Bridging the Valley of Death
The Missing Link in India's Defence Reform Year

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India's defence innovation ecosystem stands at an inflection point. The Union Budget 2026–27 has allocated a record Rs 2.19 lakh crore for capital expenditure, while the draft Defence Acquisition Procedure (DAP) 2026 signals an ambitious shift from 'Made in India' to 'Owned by India'.[1] iDEX has crossed 430 contracts, ADITI supports deep-tech development, and the Technology Development Fund enables system-level co-development.[2] Operation Sindoor in May 2025 provided live combat validation for systems such as Akash and the integrated counter-UAS grid, demonstrating that Indian-origin technology can perform under operational stress.[3]

And yet, a structural fault line runs beneath this progress. India's defence innovation architecture is demonstrably effective at generating prototypes. It remains significantly less effective at converting them into operational capabilities that reach the armed forces. Technologies mature to the level of a promising demonstrator and then stall—not for want of ingenuity, but for want of a funded, institutionally governed pathway from laboratory to fielded system. This gap is not a peripheral inefficiency. It is a central vulnerability in the reform agenda, and the reform momentum initiated in the 2025 Year of Reforms offers both the occasion and the political will to address it.

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The Valley of Death: A Structural Diagnosis

The draft DAP 2026 integrates Technology Readiness Levels (TRLs) into procurement categories, linking TRL 1–5 to 'Make' and 'Design and Development' categories, and TRL 5–9 to 'Buy (Indian-IDDM)'.[4] In practice, however, the stage between TRL 6—where a prototype has been demonstrated in a relevant environment—and TRL 8, where a system has been qualified through test and demonstration in actual operational conditions, lacks both dedicated funding and a clearly defined institutional owner. This is the Valley of Death.

The consequences follow a predictable pattern. A startup receives up to Rs 1.5 crore under an iDEX challenge, develops a functioning prototype, and completes initial trials creditably. The subsequent phase—engineering refinement at scale, environmental hardening, reliability testing, and user-driven iteration—requires substantially larger investment, sustained interaction with end-users, and an acquisition pathway that can accommodate emerging rather than fully qualified technology. At present, no single mechanism provides all three. The prototype is submitted, assessed positively, and effectively enters a holding pattern. Public investment does not translate into operational capability. Private capital reads the signal and prices defence innovation risk accordingly.

The cumulative effect is a procurement culture that inadvertently favours the known over the new. Technologies with established foreign provenance arrive with TRL 8 or 9 certification, full documentation, and a clear contractual pathway. Indigenous technologies at TRL 6 arrive with potential and uncertainty. Without a structured bridge, procurement officers operating under audit scrutiny will rationally default to the former—not out of indifference to indigenisation, but because the institutional framework offers them no comfortable alternative.

What DAP-2026 Proposes—And Where It Falls Short

The draft DAP-2026 recognises part of this gap. Its Low-Cost Capital Acquisition (LCCA) route, in Chapter VII, permits the Services and the Indian Coast Guard to procure limited quantities of indigenous equipment 'for the evaluation and induction of indigenous equipment prior to undertaking large-scale capital procurement,' subject to a ceiling of Rs 75 crore per case and an aggregate annual ceiling of Rs 2,000 crore for all Services and the Coast Guard collectively.[5] What the Draft does not contain is a funding instrument

for the validation phase that must precede such procurement. It was to fill that absence that this author—in comments submitted to the Secretary, DAP 2026 Review Committee in March 2026—proposed the establishment of a Future and Emerging Capabilities Endowment Fund (FECEF): a bridge between TRL 6 and TRL 8–9, gazetted as part of the DAP rather than left to the annual budget cycle, carrying a minimum capitalisation floor, disbursing in milestone-linked tranches, and guaranteeing trial access to the firms it funds.[6]

Both instruments are necessary. Neither, as matters stand, is sufficient on its own—the FECEF because it remains a proposal, the LCCA because of the way it is bounded.

The FECEF's effectiveness would depend critically on its capitalisation. The proposal advances a minimum capitalisation floor of approximately Rs 5,000 crore per annum—a figure that would support meaningful throughput across multiple transition-stage projects. By contrast, a fund sized at only 1 per cent of the capital outlay would be too small to shift incentive structures in any material way. A well-capitalised FECEF is not an additional expenditure but a force multiplier on the billions already invested upstream in prototype development: without it, that upstream investment yields warehoused demonstrators rather than operational systems.

The LCCA faces a different constraint. Its ceiling of Rs 75 crore per case makes it well-suited to software-intensive or component-level solutions, but inadequate for platform-level or subsystem-heavy technologies where engineering validation alone can require substantially more; and the aggregate annual ceiling of Rs 2,000 crore is shared across all three Services and the Coast Guard. More fundamentally, the LCCA, as described, operates as a procurement event rather than a procurement continuum. Without visibility of follow-on orders or explicit linkage to scale-up pathways, developers face a familiar predicament: a single pilot purchase that confirms technical merit but offers no signal about sustained induction. Investors require predictability; a one-time purchase, however welcome, does not provide it.

Learning from Comparator Models

India need not solve this problem from first principles. Several comparator nations have developed institutional mechanisms for precisely this transition phase, and their experience offers instructive lessons.

The United States Defense Innovation Unit (DIU), established in 2015 and elevated to a direct-reporting relationship with the Secretary of

Defense in 2023, was created specifically to bridge commercial and emerging technologies into operational use. Its Other Transaction Authority (OTA) mechanism enables rapid prototype agreements that convert to production contracts without triggering the full Federal Acquisition Regulation procurement cycle.[7] The DIU does not replace the conventional acquisition system; it operates in parallel, providing a structured pathway for technologies that are too mature for research funding and too immature for standard procurement. India's LCCA is conceptually adjacent to this model, but lacks the institutional continuity and procurement linkage that makes the OTA effective.

Israel's MAFAT—the Administration for the Development of Weapons and Technological Infrastructure under the Ministry of Defence—offers a different lesson. MAFAT funds engineering validation phases directly, with procurement linkage built into each co-development agreement from the outset.[8] Israeli firms developing systems under MAFAT co-funding do not simply receive a grant; they enter a structured relationship in which the conditions for induction are negotiated at the beginning of the validation phase, not at its end. This eliminates the re-evaluation bottleneck that afflicts Indian defence procurement, where a technology may complete all technical milestones only to re-enter the acquisition queue from the beginning.

South Korea's Defense Acquisition Program Administration (DAPA) offers a third model: a dedicated indigenisation agency with authority spanning research, development, testing, and procurement within a single institutional boundary. While India's fragmented institutional landscape—with the Ministry of Defence, DRDO, the Services, and the defence industry each holding partial authority—makes a wholesale replication impractical, the underlying principle is instructive: continuity of institutional ownership across the TRL spectrum reduces the friction that the Valley of Death represents.

The Audit-compatibility Problem

Any honest account of the Valley of Death must address a factor that policy proposals consistently underweight: the audit environment. The Comptroller and Auditor General's reports on defence capital acquisition have repeatedly identified single-vendor situations, time overruns, and cost escalations in complex procurements.[9] In an environment where procurement decisions are subject to retrospective audit, the rational posture for an acquisitions officer is risk-aversion. An established foreign system with full documentation,

certified performance data, and a proven service record presents a manageable audit trail. An indigenous system at TRL 7, however promising, does not.

This is not a failure of individual judgement. It is a structural feature of procurement systems where accountability is operationalised through documentation rather than outcome. Addressing the Valley of Death, therefore, requires not only financial mechanisms but also the creation of audit-compatible innovation pathways—structured evaluation frameworks that acknowledge the inherent uncertainty of emerging technologies while maintaining transparency and probity in decision-making.

A funded FECEF and the LCCA can only perform their bridging function if decision-makers feel institutionally protected in using them. This requires, at minimum, clearly defined evaluation criteria for transition-stage technologies, formal user interaction protocols that are documented but streamlined, and a model clause in the FECEF framework agreement that establishes what constitutes a satisfactory outcome without requiring the technology to meet full-system specifications prematurely.

A Transition-centric Framework: Three Specific Measures

Bridging the Valley of Death does not require a new agency. It requires three focused interventions within the existing architecture.

First, the FECEF must be established and capitalised at a level commensurate with its ambition, and gazetted as part of the DAP, so that it is a mandated financial instrument rather than a hoped-for budget line. An annual allocation of Rs 5,000 crore, ring-fenced within the capital budget and administered through a dedicated programme office with representation from the Services, DRDO, and the Department of Defence Production, would provide the throughput necessary to make a measurable difference.[10] The programme office should publish its pipeline annually— analogous to the DIU's annual report—to provide market visibility and signal to private investors that defence transition funding is institutionally durable.

That programme office should not be conceived as a new layer above the Services' own innovation machinery. The Army Design Bureau, raised in 2016, and the Naval Innovation and Indigenisation Organisation, launched in August 2020 with its Technology Development Acceleration Cell and the Naval Technology Acceleration Council above it, already perform much of the work that transition demands.[11] They hold the user relationships, they can convene trials, and they carry the domain judgement required to assess whether a demonstrator is worth hardening; the Indian Air Force

works through comparable arrangements at its base repair depots and test establishments. What these organisations lack is money commensurate with that role. The Ministry has moved decisively on delegation elsewhere: DFPDS-2026, promulgated on 2 June 2026, empowers field commanders to take procurement decisions at substantially enhanced financial ceilings, though expressly from the revenue budget. Under that instrument the Additional Director General of the Army Design Bureau may sanction Rs 1 crore for research and development through the private sector, against the Rs 75 crore a Command headquarters may commit in a single case for stores.[12] The FECEF programme office should, therefore, function as a funding and commissioning authority that buys validation capacity from these wings rather than duplicating it—the Services retaining technical ownership of the trials, and the fund carrying the financial risk.

One design condition deserves explicit statement, because it determines whether private capital follows public capital into the gap. Venture investors in this sector underwrite intellectual property rather than order books, and the terms on which IP is held during the TRL 6–8 validation phase, therefore, shape participation more powerfully than the size of any grant. The draft DAP-2026 anticipates this: benchmarking for innovation-category products is to include an Innovation Advantage Factor covering 'IP valuation, Functional value, Import Advantage', and a start-up may take an advance against 'the mortgage of IP rights' in place of a bank guarantee.[13] Both provisions treat intellectual property as a financeable asset rather than a formality. The corollary is that a transition fund must not undo them: if FECEF financing were to vest, encumber or take equity against the intellectual property it validates, it would dilute the very asset the investor is pricing, and the private capital the fund exists to attract would be crowded out instead.

Second, structured user-trial access must be codified rather than discretionary. At present, a developer who has completed iDEX or ADITI milestones may request user trials but has no entitlement to them within a defined timeline. A simple provision in the FECEF framework agreement—providing a right to user trials within six months of satisfactory TRL 6 milestone completion, with a defined evaluation duration and feedback protocol—would materially reduce dwell time in the Valley. The armed forces benefit directly: user interaction during the validation phase allows operational requirements to be incorporated before production, rather than after.

Third, the link between LCCA procurement and follow-on induction must be made explicit. A pilot purchase under LCCA should automatically

trigger a review at 12 months for potential inclusion in the acquisition plan at scale. This need not create an obligation to procure; it creates an obligation to decide, and to document that decision. The difference matters enormously to developers and their investors. A 'no further procurement' decision based on documented operational evaluation is vastly preferable to indefinite silence, which the market interprets as indifference.

Why this is the Central Reform, Not a Peripheral One

India's defence reform discourse tends to privilege the visible and the structural: theatre commands, the Chief of Defence Staff framework, procurement procedure reforms, and the expanding mandate of the Defence Public Sector Undertakings. These are consequential reforms. But the ability of the armed forces to actualise any structural change depends on the quality and availability of the equipment they operate. A reformed joint command equipped with legacy technology represents institutional modernisation without capability modernisation.

The Valley of Death is the mechanism by which India's considerable investment in defence innovation fails to reach the operational domain. iDEX and ADITI have seeded a generation of defence-focused startups and deep-tech firms. A gazetted FECEF and a well-used LCCA, properly implemented, can convert that pipeline into a sustained flow of inducted capabilities. Improperly implemented—underfunded, procedurally complex, disconnected from follow-on procurement—they can become additional bureaucratic stages through which promising technologies must pass before stalling at the same point they currently stall.

The Year of Reforms is an opportunity to change that logic. The policy architecture exists. The political will exists. The innovation ecosystem exists. What remains is the institutional plumbing that connects them: adequate capitalisation, structured user access, and a clear procurement pathway that decision-makers can use without institutional risk. These are not glamorous reforms. They are, however, the ones on which the rest depend.

Conclusion

India's defence modernisation narrative is mainly a story of progress. The ecosystem is more developed, the policy framework more sophisticated, and the indigenous industrial base more capable than at any point in the post-Kargil reform era. The Valley of Death is the exception to that narrative—a

structural gap that persists precisely because it lies between institutions rather than within them.

Bridging it requires treating transition not as a procurement event but as a programme phase with its own funding logic, institutional owner, and accountability framework. The draft DAP 2026 has identified the problem correctly. The Year of Reforms offers the occasion to solve it. The measure of that year's success will ultimately be found not in the policies announced but in the technologies inducted—and whether the generation of innovators currently building at TRL 6 finds, for the first time, a reliable path to TRL 9.

Notes

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4. 'Draft Defence Acquisition Procedure 2026', Chapters I and III, Ministry of Defence, Government of India, February 2026.
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10. Author's analysis based on iDEX PRIME and ADITI scheme documentation, cross-referenced with Ministry of Defence budget estimates 2025–26.

11. On the Army Design Bureau, see Ministry of Defence, Government of India, Delegation of Financial Powers to Defence Services 2026 (DFPDS-2026), No. 231(7)/2026/DFPDS Desk/Bud-II, Ministry of Defence, Government of India, 2 June 2026, Army Schedules of Powers 2026, Note 8 to Schedule 9. On the NIIO, see 'Naval Technology Acceleration Council (NTAC) Meeting', Press Information Bureau, Ministry of Defence, Government of India, 23 March 2022, available at https://www.pib.gov.in/Pressreleaseshare.aspx?PRID=1808821, accessed on 27 August 2026.
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