's global military standing, with observers arguing the UK would be unable "to defend its skies against the level of missile and drone strikes that Ukraine is enduring".

The threat from aerial attack is real and present.

In May, following comments from the former foreign secretary, Lord Cameron, indicating that Ukraine is able to use UK military hardware to strike inside Russia, Moscow threatened to strike British military targets. This follows consistent threats made by the Kremlin since 2022 of a wider war against Europe. The Financial Times reported on secret files indicating that Russia has been mapping potential European targets, including in the UK, using conventional and nuclear warheads. Attacks on the UK and its allies could come from Russia's Northern Fleet against military-industrial targets. Moreover, the challenge to UK aerial defence may not only be from Russia itself, with Putin musing in June 2024 of supplying "Britain's enemies" with weapons to attack Britain in the same fashion as the UK's support for Ukraine.

Accelerating Iranian and Russian collaboration following the latter's invasion of Ukraine is leading to the development of a wider range of threats: from low-end loitering munitions, a type of drone that can be used to attack targets with explosives, to cruise and quasi-ballistic missiles. Russia has launched at least 4,000 Iran-designed Shahed drones at Ukraine and, since last year, has developed its own production facilities for these and other drones. In September, it was confirmed that Iran has shipped ballistic missiles to Russia. The two states are also reportedly on the brink of signing a comprehensive partnership agreement; "a big new treaty", foreign minister Sergey Lavrov boasted barely two weeks after 7 October.

This Moscow-Tehran axis is hardly new. For the last 30 years, Russia has supported Iran on a range of arms interests, including its nuclear programme, tanks, armoured vehicles, combat aircraft and surface-to-air missiles. Russia is also supporting Iran's space programme, electronic warfare and may assist in expanding Iran's long-range ballistic missile threat. Russia has also confirmed the export of Sukhoi Su-35 training aircraft to Iran, a key step in helping Tehran upgrade its antiquated 1970s inventory of US aircraft, which were purchased by the Shah. There is evidence too that Russia has also increased its support for Iran's proxy allies, including supplying Hezbollah with arms. Both authoritarian powers have been targeted by the US and the west through economic sanctions and are key pillars of the geopolitical rivalry with the west and the international, rules-based order.

Russia is a direct threat to the UK, possessing a range of short to long-range assets capable of striking forward operating troops in battlefield scenarios as well as direct attacks against Israel. These include: air-launched missiles, such as the Kh-31; short-range ballistic missiles, like the Iskander and Tochka-U; supersonic/hypersonic cruise missiles, 9M729/SSC-8; and ground-launched cruise missiles. With Russia possessing one of the world's largest stockpiles of nuclear and non-nuclear ballistic missiles, the threat from Moscow requires the rapid acceleration of a UK and Europe wide aerial defence umbrella.

The aerial threat facing the UK and its allies from Iran and its proxies was demonstrated in full force by Iran's unprecedented attacked against Israel in April. These likely included the Shahed 139 UAV (range: 2700km), the Abu Mahdi cruise missile (range: 2500km) and the Sejjil or Emad ballistic missiles. While Iran is less likely to threaten the UK homeland, it could target UK allies within range and pose a direct threat to UK military assets in places like

Cyprus, Bahrain and Oman. Proxies also pose a robust and layered threat to UK forces. For instance, Lebanon-based Hezbollah, Iran's most well-armed proxy, has threatened attacks against Cyprus. The comparative threats faced by Israel and the UK is not an exact parallel, but Israel and the UK both face aerial threats to their armed forces in the field, as well as to homeland military and civilian infrastructure from the same rival states.

DEFENDING THE UK AGAINST ATTACK AND THE ISRAELI APPROACH

Recognising and facing down these threats, the UK's defence establishment operates a "deterrence by denial" approach which seeks to make action by an aggressor unlikely or unable to succeed. The 2023 defence command paper committed the Ministry of Defence to increasing efforts to deliver integrated air and missile defence promoting the use of "advanced ground-based, airborne, at sea and space-based sensors, and an extensive range of air and missile capabilities, including counter-UAS, to detect, protect and defend the UK". The ministry also announced it would examine the missile "detection and interception technologies of the future". The paper further committed the UK to modernising its "approach to air and missile defence, both for our own forces and through integration with Allies".

While there remain significant gaps in the UK's capacity to defend against missile attacks on the homeland from an aggressor, it does have a number of assets capable of mounting a response. The Royal Navy's six Type 45 destroyers are equipped with ballistic missile defence systems, known as the Sea Viper system. The British army employs six state-of-the-art Sky Sabre ground-based air defence systems, which are aimed at countering medium-range threats. However, the missile interceptors only have a range of about 40km, and two of the systems are overseas. However, certain types of targets, such as many UAVs, are not ones the navy or air force focus on countering in training. The Royal Artillery, for instance, uses the Short-Range Air Defence System, which is a high-velocity missile system optimised to defeat air threats including fast jets and helicopters in seconds.

The UK is also part of NATO's Integrated Air and Missile Defence, which is aimed at ensuring a desired level of control of the air, so that the Alliance is able to conduct the full range of its operations and missions in peacetime, crisis and conflict. With a view to enhancing Europe's air defence architecture, Germany has proposed the "sky shield" programme, in part employing US-Israeli developed technology.

To address the gap in Britain's aerial defences, the British army has initiated a ground-based air defence programme aimed at delivering short-range air defence, medium-range air defence, counter-small aerial target, and counter-small uncrewed aerial system capabilities to protect the UK's deployed forces and to potentially contribute to the defence of bases in the homeland. It began engaging with industry in 2022 to identify possible solutions.

As the UK assesses its options to strengthen its aerial defences, it should closely review Israel's aerial defence architecture – which has been battle-tested for nearly two decades against every type of conventional attack.

CONCLUSION: UK-ISRAEL DEFENCE AND BUILDING A BRITISH 'IRON SHIELD'

Recent diplomatic engagements between the new Labour government, including a visit to Israel by defence secretary John Healey, have underscored the importance and durability of the UK-Israel bilateral defence and security relationship. The 2023 roadmap for UK-Israel bilateral relations includes cooperation in defence and security as a priority area for growing collaboration and the two countries signed a defence cooperation agreement in 2020. The UK government has suggested areas of cooperation include defence medical training, organisational design and concepts, and defence education – as well as counter-terrorism and countering Iran.

These agreements are underpinned by a number of regular dialogues and working groups between ministries and armed forces staff. The 2023 roadmap commits both countries to conducting joint research and development "to identify transformational defence and security capabilities". However, it is not clear that the UK is fully availing itself of opportunities to cooperate further with Israel in respect of homeland defence.

From a comparative standpoint, arms sales from the UK to Israel are limited, representing only one percent of Israel's imports in this sector. However, Israeli defence subsidiaries provide significant advanced support for the UK's defence

sector, with Israel being the UK's third largest defence supplier. Unlike other UK strategic defence partners, Israel has faced a range of asymmetric threats such as limited-range attacks from Gaza and counter-insurgency operations, as well as major exchanges with Hezbollah and now Iran. As with the war in Ukraine, a future major direct conflict for the UK will resemble those scenarios facing Israel today.

With a view to enhancing defence collaboration and familiarising itself with Israeli aerial defence technology, the UK government can take a number of steps:

- The bilateral defence relationship should be formalised with a dialogue chaired at ministerial level focused on technology and sharing best practise. The "UK-Israel Defence Dialogue" could be led at the official level by respective chiefs of staff and underpinned by the Ministry of Defence's chief scientific adviser and Israel's Directorate of Defence Research and Development. The dialogue should establish dedicated workstreams to share best practises across domains and technologies including land, air, and naval war, as well as cyber security. In addition to engaging in joint war-gaming and scenario-mapping, the dialogue should involve regular delegations and field visits.

- As part of the UK-Israel Defence Dialogue, the UK and Israel should establish a specific "Aerial Defence Dialogue" with the Ministry of Defence liaising directly with Israel's Missile Defence Organisation. In the first instance, its objective should be to allow the UK to learn lessons from the Israeli perspective, with a particular focus on the multi-layered, multi-front threat currently facing Israel both before and after the 7 October atrocities and the subsequent conflict. This platform could operate in parallel, or be integrated into, wider European approaches to aerial defence such as the Sky Shield initiative.

- Finally, the UK should explore which assets used and tested by Israel to defend the state and its civilians offer potential for acquisition and deployment by UK armed forces. While the UK has developed and is in the process of enhancing some of the world's most advanced aerial defence systems, the rapidly degrading threat picture may necessitate swifter steps to ensure the UK's security. Where opportunities allow, MoD officials and in particular those involved in the Land GBAD programme, should arrange a delegation to view Israel's aerial defence architecture in operation.

As the new government works to structure and strengthen the bilateral relationship, collaboration to secure Britain's skies should be a priority. As Germany and Finland have already correctly recognised, Israel's multilayered aerial defence architecture, which encompasses the Iron Dome, David's Sling, the Arrow System and its emerging Iron Beam, represents infrastructure ideally suited to the UK's critical need to address the increasing range of threats it faces.

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