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FORGING SYNERGY
UAE-INDIA DEFENCE INDUSTRIAL COOPERATION

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Introduction

AS STATES THAT FACE serious strategic threats within their region and extended neighbourhood, the United Arab Emirates (UAE) and India have shared objectives when it comes to tackling these challenges. Consequently, they also have a common aim of developing their respective domestic defence industries. Shared strategic challenges and the need for greater self-reliance, as well as a quest for developing exportable military capabilities, make the UAE-India defence-industrial cooperation both a necessity and an opportunity. The two sides have engaged in high-level official interactions, as well as those between industry players, and among policy research institutions.

Yet tighter defence cooperation is impeded by challenges, which are not insurmountable but require careful attention. Overcoming these hurdles involves a careful understanding of the

defence industrial eco-systems of both countries. What are each side's strengths and weaknesses? How do their defence industrial manufacturing bases and Research and Development (R&D) investments create complementarities or at least set the foundation for a productive defence relationship?

This necessitates comprehending the fundamental complexities and nuances of defence procurement in each country, their respective technological strengths, and how both countries establish priorities for defence planning. The relative size of their respective defence industries also varies, yet diversification away from their traditional sources of defence supply creates opportunities, which if effectively exploited, will pave the way for a strong and durable bilateral defence relationship. This analysis provides an overview of the defence-industrial capabilities of both countries and explores avenues for cooperation.

Overview: India's Defence Industry[a]

OVER THE PAST TWO DECADES, India has upgraded its military capabilities, primarily through imports, as its domestic defence industry has struggled to meet the needs of its armed forces. Defence manufacturing in India remains restricted by regulations. Efforts to involve private companies have had minimal success, mainly due to opposition from defence public-sector units (DPSUs), which have enjoyed a monopoly in a monopsony market.

Since 2014, there has been a push to bring private businesses and startups into the defence sector through initiatives like the Strategic Partnership model and the Innovations for Defence Excellence programmes. However,

a Parts of this section derive from Sameer Patil, "A Defence Industrial Agenda for India," Gateway House: Indian Council On Global Relations, Paper No. 2, July, 2024, https://www.gatewayhouse.in/wp-content/uploads/2020/07/Defense-Industrial-Agenda-for-India_sameer-Patil_Final.pdf.

progress is slow as the private sector has been waiting for a major weapons contract, without which it would be difficult to sustain investments in infrastructure. Despite these challenges, private Indian firms continue to maintain a presence in the global defence supply chain by working with American and European aerospace companies to manufacture and export sub-systems.

Current Defence Industrial Capabilities

As of 2023, the Indian market size was estimated at US$74 billion, which is expected to grow at a Compound Annual Growth Rate (CAGR) of 4 percent during the period 2024-2032.[1] Over a shorter forecast period of 2024-2028, the rise could be more than 4 percent.[2]

India's military modernisation indicates that many of the immediate operational requirements for advanced equipment are being fulfilled exclusively through imports. In the period 2019-2023, India was the world's largest arms importer, with imports going up by 4.7 percent compared to the period 2014-2018.[3] Though Russia remains India's main arms supplier, accounting for 36 percent of its arms imports, this trend is shifting, with India diversifying its sources to include Western countries and domestic manufacturers.[4] France and the United States (US) have emerged as key suppliers for India, accounting for 33 percent and 13 percent of arms imports, respectively, followed by Israel at 9 percent in the period 2019-2023.[5]

Despite diversification, most imports are still from Russia. These include the Admiral Gorshkov aircraft carrier (commissioned as *INS Vikramaditya*) along with the MiG-29K fighter aircraft for the Indian Navy and Mi-17 transport helicopters for the Indian Air Force (IAF).[6] Big purchases from the US include the C-17 and C-130J transport aircraft for the IAF. Most of these purchases have been government-to-government (G2G), under the United States' Foreign Military Sales programme. One exception is the P-8I maritime patrol aircraft, which India purchased from Boeing under a commercial contract in 2009, becoming the first export customer of this aircraft.[7]

From Israel, India has imported military hardware worth US$2.9 billion over the past decade, including radars, missile defence systems, and surveillance and combat drones.[8] The Indian military is reportedly in possession of 108 Israeli Searcher drones and 68 unarmed Heron 1s.[9] These drones have enhanced India's surveillance capabilities, particularly in the border and coastal areas. India has also purchased a number of Harpy drones from Israel.[10] The IAF also used Israeli equipment in its raid on the Balakot terrorist training camp in Pakistan on 26 February 2019, including the

SPICE 2000 and Popeye precision-guided munitions, Heron drones, and the Phalcon airborne early warning and control system.[11] Between 2014 and 2021, India received combat aircraft radar equipment, armed Unmanned Aerial Vehicles (UAVs), anti-tank missiles, and surface-to-air missiles, amongst other hardware, from Israel.[12]

India ordered 36 Rafale jets for the IAF from France as part of an INR 59,000-crore G2G deal in 2016, the delivery of which was completed in December 2022.[13] India is also in the process of acquiring 26 Rafale Marine jets for the Indian Navy's aircraft carriers *INS Vikrant* and *INS Vikramaditya*.[14]

Domestic production is focused on the Indian Navy, with the state-run Cochin Shipyard building aircraft carriers, Mazagon Dock building the Kalavari-class submarines with transfer of technology from France's Naval Group, and Kolkata's Garden Reach shipyard building Kamorta-class corvettes.[15] However, the country lacks indigenous technological capability in naval weapons systems, gas turbine jet engines, and aviation platforms such as maritime patrol aircraft, drones, carrier-based fighter jets, and naval utility helicopters—critical modules and components that need to be indigenised.[16]

India has plans to domestically manufacture new military platforms, including Project 75I-class diesel-electric submarines, Project 17A-class frigates, Visakhapatnam-class destroyers, a naval version of the Tejas fighter aircraft for the Indian Navy, HJT-36 Sitara intermediate trainer aircraft, and a light utility helicopter for the IAF.[17]

Domestic Manufacturing Initiatives

Since 2014, India has embarked on an initiative to transform its defence manufacturing sector, which entails a larger role for the private sector. The focus has been on promoting private and foreign investments in the defence sector, prioritising the development of indigenous equipment, encouraging defence research, boosting defence research capabilities, fostering international technology partnerships, and promoting defence exports.

The defence procurement procedure in India was realigned with the goals of Make in India as part of the Atmanirbhar Bharat Initiative through the Defence Acquisition Procedure (DAP) of 2020.[18] The DAP is the key institutional mechanism by which acquisitions for the Indian Armed Forces are made. The DAP's focus is on self-reliance, with indigenisation being central through make, design, and development and via strategic partnerships. Supplementing the aim of self-reliance is the DAP's effort to

enable ease of doing business by incorporating simplified rules and delegating authority with reduced timelines. The DAP prioritises procurement in the following order:

1. Buy (Indian—Indigenously Designed Developed and Manufactured), i.e., Buy (Indian-IDDM)

2. Buy (Indian)

3. Buy and Make (Indian)

4. Buy (Global—Manufacture in India)

5. Buy (Global)[19]

IDDM has been deemed to be the most critical part of defence procurement. Ease of doing business has been facilitated through amendments to DAP 2020. This has manifested in more incentives for Micro, Small and Medium Enterprises (MSMEs). The focus is on benchmarking, cost valuation and computation, payment schedules, and procurement quantity, with the objective of establishing a conducive defence ecosystem.

To encourage private-sector participation, the government has introduced the Strategic Partnership (SP) model,[20] under which there will be tie-ups between Indian and foreign defence companies to produce fighter jets, submarines, medium lift and utility helicopters, and warships, among others. This model will also enable a conducive ecosystem across the industry. The INR 45,000-crore contract for the P75I diesel-electric submarines, which will replace the ageing submarine fleet of the Indian Navy, is the first to be activated under the SP model.[21] In January 2020, the Defence Acquisition Council, headed by the Defence Minister, shortlisted Mazagaon Dockyard Limited (MDL) and Larsen & Toubro (L&T) as its Indian strategic partners for this contract.[22]

Another step in creating this ecosystem is the stimulus given to startups through the Defence Innovation Fund established in 2017.[23] Within this, Hindustan Aeronautics Limited (HAL) and Bharat Electronics Limited (BEL) funded the establishment of the Defence Innovation Organisation (DIO). The DIO promotes innovation through the Innovations for Defence Excellence (iDEX) programme.[24] The first two rounds of iDEX have identified technologies that augment the operational capabilities of the Indian military in combat, including solutions for individual protection systems, secure

hardware encryption devices, GPS anti-jam devices, unmanned surface and underwater vehicles, and 4G/LTE tactical local area network.[25]

The Defence Research and Development Organisation's (DRDO) Technology Development Fund (TDF) Scheme also provides INR 50 crore per project to encourage the participation of public and private industries, with an emphasis on MSMEs and startups.[26]

India has also initiated projects with other countries to co-develop and co-produce defence technologies required by the Indian and partner country's militaries, including the development and operationalisation of the Barak 8 missile system with Israel and the BrahMos missile systems, created in partnership with Russia.

India is also strengthening its technological cooperation with the US and Japan, particularly in emerging technologies. The collaboration with the US encompasses research on lightweight small arms (including assault rifles and machine guns) and air-launched drones.[27] This partnership was further strengthened in January 2023 with the launch of the Initiative on Critical and Emerging Technologies (iCET), reflecting both countries' commitment to deeper technological cooperation. As an umbrella framework for technology cooperation, iCET covers commercial and defence technologies.[28] The India-US Defence Acceleration Ecosystem (INDUS-X) was launched in June 2023 to coordinate efforts in defence innovation in technology, systems, and products. Defence industrial cooperation is also being progressed under the Roadmap for US-India Defence Industrial Cooperation, signed in June 2023, under which a Memorandum of Understanding (MoU) has been signed between HAL and General Electric (GE) for the co-production of GE-414 aero-engines.[29]

With Japan, the research focuses on visual simultaneous localisation and mapping-based global navigation satellite system augmentation technology for unmanned ground vehicles and robotics.[30]

Overview: The UAE's Defence Industry

THE UAE, AS ONE OF THE BIGGEST importers of Western weapons, has largely relied on offset agreements for its domestic arms industry.[31] To modernise military equipment and systems, the UAE has been acquiring the widest range of defence equipment and technology. The acquisition of imports has mainly been aimed at procuring combat aircraft such as Boeing F-15 Eagles, Eurofighter Typhoons, Dassault Rafale F4s, and Lockheed Martin F-16 Fighting Falcons.[32] In November 2020, the US State Department also approved a Foreign Military Sale (FMS) of up to 50 Lockheed Martin F-35As to the UAE.

The UAE has also imported land systems, including air defence systems such as the Raytheon MIM-104 Patriot surface-to-air missile system and Lockheed Martin's Terminal High Altitude Area Defense System (THAAD), the

latter of which was through FMS and was approved by the State Department in August 2022.[33] There have been other acquisitions, ranging from military vehicles of all types to helicopters, UAVs, naval vessels, and small arms and ammunition.

However, the focus on imports did not provide the necessary impetus to domestic manufacturing, and there was limited success in building on such agreements to create credible arms firms. Though the UAE constituted the Emirates Defence Industries Company (EDIC) in 2014,[34] it had made little progress in subsequent years.[35] Consequently, the UAE initiated a strategic vision to enhance its indigenous defence industry to meet its domestic needs as well as initiate the export of homegrown products to other countries.

In 2019, EDIC, along with several existing organisations like the Emirates Advanced Investments Group (EAIG) and Tawazun Holding, was subsumed into a state-owned company called EDGE.[36] EDGE was initially set up with a portfolio of 20 products and a US$60 million order book.[37] It now offers around 110 products, with and order backlog of US$10 billion. About a quarter of the order book comes from abroad. The organisation is structured into five cluster groups: Platforms and Systems; Missiles; Weapons; Electronic Warfare (EW) and Cyber Technologies; and Trading and Mission Support.[38] Within these, there are over 25 individual companies that manufacture all types of defence equipment, including armoured vehicles (NIMR & Al Jasoor), loitering and guided munitions (ADASI), weapons and ammunition (CARACAL), and shipbuilding (ADSB).[b,39]

EDGE has aimed to avoid the missteps of previous companies and is leveraging the benefits of scale, allowing it to reduce fixed costs and streamline processes.[40] The company has also tried focusing on a few critical technologies to avoid spreading itself too thinly. It is prioritising work in autonomous and smart weapons and EW. Among the 14 new products that the company launched in February 2023, 11 were based on uninhabited and autonomous technology.[41] It also launched three new autonomous systems—the GY300, BUNKER PRO, and M-BUGGY—in January 2024.[42]

b ADSB undertakes shipbuilding with a focus on build, repair, maintenance, refit, and conversion of naval and commercial vessels (https://adsb.ae/about). Al Jasoor manufactures armoured fighting vehicles and is part of EDGE's platforms and systems vertical (https://aljasoor.ae/about). NIMR Automotive LLC makes light- and medium-wheeled military vehicles that are combat-proven. NIMR's core competency is in integration, manufacturing, assembly, design, and development (https://nimr.ae/about). SIGN4L, within the Electronic Warfare and Cyber Technologies cluster, develops electronic warfare capabilities, aircraft survivability systems, and Intelligence, Surveillance, Target Acquisition and Reconnaissance sensors. SIGN4L also specialises in counter Unmanned Aerial System (UAS) and air-surveillance radar systems (https://sign4l.ae/about). ADASI is a key Emirati manufacturer of unmanned systems with defence applications. The unmanned systems have applicability in all domains—sea, air, land, EW, and cyber defence (https://adasi.ae/about).

Additionally, EDGE's maritime arm, the Abu Dhabi Ship Building (ADSB), has developed a new corvette design, highlighting the desire to produce more complex naval platforms than the Falaj 3 offshore patrol vessel that it is co-developing with Singapore Technologies (ST) Engineering.[43] EDGE subsidiaries Halcon, ADASI, and Al Tariq are also spearheading Emirati efforts to develop homegrown precision-guided munitions and other weapons. These capabilities range from precision-guided bombs, guided glide weapons, and micro-munitions to cruise missiles, one-way attack drones, and loitering munitions.[44]

The Emirati government also modified its approach to create a more conducive environment for EDGE to succeed. Tawazun Council, which previously managed the UAE's defence offsets and has strong ties with EDGE, was placed in charge of defence acquisitions for the UAE.[45] Tawazun's expanded responsibility and its emphasis on defence offsets have improved EDGE's ability to secure technology transfers from defence partners. When the UAE agreed to acquire South Korea's Cheongung II air-defence system in January 2022, the deal included a commitment for the two sides to collaborate on defence technologies and co-develop weapons systems.[46]

EDGE has explored multiple options to build its defence industrial expertise. The company set up its first international office in Brasilia in April 2023.[47] Subsequently, EDGE has signed agreements with the Brazilian navy to co-invest in long-range anti-ship missile development, with the marines to work on autonomous vehicles, and with the air force to collaborate on uninhabited systems and smart weapons. EDGE has also struck partnerships with local Brazilian companies in various areas, including turbine engines, non-lethal technologies, and cybersecurity.[48]

EDGE's Al Tariq unit signed an MoU with Bharat Dynamics to jointly produce Long-Range Precision-Guided Munition (LR-PGM) kits in India.[49] EDGE and HAL have also agreed to co-design and co-develop missile systems and UAVs.[50] In Türkiye, EDGE has partnered with SAHA, an association representing over 1,000 Turkish defence companies. The UAE company also struck arrangements with Bulgaria, Egypt, Indonesia, and Malaysia, among others, in 2023. In November 2023, EDGE took a 52 percent shareholding in Switzerland's ANAVIA, which works on vertical take-off and landing systems.[51]

In 2021, EDGE was awarded an exclusive performance-based logistics three-year contract to supply UAE's Air Force Air Defense.[c,52] The contract is focused on maintenance,

c AFAD has historically received the largest share of the UAE's total defence procurement budget, as per the International Trade Administration.

repair and overhaul, and specialised support services and concluded in November 2024.[53] This highlights that the Emirati transition towards internal investment is already underway and will continue to rebalance its defence acquisitions as its larger military entities source from within the country on a bigger scale.[54]

The UAE launched the "Make it in the Emirates" initiative in March 2021, which is described as "an open invitation to industry, investors and innovators to engage with MoIAT (the Emirati Ministry of Industry and Advanced Technology)…to fulfil their ambitions of developing, manufacturing and exporting their products from the UAE."[55] Emirati defence has since received a significant boost through a range of new programmes.

Another initiative founded to stimulate the UAE's defence industry is the Emirates Defense Companies Council (EDCC),[56] established in 2014 by the UAE Ministry of Defence and Tawazun Council. The EDCC coordinates the Emirati defence industry and has grown to include over 200 member companies, playing a crucial role in fostering the development of the industry.

These initiatives are aimed at reducing the dependence on defence imports. However, the UAE remains open to foreign investment. A 2020 legal amendment allows private companies to have 100 percent private ownership of a mainland company, up from 49 percent previously, as part of the effort to stimulate the Emirati economy as part of Operation 300bn—the broader strategy driving the Make it in the Emirates initiative.[57] Though the defence sector faces additional restrictions, foreign defence companies can gain ownership rights through an administrative process.

The UAE is positioning itself as an emerging force in the global defence industry, backed by substantial investments and comprehensive initiatives to build domestic capabilities. Companies such as EDGE are gaining international traction and attracting significant investment, turning the tides on the UAE's large-scale foreign expenditure in defence acquisitions.

Current State of India-UAE Defence Cooperation

IN 2003, INDIA AND THE UAE signed an MoU on defence cooperation.[58] Another MoU on security cooperation was signed in 2011. Defence cooperation between the two countries includes training, joint naval and air exercises, high-level visits, and participating in defence exhibitions.[59] During his visit to the UAE in 2014, Indian Prime Minister Narendra Modi emphasised strengthening defence cooperation, including the manufacture of defence equipment in India. Both countries also emphasised strengthening cooperation on terrorism, counter-radicalism, intelligence sharing, cybersecurity, and maritime security.[60] Both countries have also agreed to elevate the relationship to a "comprehensive strategic partnership" and to establish a "strategic security dialogue".[61] Since then, the India–UAE cooperation in the defence and security fields has continued to grow. The UAE has expressed its interest in buying

BrahMos missiles.[62] It is also interested in India's Akash missiles and the Light Combat Aircraft (LCA) Tejas.[63] In Exercise Desert Flag-8, held in the UAE in February-March 2023, LCA Tejas aircraft was introduced by India for the first time in an international air exercise.[64] The joint production and development of technology remains a common objective for both states, but efforts in this direction need to be accelerated.

In February 2023, during the International Defence Exhibition and Conference (IDEX) held in Abu Dhabi, India's HAL and the UAE's defence firm EDGE signed an MoU to explore the joint design and development of missile systems and UAVs.[65] This agreement, when executed, will likely see the amalgamation of Indian technology in gas turbine engines and Emirati-guided weapons systems.

Defence cooperation between the two countries is steered through a Joint Defence Co-operation Committee (JDCC) at the Ministry level and Naval Staff Talks at the headquarters level, which identify new areas of cooperation between the two nations.[66] A permanent resident Defence Adviser (DA) has been posted to this Mission with effect from March 2013. Bilateral defence cooperation has been strengthened following the establishment of the DA's office, notably in defence training and regular exchange programmes.[67]

Defence industrial cooperation was also discussed at the 11th India-UAE Joint Defence Cooperation Committee (JDCC) meeting held in May 2022.[68] The 12th edition of the JDCC meeting between India and the UAE was held in Abu Dhabi on 9 July 2024.[69] During the meeting, the two sides discussed a wide range of opportunities for collaboration to further strengthen defence and security cooperation between the two countries. Detailed discussions were held in areas such as training, joint military exercises, defence industrial cooperation, subject-matter-expert exchange, and Research and Development (R&D).[70] Both sides deliberated on regional security, including maritime security, and underscored the need to enhance collaboration to tackle security challenges.[71] Exchanges and visits across different domains were also discussed, and the exchange of training opportunities in niche areas was decided.[72] Staff talks between the navies and armies of the two countries were also conducted on the sidelines of the JDCC. Service-specific cooperation was discussed in detail.[73]

India and the UAE conducted a joint military exercise, Desert Cyclone, in Rajasthan in January 2024.[74] The exercise was aimed at enhancing interoperability in sub-conventional operations in desert and semi-desert terrains under the broader framework of the United Nations charter on peacekeeping operations while also fostering a collaborative partnership and sharing best practices. Subsequently, on 23 January 2024, India, France,

and the UAE conducted a mega air exercise, Desert Knight, over the Arabian Sea.[75] The focus of the exercise was on enhancing synergy and interoperability between the three air forces amidst increasing attacks on commercial vessels by Houthi militants in the Red Sea.

In 2017, the Indian Army issued a global Request for Information (RFI) to procure nearly 94,000 close-quarter battle (CQB) carbines under Fast Track Process (FTP).[76] A UAE company under EDGE, CARACAL International, was the L1, or lowest bidder, with its CAR816 carbines.[77] However, the project was scrapped in 2020, as the Indian government's focus shifted to self-reliance in the defence sector as part of the *Atmanirbhar Bharat* and Make in India initiatives. The government was keen on making the CQBs in India and wanted a large portion of the content to be indigenous.[78] Subsequently, in 2022, CARACAL signed an MoU with the Indian firm ICOMM to facilitate small arms manufacturing in India, including the CAR816, followed by a licensing agreement at IDEX 2023.[79] These developments signify the first ever technology transfer for defence articles from the UAE to India. Under the Make in India and Atmanirbhar Bharat initiatives, ICOMM, a subsidiary of Megha Engineering & Infrastructures Limited, will produce CARACAL's entire line of small arms for the Indian market.

While defence cooperation between India and the UAE remains limited, both nations have achieved a certain level of platform interoperability. For instance, in March 2021, a batch of Rafale jets purchased by India from France were refuelled mid-air by the UAE Air Force.[80] Similarly, in June 2022, the UAE Air Force's Multi Role Tanker Transport (MRTT) aircraft conducted air-to-air refuelling of the IAF's Su-30 MkI fighter jets so that they could operate seamlessly on their non-stop flight to Egypt for the Tactical Leadership Program.[81] Furthermore, the India-France-UAE trilateral initiative was institutionalised in February 2023 to promote defence cooperation among the three nations while focusing on raising compatibility among the armed forces as well as joint development and co-production of military hardware.[82] Informally dubbed the "Rafale Forum", it emerged due to the fighter aircraft manufactured by France's Dassault Aviation, which served as the common link between the three countries.

India and UAE Defence Industrial Capabilities: Convergences and Divergences

THE DIFFERENCE IN THE DEFENCE industrial capabilities of the UAE and India is in terms of scale; India's defence needs are extensive. In absolute terms, the Indian defence budget for the Financial Year (FY) 2024-25 stands at US$75 billion[83] as opposed to the UAE, which had a budget of US$25 billion as of 2024.[84] In terms of defence market size, India's CAGR is pegged at 4 percent for 2024-2032, whereas the UAE's market size is projected to grow to US$30.7 billion, at a CAGR of 4.1 percent by 2030.[85]

As noted earlier, the defence public sector plays an outsized role in research, design, development, and production in India's defence industrial base. Indeed, 80 percent of India's defence industrial production capacities are public-sector driven.[86] Private-sector participation

constitutes the remainder but needs prior governmental approval through industrial licencing.[87]

India was the largest importer of weapons in 2023.[88] Despite its high dependence on foreign weapons systems, it has developed some indigenous capabilities in areas such as Airborne Early Warning and Control System (AEW&CS) and a fourth-generation aircraft such as Tejas and is among the few countries to have developed Ballistic Missile Defence (BMD), Main Battle Tank (MBT), and an Electronic Warfare and Multi Range Radar Program (EW&MRRP).[89] Specifically, India has developed a series of missiles such as Agni, Prithvi, Akash, Astra, BrahMos (as part of a joint venture (JV) with Russia), the NETRA AEW&C, and the Hull Mounted Sonar Advanced (HUMSA),[90] a second-generation frigate sonar. Further, it has developed an Advanced Light Towed Array Sonar (ALTAS), which is a sensor geared to detect, localise, and classify submarines that operate below the sonar layer.[91] Additionally, the DRDO, in partnership with two private-sector entities, Bharat Forge and Tata Advanced Systems Limited (TASL), developed the Advanced Towed Artillery Gun System (ATAGS).[92]

To be sure, not all these systems have exclusively indigenous elements. For instance, Arjun MBT's engine is not of indigenous design or origin. Likewise, the Tejas LCA is reliant on GE-supplied engines for both its variants. Nevertheless, the level of indigenisation of some military technologies and equipment is greater than what the UAE has achieved in its endeavours to create a native defence industry. India can supply vital platforms and some niche technologies. Consequently, it should create opportunities and incentives to collaborate between UAE and India. HAL, which is India's largest public-sector enterprise, has developed several aerial platforms, prominently Tejas (both variants, Mk1/Mk1A) and rotary aircrafts (Table 1). Native content by percentage value has also increased, although for most products listed in Table 1, it hovers just above 50 percent.

Table 1: Indigenous Content in Indian Military Platforms

Platform	Indigenous Content by Value (%)
LCA Tejas Mk1/Mk1A	53.55
Su-30 MKI	51.48
Do-228	44.19
Advanced Light Helicopter	55.89
Light Combat Helicopter	54.09
Light Utility Helicopter	52.01

Source: Lok Sabha[93]

Meanwhile, India has achieved 80-percent indigenisation in the design and construction of warships, with native shipbuilding yards estimated to have achieved 80-percent indigenisation among surface vessels such as frigates and destroyers.[94] Supplementing these surface platforms is the complete in-house design and R&D of the Naval Offshore Patrol Vessel (NOPV) by the Goa Shipyard Limited (GSL).[95] Four vessels of this kind have already been constructed and operationalised by the Indian Navy.[96] Apart from these NOPVs, the Cochin Shipyard Limited (CSL), through native design and R&D, has built Anti-Submarine Warfare (ASW) shallow-water crafts or corvettes geared for anti-submarine operations and operations in coastal waters.[97] Three of these vessels are already in service with the Indian Navy, with an additional five under construction or due to be commissioned.[98]

Nevertheless, India's investments in defence R&D remain limited. In FY 2022-23, its investments were approximately US$2.7 billion, which was roughly 3.4 percent of the Ministry of Defence's (MoD) budget. In December 2023, the Indian Parliamentary Standing Committee noted that India's defence R&D is too low by global standards. Although, in absolute terms, the defence R&D budget doubled from INR 10,149 crores or US$1.21 billion in 2010-11 to INR 23,264 crores or US$2.7 billion in 2023, as a percentage of total defence expenditure, it has declined from 6.59 percent to the current 5.28 percent.[99]

Generally, as government officials in earlier parliamentary panels have conceded, India's R&D in defence does not match that of the US or China due to a lack of adequate public- and private-sector investments.[100] Nevertheless, there are some silver linings. For instance, DPSUs such as BEL have made budgetary allocations, internally spending a part of their profits on R&D.[101] According to Indian defence officials, Indian private-sector defence enterprises spend far less on R&D than their American and Chinese counterparts.[102] Given India's low defence R&D investment, the UAE can contribute to partially meet the shortfall in funding for specific defence projects that both countries agree to co-develop.

Similar to India, the UAE is primarily an importer of weaponry, but this may not be an obstacle (see Figure 1).[103] The Emiratis' concerted efforts to develop their domestic defence industry has been successful and has created opportunities for countries such as India. The UAE has pragmatically pursued defence industrial reforms without setting overambitious targets;[104] it is targeting a growth of 10-30 percent between 2015 and 2030 in its domestic defence industry.[105] The UAE's defence industry is committed to developing "good enough" technology rather than pursuing "vanity projects" that the country's technological and manufacturing base will not allow.[106] Instead, the Emirates

aims to develop a niche in defence technologies such as navy vessels and advanced UAVs.[107]

In the coming years, the UAE's three services—Army, Navy, and Air Force—will need new infusions of technology, equipment, and platforms. All three services of the UAE are undergoing modernisation. In November 2019, the UAE made key decisions related to its domestic industrial base. As mentioned earlier, it created the state-owned group EDGE,[108] a conglomerate believed to have 12,000 employees, over 25 subsidiaries, and total revenue of US$5 billion.[109]

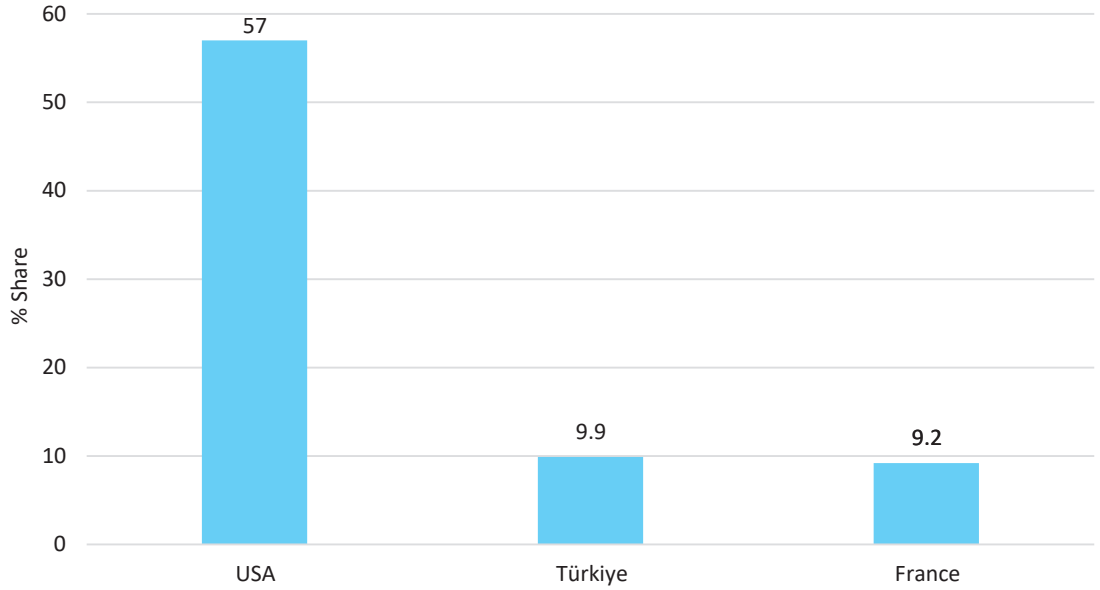
Apart from these systems, the UAE is developing the Falaj Class Fast Patrol Vessels (FPVs). The hulls of the four FPVs are being built by ADSB as part of a US$950 million contract,[110] with construction having commenced in January 2023.[111] The Falaj Class FPVs can conduct a wide range of missions integrated with a range of sensors and combat systems.[112] ADSB, as part of a subcontract, chose the Singapore Technologies (ST) Marine business for design and platform equipment and technical assistance services.[113] Although ADSB is building the vessels at home, they have had to tap into ST's expertise. The design of the Falaj Class FPV is based on the Fearless Class patrol vessels operated by the Singapore Navy and built by ST Engineering[114] for almost three decades.

Other collaborations include the NIMR Armoured Personnel Carriers (APCs) in the light and medium category between the UAE's Emirates Defence Industries Company (EDIC) and Russia's Gorkovskiy Avtomobilniy Zavod (GAZ) automotive manufacturer.[115] Tawazun Industrial Park in Abu Dhabi, which produces the APCs, has won a contract to supply the Army of the UAE with 1,765 APCs.[116] The first of the NIMRs were produced in 2007, progressively evolving into a class of light- and medium-weight utility vehicles. In 2012, EDIC won a contract to produce them as a JV in Algeria for the North African market.[117] The UAE has also seen its defence electronics industry expand through partnerships with companies such as Raytheon. The UAE has invested in the Italian Piaggio Aerospace and the Russian helicopter subsidiary VR Technology and has exported items to Russia and Saudi Arabia.[118] The VRT light helicopters will now be developed within the UAE under the Strategic Development Fund (SDF) due to the Russian invasion of Ukraine, which has compelled the UAE to divest from its former Russian helicopter partners.[119] However, the UAE has demonstrated a willingness to enter into partnerships with a range of defence players, which include Western, Russian, Ukrainian, Italian, and Serbian defence entities.[120] In the case of Italian, Serbian, and Ukrainian defence, which are lacking in financial resources, the Emiratis have been a crucial source of capital infusion.[121]

The EDGE group is among the key stakeholders, along with EDIC, EAIG, and Tawazun Holding. Abu Dhabi, in particular, wants to see its defence industry grow. Since February 2021, His Highness Sheikh Mohammad bin Zayed Al Nahyan has issued two resolutions: the first, that the Tawazun Economic Council (or Tawazun) will oversee the Direct Commercial Sales procurements and acquisitions of the UAE armed forces and the Abu Dhabi police, and the second, issued in 2023, that the Tawazun Economic Council will oversee the Foreign Military Sales (FMS) acquisitions.[122] These resolutions also require that Tawazun ensure the enforcement of the execution of contracts by the Tawazun Economic programme in the defence and security sectors.[123] Tawazun also controls and manages procurement budgets.[124]

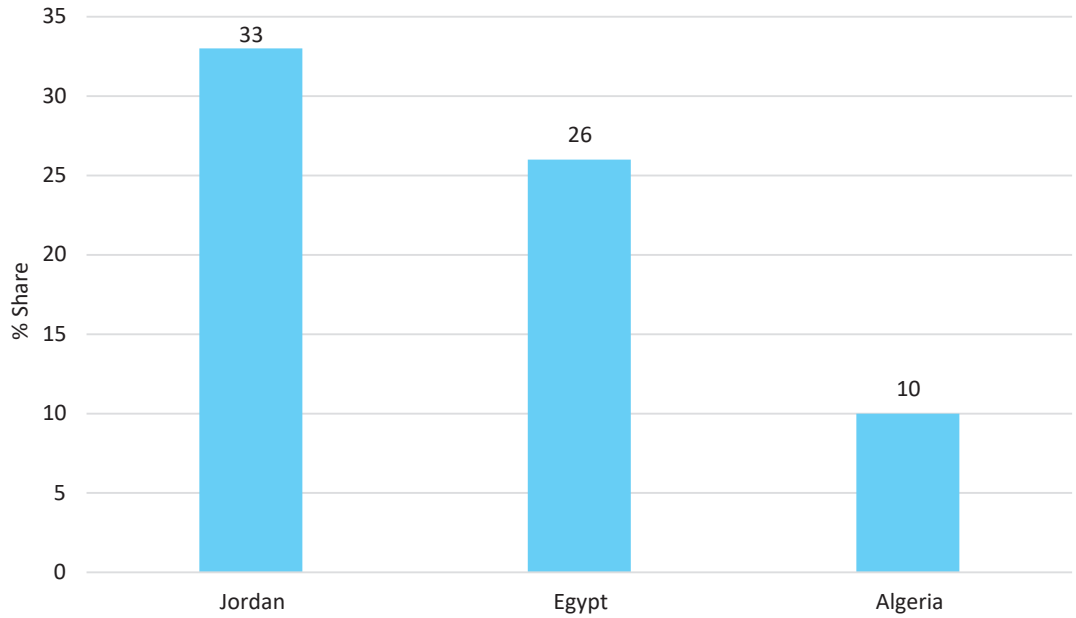
EDGE ranks among the top 25 military suppliers in the world.[125] Jordan, Egypt, and Algeria have been major recipients of UAE defence equipment (See Figure 2).[126] The UAE also has an offset programme, similar to India. This offset programme, the Tawazun Economic Programme, under Tawazun, seeks to exploit the UAE's wide-ranging defence procurements beneficially.[127] The defence vendor is subject to offset obligations if the value of the contract exceeds US$10 million or if the value is under US$10 million, but the primary or parent vendor has existing active offset obligations.[128] The goals of the programme is to develop the defence sector and high-value exports and achieve economic diversification to expand employment opportunities for the UAE's citizens.[129]

Figure 1: UAE Arms Imports and Main Suppliers (2019–2023)



Source: SIPRI (2024)[130]

Figure 2: UAE Arms Exporters and Main Recipients (2019–2023)



Source: SIPRI (2024)[131]

The Way Forward: Pathways and Strategies for India-UAE Defence Collaboration

THE UAE IS EXPLORING OPPORTUNITIES to collaborate with other countries—partly a consequence of the nation's push to be less reliant on Western technology. India has also been looking for a collaborative venture to build up its domestic industrial base. Additionally, both countries realise that innovation, particularly in defence, has to be relevant to both their needs, and Western solutions may not necessarily meet these requirements.

The UAE and India can collaborate in key areas. Yet, the goals they set must be limited and achievable or tractable. There is already some progress between the Indian private-sector company Adani Group and the EDGE group. They have agreed to create a global platform to exploit the aerospace capabilities of both companies. This involves getting their product portfolios together and meeting the

needs of customers at the global and local levels.[132] The evaluation of cooperation covers EDGE's and Adani's fundamental product domains, which include missiles and weapons related to surface, infantry, ammunition, and air defence products; platforms and systems including UAS, loitering munitions, and counter-drone systems; Unmanned Ground Vehicles; and EW and cyber technologies.[133] The agreement also seeks to go beyond just the two captive markets and cater to the Southeast Asian and wider global markets.[134]

There are a number of areas in which both countries can cooperate beyond those listed above, key among which is naval shipbuilding. The UAE's quest for small surface vessels for its navy will provide external opportunities to collaborate with the Emiratis. India has well-developed naval shipbuilding capabilities, which creates opportunities for Indian and UAE companies to collaborate. Indian expertise in building naval surface platforms and naval sub-systems can be shared as part of a cooperative arrangement.

India's investment in defence R&D is very low compared to most military powers, which creates opportunities for New Delhi and India's DPSUs and private-sector enterprises to explore opportunities to secure capital infusion into developmental programmes for weapons systems, sub-systems, and platforms. The UAE's ADSB has already forged ties with ST to build the Falaj Class FPVs; the UAE and India could similarly collaborate with other types of small surface vessels, such as the NOPVs built by India's GSL or the ASW corvettes built by CSL. UAE and India also collaborate through the co-development of gas turbines for the surface vessels of their respective navies.

Although the UAE has made progress in its EW developmental capabilities, India's own EW and electronic-based systems, developed by BEL, have become increasingly sophisticated and have been integrated or are undergoing integration into all three Indian armed forces.[135]

Another area of cooperation is missile systems. India already has some exportable missile systems, such as the Akash Surface-to-Air Missile (SAM) system, whose technology can be shared with the UAE, and the BrahMos supersonic missile system, which was developed as part of a JV with Russia, can be exported to the UAE. New Delhi has already sold BrahMos to the Philippines.[136] India can make the Emirates a collaborative partner in the development of a more advanced variant of the missile in the future. India and the UAE can also collaborate in building aircraft engines for fighters through JVs. They can further collaborate on rotary aircraft, which India's HAL already builds.

Both countries need to explore a Maintenance, Repair and Overhaul agreement. Indian steel production is growing, and the country is the world's second largest crude steel producer, with an output of 128.15 metric tonnes in January-November 2023 and a year-on-year growth of 12.1 percent.[137] During the same period, India accounted for 7.5 percent of the world's crude steel production.[138] Exporting Indian steel production capacities relevant to the defence requirements of the UAE needs to be considered.

Quantum technology is another domain ripe for cooperation and actively explored by both nations. Quantum communication depends on Quantum Key Distribution (QKD) that, unlike traditional forms of encryption, is almost unbreakable, since any interception can be easily detected, making it relevant for military applications. Recent developments in quantum computing also present a challenge to cybersecurity due to the fact that quantum computers are capable of breaking classical encryption protocols in seconds.[139] Since large-scale quantum computers are at least a decade away, this may seem like a distant problem. However, this is not the case, considering the idea of "harvest now, decrypt later", wherein malicious actors can break into databases (including military), retrieve sensitive data, and decrypt it at a later time when quantum computing reaches sufficient maturity. The answer to this issue lies in migrating to Post-Quantum Cryptography (PQC), which comprises encryption algorithms that cannot be breached even by quantum computers. While it will be some time before QKD reaches maturity, the transition to PQC is ongoing, with some of these algorithms already being publicly been released by the National Institute of Standards and Technology.[140]

In February 2022, the DRDO and the Indian Institute of Technology (IIT) Delhi demonstrated a QKD link over a distance of 100 kilometres between Prayagraj and Vindhyachal in Uttar Pradesh using existing commercial-grade fibre-optic cables.[141] Additionally, the Indian Army has set up a Quantum Lab at the Military College of Telecommunication Engineering in Madhya Pradesh to undertake research into key areas such as quantum computing, quantum communication, QKD, and post-quantum cryptography.[142] Similarly, the UAE has been pursuing quantum communication and QKD via the Quantum Communications Lab at the Technology Innovation Institute (TII).[143] The TII announced the opening of the Abu Dhabi Quantum Optical Ground Station in March 2024, which is dedicated to developing free-space optical communications.[144]

Given the expertise possessed by both India and the UAE in quantum communication, as well as its potential importance in the military domain for ensuring secure communication, cooperation in the field cannot be more timely. Both nations can also collaborate in implementing the migration to PQC, for which a clear roadmap is still lacking.

Nations worldwide are pursuing hypersonic weapons since they are difficult to counter with current BMD systems. India has been actively pursuing hypersonic missiles through initiatives such as the BrahMos-II missile programme and DRDO's Hypersonic Technology Demonstrator Vehicle (HSTDV), alongside its first hypersonic testing facility, inaugurated in February 2024.[145] The UAE has expressed an interest in acquiring hypersonic missiles and is considering doing so from countries like the US.[146] It would be natural for India and the UAE to collaborate, considering their shared interests. Additionally, it would offer them an opportunity to collaborate on developing hypersonic deterrence systems, which is a global concern at the moment.

Indian defence entities can work with the UAE's defence industries to co-develop drone technology for whole ranges of missions covering logistics; Intelligence, Surveillance and Reconnaissance (ISR); ground attack; surface attacks at sea; and air-to-air missions. While most of India's drone and UAV requirements are being met through imports, the DRDO in collaboration with the Aeronautical Development Establishment has developed the Tactical Airborne Platform for Air Surveillance (TAPAS) drone, which will be produced through a JV between HAL and BEL.[147] Private-sector companies as well as startups are playing an increasingly important role in drone development within India. The first indigenous bomber UAV, the FWD-200B, along with the first indigenous suicide drone, the Nagastara-I, have also been developed by private entities Flying Wedge Defence and Aerospace Technologies and Economic Explosive Limited, respectively.[148,149] Having already displayed its competence through entities like ADASI, the UAE can cooperate with India to develop joint platforms.

Notwithstanding the Adani-EDGE agreement, private-sector involvement in defence cooperation between the two countries is still nascent and requires a further boost. With the facilitation of both governments, private-sector companies involved in defence production need to identify areas of cooperation. Identifying low-hanging fruit and one or two big-ticket items will make private-sector involvement in defence cooperation easier. To produce tangible outcomes, prioritising startups and the private sector over public-sector enterprises is necessary and will help tailor capabilities to meet the battlefield requirements of the UAE and India. Two critical capabilities where efforts should be made to collaborate through private-sector enterprises and startups in both countries are UAVs geared specifically for ISR or multi-role missions and artillery systems such as towed artillery. For instance, the Indian defence company TASL has designed and developed the 155 mm/52mm Advanced Towed Artillery Gun System (ATAGS), which is equipped with advanced technologies in electronics and electrical and mechanical systems.[150] It can be tailored to user requirements, and the UAE's defence enterprises can be made a partner in a future upgrade programme or for

the development of a more advanced variant of the ATAGS. Beyond UAVs and towed artillery systems, both countries can collaborate in the development of Airbus C-295 medium-lift transport aircraft. Of the 56 C-295 jets, India has already received delivery of at least two, with 14 being built in Seville Spain.[151] The remaining 40 will be assembled and manufactured in India by TASL with native components.[152] There is an opportunity to plug UAE-based aeronautical companies such as Strata[153] and EDGE into the production and manufacturing of the C-295 that is being built in India. The EDGE group, for its part, has also signed an agreement with Brazil's Turbomachine, which is Brazil's top turbine development enterprise.[154] The agreement requires that both EDGE and Turbomachine work together to co-develop engines covering turbofans and propellent fans for EDGE' UAVs and missiles.[155] With India and the UAE forging key agreements with European and Brazilian aerospace makers, they must leverage these agreements to create greater synergy between the aerospace industries of the two countries. An additional area of cooperation can be greater synergy on propulsion systems for ships and submarines.

The UAE has been intensifying its focus on strengthening space defence capabilities, strategically emphasising military satellites and advanced space technologies.[156] This is exemplified by the recent MoU between the UAE Space Agency and the EDCC in May 2024 to collaborate on fostering business withing the aerospace and defence sectors.[157] India has also been stepping up its defence space efforts with the formation of the Defence Space Agency (DSA) in 2019, which was formed with the intent of creating a tri-services integrated Aerospace Command led by the Indian Air Force.[158] Through its indigenous space programme, India has launched communication satellites to improve its military communications capabilities; GSAT-7, a Navy-specific communication satellite, was launched in 2013, and GSAT-7A for the IAF was launched in 2018.[159] This puts both nations in a prime position for cooperation in the space domain. A precedent for this was already set in 2017, when ISRO launched the UAE's Nayif-1 nanosatellite after the signing of an MoU between ISRO and the UAE Space Agency.[160] Further space collaboration, particularly focused on defence applications, would help both countries fuel their ambitions in the domain and find common synergies.

Maritime Domain Awareness (MDA) and Underwater Domain Awareness (UDA) are critical areas that have witnessed growth due to the onset of emerging technologies. The Automatic Identification System (AIS), initially intended to prevent ship-to-ship collisions and manage maritime traffic, is now also being deployed through airborne and space-borne platforms for vessel monitoring.[161] Satellites are also helping extend MDA from near-coast to high seas by employing technologies like synthetic aperture radars (SAR) and electro-optics.[162] Consequently, the aforementioned space cooperation

between India and the UAE can also be extended to MDA. Collaboration on developing both traditional and underwater drones can also aid in enhancing MDA and UDA, benefitting both nations. A foundation for maritime cooperation has already been established between both nations through the Combined Maritime Forces (CMF), which is a naval partnership of 46 nations, including India and the UAE, intended to counter "illicit non-state actors" in the Persian Gulf, Gulf of Aden, and the Red Sea.[163] The Red Sea Crisis has highlighted the importance of MDA for both the UAE and India and demonstrated how building upon this foundation would be beneficial for both countries.

Technology is playing an increasingly crucial role in modern warfare; as such, defence R&D will play a dominant role in enhancing the defence industrial capabilities of any nation. One example of this is provided by the Russia-Ukraine War and the pivotal role played by Palantir. Palantir has become an unprecedented part of the day-to-day work of a wartime foreign government. Multiple Ukrainian agencies, such as its Ministries of Defense, Economy, and Education, are using Palantir's products.[164] Palantir's software, which uses artificial intelligence (AI) to analyse satellite imagery, open-source data, drone footage, and reports from the ground to present commanders with military options, has played a crucial role in giving Ukraine an advantage on the battlefield.[165] Additionally, Ukraine is using the company's data analytics for projects that go beyond battlefield intelligence, including collecting evidence of war crimes, clearing land mines, resettling displaced refugees, and rooting out corruption.[166] This goes to show how modern technology like drones, Low Earth Orbit (LEO) satellites, and AI are playing an increasingly prominent role in delivering a combat advantage on the battlefield.

In this context, a joint defence R&D fund between India and the UAE, with a focus on emerging technologies like AI, UAVs, quantum technology, EW systems, and hypersonic weapons, seems prudent. Most of these technologies require long-term investments and technical expertise, and it is an arduous task for any nation to pursue them in isolation. Both India and the UAE have proven capabilities in this domain and can reinforce each other's strengths. The UAE, with its vast investment capabilities and technical prowess, and India, with its sheer volume of talent, can provide an impetus for such an initiative. Co-investment and the development of joint platforms would further solidify the defence industrial base in both countries. The joint fund can involve public-sector entities from both nations, including DRDO, HAL, BEL, SIG4NL, and ADASI. It can also include private-sector corporations, startups, and academic institutions working in the field, such as the IITs from India and the TII from the UAE. The fund could be steered through the India-UAE JDCC, which has been actively pursuing defence cooperation between the two nations.

The establishment of tech research parks focused on defence R&D and tech commercialisation also presents a viable opportunity for both nations. Research parks can focus on R&D and innovation in defence tech while providing a collaborative platform for academia, government institutions, private-sector corporations, and startups by offering facilities like laboratories and training programmes. They can also provide funding opportunities, particularly for defence startups, which would provide a boost to innovation in emerging technologies like AI and space tech. The parks can be modelled along the lines of established research parks in the UAE such as the Sharjah Research, Technology and Innovation Park (SRTIP) and the United Arab Emirates University Science and Innovation Park (UAEU SIP).[167,168]

An important issue hindering defence cooperation between the countries stems from the lack of understanding in the UAE about India's defence systems, procedures, and markets. This is an issue that the JDCC must address. Additionally, establishing defence forums or dialogues with the involvement of officials from defence establishments on both sides and those from entities like EDGE and DRDO can help address this dilemma. An India-UAE Intergovernmental Agreement (IGA) on military-technical cooperation is necessary, mirroring what India currently has with the Russian Federation. The current India-Russia Inter-governmental Commission for Military & Military Technical Cooperation (IRIGC-M&MTC), which was initially led by the defence ministers of India and Russia and in 2021 upgraded to a 2+2 Foreign and Defence Ministers dialogue alongside Summit-level talks between the leaders, should be the model and institutionalised framework for an India-UAE defence cooperation.[169] This framework will help the leadership on both sides identify the aims of defence cooperation between the two countries.

The UAE and India must avoid succumbing to strategic chokes by Original Equipment Manufacturers (OEMs) and aim to prevent last-minute shortfalls in military weapons and supplies. Along with other elements, this can be done through an institutionalised framework, as currently exists between India and Russia. In a nutshell, an IRIGC-M&MTC agreement will help fast-track defence cooperation between the UAE and India.

The UAE remains frustrated with India's defence bureaucracy, which has moved too slowly to enable deeper defence cooperation between the two countries. Overcoming bureaucratic inertia is a key stepping stone for achieving progress. This is particularly important because both countries are located in strategically volatile neighbourhoods. The Houthi attacks brought home the vulnerabilities the UAE faces. For the Emiratis, getting timely supplies from partners and allies has been a key problem in dealing with the threats and armed conflicts it confronts. A strong UAE-India defence relationship

will help overcome supply-related problems as both countries are exploring ways to divest dependence on Western defence technology and capabilities.

Another recent example, of India-US defence cooperation, provides a possible framework for India-UAE collaboration. India and the US launched the iCET in January 2023, which serves as an umbrella framework for technology cooperation, covering both commercial and defence technologies.[170] Subsequently, the India-US Defence Acceleration Ecosystem (INDUS-X) was launched in June 2023 to coordinate efforts in defence innovation in technology, systems, and products and has advanced both countries' commitment to building a defence innovation bridge under iCET.[171] The iCET and INDUS-X initiatives have proven to be an effective model for collaboration and provide a viable opportunity for India and the UAE to pursue defence cooperation along similar lines.

A recent example of burgeoning defence cooperation is provided by South Korea, which has emerged as one of the world's fastest growing defence exporters, gaining prominence on the global stage. Embracing a vision to elevate the nation to the status of a "Global Pivotal State", South Korea rose from 31st place in 2000 to become one of the world's top 10 defence exporters between 2019 and 2023.[172] The South Korean government has grown its defence exports, which achieved their highest value in 2022. In 2023, South Korea's arms exports reached approximately US$14 billion, marking a decrease from US$17.3 billion in 2022.[173] Despite this decline, South Korean defence exports in 2023 achieved successful diversification, expanding its exports to 12 countries, up from four countries previously, while the types of weapons systems exported doubled from six to 12 in 2023.[174] South Korea's diverse customer base now spans multiple regions from the Indo-Pacific, including Australia and Southeast Asia, the Middle East, and Europe, for selling a variety of items including tanks, howitzers, warplanes, Multiple Rocket Launcher Systems, armoured vehicles, and offshore patrol vessels.[175] Furthermore, arms sales play an increasingly significant role in facilitating South Korea's defence cooperation by encompassing provisions for equipment and parts, training programs, and joint development efforts, extending beyond the sale of weapons.[176]

Based on close cooperation between the government and businesses and supported by bipartisan backing, arms manufacturers like Hanwha Aerospace, Korean Aerospace Industries (KAI), Hyundai Rotem, and LIG Nex1 are now competitive enough to make their presence felt in the global defence market.[177]

South Korea has established itself as a desirable defence industry partner globally due to its technological prowess, mass-production capacity, quick turnaround, competitive pricing, and reliable aftersales maintenance. South Korea also offers local production and joint development, providing generous opportunities for technology transfer.[178] A notable example came in 2023, when Hanwha Aerospace secured a US$2.4 billion contract with Australia to supply 129 Redback infantry fighting vehicles (IFVs).[179] South Korea adapted its K21 to the Australian-specific AS21 Redback IFV and manufactured it in Australia, thereby benefiting the local economy and the national defence industry. Both India and the UAE stand to benefit from the example set by South Korea.

In a rapidly evolving global security landscape, deepening defence industry cooperation between India and the UAE stands as a strategic imperative. A stronger strategic focus is necessary to deepen cooperation, and the business and commercial industry in both countries need to be involved to build and consolidate the defence relationship. By leveraging each other's strengths—India's burgeoning defence manufacturing capabilities and talent pool and the UAE's advanced technological infrastructure and capital—this partnership has the potential to not only enhance their respective defence sectors but also fortify regional security frameworks. Such collaboration can lead to joint development projects, technology transfers, and capacity building, ultimately positioning both countries as key players in the global defence market.

Endnotes

1 Mordor Intelligence, *Indian Defence Market Size & Share Analysis – Growth Trends & Forecasts (2024-2032)*, https://www.mordorintelligence.com/industry-reports/india-defense-market

2 Global Data, *Indian Defence Market Size, Trends, Budget Allocation, Regulations, Acquisitions, Competitive Landscape and Forecast to 2029,* 2023, https://www.globaldata.com/store/report/india-defense-market-analysis/

3 Pieter D. Wezeman et al., "Trends in International Arms Transfers, 2023," *Stockholm International Peace Research Institute,* March 2024, https://www.sipri.org/sites/default/files/2024-03/fs_2403_at_2023.pdf

4 Wezeman et al., "Trends in International Arms Transfers, 2023"

5 Wezeman et al., "Trends in International Arms Transfers, 2023"; Shianglao Sun, "Share of defence import to India from 2019 to 2023, by country of origin," *Statista,* March 27, 2024, https://www.statista.com/statistics/1345382/india-share-of-defense-import-by-country/

6 Sameer Patil, "A Defence Industrial Agenda for India," *Gateway House,* July, 2020, https://www.gatewayhouse.in/wp-content/uploads/2020/08/Defense-Industrial-Agenda_Sameer-Patil_2020_Final.pdf

7 Patil, "A Defence Industrial Agenda for India"

8 Krishn Kaushik, "Israel's Military Exports To Top Buyer India Unaffected By Gaza War," *Reuters,* February 23, 2024, https://www.reuters.com/business/aerospace-defense/israels-military-exports-top-buyer-india-unaffected-by-gaza-war-2024-02-23/

9 Azad Essa, "India and Israel: The Arms Trade in Charts and Numbers," *Middle East Eye,* May 31, 2022, https://www.middleeasteye.net/news/india-israel-arms-trade-numbers

10 Essa, "India and Israel: The Arms Trade in Charts and Numbers"

11 Patil, "A Defence Industrial Agenda for India"

12 Essa, "India and Israel: The Arms Trade in Charts and Numbers"

13 Bhaswar Kumar, "Rafale M Fighter Deal: How Navy's Rafale Will Be Different from Air Force's," *Business Standard,* May 29, 2024, https://www.business-standard.com/external-affairs-defence-security/news/rafale-m-fighter-deal-how-will-navy-s-rafale-be-different-from-air-force-s-124052901257_1.html

14 Kumar, "Rafale M Fighter Deal: How Navy's Rafale Will Be Different from Air Force's"

15 Patil, "A Defence Industrial Agenda for India"

16 Patil, "A Defence Industrial Agenda for India"

17 Patil, "A Defence Industrial Agenda for India"

18 Ministry of Defence, Government of India, *Defence Acquisition Procedure 2020* (New Delhi: Ministry Of Defence, September 30, 2020), https://www.mod.gov.in/sites/default/files/DAP2030new.pdf

19 Ministry of Defence, Government of India, *Defence Acquisition Procedure 2020*, 2.

20 Ministry Of Defence, Government of India, https://pib.gov.in/newsite/PrintRelease.aspx?relid=177295

21 Ministry of Defence, Government of India, https://pib.gov.in/PressReleasePage.aspx?PRID=1737191

22 Krishn Kaushik, "Rs 45k-crore Submarine Project: Mazagon Dock, L&T In, Adani Out," *The Indian Express*, January 22, 2020, https://indianexpress.com/article/india/rs-45k-crore-submarine-project-mazagon-dock-lt-in-adani-out-6228865/

23 Ministry of Defence, Government Of India, https://pib.gov.in/newsite/PrintRelease.aspx?relid=168797

24 Department of Defence Production, Government of India, "Innovations For Defence Excellence (iDEX)," https://www.makeinindiadefence.gov.in/pages/innovations-for-defence-excellence-idex-

25 Ministry of Defence, Government of India, https://pib.gov.in/PressReleasePage.aspx?PRID=1906339

26 Ministry Of Defence, Government of India, https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1945710

27 Patil, "A Defence Industrial Agenda for India"

28 Girish Luthra, "The India-US Defence Technology and Industrial Cooperation: It's time for delivery," Observer Research Foundation, February 26, 2024, https://www.orfonline.org/research/the-india-us-defence-technology-and-industrial-cooperation-its-time-for-delivery

29 Luthra, "The India-US Defence Technology and Industrial Cooperation: It's time for delivery"

30 Patil, "A Defence Industrial Agenda for India"

31 Albert Vidal Ribe, "UAE Eyes Regional Edge On Arms Exports," *International Institute for Strategic Studies (IISS),* November 14, 2023, https://www.iiss.org/en/online-analysis/military-balance/2023/11/uae-eyes-regional-edge-on-arms-exports/

32 Andrew Drwiega, "Gulf Defense Industry Moves into High Gear," *Asian Military Review,* May 17, 2023, https://www.asianmilitaryreview.com/2023/05/gulf-defence-industry-moves-into-high-gear/

33 Drwiega, "Gulf Defense Industry Moves into High Gear"

34 "Emirates Defence Industries Company Launched," *Mubadala,* December 2, 2014, https://www.mubadala.com/en/news/emirates-defence-industries-company-launched

35 Ribe, "UAE Eyes Regional Edge on Arms Exports"

36 Drwiega, "Gulf Defense Industry Moves into High Gear"

37 Ribe, "UAE Eyes Regional Edge on Arms Exports"

38 Drwiega, "Gulf Defense Industry Moves into High Gear"

39 Drwiega, "Gulf Defense Industry Moves into High Gear"

40 Ribe, “UAE Eyes Regional Edge on Arms Exports”

41 Ribe, “UAE Eyes Regional Edge on Arms Exports”

42 “EDGE Group Marks Start Of UMEX 2024 With the Launch Of New Advanced Autonomous Air And Land Solutions,” *EDGE,* January 23, 2024, https://edgegroup.ae/news/edge-group-marks-start-umex-2024-launch-new-advanced-autonomous-air-and-land-solutions

43 Ribe, “UAE Eyes Regional Edge on Arms Exports”

44 “UAE Defense Industry: Missiles & Weapons (Projects & Exports),” *Tactical Report,* February 14, 2024, https://www.tacticalreport.com/in-depth/62530-uae-defense-industry-missiles-weapons-projects-and-exports

45 Ribe, “UAE Eyes Regional Edge on Arms Exports”

46 Ribe, “UAE Eyes Regional Edge on Arms Exports”

47 Ribe, “UAE Eyes Regional Edge on Arms Exports”

48 Ribe, “UAE Eyes Regional Edge on Arms Exports”

49 “EDGE Entity Al Tariq Signs MoU With Bharat Dynamics,” *European Defence Review Magazine,* February 17, 2023, https://www.edrmagazine.eu/edge-entity-al-tariq-signs-mou-with-bharat-dynamics

50 “EDGE Signs MoU With HAL To Explore Business Cooperation,” *EDGE,* February 21, 2023, https://edgegroup.ae/news/edge-signs-mou-hal-explore-business-cooperation

51 Ribe, “UAE Eyes Regional Edge on Arms Exports”

52 “Localisation Of the Defence Industry In the UAE; New Players and Initiatives at the Forefront Of the Change,” Army Technology, July 5, 2024, https://www.army-technology.com/analyst-comment/localisation-defence-industry-uae-new-players-initiatives-forefront-change/?cf-view

53 “Localisation of the Defence Industry in the UAE; New Players and Initiatives at the Forefront of the Change”.

54 “Localisation of the Defence Industry in the UAE; New Players and Initiatives at the Forefront of the Change”.

55 “Localisation of the Defence Industry in the UAE; New Players and Initiatives at the Forefront of the Change”.

56 “Emirates Defence Companies Council,” https://www.edcc.gov.ae/

57 “Localisation of the Defence Industry in the UAE; New Players and Initiatives at the Forefront of the Change”

58 Prasanta Kumar Pradhan, ““Partners in Progress”: The Transformation of the India-UAE Relationship,” Manohar Parikkar Institute For Defence Studies And Analyses, February 20, 2024, https://www.idsa.in/issuebrief/Transformation-of-the-India-UAE-Relationship-PKPradhan-200224

59 Pradhan, ““Partners in Progress”: The Transformation of the India-UAE Relationship”

60 Pradhan, ““Partners in Progress”: The Transformation of the India-UAE Relationship”

61 Pradhan, ""Partners in Progress": The Transformation of the India-UAE Relationship"

62 "India, Russia Agree to Export BrahMos Missiles to Third Countries – Spokesman," *Russian News Agency,* May 27, 2016, https://tass.com/defense/878650

63 Rajat Pandit, "India Draws Up Nations' List For Akash, BrahMos Export," *The Times Of India,* January 7, 2021, https://timesofindia.indiatimes.com/india/india-draws-up-nations-list-for-akash-brahmos-export/articleshow/80144307.cms

64 Ministry Of Defence, Government of India, https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1989502

65 Alvite Ningthoujam, "India's Defence Diplomacy In the Gulf Is Growing," *The Diplomat,* May 18, 2023, https://thediplomat.com/2023/05/indias-defense-diplomacy-in-the-gulf-is-growing/

66 "India UAE Bilateral Defence Cooperation," Embassy of India, United Arab Emirates, https://www.indembassyuae.gov.in/defence-relation.php

67 "India UAE Bilateral Defence Cooperation"

68 Ningthoujam, "India's Defence Diplomacy in the Gulf Is Growing"

69 Ministry Of Defence, Government of India, https://pib.gov.in/PressReleaseIframePage.aspx?PRID=2031839

70 Ministry Of Defence, Government of India, https://pib.gov.in/PressReleaseIframePage.aspx?PRID=2031839

71 Ministry Of Defence, Government of India, https://pib.gov.in/PressReleaseIframePage.aspx?PRID=2031839

72 Ministry Of Defence, Government of India, https://pib.gov.in/PressReleaseIframePage.aspx?PRID=2031839

73 Ministry of Defence, Government of India, https://pib.gov.in/PressReleaseIframePage.aspx?PRID=2031839

74 "India, UAE's Drill 'Desert Cyclone' Ends In Bikaner," *The Times Of India,* January 17, 2024, https://timesofindia.indiatimes.com/city/jaipur/india-and-uaes-joint-military-exercise-desert-cyclone-in-rajasthan/articleshow/106913015.cms

75 "India, France, UAE Conduct Mega Air Exercise Over Arabian Sea," *The Hindu,* January 24, 2024, https://www.thehindu.com/news/national/india-france-uae-conduct-mega-air-exercise-over-arabian-sea/article67771972.ece

76 Snehesh Alex Philip, "UAE Firm Ties Up With Indian Company To Sell Rifles After Losing Out On Army's Mega Carbine Deal," *The Print,* October 19, 2022, https://theprint.in/defence/uae-firm-ties-up-with-indian-company-to-sell-rifles-after-losing-out-on-armys-mega-carbine-deal/1174023/

77 Snehesh Alex Philip, "Govt Plans To Scrap 2 Defence Deals Under Foreign Procurement, Could Go 'Atma Nirbhar' Way," *The Print,* September 15, 2020, https://theprint.in/defence/govt-plans-to-scrap-2-defence-deals-under-foreign-procurement-could-go-atma-nirbhar-way/503522/

78 Philip, "Govt Plans to Scrap 2 Defence Deals Under Foreign Procurement, Could Go 'Atma Nirbhar' Way"

79 Huma Siddiqui, "CARACAL Expands Small Arms Offerings And Local Manufacturing In India," *Financial Express,* October 30, 2023, https://www.financialexpress.com/business/defence-caracal-expands-small-arms-offerings-and-local-manufacturing-in-india-3291665/

80 "3 More Rafales Land In India; IAF Thanks UAE For Mid-Air Refueling," *Hindustan Times,* March 31, 2021, https://www.hindustantimes.com/india-news/3-more-rafales-land-in-india-iaf-thanks-uae-for-mid-air-refueling-101617214561574.html

81 "Appreciate Air-To-Air Refueling Of Our Su-30 MKI Aircraft By UAE's Air Force, Says IAF," *The Economic Times,* June 24, 2022, https://economictimes.indiatimes.com/news/defence/appreciate-air-to-air-refuelling-of-our-su-30-mki-aircraft-by-uaes-air-force-says-iaf/articleshow/92443215.cms?from=mdr

82 Anirban Bhaumik, "India, France, UAE Adopt Roadmap For 'Rafale Forum'," *Deccan Herald,* February 5, 2023, https://www.deccanherald.com/india/india-france-uae-adopt-roadmap-for-rafale-forum-1187872.html

83 "Defence Budget 2024 Comparison: How India's defence allocation for armed forces stack up against China and Pakistan," *The Economic Times,* July 24, 2024, https://economictimes.indiatimes.com/news/defence/defence-budget-2024-how-indias-defence-allocation-for-armed-forces-stack-up-against-china-and-pakistan/articleshow/111986250.cms?from=mdr

84 Harry McNeil, "UAE's military modernisation escalates amidst regional unrest," Army Technology, April 8, 2024, https://www.army-technology.com/news/uaes-military-modernisation-escalates-amidst-regional-unrest/?cf-view

85 Global Data, "United Arab Emirates (UAE) Defense Market Size, Trends, Budget Allocation, Regulations, Acquisitions, Competitive Landscape and Forecast to 2029," March 25, 2024, https://www.globaldata.com/store/report/uae-defense-market-analysis/?_gl=1*1ul50bm*_ga*MTI4NzU0NTQxMS4xNzIyMzQ3MzM0*_ga_WVVYGYVBZB*MTcyMjM1ODk3Ny4yLjEuMTcyMjM1ODk5My40NC4wLjA.

86 Laxman Kumar Behera, "The State of India's Public Sector Defence Industry," Observer Research Foundation, October 2023, https://www.orfonline.org/research/the-state-of-indias-public-sector-defence-industry#_ednref44

87 Laxman Kumar Behera, "India's Defence Industry: Achievements and Challenges," Observer Research Foundation, May 2024, https://www.orfonline.org/research/india-s-defence-industry-achievements-and-challenges

88 Wezeman et al., "Trends in International Arms Transfers, 2023"

89 Behera, "The State of India's Public Sector Defence Industry".

90 Defence Research and Development Organisation (DRDO), "HUMSA," https://www.drdo.gov.in/drdo/humsa

91 Defence Research and Development Organisation (DRDO), "ALTAS," https://www.drdo.gov.in/drdo/altas

92 "Top Defence Chief Gives Big Update On India-Made Gun Systems Order," *NDTV,* January 25, 2024, https://www.ndtv.com/india-news/orders-for-india-made-artillery-gun-system-to-be-placed-before-march-31-drdo-chief-4929359

93 Lok Sabha, "Defence Aircraft and Helicopters," Unstarred Question No. 2270, Answered on July 29, 2022

94 Laxman Kumar Behera, "Examining India's Defence Innovation Performance," *Journal of Strategic Studies* 44, no. 6 (2021): 832.

95 Goa Shipyard Limited, "Naval Offshore Patrol Vessel (NOPV)," https://goashipyard.in/products/product-history/naval-offshore-patrol-vessel-nopv/

96 Goa Shipyard Limited, "Naval Offshore Patrol Vessel (NOPV)"

97 "Three anti-submarine warfare ships for Indian Navy launched at Cochin Shipyard," *The Hindu,* November 30, 2023, https://www.thehindu.com/news/national/kerala/three-anti-submarine-warfare-ships-for-indian-navy-launched-at-cochin-shipyard/article67590173.ece

98 "Three anti-submarine warfare ships for Indian Navy launched at Cochin Shipyard".

99 Rahul Singh, "India must raise defence R&D spending to become global leader: House panel," *Hindustan Times,* December 21, 2023, https://www.hindustantimes.com/india-news/india-must-raise-defence-r-d-spending-to-become-global-leader-house-panel-101703144713429.html

100 Ministry of Defence, Government of India, *Standing Committee on Defence – 2022-2023*, (*Thirty Sixth Report, Seventeenth Lok Sabha)* (New Delhi: Ministry of Defence, March 2023),10, https://loksabhadocs.nic.in/lsscommittee/Defence/17_Defence_36.pdf; Ministry of Defence, Government of India, *Standing Committee on Defence – 2023-2024*, (*Forty Third Report, Seventeenth Lok Sabha)* (New Delhi: Ministry of Defence, December 2023), 5, https://eparlib.nic.in/bitstream/123456789/2963533/1/17_Defence_43.pdf

101 Ministry of Defence, Government of India, *Standing Committee on Defence – 2022-2023, Thirty Sixth Report,* 10.

102 Ministry of Defence, Government of India, *Standing Committee on Defence – 2022-2023, Thirty Sixth Report.*

103 Wezeman et al., "Trends in International Arms Transfers, 2023"

104 Zoltan Barany, "Indigenous Defense Industries in the Gulf," Center for Strategic and International Studies (CSIS), April 24, 2020, https://www.csis.org/analysis/indigenous-defense-industries-gulf

105 Barany, "Indigenous Defense Industries in the Gulf".

106 Barany, "Indigenous Defense Industries in the Gulf".

107 Barany, "Indigenous Defense Industries in the Gulf".

108 Lucie Beraud-Sudreau, "What the new EDGE in the UAE's defence – industrial development could mean," Military Balance Blog, International Institute of Strategic Studies, November 23, 2023, https://www.iiss.org/en/online-analysis/military-balance/2019/11/edge-uae-defence-industrial-development/#:~:text=In%20early%20November%202019%2C%20the,landscape%20of%20the%20Middle%20East

109 International Trade Administration, "United Arab Emirates – Country Commercial Guide," https://www.trade.gov/country-commercial-guides/united-arab-emirates-defense

110 "ADSB wins contract to deliver four patrol vessels to UAE Navy," Naval Technology, May 19, 2021, https://www.naval-technology.com/news/adsb-contract-patrol-vessels-uae-navy/?cf-view&cf-closed

111 "ADSB begins construction of UAE Navy's Falaj 3-class ship," Naval Technology, January 3, 2023, https://www.naval-technology.com/news/adsb-uae-navys-falaj-3/?cf-view&cf-closed

112 "ADSB begins construction of UAE Navy's Falaj 3-class ship".

113 "ST Engineering to support construction of UAE Navy's Falaj 3 Class OPVs," Naval Technology, November 16, 2021, https://www.naval-technology.com/news/st-engineering-falaj-3-opvs-support/?cf-view&cf-closed

114 "Fearless Class," *Naval Technology,* April 3, 2000, https://www.naval-technology.com/projects/fearless/

115 Barany, "Indigenous Defense Industries in the Gulf".

116 Barany, "Indigenous Defense Industries in the Gulf".

117 "Algeria has developed NIMR II Special Forces Operations 4X4 vehicle," *armyrecognition.com,* January 3, 2022, https://armyrecognition.com/focus-analysis-conflicts/army/defence-security-industry-technology/algeria-has-developed-nimr-ii-special-forces-operations-4x4-vehicle

118 Barany, "Indigenous Defense Industries in the Gulf".

119 Dominic Perry, "UAE targets domestic development of VRT light helicopters as Russian partnership dissolved," *Flightglobal.com,* November 21, 2023, https://www.flightglobal.com/airframers/uae-targets-domestic-development-of-vrt-light-helicopters-as-russian-partnership-disolved/155922.article

120 Barany, "Indigenous Defense Industries in the Gulf".

121 Barany, "Indigenous Defense Industries in the Gulf".

122 "United Arab Emirates – Country Commercial Guide.

123 International Trade Administration, "United Arab Emirates – Country Commercial Guide"

124 International Trade Administration, "United Arab Emirates – Country Commercial Guide"

125 "UAE EDGE Group Ranked Among The Top 25 Military Companies in the World," *Defence Procurement International,* December 15, 2020, https://www.defenceprocurementinternational.com/news/maritime/edge-has-been-named-among-the-top-25-military-suppliers-in-the-world-by-sipri

126 Wezeman et al."Trends in International Arms Transfers, 2023"

127 International Trade Administration, "United Arab Emirates – Country Commercial Guide"

128 International Trade Administration, "United Arab Emirates – Country Commercial Guide"

129 International Trade Administration, "United Arab Emirates – Country Commercial Guide"

130 "International Arms Transfers Database," Stockholm International Peace Research Institute (SIPRI), March 11, 2024, https://www.sipri.org/databases/armstransfers

131 "International Arms Transfers Database".

132 "Edge and Adani Defence & Aerospace sign Landmark Cooperation Agreement in Defence & Security," *EDGE,* June 11, 2024, https://edgegroup.ae/news/edge-and-adani-defence-aerospace-sign-landmark-cooperation-agreement-defence-security

133 "Edge and Adani Defence & Aerospace sign Landmark Cooperation Agreement in Defence & Security".

134 "Edge and Adani Defence & Aerospace sign Landmark Cooperation Agreement in Defence & Security."

135 "BEL wins orders worth Rs. 4,300 Cr from Indian Army and India Navy," *Bharat Electronic Limited (BEL),* March 24, 2024, https://bel-india.in/news-bel/bel-wins-orders-worth-rs-4300-cr-from-indian-army-and-indian-navy/; "MoD signs 10 contracts worth Rs. 5,498 Cr with BEL for Indian Armed Forces," *Bharat Electronic Limited (BEL),* March 30, 2023, https://bel-india.in/news-bel/mod-signs-10-contracts-worth-rs-5498-cr-with-bel-for-indian-armed-forces/

136 Dinaker Peri, "India delivers first batch of BrahMos to Philippines," *The Hindu,* April 20, 2024, https://www.thehindu.com/news/national/india-delivers-first-batch-of-brahmos-to-philippines/article68084161.ece

137 "Indian Steel Industry: December 2023 – A trend Report," JP Morgan India, December 2023: 2, https://jpcindiansteel.nic.in/writereaddata/files/Trend%20Report%20December%202023.pdf

138 "Indian Steel Industry: December 2023 – A trend Report".

139 "Breaking RSA Encryption – An Update On the State-of-the-Art," *QuintessenceLabs,* June 13, 2019, https://www.quintessencelabs.com/blog/breaking-rsa-encryption-update-state-art

140 "NIST Releases First 3 Finalized Post-Quantum Encryption Standards," *NIST,* August 13, 2024, https://www.nist.gov/news-events/news/2024/08/nist-releases-first-3-finalized-post-quantum-encryption-standards

141 Gabriel Honrada, "India Aims To Rival China In Quantum Computing," *Asia Times,* March 4, 2022, https://asiatimes.com/2022/03/india-aims-to-rival-china-in-quantum-computing/

142 Harsh V. Pant and Kartik Bommakanti, "Towards the Integration Of Emerging Technologies In India's Armed Forces," Observer Research Foundation, February 24, 2023, https://www.orfonline.org/research/towards-the-integration-of-emerging-technologies-in-india-s-armed-forces

143 Technology Innovation Institute, "Quantum Communications," https://www.tii.ae/quantum/our-research/quantum-communications

144 Amjad Saleh and Tariq Al Fahaam, "Technology Innovation Institute Unveils Abu Dabhi Quantum Optical Ground Station For Ultra-secure Global Communications," *Emirates News Agency – WAM,* March 8, 2024, https://www.wam.ae/en/article/b21h8f8-technology-innovation-institute-unveils-abu-dhabi

145 Prateek Tripathi, "How Hypersonic Weapons Are Redefining Warfare," Observer Research Foundation, May 2, 2024, https://www.orfonline.org/expert-speak/how-hypersonic-weapons-are-redefining-warfare

146 "UAE-Hypersonic: A Deal With the U.S. Drawing Closer?," *Tactical Report,* April 22, 2024, https://www.tacticalreport.com/daily/62683-uae-hypersonic-a-deal-with-the-us-drawing-closer

147 "Indian Armed Forces To Integrate Indigenous 'Tapas' Drones Despite Past Challenges," *Financial Express,* June 24, 2024, https://www.financialexpress.com/business/defence-indian-armed-forces-to-integrate-indigenous-tapas-drones-despite-past-challenges-3533329/

148 "India's First Indigenous Bomber UAV Unveiled In Bengaluru," *Times Of India,* May 3, 2024, https://timesofindia.indiatimes.com/india/indias-first-indigenous-bomber-uav-unveiled-in-bengaluru/articleshow/109814474.cms

149 Abhijeet Kumar, "Indian Army Gets First Indigenous Suicide Drones With Reusable Technology," *Business Standard,* June 14, 2024, https://www.business-standard.com/external-affairs-defence-security/news/indian-army-gets-first-indigenous-suicide-drones-with-reusable-technology-124061400184_1.html

150 "Advanced Towed Artillery System," Tata Advanced Systems Limited (TASL).

151 "IAF takes delivery of second C295 transport aircraft," *The Economic Times,* May 4, 2024, https://economictimes.indiatimes.com/news/defence/iaf-takes-delivery-of-second-c295-transport-aircraft/articleshow/109831073.cms?from=mdr

152 Rahul Singh, "Indian Air Force takes delivery of first C-295 aircraft from Airbus in Spain," *Hindustan Times,* September 13, 2023, https://www.hindustantimes.com/india-news/indian-air-force-takes-delivery-of-first-c-295-aircraft-from-airbus-in-spain-101694598324876.html

153 "Strata: A Mudabala Company," https://www.strata.ae/

154 "EDGE Signs Strategic Agreement with Brazilian Aero Engine Developer, Turbomachine," *EDGE,* August 11, 2023, https://edgegroup.ae/news/edge-signs-strategic-agreement-brazilian-aero-engine-developer-turbomachine

155 "EDGE Signs Strategic Agreement with Brazilian Aero Engine Developer, Turbomachine".

156 "UAE: Space Defense Projects Open For Asian Defense Companies," *Tactical Report,* September 12, 2024, https://www.tacticalreport.com/daily/62988-uae-space-defense-projects-open-for-asian-defense-companies

157 "UAE Space Agency And EDCC To Foster Collaboration In Aerospace And Defence," *Times Aerospace,* May 29, 2024, https://www.timesaerospace.aero/news/air-transport/uae-space-agency-and-edcc-to-foster-collaboration-in-aerospace-and-defence

158 Neelam Mathews, "As Space Security Scares Mount, India Works On Military Space Capabilities," *The Wire,* March 29, 2024, https://thewire.in/space/as-space-security-scares-mount-india-works-on-military-space-capabilities

159 Mathews, "As Space Security Scares Mount, India Works On Military Space Capabilities"

160 Pradhan, ""Partners in Progress": The Transformation of the India – UAE Relationship"

161 Vice Admiral A.K. Chawla, "Maritime Domain Awareness (MDA) In the Indo-Pacific And the Way Ahead For Indo-Pacific Partnership For MDA (IPMDA)," Vivekananda International Foundation, June 27, 2023, https://www.vifindia.org/article/2023/june/27/Maritime-Domain-Awareness-in-the-Indo-Pacific-and-the-Way-Ahead

162 Chawla, "Maritime Domain Awareness (MDA) In the Indo-Pacific and the Way Ahead for Indo-Pacific Partnership for MDA (IPMDA)"

163 U.S. Naval Forces Central Command, "Combined Maritime Forces," https://www.cusnc.navy.mil/Combined-Maritime-Forces/

164 Vera Bergengruen, "How Tech Giants Turned Ukraine Into an AI War Lab," *Time,* February 8, 2024, https://time.com/6691662/ai-ukraine-war-palantir/

165 Bergengruen, "How Tech Giants Turned Ukraine into an AI War Lab"

166 Bergengruen, “How Tech Giants Turned Ukraine into an AI War Lab”

167 “Sharjah Research Technology and Innovation Park,” https://srtip.ae/

168 “United Arab Emirates University Science And Innovation Park,” https://www.iasp.ws/our-members/directory/@334801/united-arab-emirates-university-science-and-innovation-park

169 Ministry of External Affairs, “India-Russia Relations”.

170 Luthra, “The India-US Defence Technology and Industrial Cooperation: It’s Time for Delivery,”

171 Luthra, “The India-US Defence Technology and Industrial Cooperation: It’s Time for Delivery”

172 “Trends in International Arms Transfers, 2023”

173 Eun-Jung Kim, “S. Korea’s Arms Exports Amount To Nearly $14 Bln In 2023,” *Yonhap News Agency,* December 20, 2023, https://en.yna.co.kr/view/AEN20231220004900315

174 Shinae Lee, “Global Pivotal State: South Korea’s Ascendance In Defence Exports,” Sasakawa Peace Foundation, April 12, 2024, https://www.spf.org/iina/en/articles/lee_04.html

175 Lee, “Global Pivotal State: South Korea’s Ascendance in Defence Exports”

176 Hoshik Nam and Wilder Alejandro Sanchez, “South Korea’s Role As a Major Arms Exporter: Future Prospects In Latin America,” *War On The Rocks,* August 21, 2024, https://warontherocks.com/2024/08/south-koreas-growing-role-as-a-major-arms-exporter-future-prospects-in-latin-america/#:~:text=U.S.%20industries%20are%20not%20the,defense%20technology%20to%2012%20countries.

177 Lee, “Global Pivotal State: South Korea’s Ascendance in Defence Exports”

178 Lee, “Global Pivotal State: South Korea’s Ascendance in Defence Exports”

179 Lee, “Global Pivotal State: South Korea’s Ascendance in Defence Exports”

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