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Issue Brief

Steel Dome: Türkiye's Envisioned Layered Air Shield

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Summary

Türkiye's envisioned Steel Dome is a multilayered, AI-enabled air defence system integrating radar, missile and electronic warfare platforms to secure national airspace. The project is backed by significant state investment and domestic production and seeks to position Türkiye as a major defence exporter.

Background

In August 2024, Türkiye finalised the key plans for the Çelik Kubbe (Steel Dome) programme, a multilayered air defence system to strengthen national airspace security. The initiative, endorsed at the second Defence Industry Executive Committee (SSIK) meeting chaired by Türkiye's President Recep Tayyip Erdoğan in August 2024, sought to integrate diverse defence assets into a unified, AI-enabled command and control network.[1]

During the SSIK Meeting, Erdoğan highlighted Türkiye's growing defence self-reliance, noting that 80 per cent of the military's needs are now met domestically, conserving resources and expanding diplomatic influence through exports.[2] He framed the development of the Steel Dome as enhancing confidence among allies and deterrence against adversaries, stressing that recent regional conflicts reaffirm the necessity of indigenous radar, air defence, and electronic warfare capabilities for long-term security.

Exactly a year later, ASELSAN, Türkiye's premier defence firm, delivered 47 critical indigenous components of the Steel Dome system, worth US$ 460 million, to the Turkish Armed Forces. These included advanced air defence, electronic warfare, and radar platforms such as SİPER, HİSAR, KORKUT, ALP and PUHU. Collectively, they form a multi-layered and integrated defence architecture.

Türkiye's pursuit of autonomous air defence has been shaped by historical dependence on NATO and evolving regional threats. During the Gulf War, the deployment of Patriot missile systems by NATO allies underscored Türkiye's vulnerability to missile attacks. It also highlighted its reliance on external political decisions to secure its airspace. Perceiving this dependency as a strategic liability, Türkiye launched the T-LORAMIDS (Turkish Long-Range Air and Missile Defence System) programme in 2006 to acquire its own missile defence system.[3] Although bids from the United States, Europe, Russia, and China were considered, technology-transfer restrictions and strategic concerns eventually led Ankara to cancel its planned purchase of China's FD-2000 in 2015 and shift toward domestic development.[4]

Since then, Türkiye has invested heavily in indigenous systems across multiple tiers: KORKUT for very-short range, HİSAR-A/O for short- and medium-range, and SİPER for long-range interception. This signals a determination to achieve self-reliant,

[1] Cem Devrim Yaylali, **"Turkey Advances Plan For A National Air-Defense Shield"**, *Defense News*, 11 September 2024.

[2] **""Steel Dome" System To Elevate Türkiye's Air Defense To A Higher Level"**, Directorate of Communications, Republic of Türkiye, 29 August 2024.

[3] **"Turkey's Procurement of the S-400 System: An Explainer"**, TRT World Research Centre, August 2019.

[4] Ozan Ahmet Cetin, **"Eye On The Sky: The Strategic Potential Of Türkiye's Steel Dome"**, The Foundation for Political, Economic and Social Research (SETA), 12 August 2024.

layered air defence. Erdoğan's assertion that Türkiye would one day export such systems encapsulates this strategic ambition, with the Steel Dome project representing the culmination of these efforts to ensure sovereign control over national airspace.[5]

Industrial Base and Technological Architecture

As part of ASELSAN's 50th anniversary celebrations, the foundation was laid for the Oğulbey Technology Base, with a US$ 1.5 billion investment. This is one of Türkiye's largest in the defence sector and is set to become Europe's largest integrated air defence facility.[6] It is mainly dedicated to developing the multi-layered Steel Dome air and missile defence system.

Key public defence entities, including ASELSAN, Roketsan, Mechanical and Chemical Industry Corporation (MKE), and TÜBİTAK Defence Industry Research and Development Institute (SAGE), are implementing the programme[7], marking another step in Ankara's broader push toward indigenous defence capability.

Türkiye possesses the core industrial and technical capabilities to assemble a multilayer 'Steel Dome'. Indigenous firms (notably ASELSAN and Roketsan) already produce the building blocks—radars, electronic warfare suites, and interceptors—and recent reports of the delivery of 47 key Steel Dome components to the Turkish Armed Forces demonstrate serial production and handover capacity.[8]

The missile family underpinning the layers are in place: Roketsan and partners field the HİSAR short/medium-range family and the SİPER long-range missile (SİPER Block-1 >100 km, Block-2/3 planned to extend range further), giving Türkiye indigenous interceptors across multiple ranges.[9] Crucially, in March 2025, ASELSAN received US$ 616 million in funding from Türkiye's Ministry of Industry and Technology under the government's Project-Based Investment Incentives, or Super Incentive Programme.[10] The allocation fast-tracked the establishment of advanced production facilities critical to developing the Steel Dome air defence system. This industrial hub, covering 6,500 acres in Ankara, is intended for the high-volume serial production of essential technologies, testing and integration of Steel Dome systems.

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[5] Ozan Ahmet Cetin, **"Eye On The Sky: The Strategic Potential Of Türkiye's Steel Dome"**, The Foundation for Political, Economic and Social Research (SETA), 12 August 2024.

[6] **""Steel Dome" System To Elevate Türkiye's Air Defense To A Higher Level"**, Directorate of Communications, Republic of Türkiye, 29 August 2025.

[7] **""Steel Dome": Türkiye Constructs Its Own Missile Defence System"**, Directorate of Communications, Republic of Türkiye, 8 August 2024.

[8] **"Türkiye Delivers Components Of Domestic Steel Dome Air Defense System"**, *Xinhua,* 28 August 2025.

[9] **"Air Defence Systems- SiPER"**, ROKETSAN, 2024; **"HİSAR Air Defence Missiles"**, ROKETSAN, 2024.

[10] **"Receiving Project Based Investment Incentive (Super Incentive)"**, ASELSAN, 26 March 2025.

ASELSAN will also be available for Advance Loans Against Investment Commitment (YTAK) for high-technology projects.[11]

Ankara is prioritising new investments in the 'Steel Dome' system to expand the multi-layered air defence network nationwide. The initiative aims to strengthen protection against diverse threats by upgrading missile systems, including hypersonic, ballistic and cruise missiles. It also includes advances in aircraft, warships, tanks, unmanned platforms, and the development of next-generation aircraft carriers and frigates.[12]

During Türkiye's Directorate of Communications-led panel discussion held on 29 August 2025, ASELSAN CEO Ahmet Akyol emphasised the development of the Steel Dome as Europe's largest air defence project, and one which positions Türkiye not as a follower but as a global trendsetter in defence innovation.[13] Similarly, ROKETSAN CEO Murat İkinci underlined the strength of Türkiye's defence ecosystem, noting its unique supply chain advantages over Europe and significant R&D investments that have propelled the continuing success story.

Parallel to these technological advances, the Turkish defence sector has notably witnessed a reversal of brain drain, with more Turkish engineers returning to the country than leaving. ASELSAN reported that inbound engineers from abroad now outnumber outbound departures by twofold, an outcome linked to the National Technology Initiative. Officials argue that this trend illustrates the growing confidence among young professionals in the domestic defence ecosystem. For instance, nearly 98 per cent of defence industry employees are graduates of Turkish universities, underscoring the sector's reliance on local human capital.[14]

At the same time, the Defence Industry Agency has emphasised aligning education and training with emerging technological demands to sustain innovation. Both the Steel Dome initiative and reversal of brain drain highlight how Türkiye's defence industry is consolidating technological sovereignty while cultivating the skilled workforce necessary for long-term self-reliance.

Architecture and Capabilities of the Steel Dome

In August 2024, Türkiye announced plans to establish a comprehensive "security umbrella" to protect its airspace against threats from very low to very high altitudes

[11] **"STEEL DOME, Oğulbey Technology Base and Serial Production Investment"**, ASELSAN, 27 August 2025.

[12] Utku Simsek and Seda Sevencan, **"Türkiye To Expand Layered Air Defense System With 'Steel Dome' Investment"**, *Anadolu Agency,* 26 June 2025.

[13] **"From Roots to Horizons: The Story of Türkiye's Rising Defence Industry Panel"**, Directorate of Communications, Republic of Türkiye, 29 August 2024.

[14] **"Türkiye Delivers Major Steel Dome Air Defense System, Launches $1.5B Defense Facility"**, *Türkiye Today*, 28 August 2025.

and across short to extended ranges. The Presidency of Defence Industries (SSB) confirmed that this initiative will take shape by developing the 'Steel Dome' missile defence system. SSB Secretary Haluk Görgün emphasised that the project aims to integrate air defence platforms, sensors, and weapons into a unified, AI-enabled network.[15]

The Steel Dome architecture is envisaged as a four-tiered system combining very short, short, medium, and long-range capabilities. Alongside missile defence, it will integrate radar stations, electronic warfare assets, and directed-energy weapons to counter the growing drone threat. The first tier will focus on unmanned aerial systems and mortar shells, deploying the Gökberk mobile laser with the Korkut, Gürz and Şahin platforms. The second and third tiers will be structured around variants of the Hisar short and medium-range systems, optimised for intercepting cruise missiles and aircraft at 15–40 kilometres. The SİPER system, already fielded in its Block-1 form with a range exceeding 100 kilometres, constitutes a strategic asset at longer ranges. Block-2 and Block-3 versions currently in development are projected to extend engagement ranges beyond 150 and 180 kilometres, with the capacity to track and destroy multiple targets at high altitudes simultaneously.[16]

According to reports, the Steel Dome layers short-range systems (Korkut and Sungur), medium-range interceptors (Hisar A+ and Hisar O RF), and long-range SİPER missiles, the latter expected to exceed 100 km with a future variant extending to 150 km. Its operational backbone will rely on ASELSAN's HERİKKS command system and RADNET radar network[17], generating a real-time operational air picture together. The system is not an entirely new platform but an effort to integrate Türkiye's decade-long air and missile defence developments under centralised control. Non-kinetic capabilities, such as the Gökberk laser and Alka directed-energy weapon, are envisioned as future additions once sufficiently matured.[18]

Financing and Procurement

A robust combination of state incentives, substantial corporate investment, and tangible production outcomes underpins Türkiye's Steel Dome programme. As mentioned above, in March 2025, the Ministry of Industry and Technology granted ASELSAN US$ 616 million under its Project-Based ('Super-Incentive') programme to support key facilities, including photon detectors and nanotechnology, radar system

[15] **"**"Steel Dome": Türkiye Constructs Its Own Missile Defence System**"**, Directorate of Communications, Republic of Türkiye, 8 August 2024.

[16] **"**Turkey's Steel Dome Layered Air Defense System To Be Completed By 2028**"**, *TASS (Russian News Agency),* 18 June 2025.

[17] **"**Aselsan's Game-Changing Technologies At NATO CWIX 2024**"**, ASELSAN, 27 June 2024.

[18] Cem Devrim Yaylali, **"**Turkey Advances Plan For A National Air-Defense Shield**"**, *Defense News,* 11 September 2024.

integration and production, air-defence system production, testing, and smart munition manufacturing.[19]

These national investments also align with Türkiye's NATO commitments. NATO's revised defence spending target, requiring members to allocate 5 per cent of GDP by 2035, with at least 3.5 per cent directed to core defence and the remainder to civil preparedness[20], has received Ankara's support. Türkiye already surpasses the former 2 per cent benchmark and, as NATO's second-largest military power, ranks among the top five contributors to alliance operations.[21] Türkiye has reportedly met all NATO capability targets while continuing to expand defence industrial capacity and research. In line with these commitments, Ankara plans to prioritise investments in its national 'Steel Dome' project.

Speaking at IDEX 2025, ASELSAN President and CEO Ahmet Akyol emphasised that Türkiye's Steel Dome is not solely a national programme but also an export-ready solution:

> The Steel Dome is a very promising system. All nations want to have this kind of system… We are a member of NATO… and we have got many brother countries in this [Gulf] region and all around the world. So the decision is [a] government decision, but we are ready to contribute [to] peace and prosperity of all brother and allied nations.[22]

He further confirmed ASELSAN's ability to "provide this solution for Türkiye and for allied countries right now", stressing that new subsystems are delivered annually as part of a layered, continuously updated architecture.

Akyol also outlined ASELSAN's deliberate push into Gulf and global markets:

> We are opening new entities in this region. Just last week, I was in Oman and opened a new entity in Oman. And also we have got some production facilities like in Jordan… Saudi Arabia is one of the key countries for our activities. And day by day, we are increasing activities in Saudi Arabia.[23]

He added that ASELSAN is open to technology transfer and intends to convert its Saudi office into an excellence centre with in-house design capability. It is also exploring joint ventures and production opportunities in Abu Dhabi.

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[19] **"Receiving Project Based Investment Incentive (Super Incentive)"**, ASELSAN, 26 March 2025.

[20] **"Defence Expenditures And NATO's 5% Commitment"**, North Atlantic Treaty Organization (NATO), 27 August 2025.

[21] **"Turkey Backs NATO's 5% Defence Spending Goal, Plans Nationwide Air Shield, Source Says"**, *Reuters,* 26 June 2025.

[22] Agnes Helou, **"As 'Dome' Air Defense Discussions Rage, Turkey's Aselsan Sees An Opening: CEO"**, *Breaking Defense,* 21 February 2025.

[23] Agnes Helou, **"As 'Dome' Air Defense Discussions Rage, Turkey's Aselsan Sees An Opening: CEO"**, *Breaking Defense,* 21 February 2025.

Together, these initiatives signal a strategy of leveraging Steel Dome as a flagship export platform to deepen defence ties with allies and expand Türkiye's defence-industrial presence globally. Also, these milestones suggest that while future system sustainment, replenishment, and export revenues remain to be realised, the foundational capital and industrial capacity for Steel Dome are already in place.

Geopolitical Rivalry and Regional Drivers

Türkiye's decision to develop the Steel Dome is shaped by intensifying regional tensions and a strategic imperative to reduce dependence on foreign defence systems. Erdoğan drew a direct parallel to Israel's Iron Dome, declaring, "If they (Israel) have an 'Iron Dome', we will have a 'Steel Dome'",[24] signalling not only national pride but a desire for independent deterrence capabilities through domestic defence innovation.

Türkiye has grown increasingly uneasy over regional turbulence, particularly Israel's expanded military role in post-Assad Syria and the June 2025 confrontation between Israel and Iran that lasted for twelve days. The Steel Dome system is seen as Türkiye's response to escalating regional security threats and the global demand for cutting-edge air defence capabilities. As Türkiye's Defence Minister Yaşar Güler remarked,

> Considering the recent conflicts and wars in our close geography, it has been much better understood how indispensable it is to have a strong and integrated air defence system in terms of national survival.[25]

In practice, Türkiye has essentially formalised a system that it has been developing for years, reflecting its longstanding pursuit of multi-layered air defence despite the vulnerabilities created by its vast geography. The recent Ukraine–Russia and Israel–Iran wars have underscored the urgency of constant modernisation, with Ankara situated in a region that functions as a live testing ground for evolving warfare technologies. The extensive use of first-person view (FPV) drones by Ukraine, capable of targeting both infantry and sophisticated air defence batteries, has likely shaped Türkiye's assessments, while the deployment of tactical ballistic systems and precision munitions in the Israel–Iran conflict highlights the diversity of threats Ankara is preparing for.[26]

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[24] **"Erdogan Says Turkey Aims To Have "Steel Dome" Air Defence System"**, *Reuters,* 29 October 2024.

[25] **"Türkiye Delivers Major Steel Dome Air Defense System, Launches $1.5B Defense Facility"**, *Türkiye Today*, 28 August 2025.

[26] Ata Ahmet Kokcu, **"Türkiye's Steel Dome Air Defense Network To Counter Regional Threats"**, *Türkiye Today*, 28 August 2025.

Türkiye has already tested counter-drone capabilities in Iraq and other conflict zones, but its security imperatives extend beyond protecting military installations. Safeguarding critical energy infrastructure like pipelines, ports, and industrial facilities is equally crucial, given Ankara's intensified ambition to position itself as a regional energy hub.[27] For this reason, developing advanced detection and interception systems is not a matter of choice for Türkiye but a strategic necessity for ensuring national security and economic resilience.

Pertinently, Greece, a NATO partner and historical rival, is reportedly exploring a US$ 2.11 billion Iron Dome-like anti-aircraft and missile defence system with Israel to counter similar threats — illustrating the strategic arms competition in the region.[28] Moreover, with Greece expected to acquire twenty F-35 Lightning II aircraft[29] and advanced cruise missiles, Türkiye faces the imperative of strengthening the protection of its airspace, industrial hubs, and critical infrastructure. This necessity extends beyond potential Greek actions, encompassing the broader spectrum of evolving regional threats. In this context, Ankara's security calculus increasingly emphasises a layered defence architecture, integrating missiles, laser systems, and multi-barrel platforms to safeguard the Aegean, Mediterranean and Marmara regions.

Constraints and Challenges

As an integrated air defence system (IADS), Türkiye's Steel Dome poses the complexity of a 'system of systems'. Integrating radars, missile interceptors, command-and-control nodes, and supporting platforms demands sophisticated interfaces, rigorous subsystem and system-level testing, and meticulous coordination. Such complexity creates risks of interoperability gaps, cascading developmental delays, and cost overruns, challenges well-illustrated by the F-35 programme's protracted integration phase and US$ 180 billion cost escalation.[30]

The Steel Dome faces similar vulnerabilities. Delays in any subsystem can disrupt overall timelines, upgrades can require adjustments across the network, and maintaining system coherence over its life cycle will be resource-intensive. Furthermore, the interconnected architecture enlarges the cyber-attack surface,

[27] Ata Ahmet Kokcu, **"Türkiye's Steel Dome Air Defense Network To Counter Regional Threats"**, *Türkiye Today*, 28 August 2025.

[28] Lefteris Papadimas, **"Greece In Talks With Israel To Develop 2 Bln Euro 'Iron Dome'"**, *Reuters*, 14 November 2024; **"Greece and Türkiye Draw Inspiration from Israel's Iron Dome to Develop Their Own Air Defense Systems"**, *Global Defense News*, 27 August 2025.

[29] **"The F-35: Security for Greece"**, Lockheed Martin, 2024.

[30] Ozan Ahmet Cetin, **"Eye On The Sky: The Strategic Potential Of Türkiye's Steel Dome"**, The Foundation for Political, Economic and Social Research (SETA), 12 August 2024.

making robust and continuous cybersecurity measures indispensable. Ultimately, the project's success will depend on technological progress and on disciplined programme management, cost control, and anticipatory planning to ensure timely deployment and long-term resilience.[31]

Although relatively small states like Israel operate multiple Iron Dome batteries to protect populated areas, these systems do not, and are not designed to, provide continuous coverage of uninhabited territory. Likewise, larger states, for example, France, rely on temporary, event-specific measures (e.g., the special air security system [DPSA] arrangements)[32] to intensify air defences around sensitive locations rather than attempting blanket national coverage. Many countries combine selective active defences with passive measures (civil shelters) to mitigate risk. Consequently, maintaining a permanent, impermeable air-defence blanket across Türkiye would impose an operational and logistical burden on the armed forces that is likely unsustainable or would force politically difficult trade-offs in capability allocation.[33]

Moreover, a significant constraint for the Steel Dome is the absence of an indigenous global positioning system. To address this gap, ASELSAN, in collaboration with TÜBİTAK's Space Technologies Research Institute, is developing a national satellite navigation capability, which is expected to be operational by 2030.[34]

Conclusion

The Steel Dome is more than an aggregation of systems. It is a strategic signal about Türkiye's defence trajectory and emerging capabilities. By consolidating indigenous sensors, interceptors and command systems and investing heavily in domestic production and talent, Ankara aims to reduce external dependencies while strengthening deterrence across multiple threat domains. The programme also serves dual purposes: safeguarding critical infrastructure that underpins Türkiye's regional economic ambitions and signalling to NATO partners that Ankara is investing in credible national capabilities. Looking ahead, the real test will be operational integration across Türkiye's geography, effectively translating from a policy commitment into a resilient, deployable shield.

[31] Ozan Ahmet Cetin, **"Eye On The Sky: The Strategic Potential Of Türkiye's Steel Dome"**, The Foundation for Political, Economic and Social Research (SETA), 12 August 2024.

[32] **"Air and Space Force"**, Ministry of the Armed Forces, Government of France.

[33] Patrice Moyeuvre, **"Turkey: The "Steel Dome" Project"**, The French Institute for International and Strategic Affairs (IRIS), 5 February 2025.

[34] **"Turkey's Steel Dome Layered Air Defense System To Be Completed By 2028"**, *TASS (Russian News Agency),* 18 June 2025; **"Türkiye Plans To Launch Homegrown Navigation, Map System"**, *Daily Sabah,* 8 April 2025.

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