



# INDUS-X

## Impact Report

The Year of Breakthroughs

# Table of Contents

<b>1</b>	Executive Summary	<b>02</b>
<b>2</b>	DIO and DIU: Champions of India-U.S. Defence Collaboration	<b>03</b>
<b>3</b>	The Trajectory of INDUS-X: A Tale of Shared Vision	<b>04</b>
<b>4</b>	Pillars of INDUS-X: Foundations for Bilateral Collaboration	<b>06</b>
<b>5</b>	Moments of Triumph: Celebration Corner	<b>13</b>
<b>6</b>	Power of Partnerships: INDUS-X for the World	<b>15</b>

# Executive Summary

The story of INDUS-X is a testament to the power of shared vision, collaboration, innovation and deepening defence cooperation. It highlights how visionary minds from different backgrounds can come together to create an ecosystem that not only addresses current defence challenges but also paves the way for future advancements in deep-tech domains.

Launched in June 2023 during the State Visit of the Hon'ble Prime Minister of India to the United States, the India-U.S. Defense Acceleration Ecosystem (INDUS-X) symbolizes a significant advancement in strengthening strategic technology alliances and promoting closer defence industrial cooperation between the governments, industries, and academic institutions of India and the United States. Innovations for Defence Excellence (iDEX) and the Office of the Secretary of Defense (OSD) are leading the INDUS-X initiative for the Indian Ministry of Defence (MoD) and the U.S. Department of Defense (DoD), respectively.

The INDUS-X framework has made significant progress toward achieving the objectives outlined in the INDUS-X Factsheet. The exchange of information between the government and the private sector has accelerated, leading to the integration of the defence industrial supply chains of both countries. iDEX and the U.S. (DoD) are in regular dialogue, collaborating to create pathways for the advancement of the INDUS-X initiative. Several initiatives have been successfully launched and recognized, including the INDUS-X Joint IMPACT Challenges, Gurukul Educational Series, and workshops to facilitate academia-startup partnerships between institutions such as the Indian Institute of Technology (IIT) Kanpur and Penn State University. Additionally, workshops engaging academia, industry, and startups have been organised by the Indian Institute of Sciences (IISc), Penn State University, and the Indian Space Association (ISpA). Moreover, accelerator workshops by Hacking for Allies (H4X), FedTech, and IIT Hyderabad have further contributed to the initiative's progress.

INDUS-X has also established networks among industry, startups, venture capital, academia, and policymakers. A series of industry summits and idea conclaves have emerged alongside government dialogues, weaving together a network of stakeholders from the private and public sectors. iDEX and the Defense Innovation Unit (DIU) have also launched two Joint IMPACT Challenges on Maritime ISR and Underwater Communications.

Over the past year, INDUS-X has significantly strengthened the India-U.S. defense relationship by fostering strategic technology partnerships and defence industrial cooperation. By promoting accelerated innovations, facilitating industrial partnerships, and funding initiatives to jointly support startups and Medium and Small Scale Enterprises (MSMEs) in both nations, INDUS-X is poised to become a cornerstone of the India-U.S. defense partnership. This initiative is set to drive technological advancements and contribute to global security in the years to come.

# ***DIO, U.S. DoD and DIU: Champions of India-U.S. Defence Collaboration***

*Discover the mission, values, and ground breaking work of the Defence Innovation Organization (DIO), U.S. Department of Defence (DoD) and the Defense Innovation Unit (DIU).*

## ***About iDEX-DIO***

iDEX is a pivotal initiative aimed at realizing the vision of a self-reliant and self-sufficient India. Launched in 2018, iDEX offers a robust platform for budding defence entrepreneurs across the nation, supporting them in the development of cutting-edge technologies. This initiative operates on principles of rapid prototyping and the swift delivery of high-end technologies, typically within a span of 12-24 months, to meet the operational demands of warfighters.

iDEX provides grants of up to \$3 million to winners of various challenges, encouraging innovation across multiple domains, including maritime, space, ISR (Intelligence, Surveillance, and Reconnaissance), cybersecurity, and autonomous systems. These challenges are designed to address the specific requirements of the Indian Armed Forces.

Winners of the iDEX challenges benefit from a co-creation and co-innovation model, with Mission Partners actively involved in reviewing progress and providing support. By fostering the development of frontier technologies, iDEX ensures that India's defence sector remains at the forefront of innovation, meeting the evolving needs of its armed forces efficiently and effectively.

## ***About U.S. DoD***

The Department of Defense is America's largest government agency, with a military history dating back to pre-Revolutionary times. Its mission is to provide the military forces necessary to deter war and ensure national security. The Office of the Secretary of Defense (OSD) is responsible for policy development, planning, resource management and program evaluation.

## ***About DIU***

The Defense Innovation Unit (DIU) serves as a bridge between the DoD and the technology community, fostering partnerships that bring cutting-edge solutions to defence challenges. DIU partners with organizations across the Department of Defense (DoD) to rapidly prototype and field dual-use capabilities that solve operational challenges at speed and scale. With offices in Silicon Valley, Boston, Austin, Chicago and inside the Pentagon, DIU is the Department's gateway to leading technology companies across the country.

DIU is focused exclusively on fielding and scaling commercial technology across the U.S. military at commercial speeds. Their expert team, working in seven critical technology sectors, engages directly within the venture capital and commercial technology innovation ecosystem, many of which are working with the DoD for the first time. The streamlined process delivers prototypes to the respective DoD partners, along with scalable revenue opportunities for commercial vendors, within 12 to 24 months.

# The Trajectory of INDUS-X: A Tale of Shared Vision

*Unveil the compelling story behind INDUS-X, highlighting its origins, inspirations, and the visionary minds that brought it to life.*

The genesis of the India-U.S. Defense Acceleration Ecosystem (INDUS-X) lies in the shared vision of two great democracies coming together to address global security challenges and bolster their joint defence ecosystems through innovation and technological advancement. Collaborations in deep-tech innovations form a critical foundation of this strategic partnership.

The vision for bilateral defence cooperation between the United States and India was laid out in 2005 with signing of the New Framework for India-U.S. Defense Relationship. Later, in 2015, both sides released the Framework for the U.S.-India Defence Relationship. The agreement underscores the two nations' enduring commitment to defence collaboration in promoting regional global security and stability. Since then, the India-U.S. defence relationship has evolved significantly.



Recognizing India's burgeoning tech industry and strategic geopolitical position, alongside the United States cutting-edge defence technology and extensive R&D capabilities, both nations saw immense potential in deepening their partnership. One of the primary areas for further collaboration was identifying modalities for co-developing and co-producing defence systems. In 2023, this shared vision led to the creation of a new mechanism to facilitate such co-development, involving the private sector, academia through the Initiative on Critical and Emerging Technologies (iCET) launched by the Prime Minister of India and the President of United States of America. One of the outcomes of iCET is to establish 'Innovation Bridges' in key sectors, including Defence, through expos, hackathons and pitching sessions. The Defence Innovation Bridge is intended as a catalyst for collaboration between U.S. and Indian start-ups

aimed at supporting the integration between both countries' private sector defence startups. The aim is to strengthen the participation of Indian and U.S. defence start-ups in global defence markets and support the diversification of the participants in domestic defence markets. This strategic evolution culminated in the formation of the India-U.S. Defense Accelerator Ecosystem (INDUS-X), a new defence innovation bridge between the two countries.

The inaugural INDUS-X event, held in June 2023 during Prime Minister Shri. Narendra Modi's visit to the White House, marked the launch of this initiative to accelerate U.S.-India defence ties. This ambitious effort is led by India's Innovations for Defence Excellence (iDEX) and the United States Department of Defense (DoD). The collaboration aims to create a dynamic ecosystem that leverages the strengths of both nations, driving defence innovation across borders. The vision for INDUS-X includes fostering a robust network of businesses, accelerators, incubators, investors, startups, and universities from both countries, enabling them to jointly address global security challenges. Additionally, it seeks to enhance defence and military potential by upskilling the joint capabilities of startups, MSMEs, innovators, and researchers. This will be achieved through the creation of platforms and channels that facilitate interaction among stakeholders from both nations, enabling the development of sustainable solutions through cutting-edge technological advancements.



# ***Pillars of INDUS-X – Foundations for Bilateral Collaboration***

*The core pillars that define INDUS-X's strategic framework and actionable goals.*

The core pillars of INDUS-X's strategic framework and goals have been instrumental in the extensive growth of the defence innovation ecosystems in both India and the U.S. The contributions of investors, academia, industry, and accelerators/incubators are crucial for achieving the actionable goals of this U.S.-India defence partnership. These pillars play a vital role in providing access to resources, funding, and mentorship, which are essential for scaling businesses and advancing research. The following sections elaborate on the strategic initiatives undertaken under the INDUS-X framework, highlighting the pivotal role of these core pillars in supporting bilateral collaboration.

## ***Forging Alliances: Bilateral Cooperation***

*Explore impactful collaborations between nations, fostering mutual growth and innovation.*

Since the commencement in June 2023, the INDUS-X has been swift to initiate meaningful progress in key areas of defence industrial cooperation between India and the United States. The INDUS-X Senior Leaders Forum (SLF) and Senior Advisory Group (SAG) are two key groups established to evaluate the progress of INDUS-X activities and deliberate on a roadmap for defence cooperation between India and the U.S.

### **1. Senior Advisory Group (SAG): Government Forum**

U.S. DoD and Indian MoD have established a Senior Advisory Group (SAG) to guide the government's efforts to advance the activities of INDUS-X initiative. The SAG supports all INDUS-X initiatives, including the joint challenges, the Gurukul Education Series, accelerator workshops, and investor engagement events. Till date, two SAGs have been concluded with representation from Senior Government Officials of both nations to gauge the progress so far and outline the roadmap for the future activities and initiatives. The two SAG meetings addressed several key action points aimed at strengthening the partnership between iDEX and DIU. These included enhancing the existing Memorandum of Intent (MoI) to better reflect the growing collaboration between the two organizations, and drafting a new Memorandum of Understanding (MoU). Additionally, the meetings focused on identifying stakeholders and research labs for a INDUSWERX testing consortium and developing a comprehensive roadmap to facilitate pilot testing initiatives. The results of these efforts are planned to be unveiled at the upcoming INDUS-X Silicon Valley Summit. The 3rd SAG is planned at the INDUS-X Silicon Valley Summit in September 2024.

## 2. Senior Leaders Forum (SLF): Private Industry Insights

The Senior Leaders Forum (SLF), paralleling the Senior Advisory Group (SAG), involves senior leaders from the private sector, think tanks and academia, engaged by IDEX and the U.S. DoD to share their insights on the vision of INDUS-X, thereby providing guidance for the initiative's future. The U.S. Institute of Peace (USIP) and the Society of Indian Defence Manufacturers (SIDM) hosted the first SLF at the INDUS-X Summit in February 2024 in New Delhi, focusing on identifying pathways for advancing industrial partnerships. The next SLF is planned at the INDUS-X Silicon Valley in September 2024.

These forums serve as think tanks where experienced minds deliberate on advancing industrial partnerships and exploring new avenues for cooperation. The collective wisdom of these leaders ensures that INDUS-X remains at the forefront of defence innovation. Discussions during these meetings have highlighted the importance of key objectives like supply chain resilience, enhanced U.S.-Indian military interoperability, navigating regulations for cross country market access and the co-development of advanced military capabilities.

## **Fuelling Innovation: Strategic Investments**

*Understand the critical role of investments in nurturing innovation and supporting ground-breaking projects.*

In the ever-evolving landscape of global security, cross-border collaborations for strategic investments in defence innovation have become crucial. These collaborations drive economic growth by opening up new markets and investment opportunities. The partnership between India and the United States through the INDUS-X initiative exemplifies the importance of building long-term, strategic investment models to propel the joint defence innovation ecosystem.

The U.S. India Strategic Partnership Forum (USISPF), in collaboration with the IndUS Tech Council, hosted the INDUS-X Investor Summit in New Delhi in November 2023 to foster joint innovation funding for U.S. and Indian companies developing critical defence technologies. All stakeholders, including government entities, investors, and industry partners, actively engaged in dialogues/breakout sessions to find pathways of funding from reliable capital sources and to support defence and dual-use companies in technology categories identified in the U.S.-India Roadmap for Defence Industrial Cooperation.





The inaugural INDUS-X Investors Event demonstrated significant investor interest in startups and MSMEs within the defence sector, highlighting emerging opportunities under the INDUS-X initiative. This interactive gathering brought together stakeholders, including startups, MSMEs, investors, incubators, and industry leaders from both nations, to discuss collaborative agendas and potential opportunities for future cooperation. Such programs have broken the ice between the investor community and defence innovation ecosystems on both sides and opened potential future pathways.

The third edition of the INDUS-X Summit will also focus on the harnessing investment opportunities, highlighting the significance of effective mentor-mentee matchmaking, sustained investments in defence startups, global supply chain resilience, and the capabilities to thrive in a dynamic environment.

## ***Wisdom Unleashed: Knowledge Enhancement***

*Discover initiatives aimed at expanding knowledge, sharing expertise, and building intellectual capital.*



### **1. The Gurukul Series: Educating the Innovators**

During the 2+2 Ministerial Dialogue in November 2023, the U.S. Secretary of Defence and the Indian Minister of Defence welcomed the launch of the INDUS-X Gurukul Series between DIU's National Security Innovation Network (NSIN) and iDEX.

Gurukul Series fosters an environment of continuous learning and growth, embodying the spirit of a traditional Gurukul where knowledge flows freely and mentorship thrives. These hybrid sessions bring together experts from both nations to share their knowledge and insights on pertinent topics important to build awareness amongst all stakeholders including startups, academia, industry etc. So far, five sessions have been concluded with topics ranging from exploring supply chain modalities, technology export control regulations, testing facilities access cross-border, investment opportunities and mechanisms to tap investors etc. These sessions have witnessed a prominent presence of startups, incubators, experts, industries from India and U.S., seeking to learn and venture in cross country collaborations.

## 2. Accelerator Program for Defence Startups: Building Expertise

Accelerator programs are pivotal initiatives designed to fast-track the growth and development of startups through intensive mentorship, education, and funding opportunities. These programs offer a structured environment where early-stage companies can refine their business models, enhance their products, and prepare for rapid scaling. As the startup ecosystem continues to evolve, creating a joint pathway between India and U.S. to build expertise of startups/MSMEs, will serve as a cornerstone of advanced innovation and economic development for both nations.

To navigate through the defence ecosystems of both nations and to provide startups with strategic mentorship and opportunities in defence commercialization, business development, technological advancement, and funding, the INDUS-X initiative launched an accelerator program. This program included accelerators from the U.S., such as Hacking for Allies (H4X) and FedTech, as well as from India, including the iTiC Incubator, Indian Institute of Technology (IIT) Hyderabad. They conducted workshops for 120 startups across both nations, sharing best practices for navigating the U.S. and Indian defence sectors. Aligned with the joint vision of both countries, these accelerator workshops and advanced programs will continue to foster a comprehensive defence innovation ecosystem.

## 3. Building Academia Connect for Startups and Researchers: From Lab to Market

Academic institutions are at the forefront of research and development, and collaborative efforts between Indian and U.S. universities hold immense potential for creating cutting-edge defence technologies. By tapping into the innovative ideas of researchers from both nations at an early stage, these collaborations can accelerate the development of advanced munitions systems, intelligence and surveillance systems, and other critical defence technologies. Sharing knowledge, resources, and expertise enables institutions to overcome technological challenges more efficiently, leading to superior defence solutions. Joint efforts in research and testing ensure that technologies are robust, reliable, and ready for deployment.



To realize the vision of this partnership, various workshops have been conducted, focusing on key areas of defence technology. The first workshop took place in August 2023, bringing together the Indian Institute of Technology (IIT), Kanpur and Pennsylvania State University. With over a hundred participants from both countries, the event focused on the common challenges faced by researchers across the nations, discussed roadmap to work on this sustained collaboration and future topics of importance for the startups, MSMEs and other innovators. Attended by experts and high-level officials, the workshop featured discussions on the INDUS-X initiative, a collaborative effort aimed at enhancing Indo-U.S. ties in technology and innovation.

In February 2024, the Indian Space Association (ISpA), the Indian Institute of Science (IISc), and Pennsylvania State University organized a workshop centered on developing academia-industry partnerships and building solutions for space, such as space situational awareness and sustainable space exploration. This series of workshops underscores the critical importance of academic collaboration between India and the United States.

## ***Crafting Solutions: Synergic Innovations***

*Learn about Joint IMPACT Challenges and their winners who are developing solutions for military services in India and U.S., addressing complex challenges with creativity and collaboration, along with private-led Testing Consortium.*

### **1. Joint IMPACT Challenges: Cutting-edge innovations**

The Defence Innovation Unit (DIU) and Innovations for Defence Excellence (iDEX) coordinated to design, launch, and select winners for the first round of INDUS-X Joint IMPACT Challenges, in which companies competed to identify commercial technology solutions that address warfighter challenges. U.S. Companies namely, HydroNet, OceanComm, PierSight, Pixxel, and Sea-Gal Technologies collectively won \$300,000 to develop technologies on maritime intelligence, surveillance, and reconnaissance (ISR) and undersea communications. Indian Companies declared as winners for the same challenges; AlKairos, Airbotix Technology, Prof. D. Saha and Prof. S. Ganguly, SAR Space, and Zeus Numerix collectively to receive upto \$900,000.



The India-U.S. defence collaboration has been significantly advanced through the inclusion of Indian startups in open solicitations issued by agencies such as ONR Global, Defence Innovation Unit (DIU) and National Security Innovation Network (NSIN). These challenges span a range of cutting-edge domains, including:

- High Latitude High Bandwidth Communications
- Subsea Object Detection and Identification (Underwater and Seabed)
- Personal Expeditionary Power and Energy
- Blue UAS Refresh Challenge
- Large Diameter Unmanned Underwater Vehicle (LD UUV)
- Enterprise Test Vehicle
- Tactical Range Extender Enhancer

By participating in these challenges, a pathway has been created for Indian startups to gain valuable exposure on international platforms, fostering deeper collaboration and strengthening technological ties between India and the U.S.

## 2. ***INDUSWERX Testing Consortium: Expanding frontier of testing ranges***

A privately led consortium of industry, academia, and non-profit organizations across the United States and India has been created to explore pathways to help companies access premier testing facilities, creating new opportunities for researchers to collaborate and for companies to demo their technology together. The following organizations announced the INDUSWERX testing consortium to expand testing facility access for defence and dual-use companies: FATHOMWERX, Penn State University, North Carolina State University, The Texas A&M University System (TAMUS), University of Texas at Austin, University of Maryland, Skydio, Liquid Robotics (a Boeing Company), Albers Aerospace, the Society of Indian Defence Manufacturers (SIDM), the Indian Institutes of Technology (IITs) led by Roorkee, IISc Bengaluru, Astrome Technologies, Space Pixxel, and Thermaissance. The moderator for the Stakeholder coordination and meetings is the United States Institute of Peace (USIP).



To advance the vision of the INDUSWERX testing consortium, iDEX and DoD have developed a comprehensive framework to guide the private sector including startups, MSMEs, research labs, and experts. This framework aims to facilitate the identification of suitable matches and facilities, enabling seamless testing, mentorship, and expert guidance.

Currently, one of the iDEX startups is in the advanced stages of discussions with a U.S. research laboratory to test their technology under development. This represents a significant breakthrough and will serve as a benchmark for defence startups and MSMEs across both India and the U.S. The pilot process will illustrate effective channels for matchmaking to identify the appropriate testing laboratories for startups products and technologies. This initiative sets a precedent for fostering collaboration and innovation, ensuring that emerging technologies undergo rigorous and suitable testing, thereby accelerating their transition from development to deployment.

### 3. Industrial Partnerships

U.S.-India industrial partnerships provide advanced defence capabilities and reinforce defence supply chains. Skydio, a U.S.-based manufacturer of A.I.-enabled unmanned aircraft systems (UAS), announced a new partnership with Aeroarc, an Indian-based UAS manufacturer. Through this partnership, Skydio and Aeroarc will strengthen defence capabilities, expand artificial intelligence (AI) collaboration between the U.S. and India, and support demand from global customers. General Atomics Aeronautical Systems, Inc., a U.S.-based unmanned aerial vehicle (UAV) manufacturer, announced two partnerships to support U.S.-India industrial collaboration on India's future MQ-9B UAV program. General Atomics will leverage expertise from I14ai, an Indian technology company, to jointly develop software and artificial intelligence models to process ISR data more effectively. General Atomics is also partnering with Bharat Forge and an Indian engineering company, to manufacture MQ-9 components and assemblies in India for use on all MQ-9B aircraft worldwide. Liquid Robotics, a Boeing Company, highlighted their collaboration with Indian partners to develop capabilities of the Wave Glider Uncrewed Surface.



# Moments of Triumph: Celebration's Corner

A vibrant showcase of memorable events, celebrations, and recognitions that mark the successes and milestones of the INDUS-X community.



- 1** Ms Lindsey Ford, Senior Director South Asia NSC, met with Indian MoD Delegation in New Delhi, India including Shri. T. Natarajan, Additional Secretary and Shri. Anurag Bajpai, Additional Secretary.
- 2** Ms. Heidi Shyu, Under Secretary of the U.S. Department of Defense, visited iDEX, MoD officials. She witnessed a showcase of pioneering defense technology startups.
- 3** Mr. Maynard A. Holliday, Assistant Secretary of Defense for Critical Technologies (PTDO, ASD(CT)), during his visit for the 2<sup>nd</sup> edition of India-U.S. Defense Acceleration Ecosystem (INDUS-X) Summit in Delhi, 20-21 February 2024.
- 4** First INDUS-X Investors Meet held in Delhi ahead of the 2+2 Indo-U.S. Ministerial Dialogue and the launch of the INDUS-X Educational Series 'Gurukul,' on 8 November 2023.



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**5** The 2<sup>nd</sup> Edition of the India-U.S. Defense Acceleration Ecosystem (INDUS-X) Summit, featuring Shri. Anurag Bajpai AS (DP), DDP, MoD, USIBC President Ambassador Atul Keshap, and Mr. Rajjinder Singh Bhatia, President of the Society of Indian Defence Manufacturers, February 20-21st 2024.

**6** Indian Defense Secretary Shri Giridhar Aramane in conversation with Admiral John C. Aquilino, Commandar, INDOPACOM at the 2nd edition of the INDUS-X Summit in New Delhi, 20-21 February 2024.

**7** Congressmen Rich McCormick and Rep. Ed Case visited iDEX, MoD officials and witnessed the defence technology startup showcase.

**8** A U.S. delegation led by Ms. Isabel Casillas Guzman, Administrator of the U.S. Small Business Administration (SBA), visited iDEX, MoD officials and witnessed the techno-showcase.

# Power of Partnerships: INDUS-X for the World

*Strengthening dynamic partnerships to pave the way for a global adoption of INDUS X, exploring opportunities through multinational defence-technology collaborations like QUAD and others.*

The INDUS-X initiative stands at the crossroads of innovation and strategic cooperation between India and the United States, with the potential to become a global model for defence-technology collaboration. To fully realize this potential, it is essential to strengthen dynamic partnerships that can drive the global adoption of INDUS-X. By fostering deeper ties between public and private sectors, academia, and startups across both nations, INDUS-X can serve as a catalyst for defence innovation that transcends borders. This collaborative framework must emphasize the sharing of resources, knowledge, and expertise, ensuring that technological advancements are not only cutting-edge but also sustainable and beneficial to the global security landscape.

To advance partnerships and collaborations under INDUS-X, a proactive approach is needed to engage with stakeholders across the defence innovation ecosystem. This includes establishing joint research programs, creating funding opportunities for startups and MSMEs, and promoting cross-border technology transfer and co-development initiatives. By participating in multinational frameworks like QUAD (Quadrilateral Security Dialogue), INDUS-X can further deepen strategic partnerships, allowing India and the U.S. to leverage a broader network of allies. This involvement can help in synchronizing defence innovation efforts, facilitating joint development of critical technologies, and building resilient supply chains that contribute to the collective security of the region.

Expanding bilateral cooperation through these multinational collaborations will also enhance dialogue and strategic engagement between India, the U.S., and their partners. Regular participation in forums, working groups, and joint exercises under QUAD and similar alliances will provide opportunities to align defence priorities, identify areas of mutual interest, and address emerging security challenges. This approach will not only strengthen the bilateral ties between India and the U.S. but also reinforce the commitment to a free, open, and secure Indo-Pacific region. By fostering a collaborative environment, INDUS-X can serve as a model for multinational defence partnerships, driving technological advancements and contributing to global security.

