

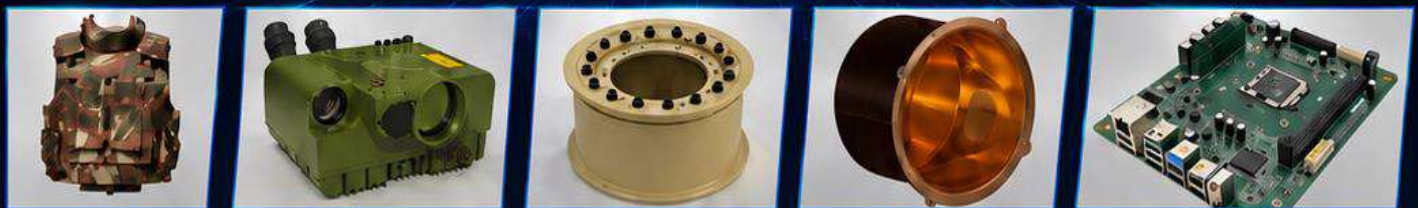


DEMYSTIFYING DEFENCE PROCUREMENT, IDEX, TPCR & TESTING PROCEDURES FOR MSMEs AND START-UPS

SEMINAR REPORT

**ORGANISED BY HQ IDS (INDIGENISATION DTE)
& CENJOWS**

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PREPARED BY TEAM CENJOWS

INDEX

S No	Contents	Page No
1.	Executive Summary	3
2.	Objectives of the Seminar	4
3.	Inaugural Session	5
4.	SESSION 1: DEFENCE ACQUISITION FRAMEWORK	10
5.	SESSION 2: INDIGENISATION AND REFORMS	16
6.	SESSION 3: DEEP DIVE INTO iDEX	25
7.	SESSION 4: TESTING AND CERTIFICATION SYSTEM	32
8.	SESSION 5: TPCR AND BEYOND	46
9.	Panel Discussion with Venture Capitalists	51
10.	Industry Queries	54
11.	Conclusion	55

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DEMYSIFYING DEFENCE PROCUREMENT, IDEX, TPCR & TESTING PROCEDURES FOR MSMEs AND START-UPS

EXECUTIVE SUMMARY

1. For decades, the defence sector has operated within a highly specialised ecosystem governed by stringent regulations, complex procurement frameworks, rigorous testing protocols, and long development cycles. While these processes are essential to ensure operational reliability, national security, and value for public expenditure, they often appear daunting to new entrants seeking to contribute to the defence ecosystem. As warfare increasingly becomes technology-driven, innovation can no longer remain confined to traditional defence manufacturers alone. The rapid emergence of advanced technologies such as artificial intelligence, autonomous systems, advanced materials, cyber capabilities, quantum technologies, and unmanned platforms has created unprecedented opportunities for Micro, Small and Medium Enterprises (MSMEs) and start-ups to become key contributors to India's defence modernisation efforts. However, the complexity of defence procurement procedures, qualification requirements, testing mechanisms, and acquisition pathways continues to pose significant challenges for many innovative enterprises seeking to enter the sector.

2. Demystifying defence procurement has therefore become a strategic imperative. By simplifying and clarifying the Defence Acquisition Procedure (DAP), Technology Perspective and Capability Roadmap (TPCR), testing and certification frameworks, and indigenous development initiatives such as iDEX and Make projects, stakeholders can gain a clearer understanding of how innovative solutions can transition from concept to capability. Particular emphasis on high-priority procurement avenues such as Buy (Indian-IDDM), Make-I, Make-II, and other indigenisation-focused categories that offer significant opportunities for domestic industry participation is yielding significant dividends. Creating greater awareness about these lowers entry barriers for MSMEs and start-ups and fosters a more vibrant innovation ecosystem aligned with the objectives of Atmanirbhar Bharat and Viksit Bharat@2047. In doing so, complex procedural requirements can be transformed into a practical roadmap that enables industry, academia, start-ups, and the Armed Forces to collaborate effectively to develop next-generation technologies and strengthen India's long-term defence preparedness and technological sovereignty.

3. A two-day workshop on “**Demystifying Defence Procurement, iDEX, TPCR and Testing Procedures for MSMEs and Start-ups**” was organised by HQ IDS (Indigenisation Directorate) in collaboration with the Centre for Joint Warfare Studies (CENJOWS) on 11–12 June 2026. The workshop was conceived to enhance awareness and understanding of India's defence acquisition ecosystem and to familiarise participants with the various procurement pathways, procedures, and opportunities available within the defence sector. Particular emphasis was placed on key acquisition mechanisms, including Requests for Proposal (RFPs), the Defence Acquisition Procedure (DAP), Technology Perspective and Capability Roadmap (TPCR), testing and certification processes, and indigenisation initiatives such as iDEX and Make projects.

4. The workshop also sought to bridge the knowledge gap between the defence establishment and emerging industry participants by providing insights into the operational, technical, and procedural requirements governing defence procurement. Discussions focused on General Staff Qualitative Requirements (GSQRs), technical evaluation methodologies, testing protocols, defence offset provisions, and the processes through which innovative technologies can transition from concept to induction. By bringing together representatives from the Armed Forces, DRDO, industry, MSMEs, start-ups, and academia, the workshop aimed to facilitate greater participation of indigenous industry in defence manufacturing and

innovation, thereby contributing to the national objectives of self-reliance, technological advancement, and strengthening of the defence-industrial ecosystem.

OBJECTIVES OF THE SEMINAR

5. This workshop cum seminar was designed to familiarise MSMEs, start-ups, and emerging technology enterprises with key defence innovation and procurement initiatives, particularly the Innovations for Defence Excellence (iDEX) framework and the Technology Product Compliance Review (TPCR) process. By providing a comprehensive understanding of these mechanisms, the workshop sought to enable participants to identify opportunities to engage with the Armed Forces and other defence stakeholders, and to understand the pathways through which innovative technologies can be developed, validated, and inducted into service.

6. A major objective of the workshop was to clarify the testing, evaluation, certification, and validation procedures that govern defence procurement. Participants were provided insights into technical evaluation methodologies, user trial requirements, quality assurance procedures, compliance standards, and indicative timelines associated with various stages of the acquisition process. This was intended to help industry participants better align their product development cycles with defence requirements and reduce uncertainties often associated with defence acquisition procedures.

7. Another important objective was to facilitate networking and collaboration among stakeholders across the defence ecosystem. By bringing together innovators, MSMEs, start-ups, venture capitalists, Service Headquarters, DRDO laboratories, defence public sector undertakings, academia and industry experts on a common platform, the workshop encouraged the exchange of ideas, the identification of collaborative opportunities, and the establishment of partnerships that could accelerate technology development and induction.

8. Finally, the workshop sought to create an actionable roadmap for participants to engage effectively with the defence procurement system. The overarching objective was to empower domestic industry, particularly MSMEs and start-ups, to become active contributors to India's defence modernisation efforts and the broader vision of Atmanirbhar Bharat. In broad terms, the aims and objectives of the event were: -

8.1. To familiarise MSMEs, start-ups, innovators and industry stakeholders with the defence acquisition ecosystem, including the Defence Acquisition Procedure (DAP), Innovations for Defence Excellence (iDEX), Technology Development Fund (TDF), Make procedures, and other indigenisation initiatives.

8.2. To provide a comprehensive understanding of the various pathways available for industry participation in defence procurement, capability development, import substitution, innovation programmes, and indigenous technology development initiatives.

8.3. To enhance awareness of the future capability requirements of the Armed Forces through the Technology Perspective and Capability Roadmap (TPCR), Positive Indigenisation Lists, SRIJAN Portal, and other long-term planning and capability development frameworks.

8.4. To explain the processes associated with product development, prototype validation, user trials, testing, evaluation, certification, quality assurance, and induction of defence technologies into service.

8.5. To familiarise participants with operational requirements, Services Qualitative Requirements (SQRs/GSQRs), user expectations, lifecycle support obligations, and the standards required for successful participation in defence acquisition programmes.

8.6. To bridge the knowledge and communication gap between MSMEs, start-ups, innovators, academia and industry on one hand, and the Armed Forces, Ministry of Defence, DRDO, acquisition agencies and other defence stakeholders on the other.

8.7. To facilitate direct interaction, knowledge sharing, and networking among industry participants, Service Headquarters, DRDO laboratories, defence public sector undertakings, venture capital firms, incubators, and policy makers.

8.8. To promote collaboration, co-development, technology partnerships, investment opportunities, and innovation-driven solutions that support indigenous capability development and defence self-reliance.

8.9. To provide practical guidance on navigating defence procurement procedures, funding mechanisms, intellectual property management, technology development schemes, and available support frameworks for innovators and industry.

8.10. To address industry concerns, clarify procedural issues, and provide actionable insights on defence procurement reforms, acquisition procedures, innovation frameworks, testing protocols, certification mechanisms, and procurement opportunities through direct interaction with subject matter experts.

8.11. To encourage industry stakeholders to align their research, development, manufacturing, and innovation efforts with emerging operational requirements and future technology needs of the Armed Forces.

8.12. To support the national objectives of ***Atmanirbhar Bharat***, defence indigenisation, technological self-reliance, and defence exports by creating greater awareness of opportunities available within India's evolving defence ecosystem.

8.13. To develop an actionable understanding among participants of how to effectively engage with the defence sector, transition technologies from concept to procurement, and contribute to strengthening India's defence-industrial and innovation ecosystem.

DAY 1 (11 Jun 26): UNDERSTANDING THE DEFENCE PROCUREMENT ECO-SYSTEM

INAUGURAL SESSION

9. In his Opening Address, **Maj Gen Ashok Kumar, VSM, PhD (Retd), DG CENJOWS**, welcomed the distinguished speakers, representatives from the Ministry of Defence, Service Headquarters, venture capital firms, media representatives, industry participants, start-ups, MSMEs, and delegates attending the seminar. He expressed gratitude to all participants who had travelled from various parts of the country to attend the two-day event. He also acknowledged the contribution of the media partner and industry stakeholders whose support had facilitated wider outreach and participation.

10. The DG CENJOWS highlighted that the seminar had been specifically designed to address all major aspects of defence capital procurement at a time when the forthcoming Defence Acquisition Procedure (DAP) 2026 was under finalisation. While the new policy framework was yet to be formally released, he observed that the broad direction of reforms was largely known. The seminar, therefore, aimed to provide participants with an

understanding of the anticipated changes from DAP 2020 and to prepare industry stakeholders for future acquisition opportunities. The event had been deliberately structured as a participative platform rather than a conventional one-way workshop. Dedicated sessions had been planned to facilitate direct interaction between industry representatives and acquisition experts, including senior officers dealing with defence procurement.

11. The DG CENJOWS added that a persistent perception exists among many MSMEs and start-ups that entry into the defence procurement ecosystem is difficult and inaccessible. He emphasised that substantial efforts had been undertaken by the Ministry of Defence, Service Headquarters, and other stakeholders to make procurement processes, policies, and opportunities more transparent through digital platforms and publicly available information. Despite these initiatives, awareness gaps continued to persist, and one of the key objectives of the seminar was to bridge this disconnect and provide clarity to emerging industry participants. He further highlighted the extensive outreach campaign undertaken to ensure broad participation from across the country. Drawing attention to the importance of financial support for innovation and industrial growth, it was highlighted that significant number of venture capital firms had been invited to participate in the event. As access to capital remains one of the principal challenges faced by start-ups and MSMEs seeking to develop defence technologies, participants were encouraged to engage with venture capital representatives throughout the seminar and explore mutually beneficial opportunities for collaboration and investment.

12. Highlighting the changing relationship between industry and the Armed Forces, it was observed that defence manufacturers were no longer merely vendors or partners but had emerged as vital stakeholders in national security. In this context, industry, MSMEs, and start-ups were described as key contributors not only to India's economic growth but also to the nation's strategic self-reliance and defence exports.

13. The growing international demand for Indian defence products presents substantial opportunities for the domestic industry. He likened the defence procurement ecosystem to a "treasure hunt," in which significant opportunities exist for organisations that can identify emerging requirements, innovate effectively, and respond in a timely manner. The seminar was intended to provide guidance to help participants align their business objectives with national priorities and emerging defence requirements.

14. Stressing the need for urgency and innovation, the DG CENJOWS remarked that contemporary technological and security challenges require a mission-oriented approach. Traditional development timelines may no longer be adequate in an increasingly competitive and rapidly evolving environment. Participants were therefore encouraged to maximise the value of the seminar, actively engage in discussions, and contribute ideas that could support future capability development.

15. In his Keynote Address, **Air Marshal PK Vohra, UYSM, AVSM, VM, DCIDS (PP&FD)**, observed that while defence procurement procedures and policies are important, the true strength of India's defence ecosystem lies in the partnership between the Armed Forces and indigenous industry. Drawing upon his operational experience, the Air Marshal emphasised that MSMEs and start-ups are integral participants in national defence and warfighting. He recalled instances where indigenous systems under development were deployed in operational areas at critical junctures, with developers and innovators working alongside the Armed Forces to refine capabilities in real-time. Such experiences, demonstrated that the contribution of industry extends far beyond manufacturing and directly influences operational effectiveness on the battlefield.

16. Reflecting on India's journey towards self-reliance, he highlighted that the foundations of indigenous defence production were laid soon after Independence. Referring to the aviation

sector, he cited milestones such as the development of the HT-2 trainer aircraft in 1951, the Hindustan Jet Trainer in 1954, and the HF-24 Marut fighter aircraft in 1961. While subsequent decades witnessed a shift towards licensed production and imports due to rapid technological advancements and competing national priorities, the current decade has marked a renewed emphasis on *Atmanirbharta* and indigenous capability development. The prevailing strategic environment necessitates accelerated capability development. Given the dynamic security challenges confronting the nation, India cannot afford development timelines that extend over decades. Air Mshl stressed the need to strengthen indigenous infrastructure, technology ecosystems, and resilient supply chains to ensure operational preparedness and strategic autonomy.

17. Highlighting the progress achieved in recent years, Air Marshal Vohra noted that India's defence production has grown significantly from approximately ₹47,000 crore in 2014 to over ₹1.27 lakh crore today. He further observed that the defence budget has expanded substantially, reaching approximately ₹7.85 lakh crore for FY 2026–27. Importantly, nearly 75 per cent of the capital acquisition budget, amounting to approximately ₹1.39 lakh crore, has been earmarked for indigenous procurement, thereby creating unprecedented opportunities for the domestic industry.

18. Emphasising the importance of wider participation by MSMEs and start-ups, he remarked that the objective of the seminar was to demystify the defence procurement landscape and address the uncertainties often associated with defence acquisitions. The Chair also highlighted the remarkable growth in India's defence exports, noting that indigenous defence products are now being exported to nearly eighty countries. Flagship systems such as BrahMos, Akash, and Pinaka have demonstrated the growing competitiveness of Indian defence manufacturing. Defence exports, currently valued at approximately ₹38,000 crore, are expected to expand substantially in the coming years, creating additional opportunities for domestic innovators and manufacturers.

19. Addressing concerns frequently raised by start-ups regarding funding for high-risk research and development, Air Marshal Vohra outlined the various support mechanisms available under government initiatives. He highlighted the role of the Innovations for Defence Excellence (iDEX) framework, under which grants ranging from ₹1.5 crore to ₹25 crore are available to support promising technologies. He also referred to the ADITI scheme and the Technology Development Fund (TDF) as important instruments for nurturing deep-technology innovation and supporting MSMEs engaged in defence-related research. The Chair further observed that the forthcoming Defence Acquisition Procedure (DAP) 2026 is expected to reinforce indigenous development by mandating higher levels of indigenous content and placing greater emphasis on Indian intellectual property. Referring to the Buy (Indian-IDDMM) category, he noted that contracts worth more than ₹3.37 lakh crore had already been awarded under this framework during the past decade, demonstrating the scale of opportunities available to Indian industry. Equally important is a clear understanding of operational requirements and close interaction with end users. The Armed Forces, he assured, remain committed to providing test facilities, trial support, and operational feedback to facilitate rapid development and induction of indigenous systems. The recent reforms have significantly improved the level playing field for private industry. Public sector entities and private firms now compete under more transparent and equitable procurement frameworks, enabling MSMEs and start-ups to participate in defence acquisition programmes without discrimination based on organisational size. Referring to the success of innovation-driven initiatives, he noted that the iDEX framework has supported hundreds of MSMEs, start-ups, and innovators, resulting in the development of breakthrough technologies and the signing of several hundred procurement contracts. These achievements demonstrate the growing maturity of India's innovation ecosystem and the increasing ability of domestic industry to compete successfully in both national and international markets.

20. Looking towards the future, the Air Mshl outlined the national vision of transforming India into a global defence manufacturing hub and among the world's leading defence producers by 2047. In his concluding remarks, Air Marshal Vohra underscored that national security is a collective responsibility. During times of conflict, the entire nation—including industry, innovators, and entrepreneurs—becomes an integral part of the national war effort. He therefore called upon MSMEs and start-ups to prepare with the same sense of purpose and commitment as the Armed Forces. Encouraging participants to engage actively during the seminar, raise questions, offer suggestions, and share innovative ideas, he expressed confidence that the deliberations would contribute meaningfully towards strengthening India's defence innovation and procurement ecosystem.

21. **Building Indigenous Def Capabilities: An overview.** While speaking on the topic, **Maj Gen AK Channan, PVSM, SM, PhD (Retd)** provided a comprehensive overview of the evolution of India's defence industrial ecosystem and the policy initiatives undertaken to promote self-reliance. Tracing the origins of the national self-reliance initiative, the speaker noted that although efforts to promote indigenous manufacturing had existed for many years, a major impetus came with the "Make in India" initiative launched in 2014. Within the defence sector, the programme sought to transform India into a major defence manufacturing hub by encouraging domestic production, facilitating technology transfer, promoting defence offsets, and enabling greater participation by private industry, MSMEs, and start-ups. The initiative also encouraged Defence Research and Development Organisation (DRDO) laboratories to open their technologies for wider industry participation and commercialisation.

22. Maj Gen Channan highlighted that the initial phase of reforms focused primarily on establishing domestic manufacturing capability and creating a robust ecosystem of defence production entities. Subsequently, policy interventions such as preferential market access, indigenous procurement categories, import embargo lists, and industrial incentives were introduced to accelerate the growth of indigenous manufacturing capability. He further explained that the strategic vision subsequently evolved from "Make in India" towards the broader concept of *Atmanirbhar Bharat*. While the former focused largely on localisation of manufacturing, the latter expanded the scope to include indigenous technology development, intellectual property creation, design capability, standards development, certification ecosystems, and technological self-reliance. This transition reflected the recognition that sustainable defence capability requires ownership not only of manufacturing processes but also of critical technologies and intellectual property.

23. Elaborating on the technological dimension of self-reliance, Maj Gen Channan described four broad approaches adopted by the Government. The first involved identifying and acquiring globally available technologies through active technology scouting mechanisms. The second focused on nurturing strategic technologies that may not be readily available externally and therefore require domestic incubation and sustained investment. The third involved encouraging innovation by adapting civilian technologies for defence applications, while the fourth centred on acquiring commercially available technologies wherever appropriate. Together, these approaches formed the basis of India's defence innovation ecosystem. Several initiatives launched to strengthen innovation and technology development. These included technology scouting programmes, challenge-based competitions, open innovation platforms, operational problem statements, and direct engagement with innovators. He noted that a large network of start-ups, innovators, academia, research institutions, and industry participants had gradually emerged through these initiatives, significantly expanding the defence innovation base over the past decade.

24. Referring to technology incubation mechanisms, he observed that dedicated funding streams had been progressively enhanced to support indigenous development. The Technology Development Fund (TDF), Service Technology Boards, Innovations for Defence Excellence (iDEX), and related programmes were designed to assist innovators in

transforming concepts into deployable capabilities. The funding support available under these initiatives had increased substantially over time, reflecting the growing emphasis on indigenous research and development. Maj Gen Channan also underscored the importance of innovation ecosystems created across the country through collaboration with academic institutions, incubators, and technology accelerators. Institutions such as the IITs, specialised innovation hubs, and state-supported incubation centres have emerged as important contributors to defence innovation. These platforms facilitate interaction between innovators, industry, academia, and defence stakeholders, thereby accelerating the translation of ideas into operational solutions.

25. Addressing the subject of intellectual property and indigenous design capability, Maj Gen Channan observed that technological self-reliance cannot be achieved solely through manufacturing. A strong indigenous intellectual property base is equally essential. The importance of indigenous standards, certification mechanisms, and testing infrastructure can't be overemphasised. The development of national standards plays a critical role in shaping technology ecosystems and industrial growth. Accordingly, significant efforts have been made to establish indigenous testing, evaluation, certification, and quality assurance frameworks to support domestic technology development and reduce dependence on foreign standards and certification systems.

26. Dedicated defence industrial corridors and specialised technology clusters have been established to provide geographical concentration of testing facilities, manufacturing infrastructure, research institutions, and industrial capability. These measures are intended to reduce development timelines and improve collaboration among stakeholders. Turning to defence acquisition procedures, Maj Gen Channan observed that procurement processes are often perceived as excessively complex. However, he emphasised that the underlying principles are fundamentally straightforward and are primarily designed to ensure transparency, accountability, and effective utilisation of public funds. Maj Gen Channan clarified that the various procurement categories under the Defence Acquisition Procedure essentially reflect different approaches towards acquiring or developing capability. Procurement may involve direct acquisition from indigenous or foreign sources, indigenous development through government-supported programmes, or collaborative development involving strategic partnerships and joint ventures. The selection of a particular category depends upon factors such as technological complexity, urgency, industrial capability, and strategic requirements.

27. Maj Gen Channan also highlighted the role of long-term planning mechanisms such as capability development plans, acquisition roadmaps, technology perspective documents, and service-specific requirements. These frameworks guide future capability development and provide industry with visibility regarding emerging requirements and opportunities for participation. The acquisition process itself incorporates multiple stages of planning, categorisation, approval, procurement, testing, evaluation, and induction, each designed to ensure transparency and operational effectiveness.

28. In his concluding remarks, Maj Gen Channan emphasised that the Government has adopted a whole-of-nation approach towards defence innovation and indigenisation. Defence manufacturing, technology development, innovation, and exports are being monitored at the highest levels of government and supported through a range of policy, financial, institutional, and regulatory mechanisms. He observed that while practitioners may continue to encounter implementation challenges, the overall policy direction remains firmly oriented towards self-reliance, innovation, and indigenous capability development. Participants were encouraged to utilise the seminar as an opportunity to better understand the ecosystem, engage with stakeholders, and identify pathways for contributing to India's defence modernisation and self-reliance objectives.

SESSION 1: DEFENCE ACQUISITION FRAMEWORK

29. **Overview of Draft DAP 2026: Imp Provisions.** The talk was delivered by **Lt Gen Rohit Gupta (Retd)**, who provided an overview of the key provisions, policy shifts, and procedural reforms proposed in the forthcoming acquisition framework. He emphasised that DAP remains the foundational document governing defence procurement and that a sound understanding of its provisions is essential for all stakeholders seeking to participate effectively in the defence acquisition ecosystem. One of the most significant conceptual shifts in DAP 2026 is the transition from a singular emphasis on “Make in India” towards a broader objective of ensuring that critical defence technologies are both manufactured in India and owned by India. This shift reflects a move away from dependence on conventional transfer-of-technology arrangements towards co-development, indigenous intellectual property ownership, source-code access, and long-term technological sovereignty. The proposed framework seeks to ensure that critical technologies, design data, software architecture, upgrade authority, and lifecycle support remain under Indian control.

30. The earlier focus on maximising indigenous participation has now matured into a framework aimed at preventing long-term technological dependencies while simultaneously encouraging international collaboration wherever beneficial. The objective is no longer merely to exclude foreign participation but to ensure that foreign partnerships contribute meaningfully to indigenous capability creation, technological absorption, and lifecycle autonomy. The DAP 2026 recognises the growing importance of civil-military fusion and the utilisation of commercial off-the-shelf technologies. The proposed framework encourages adoption of mature civilian technologies with minimal modification for defence applications, thereby reducing development timelines and accelerating capability induction. Greater emphasis has also been placed on lifecycle support, sustainment costs, and long-term operational effectiveness rather than focusing solely on acquisition cost at the time of procurement.

31. Referring to procurement categorisation, the speaker noted that the acquisition categories have been rationalised and simplified. The earlier “Buy (Indian)” and “Buy and Make (Indian)” categories have been merged into a consolidated “Buy (Indian – Manufactured in India)” category, thereby reducing complexity while retaining the emphasis on indigenous manufacturing. The revised structure seeks to improve clarity and facilitate more efficient implementation of acquisition policies. A major reform highlighted during the presentation related to indigenous content requirements. While DAP 2020 introduced indigenous content thresholds, implementation challenges often limited their effectiveness. In DAP 2026, under the revised framework, indigenous content obligations to be demonstrated from the trial stage itself and progressively enhanced before final induction. The new provisions are intended to ensure genuine capability development rather than superficial localisation.

32. In DAP 2026, for the first time, indigenous design ownership has been embedded as a key acquisition consideration. Systems developed and designed within India will receive greater priority, while verification of indigenous design claims will be subject to stricter scrutiny. The reform reflects the growing recognition that true self-reliance requires ownership of technology and intellectual property rather than merely local production. Another important feature of DAP 2026 is the strengthening of incentives for technological innovation through enhanced performance parameters. The speaker noted that previous provisions did not adequately incentivise vendors to exceed baseline requirements. The revised framework increases the weightage accorded to superior performance characteristics, thereby encouraging industry to invest in advanced technologies and innovative solutions rather than limiting development efforts to minimum qualifying standards.

33. The speaker also addressed reforms related to trial procedures and vendor participation. Recognising concerns frequently raised by industry, DAP 2026 introduces measures to discourage delays, improve accountability, and provide limited compensation for

vendors whose equipment undergoes prolonged trial and evaluation processes. Although the proposed compensation mechanisms remain modest, the speaker observed that they represent an important acknowledgement of industry concerns and mark a positive step towards improving stakeholder confidence. A substantial portion of the address focused on developmental procurement programmes, particularly the evolution of the Innovations for Defence Excellence (iDEX) framework. The speaker noted that iDEX has evolved from an innovation initiative into an increasingly important capability development mechanism. Timelines have been reduced, funding levels enhanced, and procurement pathways strengthened. Funding under Make-I projects has been increased substantially, while financial burdens on start-ups and MSMEs have been reduced through exemptions and simplified procedures.

34. The concept of **spiral development** was identified as a major innovation within the draft procedure. The spiral development is a structural reset that treats upgrades as planned, iterative cycles rather than rigid, one-off acquisitions. Under this approach, developmental projects may progress through multiple stages, with progressively increasing performance requirements rather than requiring complete attainment of all service requirements at the initial stage. This model enables technologies to mature incrementally, reduces developmental risk, and improves survivability of start-ups and MSMEs engaged in complex technology programmes.

35. The speaker also highlighted several measures specifically designed to support start-ups and MSMEs. These include accelerated release of advance payments, reduced financial burden associated with bid participation, expanded funding support, and greater opportunities for progression from innovation projects into larger procurement programmes. The revised framework seeks to create a more conducive environment for emerging enterprises while enabling them to transition from prototype development to large-scale production.

36. Particular focus was reserved for the introduction of technological readiness level (TRL) and manufacturing readiness level (MRL) assessments within the acquisition process. These mechanisms are intended to improve alignment between operational requirements and technological maturity, thereby reducing procurement risk and facilitating more informed acquisition decisions. Technology maturity assessments will increasingly influence categorisation, procurement planning, and vendor eligibility.

37. One of the most notable additions to DAP 2026 is the introduction of the **Low-Cost Capital Acquisition** framework. This is a highly significant reform that enables limited-scale procurement of promising technologies for operational exploitation prior to large-scale acquisition. The mechanism enables the Services to evaluate emerging technologies under operational conditions while also providing industry with an opportunity to demonstrate capabilities and establish performance credentials. Successful systems may subsequently transition into larger procurement programmes without repeating the entire acquisition cycle.

38. DAP 2026 introduces reforms relating to long-term bulk acquisition, leasing arrangements, and trial methodologies. Flexible leasing models have been introduced to provide greater customisation according to user requirements, while two-stage trial concepts have been incorporated to facilitate earlier contract conclusion and progressive validation of performance parameters. Greater flexibility has also been introduced in quality assurance and certification processes through increased use of self-certification, third-party certification, and risk-based evaluation approaches.

39. The DAP 2026 must be viewed not merely as a procurement manual but as a strategic instrument for capability development, industrial growth, and technological self-reliance. The document seeks to align acquisition policies with the broader national objective of establishing a robust defence-industrial ecosystem capable of supporting operational requirements,

fostering innovation, enhancing exports, and ensuring long-term strategic autonomy.

40. In conclusion, the speaker remarked that the proposed reforms collectively represent a significant evolution in India's defence acquisition philosophy. By placing greater emphasis on indigenous ownership, technological maturity, innovation, lifecycle sovereignty, and industry participation, DAP 2026 seeks to create a more responsive, transparent, and capability-driven acquisition framework.

41. **Salient Aspects of RFP.** While speaking on the subject **Col Debasish Sinha, Col RFP (Lgs Services)**, he provided a comprehensive overview of the RFP process, its structure, key stakeholders, and the critical role it plays within the defence acquisition framework. At the outset, Col Sinha observed that although DAP 2026 is expected to be promulgated in the near future, the principles governing RFP formulation remain broadly similar.

42. The RFP constitutes the first legally binding document in the acquisition process and serves as the foundation upon which all subsequent procurement activities are based. Regardless of the effort invested during the Request for Information (RFI), Services Qualitative Requirements (GSQR), and Acceptance of Necessity (AoN) stages, failure to fully understand and comply with the provisions of the RFP can adversely affect a bidder's prospects. A thorough understanding of the RFP is essential for successful participation in defence procurement programmes.

43. The RFP establishes a transparent and level playing field for all bidders by clearly defining technical requirements, commercial conditions, evaluation criteria, contractual obligations, and procedural requirements. It provides vendors with a comprehensive understanding of the capability sought by the Services and the conditions under which procurement will be undertaken. Beyond technical specifications, the RFP also addresses aspects such as product support, sustainment requirements, commercial obligations, quality assurance procedures, and contractual responsibilities.

44. Col Sinha highlighted that the preparation of an RFP is a collaborative process involving multiple stakeholders across the acquisition ecosystem. Key contributors include the user directorates, maintenance agencies, logistics organisations, quality assurance agencies, finance authorities, Service Headquarters, DRDO, production agencies, DPSUs, and acquisition wings of the Ministry of Defence. Depending on the nature of the project, RFPs may be Service-specific or joint-service documents developed in consultation with all concerned stakeholders. Many procurement challenges originate from inaccurate or overly optimistic responses received during the RFI stage. Industry representatives were therefore encouraged to provide realistic assessments of their capabilities during preliminary consultations. He cautioned that if vendors indicate capabilities that cannot subsequently be demonstrated, the acquisition process may ultimately require amendments, revisions, or even withdrawal of the RFP, resulting in significant delays for both the Services and industry.

45. Col Sinha explained that an RFP is broadly structured into four major components: General Characteristics, Technical Characteristics, Commercial Conditions, and Bid Evaluation & Acceptance Criteria. Together, these sections provide a comprehensive framework governing the acquisition process and define the obligations of both the procuring authority and the participating vendors.

46. The General Characteristics section includes details relating to the equipment, procurement quantity, indigenous content requirements, warranty obligations, training provisions, delivery schedules, vendor eligibility criteria, and financial qualification requirements. Particular attention is given to parameters such as net worth, annual turnover, credit ratings, insolvency status, and financial capability. These provisions are intended to

ensure that participating vendors possess the organisational and financial capacity necessary to successfully execute the contract.

47. The Technical Characteristics section defines the operational and technical requirements that bidders must satisfy. It includes detailed provisions relating to field evaluation trials, technical evaluations, maintainability evaluations, electromagnetic compatibility testing, quality assurance procedures, and acceptance testing methodologies. The RFP contains a detailed trial methodology outlining how compliance with the GSQRs will be assessed. Draft acceptance test procedures, quality assurance plans, and evaluation frameworks are included within the RFP to provide transparency to bidders. Industry participants are given opportunities to engage with the concerned agencies to clarify technical aspects and refine implementation methodologies wherever required.

48. The presentation also highlighted the importance of product support and lifecycle sustainment provisions. Maintenance organisations play a key role in defining requirements relating to repair infrastructure, maintenance support, test equipment, spare parts, maintenance repair lists, and sustainment documentation. These provisions ensure that equipment remains operational throughout its service life and that adequate support arrangements are established prior to induction.

49. The Commercial Conditions section addresses payment schedules, delivery obligations, contractual terms, bank guarantees, insurance provisions, arbitration clauses, integrity pacts, and other contractual obligations. It establishes the financial and legal framework governing contract execution and provides clarity regarding the responsibilities of both parties throughout the procurement lifecycle. The final section of the RFP relates to bid evaluation and acceptance criteria. This includes the price bid format, commercial evaluation methodology, determination of the lowest bidder (L1), and contract conclusion procedures. Col Sinha emphasised that a clear understanding of these provisions enables vendors to structure their bids appropriately and avoid procedural shortcomings that may affect evaluation outcomes.

50. Reflecting on the broader objective of RFP preparation, Col Sinha observed that a well-structured and comprehensive RFP contributes significantly towards reducing ambiguity, minimising vendor queries, avoiding retractions, and expediting contract conclusion. Conversely, inadequately defined requirements or unresolved issues at earlier stages often result in delays, amendments, or withdrawal of procurement cases. The RFPs are prepared in accordance with standard formats prescribed under the DAP while remaining sufficiently flexible to accommodate project-specific requirements. Depending on the procurement category, acquisition strategy, and complexity of the equipment, specific appendices and contractual provisions may vary. Consequently, each RFP must be treated as a unique document tailored to the operational and technical needs of the particular acquisition programme. The importance of pre-bid meetings and stakeholder consultations can't be overemphasised. Extensive interaction takes place with industry at multiple stages, including the RFI stage, GSQR formulation stage, draft RFP preparation stage, vendor shortlisting stage, and pre-bid stage. Such consultations are intended to ensure transparency, maximise competition, and minimise the possibility of misunderstandings during subsequent phases of the procurement process.

51. Col Sinha also highlighted recent initiatives aimed at improving procurement efficiency, including the use of the Government e-Marketplace (GeM) platform for selected capital procurement cases. These measures are intended to streamline acquisition procedures and enhance accessibility for industry participants while maintaining transparency and accountability.

52. In conclusion, Col Sinha reiterated that industry participation and transparency are essential for successful defence procurement. Vendors must accurately communicate their capabilities from the earliest stages of the acquisition cycle and actively engage during consultations. Such an approach would reduce the likelihood of RFP withdrawal, minimise delays, and contribute towards faster induction of capability for the Armed Forces.

53. **Industry Queries and issue Resolution.** This sub session was dedicated entirely to address Industry Queries and issue Resolution by **Maj Gen CS Mann, PVSM, AVSM, VSM, ADG ADB**. Participants were encouraged to raise practical issues encountered while engaging with the defence acquisition ecosystem and to offer suggestions for improving industry participation.

54. As a prelude to the session, Maj Gen Mann explained that the Army Design Bureau serves as the principal interface between the Indian Army, industry, academia, research institutions, and start-ups for the identification, development, and induction of emerging technologies. He emphasised that the Bureau's primary role is to facilitate innovation, handhold technology developers, assist in product maturation, and support evaluation and induction processes within the Army.

55. **Need for Detailed Feasibility Studies at the RFI Stage.** An industry representative observed that many procurement challenges arise because competency mapping and feasibility studies are not conducted comprehensively during the Request for Information (RFI) stage. He suggested that DAP 2026 should incorporate a structured feasibility study format to improve requirement definition and reduce delays later in the procurement cycle.

55.1. **Response.** Maj Gen Mann acknowledged the recommendation and noted that lessons learnt from ongoing procurement programmes should be incorporated into future policy refinements. He invited the participant to share the study and recommendations for further examination and possible consideration by the concerned authorities.

56. **Funding Challenges for Deep-Technology Start-ups.** Concerns were raised regarding the adequacy of existing innovation funding mechanisms. The participant observed that while schemes such as iDEX and ADITI provide financial support, deep-technology development requires larger and sustained funding models. It was suggested that technology-readiness-level (TRL) based funding models similar to those followed by advanced innovation ecosystems abroad should be considered.

56.1. **Response.** The panel acknowledged that funding remains one of the principal challenges faced by start-ups. While existing programmes have created a framework for supporting innovation, the suggestion regarding TRL-based funding models and alternative financing approaches was noted for further consideration.

57. **Applicability of DAP 2026 to Ongoing Make-I and Make-II Cases.** A participant sought clarification regarding whether the provisions of DAP 2026 would apply retrospectively to ongoing Make-I and Make-II projects where Development Agencies had not yet been selected.

57.1. **Response.** Lt Gen Rohit Gupta (Retd) explained that DAP 2026 contains specific transition provisions. The guiding principle is to avoid disrupting ongoing acquisition programmes. Accordingly, new provisions will be applied only to the extent possible without adversely affecting projects already under execution.

58. **MSME Participation in High-Value Make-I Projects.** An MSME representative highlighted that Make-I projects often involve substantial financial eligibility requirements,

making participation difficult for smaller enterprises despite possessing relevant technical expertise.

58.1. **Response.** The panel explained that Make-I projects generally involve large-scale capability development and production responsibilities requiring significant financial resources. However, dedicated provisions exist for MSMEs through other acquisition and innovation categories. Furthermore, DAP 2026 includes provisions that would allow successful developmental projects under schemes such as iDEX to migrate to larger development programmes where warranted.

59. **Procurement of Software-Based Capabilities.** A participant enquired whether specialised acquisition procedures exist for software-intensive systems, considering the rapid pace of technological obsolescence in software domains.

59.1. **Response.** Maj Gen Mann clarified that software development projects are frequently undertaken through revenue procurement routes rather than capital acquisition processes. These mechanisms provide greater flexibility and faster execution, making them more suitable for rapidly evolving software capabilities.

60. **Proposal Evaluation under iDEX Challenges.** Concerns were raised regarding the difficulty faced by start-ups in effectively presenting their ideas under iDEX challenge mechanisms. It was suggested that greater interaction between line directorates and applicants during the evaluation process could improve proposal quality and selection outcomes.

60.1. **Response.** Maj Gen Mann explained that challenge-based programmes often attract very large numbers of applications. For example, recent ADB challenges received over 2,000 proposals for 34 problem statements. Direct interaction with every applicant was therefore operationally difficult. However, proposals undergo multiple layers of technical scrutiny involving domain experts, ADB specialists, and user directorates before final selection. Additional measures such as webinars and challenge clarification sessions are also being considered to improve understanding of requirements.

61. **Financial Engineering and Credit Support for Start-ups.** Industry representatives proposed greater use of innovative financing mechanisms, including credit guarantee schemes and contract-manufacturing models, to support start-ups and MSMEs. It was argued that many technology companies should focus on research and development while leveraging existing industrial capacity for manufacturing.

61.1. **Response.** The panel acknowledged the value of these suggestions and agreed that improved access to credit and innovative financing structures could significantly strengthen the defence innovation ecosystem. The recommendations were noted for further examination.

62. **Handholding for Start-ups Funded Outside iDEX.** A participant sought clarification regarding whether start-ups receiving funding through alternate channels such as DST, Startup India, incubators, or private investors could still access Army support mechanisms.

62.1. **Response.** Maj Gen Mann clarified that Army Design Bureau support is not restricted to iDEX-funded entities. Any innovator, start-up, MSME, academic institution, or individual possessing a promising idea can approach ADB for guidance, operational exposure, user interactions, and technical assistance. He cited examples of support being extended even to school students presenting innovative technological concepts.

63. **Participation of Space Technology Companies.** Representatives from the space technology sector sought greater opportunities for participation in defence innovation programmes and suggested dedicated challenge categories focused on space and dual-use technologies.

63.1. **Response.** The panel highlighted existing provisions under the iDEX Open Challenge framework, which enables innovators to submit proposals even when no specific challenge has been announced. Participants were encouraged to utilise this mechanism for presenting novel space-based solutions and emerging technologies.

64. **Need for Defence Demonstration Platforms and Investor Engagement.** Participants emphasised the importance of establishing stronger communication channels between innovators, investors, incubators, and defence users. Suggestions included defence-focused hackathons, demonstration days, investor forums, and technology showcases to accelerate the transition from prototypes to operational capabilities.

64.1. **Response.** Maj Gen Mann welcomed the suggestions and acknowledged the importance of creating stronger links between developers, investors, and end users. He noted that hackathons and innovation events have already been conducted in certain technology domains and indicated that similar initiatives could be expanded in future.

65. **Technology Development Based on Problem Definition Statements.** A participant highlighted that some start-ups invest significant resources in developing solutions against Capability and Problem Definition Statements (CPDS) before receiving any formal support, creating financial risks.

65.1. **Response.** Maj Gen Mann advised innovators not to undertake major investments solely on the basis of broad problem-definition statements. Instead, they should submit proposals through the prescribed mechanisms and allow them to progress through the formal evaluation process. Once selected, suitable funding and development pathways can be identified through available innovation schemes and support frameworks.

66. Concluding the interaction, the panel emphasised that successful defence innovation requires close collaboration among the Armed Forces, industry, academia, investors, and research institutions. Participants were encouraged to continue engaging with the Army Design Bureau and related organisations to leverage available opportunities for technology development, evaluation, and induction.

SESSION 2: INDIGENISATION AND REFORMS

67. **'Atmanirbharta Schemes – Opportunities for Industry'**. Speaking on the subject, **Cmde Sandeep Deshmukh, DoI (N)** provided a comprehensive overview of the principal mechanisms available to industry, MSMEs, start-ups, and innovators for participation in defence indigenisation programmes. The talk focused on the operationalisation of innovation and indigenous capability development through various Ministry of Defence initiatives and highlighted pathways available for technology development, product realisation, and eventual induction into service.

68. While the national emphasis on innovation and self-reliance received renewed momentum under the *Make in India* initiative, the Indian Navy has pursued indigenous design and development for several decades. He highlighted the achievements of the Navy's indigenous shipbuilding programme, noting that more than one hundred indigenously

designed warships have been delivered and that all forty-six naval platforms currently under construction are being built in Indian shipyards. These programmes have generated substantial opportunities for domestic industry and contributed significantly to the growth of India's defence industrial ecosystem.

69. The defence innovation and indigenisation activities are guided by several key policy documents, foremost among them being the Defence Acquisition Procedure (DAP) and the Defence Procurement Manual (DPM). The recently promulgated DPM 2025, particularly Chapter 10, provides as an important framework governing innovation and indigenisation activities under revenue procurement. In addition, the Navy's Swavalamban 4.0 roadmap and the Naval Aviation Indigenisation Roadmap provide industry with visibility regarding future requirements and opportunities for indigenous development.

70. The SRIJAN Portal and similar indigenisation platforms serve as communication channels that identify import substitution opportunities and future requirements. However, actual development and procurement still require progression through one of the formal indigenisation pathways, namely Make, iDEX, TDF, or revenue procurement.

71. The speaker also acknowledged concerns frequently raised by industry regarding procurement timelines. The defence procurement necessarily involves multiple stakeholders, approvals, and independent oversight mechanisms to ensure transparency and fairness. While these processes can result in longer timelines than those typically encountered in the commercial sector, efforts are underway to progressively reduce acquisition timelines and improve responsiveness. Innovation and indigenisation need to be viewed as long-term strategic engagements rather than short-duration commercial transactions.

72. The Government currently supports innovation and indigenous capability development through four principal mechanisms: Make, iDEX, Technology Development Fund (TDF), and Revenue Procurement. Each scheme serves a distinct purpose and caters to different stages of technology maturity, funding requirements, and acquisition priorities. Collectively, these mechanisms provide industry with multiple pathways to develop technologies, secure funding support, and transition prototypes into operational capability.

73. Elaborating on funding structures, the speaker explained that Make, iDEX, and TDF projects are financed through the capital procurement budget, while revenue procurement projects are funded through service revenue budgets. Revenue-funded projects offer complete reimbursement of approved developmental costs upon successful completion and selection. Make-I projects provide government funding of up to seventy percent of development costs, while Make-II and Make-III projects are industry-funded but supported through assured procurement commitments and defined minimum order quantities.

74. The speaker described the Make Scheme as one of the most significant mechanisms for indigenous capability development. Make-I projects are supported through substantial government funding and are intended for complex developmental programmes involving strategic technologies. Make-II projects are industry-funded and focus on indigenous development of equipment and systems against identified service requirements. Make-III projects facilitate import substitution through transfer of technology and joint venture arrangements while ensuring increasing levels of indigenous content.

75. The successful participation in Make programmes not only enables procurement by the Services but also create opportunities across other ministries and government sectors through broader recognition of indigenous products developed under government-supported schemes.

76. DRDO and focuses primarily on the development of critical technologies rather than

individual products. TDF provides financial assistance of up to ninety percent for projects valued below ₹10 crore and up to seventy percent for projects between ₹10 crore and ₹50 crore. The objective is to create technological capabilities that can subsequently support multiple products and operational applications.

77. The Innovations for Defence Excellence (iDEX) as one of the most dynamic and rapidly expanding innovation initiatives within the defence ecosystem. Established in 2018, iDEX provides a structured framework for engaging start-ups, MSMEs, and innovators through challenge-based competitions and open innovation mechanisms. He noted that the programme has witnessed substantial growth in recent years, resulting in the development of numerous prototypes and successful procurement of innovative solutions by the Armed Forces. Importantly, iDEX participation is reserved primarily for MSMEs and start-ups, thereby creating a dedicated innovation ecosystem for emerging enterprises. Explaining the operational structure of iDEX, the speaker described the distinction between DISC Challenges, Aditi Challenges, and Open Challenges. DISC and Aditi challenges originate from operational requirements identified by the Services and are subsequently published for industry participation. Open Challenges, by contrast, allow innovators to propose solutions based on their own assessment of future defence needs. Selected proposals undergo detailed evaluation by multidisciplinary committees comprising representatives from the Services, academia, industry, and subject matter experts before developmental contracts are awarded. The developmental projects under iDEX are executed through milestone-based contracts under which funding support is released progressively as defined objectives are achieved. This collaborative model enables continuous interaction between developers and user agencies throughout the development cycle, thereby reducing risk and ensuring alignment with operational requirements. Successful projects are subsequently considered for bulk procurement, with minimum order quantities increasingly being defined at the outset to provide greater commercial certainty to innovators.

78. Referring to Intellectual Property Rights (IPR), the speaker noted that recent policy reforms have become increasingly industry-friendly. Under earlier provisions, intellectual property generated through government-funded development programmes was largely owned by the Government. However, DPM 2025 provides significantly greater flexibility and recognises the importance of industry ownership of intellectual property. Depending upon the specific programme and contractual arrangements, developers may retain substantial ownership rights while the Government retains necessary safeguards relating to national security and operational use. The speaker also discussed the continuing relevance of the Revenue Procurement Route, which predates many of the newer innovation initiatives. Revenue procurement remains particularly suitable for import substitution and incremental improvements to systems already in service. Unlike capital-funded development programmes, revenue-funded projects may provide complete reimbursement of approved development costs and continue to serve as an effective mechanism for indigenous development of equipment and subsystems required by the Services.

79. In conclusion, the speaker observed that India today possesses a robust ecosystem of policy instruments, funding mechanisms, innovation programmes, and procurement pathways designed to support indigenous technology development. The challenge, he noted, is no longer the absence of opportunities but ensuring that innovators, MSMEs, and industry participants actively utilise these mechanisms. He encouraged participants to engage proactively with the Services, leverage available schemes, and contribute towards strengthening India's defence industrial base and achieving the national objective of self-reliance in defence technology and manufacturing. For Q & A, a query was put about the introduction of the L1 (Lowest Bidder) concept under the iDEX framework. It was brought out that start-ups and MSMEs participating in ongoing iDEX projects had invested significant resources based on the existing development model and sought clarification on how the proposed change would affect such projects.

79.1. **Response.** The speaker acknowledged the concern and stated that the issue was under active consideration by the Ministry of Defence and other stakeholders. He clarified that ongoing projects would continue under their existing contractual provisions. He further explained that while L1-based selection has traditionally been applied during bulk procurement after prototype development, proposals to apply it at the developmental stage were still being deliberated. The concerns of MSMEs and start-ups had been recognised, and efforts were underway to balance innovation, financial sustainability, and procurement efficiency within the iDEX ecosystem.

80. **Defence Competency Mapping Portal: Features, Functionality and Demonstration.** The session was conducted by **Capt (IN) Pankaj Yadav, Capt (Indigenisation) and Col Suryavanshi (Retd), KPMG**, members of the development team responsible for creating the portal under the guidance of Headquarters Integrated Defence Staff (HQ IDS). The portal has been conceptualised as a digital platform to improve visibility of indigenous industrial capabilities and facilitate easier identification of domestic suppliers and manufacturers across the defence ecosystem.

81. The presenters informed the audience that the portal was in its final stages of development and was expected to be made publicly accessible within a few weeks. The platform would be available through the internet and would allow manufacturers, MSMEs, start-ups, and service providers to register themselves and upload details of their products, capabilities, and associated information. Once operational, the portal would serve as a central repository of indigenous industrial competencies, thereby improving accessibility of information for defence users and procurement agencies.

82. Demonstrating the portal's functionality, the presenters explained that users would be able to search for companies, products, testing facilities, and research capabilities. The database already contained information relating to thousands of companies and over two lakh products collected from publicly available sources and industry databases. Search functionality would allow users to identify manufacturers either through company names, product names, or technical parameters, thereby enabling defence establishments to rapidly locate potential suppliers and service providers.

83. The presenters highlighted that the portal had been designed not only as a discovery platform but also as a mechanism for continuous updating of industrial capability information. Registered companies would be able to add new products, modify existing information, upload product images, and submit requests for updating records. All modifications would be subject to an administrative approval process to ensure authenticity and accuracy of information. The portal would also include verification mechanisms and approval tags to distinguish validated industry participants.

84. A key objective of the portal is to enhance visibility of indigenous products and capabilities within the Armed Forces. By creating a searchable database of manufacturers and suppliers, the portal is expected to assist workshops, depots, dockyards, base repair depots, maintenance agencies, and procurement organisations in identifying domestic sources of supply, reducing dependence on imports, and improving maintenance and repair support for equipment already in service. The products within the portal are organised through a structured seven-tier framework comprising platforms, systems, standalone units, subsystems, components, processed materials, and raw materials. This classification enables systematic categorisation of products and allows users to navigate through different technology domains and product hierarchies. The framework also facilitates mapping of industrial capabilities across multiple sectors and application areas.

85. Interactions with participants. During the interaction, participants raised several suggestions regarding future enhancements to the portal. These are as follows: -

85.1. One participant recommended incorporation of artificial intelligence and vector database technologies to improve contextual search and retrieval capabilities. While acknowledging the suggestion, the presenters explained that the current version represents an initial implementation and that advanced AI-enabled search functionalities could be considered during future upgrades. They emphasised that the immediate objective was to establish a reliable and comprehensive database of indigenous capabilities before introducing more sophisticated analytical features.

85.2. Another participant enquired whether the portal could accommodate service-based organisations such as design consultancies and engineering service providers rather than being limited solely to product manufacturers. In response, the presenters clarified that while the portal had been primarily designed for manufacturing entities, no restrictions had been imposed on registration of service providers. Such organisations could register their capabilities under relevant product or service categories and thereby make their expertise visible to prospective users.

85.3. Queries were also raised regarding the process for registration of companies not already included within the database. The presenters explained that organisations would be able to create company profiles, upload supporting information, add products, and submit registration requests directly through the portal. Following administrative verification and approval, these details would become searchable and accessible to users across the defence ecosystem. Registration and use of the portal would be free of cost.

85.4. When clarification was sought regarding analytical and research applications of the portal, it was explained that users would be able to generate tabular views of data and export information for further analysis. Such functionality would support research, market assessments, capability mapping, and identification of industrial trends. The presenters observed that while the primary objective of the portal was to support defence users in locating indigenous suppliers, the database could also provide valuable insights for policy analysis, industrial studies, and technology assessments.

85.5. Suggestions were also made regarding incorporation of ratings, technology readiness indicators, procurement history, and performance metrics to better reflect industrial competence. The presenters clarified that the current version was intended primarily as an information and visibility platform rather than a procurement or evaluation mechanism. However, features such as verification tags, identification of defence suppliers, patent references, and other capability indicators were already being considered for future versions of the portal.

85.6. In response to suggestions concerning integration with existing defence and government databases, participants recommended leveraging information available through SIDM, GeM, Ministry of Corporate Affairs records, and other industry platforms. The presenters welcomed these recommendations and indicated that such integration possibilities would be examined during future development phases in order to further enhance the utility and comprehensiveness of the portal.

86. Concluding the session, the presenters emphasised that the Competency Mapping Portal is intended to serve as a national database of indigenous industrial capabilities and a bridge between defence users and domestic industry. Participants were encouraged to actively register their organisations, provide feedback during the initial deployment phase, and

contribute suggestions for future enhancements. The portal is expected to play an important role in improving visibility of indigenous capabilities, facilitating industry participation, and supporting the broader objectives of defence indigenisation and self-reliance.

87. **SRIJAN portal and Import Substitution Mapping.** **Maj Gen Abhay Dayal, AVSM, VSM (Retd)**, former Additional Director General (Acquisition Technical) highlighted the importance of import substitution as a critical pillar of India's quest for strategic autonomy and defence self-reliance. While complete elimination of imports may neither be practical nor economically viable in all cases, systematic reduction of external dependence remains essential for strengthening national security, enhancing supply-chain resilience, and developing indigenous industrial capabilities.

88. Defining import substitution, the speaker explained that it is an economic strategy aimed at reducing dependence on foreign products by developing domestic manufacturing capability. He emphasised that import substitution is not merely a manufacturing exercise but a structured process involving identification of imported products, assessment of domestic capability, planning for technology absorption, and eventual replacement through indigenous production.

89. The import substitution mapping is a systematic roadmap involving three broad phases—identification, planning, and execution. The identification phase involves collection and analysis of data relating to imported products, services, and technologies. This is followed by feasibility assessment to determine whether domestic production is technologically feasible, economically viable, and operationally sustainable. The planning phase focuses on capability gap analysis, technology requirements, skill development, and industrial readiness. Finally, the execution phase encompasses industry participation, policy support, incentive structures, implementation, and continuous monitoring.

90. Successful import substitution requires a strong industrial base capable of absorbing technology, scaling production, and meeting quality standards. Therefore, import substitution industrialisation must precede large-scale indigenisation efforts. The Government's approach towards import substitution, the speaker referred to the Positive Indigenisation Lists promulgated by the Department of Military Affairs (DMA) and the Department of Defence Production (DDP). These lists identify equipment, systems, assemblies, and components that are to be progressively indigenised within specified timelines. The lists provide industry with clear visibility regarding future opportunities and serve as a roadmap for capability development within the domestic defence manufacturing ecosystem.

91. The five Positive Indigenisation Lists issued by the DMA cover more than 500 major platforms, weapons and systems, while the lists issued by the DDP encompass over 5,000 assemblies, sub-systems, and components. Together, these initiatives create a large and expanding opportunity space for domestic industry and provide a structured framework for reducing import dependence across the defence sector. The role of policy interventions and incentive mechanisms in supporting import substitution efforts. These include production-linked incentive schemes, indigenous procurement preferences, innovation programmes such as iDEX and the Technology Development Fund (TDF), Make-I and Make-II projects, defence industrial corridors, and the prioritisation of indigenous procurement categories under the Defence Acquisition Procedure. Collectively, these initiatives seek to create favourable conditions for investment, technology development, and industrial growth.

92. Referring to specific technology domains, the speaker identified semiconductors, defence electronics, electro-optical and infrared sensors, radar modules, aerospace materials, propulsion systems, unmanned systems, defence-grade batteries, and electronic warfare equipment as some of the critical areas where import substitution efforts require greater emphasis. Development of indigenous capability in these domains would significantly enhance

technological sovereignty and reduce strategic vulnerabilities.

93. Speaking on **SRIJAN Portal**, it was described as a key enabler of defence indigenisation. Developed by the Department of Defence Production, the portal serves as a one-stop digital platform for promoting indigenous development of imported defence items. The portal provides visibility of import substitution opportunities and facilitates interaction among Service Headquarters, DPSUs, ordnance factories, MSMEs, start-ups, academia, and industry. The primary purpose of the SRIJAN Portal is to make information relating to import substitution opportunities readily available to industry. Through the portal, manufacturers can identify products currently being imported, review technical specifications, assess demand patterns, and express interest in undertaking indigenous development. The platform therefore acts as an information-sharing mechanism that connects requirement owners with potential domestic suppliers. Imported equipment often creates long-term dependencies extending far beyond the initial acquisition stage. Imported platforms require continued procurement of spares, maintenance support, upgrades, and specialised components throughout their service life. Such dependencies create supply-chain vulnerabilities, increase lifecycle costs, and may adversely affect operational readiness during periods of geopolitical instability or conflict. Import substitution is therefore essential not only for economic reasons but also for sustaining operational capability.

94. Demonstrating the portal's functionality, the speaker explained that users can search opportunities by product category, technology domain, equipment type, or specific component. Detailed information available on the portal includes technical specifications, import quantities, annual import value, quality assurance requirements, contact details of the concerned organisation, and the status of indigenisation efforts. This enables industry to make informed decisions regarding investment and capability development. The speaker further outlined the workflow associated with the SRIJAN ecosystem. Imported items are first identified by the Services, DPSUs, or production agencies and subsequently uploaded to the portal. Industry participants can then express interest in developing indigenous alternatives. Following technical evaluation, prototype development, testing, and qualification, successful products are inducted into the defence supply chain. Quality assurance agencies such as DGQA play a crucial role in validating indigenous products through Form, Fit and Function (FFF) testing and other certification processes.

95. The portal contains thousands of items ranging from low-complexity mechanical components and fabricated products to sophisticated electronics, avionics, sensors, radar modules, electronic warfare systems, autonomous technologies, and artificial intelligence-enabled capabilities. Consequently, opportunities exist not only for large defence manufacturers but also for MSMEs, start-ups, academic institutions, and specialised technology companies. The SRIJAN Portal provides visibility of assured demand, facilitates direct interaction with requirement owners, enables participation in indigenisation initiatives, and reduces uncertainty regarding future opportunities. For MSMEs and start-ups in particular, the portal serves as an accessible entry point into the defence manufacturing ecosystem and offers opportunities to contribute to national self-reliance while simultaneously developing sustainable business models.

96. In conclusion, the speaker emphasised that import substitution is not merely a procurement initiative but a strategic national endeavour aimed at strengthening India's defence-industrial base. The combination of policy support, industry participation, innovation programmes, and digital platforms such as SRIJAN provides a comprehensive framework for reducing import dependence and promoting indigenous capability development. He encouraged industry participants to actively utilise the portal, identify opportunities aligned with their competencies, and contribute towards achieving the national vision of defence self-reliance and strategic autonomy.

97. **Gaining Inputs from IPR and Protecting IPR –Raksha Gyan Samiti.** Speaking on the subject, **Mr. Lalit Ambasta**, Co-Founder of IP Bazaar and an Intellectual Property (IP) attorney, highlighted the growing significance of intellectual property as a strategic asset for organisations operating in technology-intensive sectors, particularly defence, aerospace, and advanced manufacturing. At the outset, Mr. Ambasta described intellectual property as the “soul of a business,” observing that while organisations often focus on physical assets and manufacturing capabilities, sustainable competitive advantage is increasingly derived from intangible assets such as patents, trademarks, copyrights, trade secrets, and proprietary technologies. Global technology leaders derive the majority of their enterprise value from intellectual property and associated intangible assets rather than from physical infrastructure.

98. Illustrating the strategic value of intellectual property, the speaker referred to leading global corporations such as Apple and General Electric. The Apple’s technological leadership is supported by an extensive portfolio of patents, trademarks, designs, copyrights, and trade secrets, while organisations such as General Electric have consistently used intellectual property as a strategic instrument for sustaining innovation and maintaining market leadership. While global corporations systematically build and leverage IP portfolios, many Indian enterprises continue to underutilise intellectual property as a business and growth strategy. Highlighting international trends, Mr Ambasta explained that the proportion of intangible assets within the valuation of leading global corporations has increased dramatically over the past several decades. Whereas intangible assets constituted a relatively small component of enterprise value in the 1970s, they now account for approximately ninety per cent of the valuation of many Fortune 500 companies. This trend underscores the importance of innovation, intellectual property creation, and technology ownership in modern economies.

99. The speaker provided an overview of the intellectual property ecosystem and explained that intellectual property encompasses all creations of the human intellect that are capable of legal protection. The principal forms of intellectual property recognised under international and Indian law include patents, trademarks, industrial designs, copyrights, semiconductor integrated circuit layout designs, geographical indications, plant varieties, and trade secrets. Collectively, these mechanisms enable innovators to protect and commercialise knowledge, technologies, and creative outputs.

100. In the defence sector, the intellectual property protection extends across a broad spectrum of technologies and products. Patents may protect innovations such as propulsion systems, radar technologies, communication systems, sensors, and weapon subsystems. Designs may protect the visual appearance of equipment and platforms, while copyrights protect software, algorithms, technical documentation, and digital systems. Similarly, semiconductor layout designs, trade secrets, and trademarks all contribute to strengthening technological competitiveness and commercial value.

101. The belief that defence-related technologies should generally remain unpatented because disclosure could compromise security is misplaced. Several technologically advanced nations, including the United States and Israel, routinely protect defence innovations through patents while safeguarding genuinely sensitive information through appropriate classification and security mechanisms. He explained that technologies vulnerable to reverse engineering are often better protected through patents, whereas trade secrets are more suitable only where replication is practically impossible.

102. The patent system was originally designed to encourage disclosure of technological knowledge while simultaneously rewarding innovators. In exchange for public disclosure of an invention in sufficient detail to enable reproduction, the inventor receives a limited period of exclusive rights. This framework promotes innovation, facilitates the dissemination of technology, and contributes to long-term technological advancement by ensuring that valuable technical knowledge ultimately enters the public domain.

103. The dual nature of patents provides both legal exclusivity and a vast repository of technical knowledge. Every patent application contains detailed descriptions of technologies, systems, processes, and methods, thereby creating a comprehensive global knowledge database. Engineers, scientists, and innovators can therefore utilise patent literature not only for the protection of inventions but also as a valuable source of technical intelligence, technology scouting, competitive analysis, and innovation benchmarking.

104. The patent databases constitute one of the largest repositories of technical information in the world. Millions of patent documents are publicly available and can be accessed without cost. These databases provide detailed insights into technologies being developed across different countries, sectors, and organisations. By systematically analysing patent literature, organisations can identify emerging technological trends, assess competitor activities, understand technology trajectories, and accelerate indigenous innovation efforts. In the context of the defence innovation ecosystem, patent information can significantly support the development of indigenous technology. Technologies disclosed in patent documents may provide valuable technical guidance, reveal design approaches, and enable researchers to identify alternative solutions. Patent intelligence can therefore reduce development timelines, avoid duplication of effort, and support informed decision-making regarding research and development priorities.

105. The speaker also explained the territorial nature of intellectual property rights. Patent protection is valid only in jurisdictions where patent applications have been filed and granted. Consequently, technologies patented in one country may not necessarily enjoy protection in another jurisdiction if corresponding applications have not been filed. This creates opportunities for lawful utilisation of technologies that are not protected within a particular territory. Inventors are generally required to extend patent protection to foreign jurisdictions within specified timelines. Where patent protection is not sought within those timelines, the technology may become freely available for use in countries where no patent rights exist. This principle provides opportunities for domestic industry to identify technologies that are unprotected within India and utilise them legally for indigenous development and manufacturing.

106. International frameworks such as the Patent Cooperation Treaty (PCT) and the Paris Convention facilitate international filing and management of patent rights. These mechanisms enable innovators to seek protection across multiple jurisdictions while providing structured timelines for decision-making regarding foreign filings. Understanding these systems, he noted, is essential for organisations seeking to protect technologies in global markets.

107. In India, intellectual property laws contain provisions that permit governments to utilise patented technologies under exceptional circumstances concerning national security, sovereignty, or the public interest. Mechanisms such as compulsory licensing permit the utilisation of patented technologies under specific legal conditions when broader national interests require intervention.

108. The speaker stressed that intellectual property should not be viewed merely as a legal compliance requirement but as a strategic business tool. Effective IP management can support market positioning, technology commercialisation, investment attraction, licensing opportunities, valuation enhancement, and long-term competitive advantage. For start-ups and MSMEs in particular, a strong intellectual property portfolio can be an important differentiator when seeking investment and strategic partnerships.

109. Presenting examples from the semiconductor sector, the speaker demonstrated how patent analytics can reveal technological strengths and weaknesses across countries and industries. Developed nations maintain extensive patent portfolios in strategically important

technologies such as semiconductors, electronics, communication systems, and sensing technologies. Patent intelligence, therefore, provides valuable insights into global technology leadership and can help identify areas that require greater domestic investment and innovation.

110. In conclusion, Mr Ambasta emphasised that intellectual property represents a critical enabler of technological self-reliance, innovation-driven growth, and strategic competitiveness. He encouraged participants to actively create, protect, manage, and leverage intellectual property assets as an integral component of their business and technology strategies. Greater awareness and utilisation of intellectual property mechanisms, he observed, would contribute significantly towards strengthening India's defence innovation ecosystem and advancing the broader objectives of Atmanirbhar Bharat.

DAY 2 (12 JUN 26): IDEX, TESTING, CERTIFICATION & QUALITY ASSURANCE

SESSION 3: DEEP DIVE INTO IDEX

111. **iDEX: The Catalyst for Defence Start up Eco System.** In addition to the subject, **Mr Vivek Virmani**, DDG, iDEX & COO, DIO, owing to his expertise and experience, spoke on DISC, Open Challenges, SPRINT, Grant Structure and Milestone-Based Funding and Evaluation Mechanisms. Mr Virmani provided a detailed overview of the evolution, funding architecture, operational processes, and future direction of the iDEX ecosystem. The iDEX has emerged as one of the Ministry of Defence's most significant initiatives for fostering innovation, supporting start-ups and MSMEs, and accelerating indigenous technology development for defence applications. The framework is specifically designed to bridge the gap between innovators and end users while ensuring that technology development remains aligned with operational requirements.

112. While the Armed Forces remain responsible for defining operational requirements, conducting trials, and validating performance, the Defence Innovation Organisation (DIO) and iDEX provide an institutional mechanism for funding, contracting, and supporting innovators. This separation allows the Services to focus on technical and operational aspects while dedicated agencies manage financial and contractual processes. Such an approach reduces administrative burdens on user agencies and improves the efficiency of innovation management.

113. Providing an overview of the funding structure, Mr Virmani noted that iDEX currently operates through two principal funding streams. The first supports projects up to ₹1.5 crore through challenge-based and open-challenge mechanisms, while the second provides funding of up to ₹25 crore for more ambitious and technologically complex programmes under the Aditi framework. Collectively, these schemes have mobilised significant financial resources for defence innovation and have received approval for continuation beyond their initial funding cycles.

114. The iDEX functions primarily as a grant-based innovation programme rather than a procurement mechanism. Funding is released through a milestone-based approach, with projects progressing through six defined stages. Contracts are structured around achievement of specified outcomes rather than conventional deliverables, thereby encouraging innovation and reducing procedural complexities. This model allows innovators greater flexibility while ensuring accountability and measurable progress throughout the development cycle.

115. A key feature of the iDEX framework is the emphasis on co-creation and co-development. Unlike traditional R&D programmes, iDEX actively supports innovators throughout the development lifecycle through mentorship, user interaction, technical guidance, and institutional support. This handholding mechanism begins during project

selection and continues through development, testing, validation, and eventual scaling of successful technologies. The approach recognises that innovation often requires iterative refinement and close collaboration between developers and users. The concept of co-development has gradually expanded beyond the initial design and development phase. As technologies mature, support mechanisms increasingly focus on enabling production scaling, market access, procurement opportunities, and integration into the broader defence ecosystem. This evolution reflects the recognition that successful innovation requires not only technological development but also commercial sustainability and operational adoption.

116. Addressing the issue of matching contributions, Mr Virmani explained that iDEX presently follows a model in which innovators contribute approximately fifty per cent of project costs. Although suggestions have been made to increase or decrease this percentage, the current balance is considered optimal because it ensures innovators' commitment while maintaining significant government support. The availability of venture capital, private investment, and financial institutions has further strengthened start-ups' ability to mobilise complementary funding.

117. The session highlighted the increasing emphasis being placed on assured procurement. Initially, successful completion of an iDEX project did not automatically guarantee procurement. However, growing confidence within the Services and the Ministry of Defence has led to the introduction of minimum pilot order quantities and stronger commitments to support the procurement of successful innovations. This shift has significantly improved industry confidence and enhanced the commercial attractiveness of participation in iDEX programmes. Procurement remains a critical element in transforming prototypes into sustainable businesses. While initial pilot orders provide validation, long-term success depends upon follow-on orders, production scaling, and wider adoption across Services. Consequently, ongoing efforts focus on determining economically viable order quantities and ensuring that innovators receive meaningful opportunities for commercial growth after the successful completion of development projects.

118. On the role of incubators within the iDEX ecosystem, the speaker explained that incubators have been instrumental in guiding innovators through proposal development, project execution, milestone achievement, and financial management. Beginning with a small network of incubators, the ecosystem has expanded considerably and now includes a nationwide network of government-supported and private incubators. However, increasing emphasis is being placed on quality, accountability, and technical mentorship to ensure that incubators contribute effectively to innovation outcomes.

119. Referring to financial governance reforms, Mr. Virmani highlighted the progressive simplification of project monitoring and auditing mechanisms. Earlier approaches involving detailed scrutiny of individual expenditures were found to be cumbersome and time-consuming. Consequently, greater responsibility has been delegated to incubators for technical and financial oversight, enabling more efficient project execution while maintaining appropriate accountability standards.

120. The speaker also covered the role of the iDEX Investor Hub, which has been established to facilitate interaction between innovators and private investors. Through partnerships with venture capital firms, investment funds, and financial institutions, the Investor Hub seeks to improve access to capital and support the commercial growth of successful defence start-ups. While investor participation remains voluntary, the initiative has significantly enhanced the visibility of defence innovation opportunities within the broader investment community.

121. The extensive outreach initiatives undertaken by iDEX to broaden participation across the innovation ecosystem are yielding rich dividends. During challenge cycles, dedicated

outreach sessions, webinars, and interactions are conducted to familiarise innovators with operational requirements and challenge objectives. Recent reforms have shifted these engagements towards problem-statement-specific interactions, enabling more focused discussions and improving the quality of submissions received from start-ups and MSMEs.

122. Elaborating on the project evaluation process, the speaker highlighted the reforms introduced to streamline proposal assessment and reduce the administrative burden on user agencies. Under the revised framework, applicants are required to present concise summaries of their proposed solutions during the initial evaluation stage, facilitating faster screening and more efficient identification of promising technologies. The speaker noted that this approach has become increasingly important in view of the growing number of applications being received under various iDEX challenges.

123. As per the speaker, technology maturation and specification finalisation remain among the most challenging aspects of defence innovation. Balancing operational aspirations with practical developmental realities requires continuous interaction between innovators and user agencies. The iDEX framework therefore seeks to maintain sufficient flexibility to encourage experimentation while ensuring that resulting technologies remain relevant to operational requirements.

124. The defence innovation ecosystem has expanded substantially since the launch of iDEX. Hundreds of projects have been supported, numerous procurement contracts have been concluded, and significant private investment has been attracted into the sector. The initiative has not only contributed to indigenous technology development but has also helped create a vibrant ecosystem connecting innovators, investors, incubators, academia, industry, and the Armed Forces.

125. In conclusion, the speaker emphasised that iDEX has evolved from a start-up support initiative into a strategic instrument for defence capability development. Through funding support, co-creation, procurement pathways, investor engagement, and institutional handholding, the programme is playing a critical role in strengthening India's defence innovation ecosystem and advancing the national objective of Atmanirbhar Bharat in defence technology and manufacturing.

126. At the end of the talk, the details of Q&A session are as follows: -

127. **Can the matching contribution requirement under iDEX be reduced and funding limits increased to support deep-technology start-ups?** The matching contribution requirement could be reduced for early-stage start-ups and that funding ceilings under existing schemes could be enhanced to support ambitious technology development programmes.

127.1. **Response.** Mr. Virmani acknowledged that there was an intent to increase the quantum of funding available under iDEX. However, the existing 50 percent matching contribution model had been retained after extensive deliberations, as it ensured commitment from innovators while balancing government support and private investment. He further highlighted the growing availability of venture capital and private funding mechanisms for start-ups.

128. **Should a Technology Readiness Level (TRL)-based funding model be adopted for deep-technology projects?** A participant suggested that deep-technology projects require a differentiated funding model linked to Technology Readiness Levels (TRLs), similar to international innovation ecosystems, to improve the probability of successful technology maturation and induction.

128.1. **Response.** Mr. Virmani agreed that the proposal merited consideration and observed that a TRL-based approach could provide a more structured mechanism for supporting advanced technology projects. He noted, however, that assessment and verification of TRLs remained a practical challenge and would require further study before formal adoption.

129. **How many iDEX projects have successfully translated into procurement orders?** A participant sought clarification regarding the number of iDEX projects that had progressed beyond prototype development and resulted in procurement by the Armed Forces.

129.1. **Response.** Mr. Virmani stated that a growing number of iDEX projects had secured procurement contracts and that the overall success rate was significantly higher than originally envisaged. He noted that approximately 15 percent of projects had already converted into successful outcomes, while many others were in advanced stages of development, trials, or procurement processing. He emphasised that the focus was now shifting from technology development alone to production scaling and sustained induction into service.

130. **Proto type development cycle, transition from prototype to procurement.** The talk was delivered by two speakers: Col Jasrotia, Col ADB (Fd Fmn) and Col Ashish Pradhan Col ADB (Engr).

131. **Col Ashish Pradhan Col ADB (Engr)** provided a detailed overview of the Make framework, its sub-categories, project lifecycle, and opportunities available to industry for indigenous capability development. The Make procedure remains one of the most important mechanisms for promoting indigenous design, development, and production of defence equipment under the Defence Acquisition Procedure (DAP). The Make framework comprises three sub-categories: Make-I, Make-II, and Make-III. Make-I projects are government-funded developmental programmes involving niche technologies and complex capital acquisition requirements. Under this category, the Government provides funding of up to 70 percent of prototype development costs or ₹250 crore, whichever is lower. Make-II projects are industry-funded initiatives in which development costs are borne by industry, while Make-III projects primarily focus on import substitution of equipment already in service and fall under the Buy (Indian) category.

132. The Make-II offers a significant advantage to industry by providing assured Minimum Order Quantities (MOQs). Once a project receives sanction, the approved MOQ cannot be cancelled or reduced, thereby providing a viable business case for participating industries. This assurance has been a key factor in encouraging greater industry participation in indigenous development programmes.

133. Explaining project initiation mechanisms, the speaker noted that Make projects can originate through two pathways. The first is the **Service Headquarters-Initiated Route**, wherein the Armed Forces identify a capability requirement and seek industry participation for indigenous development. The second is the **Suo Moto Route**, through which industry can proactively propose technologies or solutions that may provide significant operational advantages even if such requirements are not currently part of the Services' acquisition plans.

134. The Army actively encourages industry-driven proposals under the Suo Moto category. Such proposals may be submitted at any time using the prescribed format available on the Ministry of Defence's *Make in India Defence* portal. A significant number of ongoing Make projects have originated through industry-led initiatives,

reflecting the increasing role of private industry in shaping future military capabilities.

135. In the Make process, the first formal stage is the grant of **Approval in Principle (AIP)** by the Secretary (Defence Production). Prior to obtaining AIP, informal consultations are held with industry to assess available technological capabilities, industrial capacity, and feasibility of indigenous development. These interactions help stakeholders develop a realistic understanding of the proposed programme before seeking formal approval. Following the grant of AIP, a **Project Facilitation Team (PFT)** is constituted. The PFT comprises representatives from the Services, DRDO, DGQA, and other stakeholders and remains associated with the project throughout its lifecycle. Acting as the principal interface between industry and the Services, the PFT facilitates technical discussions, coordinates evaluations, assists in certification activities, and supports project execution from feasibility assessment to prototype validation.

136. The **Feasibility Study** stage is one of the most critical phases of the Make process. During this stage, industry responses to questionnaires uploaded on the Ministry of Defence website are used to formulate the Preliminary Services Qualitative Requirements (PSQRs). Participants were urged to provide factual, accurate, and technically validated information, as unrealistic claims or inaccurate responses often result in impractical qualitative requirements and subsequent delays in development.

137. Once feasibility studies are completed, draft PSQRs are prepared and subjected to extensive stakeholder consultations before being finalised. This is followed by the **Acceptance of Necessity (AoN)** stage, during which procurement cost estimates, project scope, and any special approvals are obtained. The speaker stressed that accurate cost estimates from industry are essential because significant deviations between estimated and actual costs can create difficulties during later procurement stages.

138. The next stage involves issuing the Expression of Interest (EoI) and the subsequent evaluation of participating firms. In Make-II projects, industries that did not participate during the feasibility study stage may still respond to the EoI and join the programme. However, in Make-I projects, only firms that participated in feasibility studies are eligible to proceed, reflecting the more selective nature of government-funded development programmes.

139. Following completion of the evaluation process, a **Project Sanction Order (PSO)** is issued, formally commencing prototype development. The speaker clarified that once a PSO has been issued, additional firms cannot subsequently join the programme. Development responsibilities remain limited to the agencies selected during the evaluation process.

140. During the prototype development stage, industries are expected to adhere to approved project plans, maintain regular engagement with the Project Facilitation Team, and ensure timely completion of quality assurance, certification, and testing requirements. The Army provides extensive support through access to testing facilities, service equipment, firing ranges, ammunition, and technical expertise wherever required.

141. Certification and quality assurance continue to be among the most frequently overlooked aspects of prototype development. Delays in obtaining certifications from quality assurance agencies often affect project timelines. Industries were therefore advised to initiate certification processes at an early stage rather than treating them as post-development activities.

142. Upon completion of development, projects undergo **Confirmation of Prototype Development (COPD)**, a preliminary validation activity designed to establish readiness for formal trials. Successful prototypes subsequently proceed to Single Stage Composite Trials and further evaluation activities in accordance with prescribed procedures.

143. Referring to recent reforms, the speaker highlighted the increasing role of Project Facilitation Teams in monitoring project progress and addressing developmental challenges. The Army has also introduced provisions that allow projects to progress even if all participating developmental agencies do not complete prototypes simultaneously. When one developmental agency demonstrates readiness while others continue to experience delays, the project may proceed without waiting indefinitely for all participants.

144. The speaker emphasised that timelines remain a critical factor in the Make process. Since many **Make projects** are linked to Positive Indigenisation Lists, delays in prototype development directly affect the Army's ability to acquire critical capabilities through indigenous sources. Consequently, while reasonable extensions may be granted, developmental agencies are expected to adhere closely to approved timelines.

145. Concluding the session, Col Pradhan observed that the Make framework has evolved significantly since its introduction, with major procedural refinements incorporated through successive amendments to DAP 2020. He encouraged industry representatives to familiarise themselves with the provisions of Chapter III of DAP and closely monitor forthcoming reforms under DAP 2026. He emphasised that active industry participation, accurate technical inputs, timely execution, and continuous engagement with Project Facilitation Teams would be critical to the success of indigenous capability development programmes under the Make framework.

146. **Col Jasrotiya, Army Design Bureau (ADB)** explained how the iDEX framework supports the complete innovation lifecycle, from identification of operational challenges to prototype development, validation, procurement, and induction. The objective of iDEX extends beyond innovation alone, seeking to bridge the gap between promising technologies and deployable military capabilities. The fundamental vision of iDEX is to create an ecosystem that fosters innovation by actively engaging MSMEs, start-ups, individual innovators, and technology developers. While encouraging innovation remains important, the ultimate objective is to ensure that successful prototypes transition into operationally relevant solutions that can be procured and inducted by the Armed Forces. The iDEX journey is structured into three broad phases. The first phase focuses on challenge formulation, selection of innovators, and preparation of technical documentation. The second phase encompasses prototype development, testing, certification, validation, and user trials. The final phase involves procurement, induction, and capability enhancement through user feedback and iterative development. This structured approach minimises uncertainty and provides innovators with a clear pathway from concept to induction.

147. Elaborating on challenge generation, the speaker noted that every project begins with the Services identifying an operational requirement. Problem statements are refined by subject-matter experts and subsequently launched via mechanisms such as DISC, Aditi, or Open Challenges. Proposals received from innovators undergo multiple levels of technical scrutiny by the Army Design Bureau and user directorates before being evaluated by the Higher-Powered Steering Committee (HPSC) for final selection. While earlier challenge cycles typically attracted 20–25 responses, current

challenges routinely receive 50–60 submissions, with some challenges attracting over 200 proposals. Similarly, open challenges have seen substantial growth, with several hundred proposals received in each cycle. This increasing participation reflects growing confidence in the defence innovation ecosystem and the expanding engagement of start-ups and MSMEs.

148. Once a project is approved, a Project Facilitation Team (PFT) is constituted to act as the interface between the innovator and the user agency. The PFT plays a central role throughout the development cycle, assisting in the refinement of problem statements, facilitating user interactions, coordinating with quality assurance agencies, developing trial methodologies, supervising testing and validation activities, and supporting the preparation of operational requirements. The team also assists in cost evaluation and procurement-related activities as projects mature towards induction.

149. The prototype development follows a milestone-based framework. Projects progress through successive stages involving technology validation, design refinement, laboratory prototyping, system integration, prototype development, certification, testing, and finally user trials. Funding support is linked to the achievement of predefined milestones, ensuring accountability while allowing innovators flexibility in technology development. Several challenges typically arise during the development process, including technological constraints, sourcing specialised components, redesign requirements, certification issues, and aligning technical performance with user expectations. To address these challenges, the Army Design Bureau provides continuous support through regular review meetings, direct communication channels, access to user facilities, testing ranges, and equipment, as well as technical guidance. This collaborative ecosystem ensures that innovators are not isolated during the development journey.

150. Particular emphasis was placed on the importance of documentation throughout the project lifecycle. Successful completion of technical development alone is insufficient for induction. Innovators must also prepare comprehensive documentation relating to quality assurance, maintainability, lifecycle support, certification, and operational deployment. To facilitate this process, representatives from quality assurance, maintenance, and logistics organisations are included within Project Facilitation Teams from the earliest stages of development.

151. Referring to procurement procedures, the speaker explained that the successful completion of the Single Stage Composite Trial marks a critical milestone in the transition from prototype development to acquisition. Recent reforms have introduced professional cost evaluation mechanisms that assist in benchmarking and facilitate subsequent procurement decisions. These measures are intended to reduce delays and create a smoother pathway from prototype validation to procurement.

152. A major innovation highlighted during the presentation was the concept of **Spiral Development**, introduced as part of recent policy reforms. Under this approach, technologies demonstrating substantial capability need not wait until every performance parameter is fully achieved before induction. Instead, pilot quantities can be procured for operational validation while developers continue to improve the system through subsequent iterations. This approach significantly accelerates induction timelines and enables users to gain operational experience with emerging technologies.

153. Several Army projects have already benefited from the spiral development approach. Successful examples have progressed from prototype development to pilot procurement and limited validation trials, demonstrating the model's practical viability.

He cited cases where technologies had matured sufficiently to enter procurement stages while further refinements continued in parallel. A large number of iDEX-supported projects have now progressed beyond early development stages and are approaching user trials, validation, and procurement. These projects span a wide range of technology domains, including artificial intelligence, autonomous systems, communications, surveillance, cyber security, mobility platforms, and soldier-support technologies.

SESSION 4: TESTING AND CERTIFICATION SYSTEM

154. **Testing and Evaluation of Mil Products.** Speaking on the subject, **Maj Gen Bimalendu Mohapatra, ADG (Armaments), DGQA**, highlighted the critical role played by testing, evaluation, and quality assurance throughout the lifecycle of military equipment supplied to the Armed Forces. He emphasised that the primary objective of DGQA is not to create procedural hurdles but to ensure that equipment delivered to soldiers performs reliably under operational conditions and inspires complete confidence among users. Testing and evaluation are among the most important stages in the acquisition and induction process. DGQA provides testing and quality assurance support not only to the Armed Forces but also to organisations under the Ministry of Home Affairs, Coast Guard, and other government agencies. Many challenges faced by industry arise from procedural misunderstandings, incomplete documentation, or avoidable technical oversights rather than deficiencies in product design itself.

155. Explaining the evaluation framework, the speaker stated that testing is conducted against approved General Staff Qualitative Requirements (GSQRs), Preliminary Services Qualitative Requirements (PSQRs), Joint Services Specifications (JSS), and other prescribed standards. The objective is to ensure compliance with operational, safety, reliability, and performance requirements before induction into service. Particular emphasis is placed on ensuring that equipment functions effectively across India's diverse operational environments, ranging from deserts and coastal regions to high-altitude areas.

156. There are three broad categories of testing typically undertaken during evaluation. These include laboratory and environmental testing under controlled conditions, DGQA evaluation and certification activities, and user trials conducted by the respective Services. Together, these stages validate technical performance, operational suitability, maintainability, and compatibility with military operating environments.

157. Referring to common causes of failure during evaluation, the speaker observed that many products fail due to inadequate attention to electromagnetic interference and compatibility (EMI/EMC) requirements. Many otherwise capable systems fail to satisfy prescribed standards because of minor deficiencies in shielding, emissions control, or harmonic suppression. He advised industry participants to incorporate EMI/EMC compliance considerations from the earliest stages of design and development.

158. Metallurgical compliance was identified as another major area where products frequently encounter difficulties during evaluation. The failures often arise due to inconsistencies in raw materials, deviations in chemical composition, or inadequacies in microstructural properties. He urged manufacturers to source materials from reliable suppliers and ensure compliance with specified metallurgical standards before commencing production. Environmental qualification testing was also highlighted as a critical requirement. Products are subjected to extreme temperature variations, humidity, dust, vibration, shock, and other environmental stresses to ensure reliable performance under operational conditions. The speaker explained that many failures occur because environmental considerations are not adequately addressed during the design stage, even though they are relatively straightforward to rectify through proper engineering and testing.

159. The talk further covered safety, reliability, ballistic, and functional testing. These evaluations are intended to verify that equipment performs consistently, safely, and accurately under operational conditions. Particular attention is given to weapons, ammunition, ballistic systems, and other kinetic platforms, where even minor deviations in design or manufacturing tolerances can significantly affect performance and safety. The speaker explained that testing and evaluation form part of a broader lifecycle approach beginning with design verification and prototype evaluation and extending through field trials, DGQA assessments, maintenance evaluation trials, EMI/EMC certification, user evaluations, induction, and subsequent in-service support. Even after induction, DGQA remains involved in defect investigations, root cause analysis, corrective actions, and preventive measures to improve product reliability.

160. A recurring challenge identified is the quality of documentation submitted by industry. The speaker observed that incomplete test reports, missing certifications, inadequate technical documentation, and insufficient training plans often delay acceptance of otherwise satisfactory products. He urged manufacturers to treat documentation, training support, and lifecycle maintenance planning as integral components of the development process rather than as post-production activities.

161. The speaker also highlighted the importance of logistics and field support arrangements. He noted that many equipment suppliers underestimate the challenges associated with sustaining products in remote operational environments. Timely availability of spare parts, maintenance support, and technical assistance remains essential for maintaining user confidence and ensuring operational readiness throughout the service life of equipment.

162. Referring to ongoing initiatives to strengthen indigenous testing infrastructure, the speaker highlighted the development of the proposed **National Integrated Test Facility (NITF)**. The facility is envisioned as a comprehensive testing ecosystem capable of supporting a wide spectrum of military equipment, platforms, and technologies. It is expected to provide integrated testing, simulation, environmental qualification, and certification capabilities, thereby reducing dependence on foreign testing facilities and strengthening India's self-reliance in validating defence technology.

163. The growing integration of government laboratories, defence establishments, academic institutions, and private industry is strengthening the national testing ecosystem. Through initiatives such as the Defence Testing Portal and increased participation of accredited private laboratories, the Ministry of Defence is seeking to expand testing capacity, improve accessibility, and reduce bottlenecks faced by innovators and manufacturers. The increasing adoption of advanced technologies such as digital twins, simulation-based testing, remote quality assurance, additive manufacturing, and Industry 4.0/5.0 practices is expected to improve efficiency, reduce testing timelines, enhance accuracy, and support the development of more sophisticated indigenous defence systems.

164. In conclusion, Maj Gen Mohapatra emphasised that testing and quality assurance are fundamental enablers of operational effectiveness and user confidence. He encouraged industry participants to engage proactively with DGQA, utilise available testing infrastructure, strengthen documentation and certification practices, and adopt modern quality assurance methodologies. Such efforts, he observed, would contribute significantly towards improving product reliability, accelerating induction timelines, and supporting India's broader objectives of defence indigenisation and technological self-reliance.

165. At the end of the talk, the details of the Q&A session are as follows: -

165.1. **Will test certificates issued by accredited private laboratories be accepted by DGQA and the Armed Forces? The** clarification was sought regarding

the acceptability of test certificates issued by private laboratories. While private-sector testing capability is increasing, uncertainty remained regarding formal recognition of such certificates during defence procurement and evaluation processes.

165.1.1. **Response.** Maj Gen Mohapatra clarified that accredited private laboratories are already being utilised within the defence testing ecosystem. He stated that where testing methodologies fall within the approved accreditation scope, the certificates would be accepted. He further encouraged participants to engage directly with DGQA for empanelment and integration into defence testing activities, emphasising that the system is actively moving towards greater utilisation of accredited private-sector testing facilities.

165.2. **Are different EMI/EMC standards prescribed for different categories of drones?** A participant sought clarification regarding EMI/EMC requirements for drones, noting that different categories of drones such as logistics, agricultural, firefighting, and surveillance platforms may require different standards.

165.2.1. **Response.** The speaker confirmed that category-specific EMI/EMC standards have been defined for different types of drones. He explained that separate standards and evaluation criteria are available depending on the intended role and operational application of the platform. He also highlighted ongoing efforts to expand national EMI/EMC testing capacity and encouraged industry and academic institutions to establish accredited facilities to meet these requirements.

166. **Technical Trials vs User Trials.** While speaking, **Brig Navneet Tanwar, Brig CD – A**, provided a comprehensive overview of the trial methodology used in defence procurement, the challenges encountered during evaluation, and measures that industry can adopt to improve compliance and reduce procurement delays. He emphasised that trials constitute a critical stage in the acquisition process, ensuring that equipment not only meets prescribed technical specifications but is also operationally suitable for induction into service.

167. The capital procurement process broadly comprises three stages: requirement conceptualisation by user directorates, procurement by the acquisition authorities, and post-contract management by the concerned logistics and maintenance agencies. Trials form a key component of the procurement stage and are intended to assess equipment against approved General Staff Qualitative Requirements (GSQRs) and confirm its suitability for operational employment. Elaborating on the evaluation framework, the speaker stated that Field Evaluation Trials consist of two principal components. The first comprises Technical Trials, which assess compliance with technical specifications through quality assurance, maintainability evaluation, EMI/EMC assessment, secrecy evaluation, ballistic testing, and related activities. The second comprises User Trials, which evaluate operational performance, suitability, and acceptance by the intended users. Together, these trials ensure that equipment satisfies both technical and operational requirements.

168. The speaker clarified that user trials may be conducted either by the Capability Development Directorate or by the respective user directorates depending on the nature of the equipment and the acquisition case. He also distinguished between routine trial continuation activities and formal confirmatory trials, explaining that a confirmatory trial involves issuance of a fresh trial directive and focuses specifically on previously identified shortcomings, whereas routine rectifications undertaken during an ongoing trial remain part of the same evaluation process.

169. Emphasising the importance of planning, the speaker observed that trial considerations begin much earlier than the actual evaluation stage. The trialability of the

proposed parameters is examined during the formulation of GSQRs to ensure that all prescribed requirements can be objectively evaluated. Trial teams and technical experts therefore contribute throughout the acquisition lifecycle, from requirement definition to final validation. The speaker explained that a detailed Trial Methodology is prepared and issued along with the Request for Proposal (RFP). This document outlines the parameters to be tested, the responsibilities of various agencies, the evaluation criteria, the equipment requirements, and the broad trial plans. Extensive consultations are conducted with stakeholders, including industry representatives, to ensure transparency and feasibility. Subsequently, Trial Directives are issued specifying locations, schedules, trial teams, equipment requirements, and detailed evaluation methodologies.

170. Turning to the principal challenges encountered during trials, the speaker identified inadequate understanding of technical and operational requirements as a major cause of non-compliance. In many cases, vendors submit equipment that does not fully align with the intended requirements due to an incomplete understanding of the GSQR provisions. This results in avoidable failures during evaluation and delays in procurement.

171. Another challenge highlighted was the mismatch between technological readiness and commercial aspirations. The speaker noted that industries occasionally commit to performance levels that are not yet technically achievable within existing technological constraints. While commercial enthusiasm is understandable, unrealistic commitments often lead to developmental delays and subsequent failures in trials when products cannot meet prescribed specifications.

172. The speaker further observed that commercial pressures and competitive considerations sometimes lead to suboptimal inputs during the requirements formulation stage. Industry responses to Requests for Information (RFIs) may overstate achievable capabilities, leading to the formulation of GSQRs that subsequently prove difficult to satisfy. He stressed the importance of providing realistic assessments during preliminary consultations so that requirements remain achievable and relevant.

173. Other recurring challenges include inadequate training of vendor personnel, delays in submission of equipment under test, disruptions in global supply chains, dependence on single sources for critical components, and insufficient attention to integration of buyer-nominated equipment. These factors collectively contribute to delays in evaluation schedules and procurement timelines.

174. The products developed under innovation schemes such as iDEX and Make frequently focus on technology development without giving adequate consideration to quality assurance, EMI/EMC certification, and maintainability requirements. Consequently, otherwise promising technologies sometimes encounter difficulties during final validation stages. Industry was therefore encouraged to incorporate compliance considerations from the earliest phases of development. The acquisition cases often witness multiple complaints from competing vendors. While grievance redressal mechanisms are necessary, excessive and unsubstantiated complaints can significantly delay procurement. The trial procedures seek to balance objectivity and practical operational considerations while ensuring fairness and transparency for all participants.

175. The speaker recommended several strategies for industry. These included providing realistic responses to RFIs, ensuring participation of technical experts during interactions with user agencies, maintaining awareness of trial methodologies while designing products, planning certification activities well in advance, developing prototypes before bid submission wherever possible, and adopting digital twin technologies to improve product design and lifecycle support. He also encouraged industries to explore consortium-based approaches where necessary to bridge technological and financial capability gaps.

176. It was informed that efforts are underway to reduce trial timelines by minimising redundant testing, conducting parallel evaluations where feasible, accepting recognised certificates, increasing use of Government e-Marketplace (GeM) mechanisms, and reducing unnecessary subjectivity in evaluation procedures. These measures are intended to improve efficiency while maintaining the integrity of the procurement process.

177. Touching upon Emergency Procurement (EP) mechanisms, the speaker explained that these are special acquisition procedures designed to rapidly induct critical operational capabilities. Unlike standard procurement processes, emergency procurement permits certain procedural relaxations and accelerated timelines, enabling contracts to be concluded and equipment delivered within compressed timeframes when operational necessity demands urgent acquisition. The speaker also outlined the broad framework governing Defence Industrial Licences. He explained that production of specified categories of defence equipment remains regulated under relevant legislation and requires licensing through the Department for Promotion of Industry and Internal Trade (DPIIT). Industries were encouraged to familiarise themselves with licensing requirements and consult the relevant authorities where necessary.

178. In conclusion, Brig Tanwar emphasised that successful participation in defence procurement requires a thorough understanding of user requirements, realistic capability assessments, early compliance planning, and close engagement with trial authorities. By adopting these practices, industry can reduce non-compliances, improve trial outcomes, and contribute more effectively to the national objective of defence indigenisation.

179. At the end of the talk, the details of Q &A session are as follows: -

179.1. Have repeated Emergency Procurement (EP) schemes adversely affected defence indigenisation efforts? A participant sought clarification on whether successive emergency procurement initiatives had negatively impacted indigenous defence manufacturing and indigenisation efforts.

179.1.1. Response. The speaker responded that emergency procurement mechanisms had not adversely affected indigenisation. Rather, they were designed to address urgent operational requirements through accelerated acquisition procedures while continuing to support capability enhancement of the Armed Forces.

179.2. Is there any proposal to reduce the validity period and processing timelines associated with Defence Industrial Licences?

179.2.1. Response. The speaker clarified that Defence Industrial Licences are administered by DPIIT and that detailed policy decisions relating to licence validity and timelines fall within the purview of the concerned authority. He explained the broad licensing process but noted that specific reforms would need to be addressed by DPIIT.

179.3. How are software-based products evaluated when they do not require conventional physical testing?

179.3.1. Response. In response, the panel explained that software embedded within defence equipment is generally assessed through certification and conformity declarations submitted by manufacturers. However, where concerns arise regarding functionality, security, frequency management, interoperability, or operational performance, detailed software evaluation and validation may be undertaken through specialised testing facilities. The

importance of software assurance has increased significantly as modern military systems become increasingly networked, digitised, and software-driven.

180. **NCNC Demo and Difference with Trials.** While speaking **Maj Gen CS Mann, PVSM, AVSM, VSM, ADG ADB** explained the purpose, procedures, outcomes, and procurement implications of NCNC demonstrations within the defence innovation and indigenisation ecosystem. The speaker observed that a significant proportion of industry participants often use the terms “trial” and “demonstration” interchangeably, despite the two processes serving fundamentally different objectives within the acquisition framework. He clarified that NCNC demonstrations are not procurement trials. Formal procurement trials are conducted against approved Services Qualitative Requirements (SQRs) and Requests for Proposal (RFPs) as part of an ongoing acquisition process. Such trials involve strict compliance assessment, where equipment either meets prescribed parameters or fails to do so. NCNC demonstrations, by contrast, are intended to evaluate emerging technologies and innovative products that are not yet linked to any specific procurement case.

181. NCNC demonstrations are conducted against the developer's claimed capabilities rather than against formally approved qualitative requirements. The objective is to assess the equipment's actual performance and determine whether it provides operational value to the Army. Consequently, the outcome is not expressed in terms of compliance or non-compliance, but rather in terms of demonstrated capability and potential operational utility.

182. Elaborating on the process, the speaker informed participants that proposals for NCNC demonstrations are submitted to the Army Design Bureau for evaluation. Prior to approving a demonstration, the Army undertakes an internal assessment to determine whether the technology offers new capabilities, whether similar demonstrations have already been conducted, and whether further evaluation is warranted. This screening process helps avoid duplication of effort and ensures efficient utilisation of Army resources.

183. Following approval, the demonstration is coordinated through nominated Army formations and units. Feedback received after the demonstration is categorised into three broad outcomes: recommended, recommended with product improvements and not recommended. Recommended products are shared with Commands and user directorates to provide visibility into available indigenous capabilities and facilitate procurement decisions under delegated financial powers.

184. In cases wherein, during demonstrations, product improvement needs are identified, the feedback is shared with the developer along with a comparison of claimed and demonstrated capabilities. Developers may subsequently incorporate the suggested modifications and resubmit the product for further evaluation. Similarly, where a product is not recommended, the developer receives detailed feedback and may choose to undertake additional improvements before seeking re-evaluation.

185. Highlighting the impact of the NCNC framework, the speaker noted that approximately 200 demonstrations covering 135 products had been conducted over the preceding year and a half. Nearly half of the products evaluated had been recommended, while a significant proportion had subsequently been procured by Army formations. He observed that around fifty recommended products had already been procured through various procurement mechanisms since 2024, demonstrating the practical value of the NCNC process in bridging the gap between innovation and acquisition.

186. The speaker further explained that NCNC demonstrations have emerged as an important source for identifying capabilities, particularly during recent emergency procurement initiatives. Several products procured under emergency procurement schemes had not

originally formed part of the Army's Annual Acquisition Plan but were inducted after successful demonstration of operationally relevant capabilities. This highlights the role of NCNC demonstrations in accelerating adoption of innovative technologies and responding rapidly to emerging operational requirements.

187. To improve efficiency and reduce duplication, the Army has recently rationalised the NCNC process. Authority for approving demonstrations has been centralised at Army Headquarters and Command Headquarters levels, thereby reducing the need for industry to approach multiple individual units. The Army has also designated specific formations and units as nodal entities to conduct demonstrations across different operational environments, including high-altitude, desert, and plains sectors. This new framework ensures standardisation, continuity of expertise, and creation of a central repository of knowledge regarding demonstrated technologies. The designated formations also conduct periodic exercises to assess the equipment demonstrated in realistic tactical scenarios, thereby enabling a more comprehensive evaluation of its operational utility and integration into existing tactics, techniques, and procedures.

188. The Army has also established a centralised digital repository of NCNC demonstration data accessible through the Army Data Network. This repository captures details on demonstrated products, participating firms, demonstration locations, and evaluation outcomes. The database is intended to improve visibility of indigenous technologies across the Army and support future procurement planning.

189. Concluding the session, the speaker encouraged industry participants to route all NCNC proposals through the Army Design Bureau or Command Headquarters rather than approaching individual units directly. Such an approach would ensure better coordination, reduce unnecessary expenditure by developers, and maximise the prospects of successful evaluation and eventual procurement.

190. At the end of the talk, the details of the Q&A session are as follows: -

190.1. Is the Army considering reimbursement or financial support for NCNC demonstration costs incurred by industry?

190.1.1. **Response.** The speaker explained that the Army had previously proposed a broader framework encompassing NCNC demonstrations, field exploitation, and capability acceleration mechanisms. While some aspects had subsequently been addressed through the Low-Cost Capital Acquisition (LCCA) framework, the specific issue of NCNC demonstration costs remained under consideration. He informed participants that a fresh proposal had recently been submitted to address support mechanisms for higher Technology Readiness Level (TRL) systems and that discussions were ongoing within the Ministry of Defence. No final decision had yet been taken.

190.2. Can the NCNC demonstration process be decentralised further to support local operational requirements and faster engagement with units?

190.2.1. **Response.** The speaker clarified that the Army had already delegated authority for approving NCNC demonstrations to Command Headquarters in addition to Army Headquarters. However, further decentralisation to individual units was not considered desirable, as it could result in duplication of effort, inconsistent evaluation standards, and fragmented procurement decisions. The current approach seeks to harmonise demonstrations through centralised coordination while ensuring that information on demonstrated technologies is shared widely across the Army.

Industry participants were therefore advised to route proposals through the Army Design Bureau or Command Headquarters rather than approaching individual units directly.

191. **Maintainability Evaluation Trials (MET) Trials.** Col Amit Ranjan, DCSE (LE Wing) of HQ TG GP EME provided an overview of the role of MET in defence procurement and highlighted the importance of maintainability, engineering support planning, and lifecycle sustainment in ensuring long-term operational effectiveness of military equipment. The speaker informed participants that HQ TG EME is responsible for formulating Integrated Engineering Support Plans (IESP) for the entire spectrum of Army equipment, including armoured fighting vehicles, artillery systems, communication equipment, radars, aviation platforms, and weapon systems. He noted that engineering support and product sustainment typically account for nearly 10–15 percent of the total value of a procurement contract, underlining their importance in the acquisition process.

192. Explaining the role of Maintainability Evaluation Trials, the speaker stated that MET is conducted by specialised units known as Maintainability Advisory Groups (MAGs). These organisations assess the maintainability characteristics of equipment and evaluate the adequacy of the Engineering Support Package (ESP) offered by vendors. MET forms an integral part of Field Evaluation Trials (FET), Single Stage Composite Trials (SSCT), maintenance demonstrations, iDEX milestone verification activities, and other acquisition processes.

193. The Army currently operates twenty-two specialised MAGs located across the country. Each MAG focuses on a specific equipment domain such as aviation systems, electro-optical devices, armoured platforms, communications equipment, or weapon systems. This domain expertise enables detailed technical evaluation of maintainability and supportability aspects of equipment under consideration for induction. The MET primarily evaluates the adequacy of the Engineering Support Package in accordance with the Army's prescribed repair philosophy. Depending upon operational requirements, repair responsibilities may be distributed across organisational, intermediate, and depot levels. The vendor's support package is therefore expected to align with the repair philosophy specified in the RFP.

194. A key aspect of MET is the evaluation of the Manufacturer Recommended List of Spares (MRLS). Vendors are required to identify spares essential for sustaining equipment throughout its operational lifecycle. The speaker emphasised that MRLS submissions should reflect equipment criticality, anticipated failure rates, maintenance philosophy, operational deployment conditions, and the number of designated repair points. He cautioned against treating production surplus items as spares and urged vendors to ensure that all subsystems, including imported and ancillary components, are adequately covered.

195. The speaker observed that some vendors, in an effort to remain commercially competitive, tend to understate spares requirements. Such practices may reduce initial costs but often result in operational difficulties, increased downtime, and reduced equipment availability after induction. He stressed that realistic provisioning of spares is essential for ensuring long-term reliability and sustaining user confidence.

196. Another major area of evaluation involves Special Maintenance Tools (SMTs), Special Test Equipment (STEs), and associated gauges. These tools are essential for inspection, testing, maintenance, and repair activities at various levels of support. Vendors are required to demonstrate the functionality and adequacy of such equipment during MET and ensure that they are consistent with the prescribed repair philosophy.

197. The speaker also highlighted the importance of comprehensive Technical Literature. Documentation must conform to Joint Services Specification (JSS) formats and include

operating instructions, maintenance procedures, troubleshooting guides, illustrated spare parts catalogues, repair manuals, and training materials. Such documentation is critical for enabling maintenance personnel to undertake fault diagnosis, repairs, and lifecycle support effectively.

198. Training support was identified as another essential element of the Engineering Support Package. Depending on the nature of the equipment, vendors may be required to provide training aids such as sectioned models, exploded assemblies, charts, and simulation systems. These facilitate effective training of operators and maintenance personnel and improve the Army's ability to sustain equipment independently.

199. Explaining the broader objectives of MET, the speaker noted that the trial assesses not only the adequacy of spares, tools, literature, and training support, but also examines the commonality of components across equipment families, import dependence, repairability, and maintainability characteristics. Particular attention is given to imported assemblies, Chinese-origin components, and items requiring factory-level repairs to ensure that operational availability is not adversely affected by supply chain vulnerabilities.

200. During the evaluation process, maintainability teams physically examine equipment, assess accessibility of components, and verify the practicality of maintenance procedures. The speaker cited examples in which routine maintenance tasks required extensive disassembly of major assemblies, significantly increasing maintenance effort and downtime. Such design features are carefully examined as part of the maintainability assessment.

201. The speaker highlighted several recurring challenges encountered during MET. These include non-availability of mandatory documentation, delayed submission of equipment and support packages, inadequate adherence to prescribed repair philosophies, incomplete development of maintenance tools and test equipment, and absence of technical representatives from partner firms supplying critical subsystems. Such deficiencies often result in delays and adversely affect evaluation outcomes.

202. He advised industry participants to plan maintainability requirements from the earliest stages of product development rather than treating them as post-design activities. Spares provisioning, technical documentation, maintenance tooling, training support, and repair concepts should be developed in parallel with equipment design to ensure smooth progression through evaluation and induction stages.

203. In conclusion, Col Amit Ranjan emphasised that maintainability is a critical determinant of operational effectiveness and lifecycle costs. A technically capable system can only deliver sustained operational value if it is adequately supported through spares, maintenance infrastructure, technical documentation, and training. He encouraged industry participants to view maintainability as an integral component of product development and not merely a contractual requirement, thereby contributing to improved equipment availability and long-term operational readiness of the Armed Forces.

204. **User Evaluation Trials and Documentation before Trials.** Delivering a session on User Trials and Industry Preparedness, **Maj Gen Rohit Gupta (Retd)** provided a practitioner's perspective on the conduct of field evaluation trials and highlighted several misconceptions surrounding the defence procurement process. He emphasised that user trials are an indispensable component of military acquisitions and cannot be diluted merely to accelerate procurement timelines. Equipment inducted into service must perform reliably under operational conditions; therefore, trials are intended to validate whether a product can safely and effectively meet the soldier's requirements in the field. The speaker stressed that while industry often perceives trials as lengthy and restrictive, the objective of the Services is not to reject equipment but to identify and induct capable systems that meet operational

requirements.

205. Maj Gen Rohit Gupta argued that many difficulties encountered during trials originate much earlier in the acquisition cycle. He observed that user trials effectively begin at the Request for Information (RFI) stage, where industry inputs contribute significantly to the formulation of Services Qualitative Requirements (SQRs). If vendors provide incomplete, inaccurate, or overly optimistic information regarding equipment capabilities, the resulting SQRs may not accurately reflect realistic technological performance. This can subsequently create challenges during evaluation when equipment fails to meet the very parameters that were initially proposed by industry itself. He therefore encouraged vendors to provide realistic and technically sound responses during the preliminary stages of procurement.

206. Referring to the formulation of SQRs, Maj Gen Rohit Gupta explained that requirements are not drafted in isolation. Before an SQR is finalised, authorities examine whether the proposed parameters can be objectively tested and validated. Trialability is therefore a key consideration during requirement formulation. He observed that industries often seek greater flexibility in evaluation procedures, yet fail to appreciate that the Services must establish measurable, verifiable criteria to ensure transparency and fairness in procurement. Consequently, technical specifications and evaluation methodologies are closely linked throughout the acquisition process.

207. The presentation also highlighted the growing discussion surrounding simulation-based testing and digital evaluation methods. While acknowledging their potential benefits, the speaker cautioned that meaningful simulation requires extensive databases, validated performance data, sophisticated modelling tools, and continuous learning systems. Such capabilities are still evolving and cannot entirely replace physical testing under operational conditions. He suggested that simulation should first become a design and validation tool for industry, enabling manufacturers to assess product performance under diverse environmental and operational conditions before presenting equipment for formal military evaluation.

208. Emphasising the importance of vendor engagement, the speaker noted that trial methodologies and directives are increasingly detailed as the industry frequently seeks greater clarity on evaluation criteria. However, he observed that many vendors fail to provide technically competent representatives during pre-trial interactions. Instead of domain experts, companies often depute commercial or managerial personnel who are unable to explain equipment characteristics, limitations, and operational parameters. Such gaps hinder meaningful technical discussions and may ultimately affect the quality of trial planning and execution.

209. Maj Gen Rohit Gupta explained that once a trial directive is issued, vendors are formally briefed regarding trial procedures, evaluation criteria, documentation requirements, and responsibilities. Equipment submitted for trials is accompanied by complete technical documentation, certificates of conformity, maintenance information, and supporting records. Any deficiencies in documentation or certification can result in delays or non-acceptance of equipment. He therefore urged industry to treat documentation, certification, and quality assurance as integral components of product development rather than as administrative formalities.

210. While discussing recent reforms proposed in the draft DAP 2026, Maj Gen Rohit Gupta highlighted measures aimed at improving efficiency and reducing delays. These include stricter timelines for equipment submission, limits on extensions, penalties for repeated delays, and greater flexibility in handling single-vendor situations resulting from non-submission by competing vendors. He noted that while procurement timelines must be reduced wherever possible, such reductions cannot come at the expense of operational reliability and safety. The emphasis remains on achieving a balance between efficiency and

robustness in the acquisition process.

211. Maj Gen Rohit Gupta further elaborated on the concepts of Essential Parameters A (EPA), Essential Parameters B (EPB), and Enhanced Performance Parameters. EPA requirements must be demonstrated during field evaluation trials, whereas EPB requirements may be validated subsequently under specified contractual provisions. Enhanced performance attributes exceeding stipulated requirements can earn additional credit during commercial evaluation, thereby encouraging technological innovation and superior performance. Such provisions, he explained, are intended to reward companies that deliver capabilities beyond baseline operational requirements.

212. Illustrating the importance of thorough preparation Maj Gen Rohit Gupta narrated an early experience involving an unmanned aerial vehicle (UAV) trial. Although the system appeared highly capable on paper, it had not been adequately tested under the high-altitude conditions in which it was eventually evaluated. The aircraft repeatedly failed during launch due to environmental factors the manufacturer had not properly accounted for. The incident highlighted the consequences of insufficient pre-trial validation and demonstrated the importance of understanding operational conditions before presenting equipment for military evaluation. The example served as a reminder that successful trials depend as much on preparation and engineering diligence as on product specifications.

213. In conclusion, Maj Gen Rohit Gupta emphasised that user trials should be viewed as a collaborative process rather than an adversarial exercise. The Services, industry, quality assurance agencies, and trial authorities all share the common objective of inducting reliable and effective equipment into service. Success depends on realistic capability assessments, rigorous pre-trial testing, comprehensive documentation, technical competence in industry participation, and transparent communication throughout the acquisition cycle. By adopting these practices, the industry can significantly improve trial outcomes, reduce procurement delays, and contribute more effectively to India's defence modernisation and indigenisation objectives.

214. **Airworthiness Certification.** While speaking, **Wing Commander Vivek Chaturvedi** highlighted the critical importance of certification in military aviation, emphasising that even the most innovative technology has little operational value unless it is certified for airworthiness and military use. The certification requirements vary according to the category of the product being developed. Flight-critical systems such as autopilots, engines, and flight-control systems fall under the highest certification category and require extensive quality assurance, safety analysis, environmental qualification, and flight testing. Mission-critical systems such as radars, electronic warfare suites, and mission computers require rigorous testing to ensure operational effectiveness, while ground-support and ancillary equipment offer a comparatively easier entry point for startups and MSMEs seeking to enter the defence aviation ecosystem.

215. The speaker outlined the institutional framework governing military aviation certification in India. The Centre for Military Airworthiness and Certification (CEMILAC) serves as the national airworthiness authority and issues type certifications, while the Directorate General of Aeronautical Quality Assurance (DGAQA) oversees production quality and licensing. Flight testing and operational evaluation are undertaken by establishments such as the Aircraft and Systems Testing Establishment (ASTE). The certification should not be viewed as a final hurdle after product development but as a parallel process that begins from the design stage itself. Successful certification requires adherence to Preliminary Design Reviews, safety assessments, environmental qualification testing in accordance with applicable standards, and extensive ground testing prior to flight validation. A typical flight-testing programme can take between 12 and 36 months, making early engagement with certification agencies essential.

216. The speaker highlighted the emerging challenges posed by artificial intelligence-enabled systems, adaptive radars, cognitive electronic warfare suites, and autonomous mission computers. Traditional certification methodologies were developed for deterministic systems and may not adequately address the unpredictable behaviour and evolving failure modes of AI-based technologies. Indian certification authorities are actively developing new frameworks to address these challenges and are encouraging industry, startups, and MSMEs to engage with certification agencies at an early stage as they develop advanced systems. He also drew attention to the Indian Military Airworthiness Procedure (IMAP) 2023 and Indian Military Technical Airworthiness Requirements (IMTAR), which provide the regulatory foundation for certification of military aircraft, unmanned systems, airborne stores, and related technologies, supporting India's broader push towards indigenous aerospace development.

217. **Environmental and EMI / EMC Testing.** The session on Electromagnetic Interference and Electromagnetic Compatibility (EMI/EMC) focused on the growing importance of spectrum dominance and electromagnetic resilience in modern warfare. **Lt Col Mohit, ACE, Mhow** highlighted that contemporary battlefields are increasingly characterised by electronic warfare, contested electromagnetic environments, cyber threats, and network-centric operations. In such an environment, EMI/EMC compliance is no longer an optional technical requirement but a critical determinant of mission success. Equipment that cannot function reliably in a complex electromagnetic environment risk causing communication failures, sensor degradation, navigation errors, and weapon system malfunctions, thereby directly affecting operational effectiveness.

218. Explaining the fundamentals of EMI/EMC, the speaker noted that every electronic system can act both as a source of electromagnetic interference and as a victim of interference generated by other systems. Defence equipment is therefore required not only to minimise its own emissions but also to remain operational when exposed to external electromagnetic disturbances. To ensure this, the Armed Forces follow internationally recognised military standards, particularly MIL-STD-461 for subsystem testing and MIL-STD-464 for platform-level compatibility assessments. These standards are designed to ensure that equipment can operate effectively under the demanding environmental and electromagnetic conditions encountered during military operations.

219. The speaker identified several challenges commonly faced by industry during EMI/EMC compliance and trial evaluations. These include limited awareness of military EMI/EMC requirements, inadequate incorporation of EMI/EMC considerations during product design, limited availability of accredited testing facilities, long testing queues, and the high cost of certification. He also observed that many companies continue to approach EMI/EMC testing as a final-stage activity rather than integrating it into the design process. As a result, equipment frequently fails during field evaluation trials, leading to delays, redesign efforts, and significantly higher rectification costs.

220. To address these issues, the speaker strongly advocated adopting an "EMC by Design" philosophy. Industry participants were encouraged to consider EMI/EMC requirements from the earliest stages of system conceptualisation and development. Measures such as proper grounding, shielding, bonding, cable management, design reviews, simulation-based validation, and establishment of dedicated EMI/EMC management plans can substantially reduce risks during testing and certification. Early incorporation of EMI/EMC requirements, he noted, is considerably more cost-effective than attempting corrective modifications after prototype development or during trials.

221. Concluding the session, the speaker highlighted the availability of advanced simulation tools developed by the Army's technical establishments to evaluate electromagnetic behaviour at the component, platform, mission, and theatre levels. Industry representatives were invited

to utilise these facilities to assess designs during the development phase and identify potential EMI/EMC issues before formal testing. He emphasised that close collaboration among designers, industry, testing agencies, and users would be essential to developing robust, resilient defence systems that operate effectively in future electromagnetic warfare environments. During the brief interaction that followed, a participant enquired about satellite-based radio frequency interference and geolocation applications. The speaker advised that such capability development proposals should be pursued through the Army Design Bureau and relevant capability development channels for further consideration.

222. Common Compliance Gaps & Timeline Optimisation Strategies. Speaking on the subject, **Maj Gen SQ Ahmad (Retd)** highlighted that while India possesses significant technological talent and innovation potential, many promising defence technologies fail to transition into service due to gaps in compliance with procurement procedures. Drawing upon his extensive experience in project management, emergency procurements, and capability development, he emphasised that compliance requirements exist at every stage of the acquisition process—from formulation of Service Qualitative Requirements (SQRs) and Requests for Proposal (RFPs) to technical evaluations, field trials, commercial negotiations, and contract finalisation. He noted that many companies, including technologically competent startups and MSMEs, lose valuable opportunities not because of technical shortcomings but due to inadequate understanding of procedural, legal, financial, and documentation requirements.

223. The speaker stressed that compliance failures often arise from incomplete documentation, inadequate responses to RFP requirements, incorrect certifications, registration delays, flawed partnerships, financial documentation errors, and insufficient preparation for field evaluation trials. He cited several examples in which otherwise capable firms were disqualified for failing to meet seemingly minor requirements specified in the RFP. He underscored the importance of thoroughly studying procurement documents, actively participating in pre-bid meetings, understanding indigenous content requirements, and ensuring that all certifications, quality assurances, and commercial documentation are in place well before the bidding process begins. According to him, successful participation in defence procurement requires the same level of rigour in compliance management as in technology development.

224. To overcome these challenges, Major General Ahmed recommended that companies adopt a proactive compliance strategy, including maintaining comprehensive document repositories, creating detailed compliance matrices, establishing multidisciplinary teams with expertise in both technology and defence procurement procedures, conducting internal audits and red-team reviews, and carrying out rigorous product testing before formal trials. He encouraged startups and MSMEs to familiarise themselves with the Defence Acquisition Procedure (DAP), leverage pre-bid interactions for clarifications, and build internal systems to monitor timelines and regulatory requirements. Concluding his address, he emphasised that technological excellence alone is insufficient for success in defence procurement; sustained attention to compliance, documentation, quality assurance, and process discipline is equally essential for translating innovation into operational capability.

225. DRDO's Role in R&D.

225.1. Collaboration for TOT. The session commenced with a presentation on Transfer of Technology (ToT) in DRDO, wherein **Sh. Sanjeev Kumar**, Sc 'F', DIIQM, DRDO highlighted the critical role played by industry in India's defence research and manufacturing ecosystem. He explained that DRDO's relationship with industry has evolved significantly over the years—from a traditional build-to-specification approach to a collaborative partnership model. Under initiatives such as the Development cum Production Partner (DCPP) framework, industries are increasingly being involved from

the inception of mission-mode projects, enabling them to participate in design reviews, development activities, trials, and technology maturation. This collaborative approach seeks to bridge the gap between research and production while reducing technology development risks.

225.2. The speaker outlined the principal challenges associated with defence manufacturing, including high research and development costs, technological uncertainties, stringent certification requirements, advanced material technologies, complex supply chains, and rapidly changing technological landscapes. To address these challenges, DRDO has instituted several initiatives, including Technology Transfer (ToT), Development cum Production Partner programmes, Defence Industry–Academia Centres of Excellence (DIA-CoEs), open access to DRDO testing facilities, intellectual property licensing, and industry interface mechanisms. These initiatives are designed to strengthen indigenous capability development, improve industry participation, and support technology maturation from laboratory concepts to deployable products.

225.3. Particular emphasis was placed on DRDO's Technology Transfer framework, through which technologies developed by DRDO are transferred to Indian industries for production and commercialisation. The speaker informed participants that over 1,250 technology transfers have been completed in recent years, covering a wide range of systems, including missile systems, radars, torpedoes, air-independent propulsion systems, and artillery platforms. Technology transfers are generally provided on a non-exclusive basis, enabling multiple industries to access the same technology and compete on a level playing field. Industries are also encouraged to undertake value addition and product improvement, with provisions for exclusive marketing rights where significant enhancements are made.

225.4. The session also highlighted DRDO's efforts to improve industry accessibility and engagement. Dedicated Industry Interface Groups (IIGs) have been established at DRDO laboratories and headquarters to facilitate direct interaction with industry. Companies can engage with subject matter experts, seek technical clarifications, explore consultancy opportunities, and access DRDO's testing infrastructure through the Defence Testing Portal. The speaker emphasised that DRDO seeks to function as an enabler of indigenous innovation and remains committed to supporting MSMEs, start-ups, academia, and established industries in overcoming technological and procedural barriers.

225.5. **TDF Provisions.** The second presentation focused on the Technology Development Fund (TDF), a flagship initiative aimed at promoting indigenous development of critical and emerging defence technologies. **Gp Capt Manoj Pandey (Retd), Finovista** explained that TDF was established to support MSMEs, start-ups, academic institutions, and innovators in developing technologies required by the Armed Forces. Since its inception, the scheme has grown substantially, with 85 projects worth approximately ₹388 crore sanctioned across a diverse range of technology domains. TDF provides financial assistance of up to 90 percent of project cost for projects up to ₹10 crore and up to 70 percent funding for projects costing between ₹10 crore and ₹50 crore, thereby significantly reducing financial risks for technology developers.

225.6. The speaker explained that TDF focuses on bridging the “valley of death” that often exists between early-stage technology development and operational deployment. While fundamental research is supported through other mechanisms, TDF concentrates on advancing technologies from intermediate readiness levels towards deployable prototypes and operational systems. Projects are selected through

a structured process involving identification of service requirements, issue of Requests for Information (RFIs), preparation of Project Definition Documents (PDDs), competitive evaluation of proposals, and milestone-based funding. This process ensures that technologies are developed in alignment with operational requirements while maintaining transparency and accountability.

225.7. The speaker also highlighted the growing emphasis on deep technologies, advanced materials, autonomous systems, artificial intelligence, aerospace technologies, and other critical capability areas. He noted that India is increasingly positioning itself as a significant player in global technology development, and initiatives such as TDF are intended to accelerate indigenous innovation and reduce dependence on foreign technologies. Through close collaboration between DRDO, industry, academia, think tanks, and the Armed Forces, the scheme seeks to create a robust ecosystem capable of delivering cutting-edge technologies for future military requirements.

225.8. Concluding the session, the speakers emphasised that both Technology Transfer and the Technology Development Fund are integral pillars of India's defence indigenisation strategy. While Technology Transfer enables rapid industrial absorption of mature technologies, TDF supports the creation of future technologies and indigenous intellectual property. Together, these initiatives provide industry with opportunities to participate across the entire technology lifecycle—from research and development to production, commercialisation, and export—thereby contributing significantly to the objectives of Atmanirbhar Bharat and long-term defence self-reliance.

SESSION 5: TPCR AND BEYOND

226. **TPCR Structure and purpose.** In his talk, **Col Navratna Jaimal, SM** provided an overview of the structure, purpose, and significance of the document for industry, MSMEs, start-ups, and innovators. The Col Jaimal emphasised that TPCR 2025 is a publicly available document that outlines the Armed Forces' anticipated capability requirements over the next fifteen years. While widely accessible, the document remains underutilised by many industry stakeholders, who either overlook it or regard it merely as a broad wish list rather than a strategic guide for future investments and capability development.

227. Explaining the purpose of the document, Col Jaimal clarified that TPCR is not a procurement commitment, tender, or contract. Instead, it serves as a strategic roadmap that communicates the future capability requirements of the Indian Army, Navy, Air Force, and joint services. It provides industry with early visibility of emerging technologies, operational requirements, and potential procurement areas, thereby enabling organisations to align their research, development, manufacturing, and investment plans with future defence needs. Every entry in the roadmap supports the twin objectives of indigenisation and enhancement of indigenous manufacturing capabilities under the Make in India initiative.

228. Col Jaimal explained that TPCR 2025 is organised into four broad sections covering the requirements of the Indian Army, Indian Navy, Indian Air Force, and joint capability domains. The document contains detailed information on a wide range of future systems and technologies, including unmanned systems, artificial intelligence, cyber capabilities, sensors, communication systems, and advanced combat platforms. Each entry provides information relating to the proposed programme, lifecycle, indicative quantities, single point of contact (SPOC), broad technical parameters, and the status of DRDO involvement. These details offer valuable insights into potential business opportunities and the Armed Forces' future technological priorities.

229. A significant portion of the presentation focused on how industry should interpret and utilise the roadmap. The Col Jaimal advised participants to view the broad parameters provided in TPCR not as fixed specifications but as indicators of future capability requirements. He encouraged industry to translate these broad parameters into likely qualitative requirements and begin product development accordingly, rather than waiting for formal Requests for Proposal (RFPs). Early engagement with the designated SPOCs, incorporation of military standards during the design stage, systematic documentation, and increased indigenous content were identified as critical factors for improving competitiveness and reducing future compliance challenges.

230. Col Jaimal further highlighted the opportunities available through various defence innovation and development mechanisms, including iDEX, Make-I, Make-II, TDF, and other indigenisation initiatives. He noted that a substantial number of projects identified in previous editions of the TPCR had already progressed into procurement pipelines, while many others remained open for industry participation. Concluding the session, he urged participants to treat TPCR as a strategic intelligence document rather than a catalogue of products. He emphasised that companies which align their technology development efforts with the roadmap, proactively engage stakeholders, and anticipate future requirements would be better positioned to secure opportunities within India's evolving defence procurement ecosystem.

231.

232. **Technology Perspective and Capability Roadmap.**

232.1. **TPCR Army.** Presenting the Indian Army's perspective on the Technology Perspective and Capability Roadmap (TPCR) 2025, **Col Manoj Silot**, Colonel Signals, Army Design Bureau, highlighted the extensive range of capability development programmes planned by the Army over the next fifteen years. He informed participants that a significant number of projects identified in earlier editions of the TPCR had already progressed to various stages of procurement, with Requests for Information (RFIs) and Requests for Proposal (RFPs) issued for a substantial proportion of the identified requirements. The TPCR therefore serves not merely as a planning document but as a practical indicator of future procurement opportunities.

232.1.1. Col Silot explained that the Indian Army segment of TPCR 2025 comprises 84 exclusive Army projects, in addition to 62 joint-service projects, bringing the total number of projects relevant to the Army to 146. These projects span a broad spectrum of operational domains, including armoured platforms, communication systems, unmanned aerial systems, artificial intelligence, big data analytics, cyber technologies, space-based capabilities, and other emerging technology areas. The roadmap therefore provides industry with a comprehensive overview of the Army's anticipated future capability requirements and technology priorities.

232.2. Referring to the information contained within individual project entries, Col Silot noted that certain parameters and capability descriptions have deliberately been kept broad because the document is available in the public domain. Detailed operational specifications and classified requirements cannot be disclosed at this stage and will be communicated through formal acquisition processes such as RFIs and RFPs. Nevertheless, the broad parameters contained in the TPCR provide sufficient direction for industry to understand the general capability requirements and align their research and development efforts accordingly.

232.3. Col Silot further highlighted that several projects listed in the roadmap include references to technologies that are either already developed or currently under development by DRDO. Such projects present opportunities for industry either to

collaborate with DRDO or to pursue independent development where appropriate capabilities exist. He encouraged industry participants to view the roadmap as a strategic planning tool and to begin technology development and manufacturing preparations well in advance rather than waiting for formal procurement processes to commence.

232.4. Drawing attention to the miscellaneous category within the TPCR, Col Silot observed that this section contains a number of cutting-edge technology requirements that do not fit within traditional capability domains. These include artificial intelligence and machine learning applications, deepfake detection systems, advanced information services, adaptive jamming technologies, and other emerging capabilities relevant to future warfare. He emphasised that these projects provide valuable insight into the Army's evolving technology requirements and offer significant opportunities for innovators, start-ups, MSMEs, and established industry participants. Concluding the session, he encouraged stakeholders to study the TPCR in detail and engage with the designated Army points of contact through formal communication channels for any clarification regarding future capability requirements.

232.5. **TPCR Navy.** Presenting the Indian Navy's perspective on the Technology Perspective and Capability Roadmap (TPCR) 2025, **Capt Ashu Gupta, VSM**, Directorate of Naval Plans, highlighted the strategic considerations shaping future naval capability development. He explained that the growing strategic significance of the Indian Ocean Region, coupled with emerging threats such as grey-zone warfare, cyber attacks, drone operations, persistent surveillance challenges, and information warfare, has driven the Navy to identify a range of advanced technological requirements for the coming years. These evolving operational challenges have significantly influenced the capability roadmap reflected in TPCR 2025.

232.6. The speaker informed participants that the naval component of TPCR comprises approximately 169 Navy-specific projects in addition to around 40 joint-service projects, resulting in a total of more than 200 technology and capability development initiatives. While several projects relate to conventional platforms such as ships and naval systems, increasing emphasis is being placed on emerging technology domains including autonomous systems, artificial intelligence and decision-support systems, cyberspace convergence, directed energy weapons, quantum technologies, and undersea warfare capabilities. These areas have been identified as critical enablers of future maritime operations and represent significant opportunities for industry participation.

232.7. Highlighting the progress already achieved under innovation initiatives, the speaker noted that the Navy has successfully utilised platforms such as iDEX, Technology Development Fund (TDF), and Make procedures to translate innovative concepts into acquisition programmes. Numerous projects have already progressed from challenge statements to Acceptance of Necessity (AoN) and contract stages. At the same time, a large proportion of the projects identified in TPCR remain at early stages of the acquisition cycle, presenting substantial opportunities for MSMEs, start-ups, and established industry partners to develop indigenous technological solutions for future naval requirements.

232.8. The speaker emphasised that the Navy continuously refines its capability requirements through structured interactions with operational commands, technical directorates, DRDO, industry, and innovation ecosystems. While TPCR provides a long-term roadmap, emerging requirements are also communicated through mechanisms such as the Srijan Portal, iDEX challenges, and other innovation initiatives. He encouraged industry to engage proactively with the designated points of

contact, study the roadmap carefully, and focus particularly on areas such as underwater technologies, unmanned systems, cyber and electronic warfare, space-based capabilities, artificial intelligence, and digital twin technologies, which are expected to play an increasingly important role in future procurement programmes.

232.9. Concluding the session, Capt Gupta reiterated that the Navy views MSMEs, start-ups, and innovators as critical partners in achieving technological self-reliance. He highlighted several success stories in which innovative solutions developed by smaller enterprises had successfully progressed from concept stage to operational deployment. The Navy's long-term vision, he noted, encompasses AI-enabled operations, undersea dominance, advanced cyber and space capabilities, directed-energy systems, and a robust indigenous industrial ecosystem. He encouraged industry participants to leverage TPCR as a strategic guide for research, development, and investment planning so as to align their future capabilities with the Navy's evolving operational requirements.

232.10. **TPCR Air Force.** Presenting the Indian Air Force (IAF) perspective on the Technology Perspective and Capability Roadmap (TPCR) 2025, **Gp Capt Amarendra Thakur**, Department of Aerospace Design (DAD), explained the process through which future capability requirements are identified and translated into technology development programmes. He highlighted that the Department of Aerospace Design serves as the principal interface between the IAF, industry, academia, and innovation ecosystems, and actively supports initiatives under iDEX, TDF, Make and other indigenisation programmes. Through extensive industry outreach and capability mapping exercises, the IAF has engaged with more than 1,800 industries to understand indigenous technological capabilities and identify opportunities for collaborative development.

232.11. The speaker explained that the formulation of TPCR requirements is driven by threat assessments, operational capability gaps, and future warfare requirements. Particular emphasis is placed on extended strike capabilities, air defence systems, network-centric warfare, interoperability, modular system architecture, and indigenous technological sovereignty. He noted that the Air Force seeks technologies that act as force multipliers and can be integrated into larger systems-of-systems architectures. The roadmap therefore encompasses a broad range of domains, including aerospace systems, weapon technologies, electronic warfare, air defence, unmanned systems, satellites, cyber capabilities, and advanced communication networks.

232.12. Highlighting the distinctive nature of Air Force requirements, the speaker observed that airborne systems demand significantly higher standards of airworthiness certification, quality assurance, integration, testing, and evaluation. Many Air Force projects involve convergence of multiple technologies and require substantial research and development investment along with extended testing cycles. At the same time, the IAF is increasingly adopting the concept of spiral development, enabling progressive enhancement of systems after initial induction. This approach allows industry to field solutions that meet core operational requirements while continuing to improve performance through subsequent development cycles.

232.13. The speaker informed participants that, in addition to projects being pursued through TPCR, iDEX, Make, and TDF routes, the Air Force is also progressing numerous capability development initiatives through revenue procurement channels and international cooperation programmes. He highlighted recently released Air Force problem-statement compendiums for industry and academia, which together contain more than 200 identified challenges requiring technological solutions. Concluding the

session, he encouraged industry, MSMEs, start-ups, and academic institutions to engage proactively with the Department of Aerospace Design through outreach events, webinars, and direct interactions. He emphasised that close collaboration between the Air Force and indigenous industry would be critical for developing future capabilities and advancing India's objectives of technological self-reliance in aerospace and defence.

233. Technology Readiness Levels (TRL1-9), TRL Gates and Rolling Updates.

In his talk, **Mr Lalit Ambastha** highlighted the importance of Technology Readiness Levels (TRLs) as a structured framework for assessing a technology's maturity from concept to deployment. He observed that while TRL terminology is widely used in defence and government programmes, awareness within industry remains limited. TRLs provide innovators, researchers, investors, and policymakers with a common language to assess technological progress, allocate resources, manage risks, and make informed investment decisions. The framework enables systematic planning and helps organisations visualise the complete innovation journey from an initial idea to a commercially deployable product.

234. Mr Ambastha explained that technology development progresses through a series of maturity stages, beginning with basic scientific principles and conceptualisation and culminating in operational deployment. TRL 1 to TRL 3 generally cover fundamental research, concept formulation, and proof-of-concept demonstrations, while TRL 4 to TRL 6 involve laboratory validation, prototype development, and testing in relevant environments. TRL 7 to TRL 9 focus on operational demonstrations, qualification, and deployment of the final product. He noted that many academic research projects and doctoral programmes typically conclude at TRL 3 or 4, creating a significant gap between research outcomes and industry expectations, which generally require technologies at TRL 6 or above for commercial adoption.

235. A major challenge identified by Mr Ambastha was the disconnect between academia and industry in technology transfer. Universities often develop promising technologies but lack the mechanisms and resources needed to mature them beyond early-stage readiness. To bridge this gap, incubators, start-ups, and innovation ecosystems play a critical role in advancing technologies through higher TRLs. He emphasised that successful commercialisation requires coordinated efforts involving research institutions, incubators, start-ups, industry, investors, and government agencies. Large industrial organisations with established R&D infrastructure are often better positioned to undertake the complete journey from concept to deployment.

236. The Mr Ambastha further explained that TRLs alone are insufficient for successful technology deployment and must be complemented by other assessment frameworks such as Manufacturing Readiness Levels (MRL), Commercial Readiness Levels (CRL), and System Readiness Levels (SRL). While TRLs measure technological maturity, MRLs assess manufacturing capability and supply-chain readiness, CRLs evaluate market viability and commercial sustainability, and SRLs assess integration within larger systems. These factors must progress together to ensure that technologies can move successfully from laboratories to operational use and commercial markets.

237. Using the development of the Hubble Space Telescope as a case study, Mr Ambastha illustrated how complex technologies may require decades to progress through successive readiness levels before achieving operational success. He emphasised that innovation is a long-term process requiring sustained investment, continuous documentation, intellectual property management, and iterative improvements even after deployment. Concluding the session, he encouraged innovators, start-ups, academic institutions, and industry to adopt TRL-based planning frameworks to better manage technology development, improve

commercialisation outcomes, and accelerate the transition of indigenous innovations from laboratories to the marketplace.

238.

239. Panel Discussion with Venture Capitalists. The concluding session of the seminar featured a panel discussion on venture capital funding and investment opportunities in the defence sector. The discussion was moderated by Maj Gen AK Channan, PVSM, SM, PhD (Retd). The panel brought together the following representatives from leading venture capital and private equity firms:-

239.1. **Lt Cdr Toni Thomas (Retd)**, Founder & CEO, TTL Defence Services

239.2. Cdr Navneet Kaushik (Retd), Founder, Jamwant Ventures.

239.3. **Mr Tanay Valia**, Associate, 360 ONE Asset.

239.4. **Mr Suresh Kumar**, Vice President, IdeaSpring Capital, Bengaluru.

240. The session focused on the financing challenges faced by defence start-ups, investors' expectations, and mechanisms for scaling indigenous defence technologies from prototype development to commercial deployment. Opening the discussion, the moderator observed that while numerous government initiatives, such as iDEX, Aditi, and Make projects, provide support during the innovation and prototype development stages, the greater challenge often arises when companies begin executing orders and require substantial growth capital. He noted that access to finance remains one of the most critical enablers of successful defence innovation, particularly for start-ups and MSMEs attempting to transition from technology development to production and commercialisation.

241. Representatives of the participating investment firms outlined their investment philosophies and focus areas. Mr Suresh Kumar of IdeaSpring Capital highlighted its focus on early-stage deep-tech, artificial intelligence, and defence technology start-ups, particularly at the seed and pre-Series A stages. The firm emphasised the importance of intellectual property, technological differentiation, and in-house technical evaluation capabilities when assessing investment opportunities. Similarly, Mr Tanay Valia of 360 Asset described its recently launched defence and space-focused investment fund, one of the largest domestic sector-specific funds in India, with plans to invest across multiple stages of company growth.

242. Cdr Navneet Kaushik (Retd) of Jamwant Ventures explained its specialised focus on defence technologies and indigenous capability development. Drawing upon experience within defence acquisition and technology development ecosystems, the firm highlighted its strategy of investing exclusively in defence and dual-use technology companies. The panellists collectively observed that the defence sector has evolved into a major growth area attracting increasing investor interest owing to policy reforms, rising defence expenditure, export opportunities, and growing emphasis on indigenous capability development.

243. A key theme of the discussion was the unique risk profile associated with defence technology investments. The panellists acknowledged that defence projects often involve long development cycles, complex qualification requirements, and dependence on a limited number of institutional buyers. However, they noted that recent reforms have significantly improved the environment for innovation by accelerating requirement generation, increasing procurement opportunities, and encouraging participation by start-ups and MSMEs. Investors increasingly view defence technologies as part of the broader deep-tech ecosystem and evaluate opportunities accordingly.

244. Collectively, speakers emphasised the importance of developing technologies with both defence and civilian applications. Rather than focusing exclusively on defence markets, investors prefer companies that possess dual-use capabilities, enabling them to access commercial, industrial, and export markets in addition to defence customers. Such diversification reduces dependence on a single buyer and improves the long-term commercial viability of the enterprise. Examples were cited of companies developing technologies for defence applications that subsequently found significant commercial opportunities in adjacent sectors.

245. The discussion also highlighted the growing role of academic institutions and research organisations in generating defence innovations. Venture capital representatives noted that several promising defence technology companies have emerged from universities, particularly IITs, where researchers and faculty members are increasingly working on real-world defence challenges. However, the panellists observed that converting academic research into commercially viable products remains a challenge and requires sustained support through incubation, mentorship, industry partnerships, and access to growth capital.

246. Addressing the issue of capital structure, the panellists discussed the relative merits of debt and equity financing. It was generally agreed that early-stage start-ups should avoid excessive debt burdens because repayment obligations can constrain growth and increase financial stress during technology development. Equity financing was considered more appropriate during the initial stages, while debt financing becomes increasingly viable as companies mature, generate revenues, and develop stronger financial fundamentals. The importance of selecting financing instruments appropriate to the company's stage of development was repeatedly emphasised.

247. During the interaction, concerns were raised regarding start-ups that possess mature technologies and potential orders but lack sufficient working capital to execute contracts. The panellists acknowledged that such situations are common within the defence sector. In response, investors explained that their assessment extends beyond technology alone and includes evaluation of the company's financial management capability, promoter vision, business model, governance standards, and growth strategy. While technological innovation remains important, investors require confidence that management teams can successfully scale operations and deliver sustainable business performance.

248. Several panellists described the criteria used when evaluating investment opportunities. Apart from technological maturity and market potential, investors assess factors such as Technology Readiness Levels (TRLs), financial readiness, promoter capability, organisational governance, intellectual property ownership, scalability, and export potential. Companies developing sovereign intellectual property and unique technological capabilities were considered particularly attractive because they create long-term competitive advantages and open opportunities in both domestic and international markets.

249. At the end of the talk, the details of the Q&A session are as follows: -

249.1. **Question 1:** What are the major challenges that venture capital firms face while investing in defence start-ups, given the long procurement cycles and the presence of a single major customer?

249.1.1. **Response.** The panellists acknowledged that defence investments involve longer gestation periods and procurement uncertainties compared to conventional sectors. However, investors mitigate these risks by focusing on deep-tech and dual-use technologies that can serve both defence and civilian markets. Particular emphasis is placed on sovereign intellectual property, export potential, technological differentiation, and the ability of

companies to address broader commercial opportunities beyond a single customer.

249.2. **Question 2:** How should start-ups balance equity funding and debt funding during different stages of growth?

249.2.1. **Response.** The panel advised that early-stage start-ups should primarily rely on equity funding rather than debt. Since young companies often lack stable revenue streams, debt obligations can become burdensome and constrain growth. Debt financing becomes more appropriate during later growth and scale-up stages when the company possesses stronger financial fundamentals and greater capacity to service repayments.

249.3. **Question 3:** Many defence start-ups possess mature technologies and potential orders but lack sufficient capital to execute contracts. How can this gap be addressed?

249.4. **Response.** Investors explained that funding decisions are not based solely on technology. Venture capital firms evaluate opportunities through a combination of Technology Readiness Levels (TRLs), Financial Readiness Levels (FRLs), and Promoter Readiness Levels (PRLs). Apart from technological capability, investors assess financial discipline, governance standards, management quality, scalability, and the promoter's long-term vision before committing capital.

249.5. **Question 4:** Do venture capital firms generally seek majority ownership in start-ups?

249.5.1. **Response.** The panellists clarified that conventional venture capital investors rarely seek majority ownership. Most venture capital firms acquire minority equity stakes and aim to support growth rather than control management. Demands for controlling stakes are generally associated with strategic investors rather than venture capital funds. Entrepreneurs were encouraged to understand the differences between various categories of investors before raising capital.

249.6. **Question 5:** How are defence technology companies valued and what are the typical investment sizes?

249.6.1. **Response.** The panel explained that valuation depends on multiple factors, including technology maturity, market potential, scalability, intellectual property, team capability, and growth prospects. Investment sizes vary considerably depending on the stage of development. Early-stage investments typically range from ₹10–20 crore, while larger defence-focused funds may invest between ₹20 crore and ₹200 crore or more in growth-stage companies.

249.7. **Question 6:** Is there merit in establishing a dedicated defence-focused Fund of Funds involving government participation and private capital?

249.7.1. **Response.** The panellists generally supported the concept of a defence-focused Fund of Funds. They suggested that a model similar to existing government-backed innovation funding structures could help attract larger pools of private capital into defence technologies. However, they emphasised that professional fund management, commercial investment

discipline, and autonomy in investment decisions would remain essential for the success of such a mechanism.

249.8. **Question 7:** How do investors assess technologies with long development and certification timelines, such as propulsion systems and advanced aerospace technologies?

249.8.1. **Response.** Investors acknowledged that strategic technologies often require patient capital and longer investment horizons. Rather than waiting for complete certification or induction, they increasingly rely on milestone-based assessments, technology demonstrations, proof-of-concept achievements, and progressive validation benchmarks to evaluate investment opportunities and manage risk.

250. In conclusion, the panel agreed that India's defence innovation ecosystem is entering a period of significant growth driven by policy reforms, increasing indigenous procurement, export opportunities, and the emergence of specialised defence investment funds. While access to capital remains a challenge for many start-ups and MSMEs, the expanding participation of venture capital firms, private equity investors, and institutional funding mechanisms is creating new pathways for technology development and commercialisation. The speakers emphasised that successful defence enterprises will increasingly require a combination of strong technology, sound business fundamentals, scalable execution capabilities, and access to long-term growth capital to realise their full potential.

251. **Industry Queries.** The seminar concluded with an interactive question-and-answer session moderated by senior representatives from the Army Design Bureau and participating organisations. The session provided delegates from industry, academia, start-ups, MSMEs, and research institutions with an opportunity to seek clarifications on issues relating to defence procurement, defence innovation, technology development, intellectual property, funding mechanisms, Technology Readiness Levels (TRLs), the Technology Development Fund (TDF), and pathways for transition of indigenous technologies from research to operational deployment. The discussion reflected the growing interest of stakeholders in strengthening collaboration between the Armed Forces, DRDO, academia, industry, and investors to accelerate indigenisation and enhance self-reliance in defence technology. The key questions and responses are summarised below.

251.1. **Question 1:** What progress has been made under the DRDO–Industry–Academia Centres of Excellence initiative for development of critical technologies?

251.1.1. **Response.** DRDO representatives informed participants that the earlier Centres of Excellence model has evolved into the **DRDO–Industry–Academia Centres of Excellence (DIA-CoE)** framework. The programme is being coordinated through a dedicated department within DRDO, and several hundred technology development projects are currently being pursued through academic institutions, particularly IITs. Participants were advised to engage directly with DRDO for detailed information on specific projects and outcomes.

251.2. **Question 2:** Is there a mechanism under the Technology Development Fund (TDF) similar to iDEX through which innovators can submit technology ideas?

251.2.1. **Response.** It was clarified that TDF operates through identified technology requirements originating from the Services. These requirements are converted into problem statements and Requests for Information (RFIs), following which proposals are invited and evaluated. Project awards are made

through a competitive process, ensuring that the most suitable technology solution is selected for development.

251.3. **Question 3:** How can technologies and intellectual property developed within academic institutions be transitioned more effectively to industry?

251.3.1. **Response.** The panel acknowledged the existing gap between academic research and industrial deployment. It was suggested that industry actively engage with universities, researchers, and technology developers to identify promising technologies at lower Technology Readiness Levels (TRLs) and mature them further for commercial application. Collaboration between academia, start-ups, and industry was highlighted as an important pathway for technology commercialisation and innovation.

251.4. **Question 4:** Why are Compendium of Problem Definition Statements (CPDS) challenges separate from iDEX challenges?

251.4.1. **Response.** The panel explained that CPDS is intended to attract solutions from the entire innovation ecosystem, including large industries, MSMEs, start-ups, academia, and research institutions. Unlike iDEX, which primarily targets start-ups and innovators, CPDS provides a broader platform to identify the best available technological solution, after which an appropriate development route is selected.

251.4.2. **Question 5:** Are there recognised agencies authorised to certify Technology Readiness Levels (TRLs)?

251.4.3. **Response.** It was clarified that there is presently no nationally designated authority responsible for formal TRL certification. However, organisations such as NRDC and certain academic institutions have begun developing TRL assessment mechanisms. Participants were also informed that the Office of the Principal Scientific Adviser had circulated a draft framework addressing aspects of TRL assessment and validation.

251.5. **Question 6:** Are innovation initiatives also focusing on development of critical technologies and subsystems rather than only complete platforms?

251.5.1. **Response.** The panel confirmed that increasing emphasis is being placed on development of critical technologies and constituent subsystems. Through initiatives such as technology challenge compendiums and Mission Swavalamban-related programmes, numerous technology modules and enabling technologies have been identified for indigenous development, recognising that long-term self-reliance requires mastery of critical sub-systems as well as complete platforms.

251.6. **Question 7:** How can financing challenges faced by start-ups and MSMEs after securing defence orders be addressed?

251.7. **Response.** Participants highlighted that many start-ups and MSMEs face difficulties in raising working capital even after receiving procurement orders. The panel acknowledged the issue and informed participants that industry bodies such as SIDM are examining mechanisms to support post-order financing, including proposals for dedicated defence financing structures, contract-backed lending, and guarantee-based funding models. Such measures are intended to assist innovative companies during the critical transition from prototype development to production and delivery.

252. **Closing Address.** Delivering the closing remarks, Maj Gen Ashok Kumar, VSM, PhD (Retd), DG CENJOWS expressed gratitude to all participants, speakers, industry representatives, start-ups, MSMEs, venture capitalists, and stakeholders who had contributed to the success of the two-day seminar. He emphasised that the discussions and recommendations generated during the event would not conclude with the seminar itself. Instead, all significant suggestions, observations, and policy recommendations emerging from the deliberations would be compiled and formally submitted to the Government and relevant decision-makers through a structured policy recommendation report. The objective, he noted, was to ensure that constructive ideas generated during the seminar are translated into actionable outcomes for strengthening India's defence innovation and procurement ecosystem.

253. The DG CENJOWS acknowledged the efforts of the Directorate of Indigenisation, Headquarters Integrated Defence Staff (HQ IDS), and the organising team for conceptualising and executing the seminar. He highlighted that considerable effort had been invested in identifying the key concerns of industry, particularly MSMEs and start-ups, before the event. More than 300 industry participants had responded to pre-seminar outreach initiatives, and their queries were compiled and shared with the speakers in advance. This enabled presentations to be tailored towards addressing practical industry concerns rather than focusing solely on theoretical aspects of defence procurement and innovation.

254. Reflecting on the outcomes of the seminar, the DG CENJOWS observed that the true measure of success would lie in the practical impact generated by the participants. He expressed confidence that the knowledge shared during the seminar would assist industry representatives in navigating the defence procurement ecosystem more effectively and identifying new opportunities for innovation and growth. He remarked that even if a small number of participants were able to leverage the insights gained to build successful enterprises and contribute to national self-reliance, the objectives of the seminar would have been fulfilled.

255. The DG CENJOWS also shared concerns regarding participant commitment and attendance. Despite receiving confirmations from a significantly larger number of registrants, actual attendance was lower than expected, resulting in avoidable expenditure and administrative effort. He emphasised the importance of professional commitment and encouraged stakeholders to honour their registrations and commitments in future engagements. Such discipline, he observed, is essential not only for the efficient conduct of events but also for fostering a culture of professionalism and accountability within the broader innovation ecosystem.

256. Concluding the seminar, the DG CENJOWS reiterated that CENJOWS and the organising agencies would continue to remain accessible to participants even after the event. Industry representatives were encouraged to remain engaged with the organisers and utilise the established channels of communication whenever assistance or guidance was required. He wished all participants success in their future endeavours and expressed confidence that the collaborative spirit demonstrated during the seminar would contribute meaningfully to advancing defence indigenisation, innovation, and self-reliance in the years ahead.

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