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India's Defence Tech Evolution:

Skills Shaping the Next Decade

EXECUTIVE SUMMARY

GROWTH IMPERATIVE

- **Scale:** New age Defence Tech sector will expand from US$7.6bn in 2025 to US$19B by 2030 (~20% CAGR) — growing faster than the overall defence market.
- **Innovation:** With 2,500+ defence patents filed since 2018 and are expected to increase, India will have momentum though global peers still outpace us in scale.
- **To seize the US$19bn opportunity**, India should double its defence-ready AI talent, expand frontier skills **5-6×**, and integrate startups more effectively into prime supply chains.

TALENT REALITY

- **Software Advantage:** India contributes **~20%** of global AI GitHub activity, and **12–15%** of its tech workforce is in cloud and digital roles. This gives India a scale advantage in AI, cloud, and cybersecurity, which can be leveraged for dual-use defence applications.
- **Hardware & Frontier Gaps:** In contrast, radar, propulsion, quantum, and certification engineers make up less than **5%** of the defence workforce. This leaves India import-dependent in critical hard-tech systems.
- **Strategic Risk:** Of **India's 800k AI** Talent, only less than **5% are defence-ready**. Without transformation, we risk being a subcontractor in software rather than a leader in defence systems.
- **Hub Dynamics:** Bengaluru anchors 45% of the defence-tech workforce; Hyderabad, Pune, NCR, Chennai are rising; new corridors (Lucknow, Coimbatore) are scaling fast.

PSU + PRIVATE AGILITY

- PSUs (like HAL, BEL, DRDO units) still dominate big-ticket platforms (fighter aircraft, radars, missiles) but private firms are becoming key for niche tech, faster innovation, exports, and dual-use spin-offs.
- Increasingly, collaboration models are forming — HAL with startups on UAV subsystems, BEL with AI players for sensor fusion, etc.

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FROM THE LEADERSHIP DESK

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India's defence industry is entering a new era. For decades, our strength rested on PSU and external imports. Today, that model is giving way to a **technology-first future with private companies partnership,** anchored in AI, autonomy, and innovation. By 2030, new age Defence Tech will account for nearly **half of the defence market**, with the true measure of power shifting from platforms to **advanced skills and intellectual property.**

The opportunity is clear. From a base of **US$7.6bn in 2025**, Defence Tech is projected to scale to **US$19bn by-2030,** led by UAVs, AI-driven ISR, and next-generation electronic warfare systems. Innovation pipelines are building fast — over **2,500 patents filed since 2018**, and nearly **200 iDEX startups** integrated into the ecosystem.

The challenge lies in talent. India contributes **20% of global AI GitHub activity** and has a strong base in cloud and cybersecurity. Yet, less than **5% of our AI engineers and under 2% of our cyber experts are defence ready**. Hard-tech areas like **radar, propulsion, quantum, and certification** are critically undersupplied, representing less than 5% of the workforce. If we do not close these gaps, India risks remaining a **subcontractor hub**, not a **systems leader.**

To combine the **scale of PSUs with the agility of private players and startups**, to nurture talent pipelines in frontier technologies, and to anchor India's rise as a **global defence exporter**, the next five years are decisive. If we double defence-ready AI talent, and scale quantum and certification skills **5–6×**, India will not just be building platforms, we will be building leadership.

DEFENCE TECH TRANSFORMATION:
4 KEY SUB SECTORS TO WATCH IN 2025-26

Naval & Subsurface Technologies on the Rise

- India's defence innovation is moving beyond UAVs into the naval and underwater domains.
- Contracts, such as EyeROV's **₹47 crore** order from the Indian Navy, signal early momentum in this segment.
- Although subsurface robotics currently represent less than **5%** of defence-tech startups, the sector is growing rapidly and is expected to contribute **10–12%** of new defence-tech.

Counter-Drone and Autonomous Defence Systems

- India is fast emerging as a global contender in counter-drone autonomy. Systems like the Indra Jaal AI defence dome, capable of covering up to **4,000 sq km,** and Bhargavastra micro-missiles highlight the country's technological edge.
- Counter-drone solutions now account for the largest share of funding in India's defence-tech ecosystem, representing about **71%** of total investments (approximately US **$414 million**).

Directed Energy and Quantum Breakthroughs

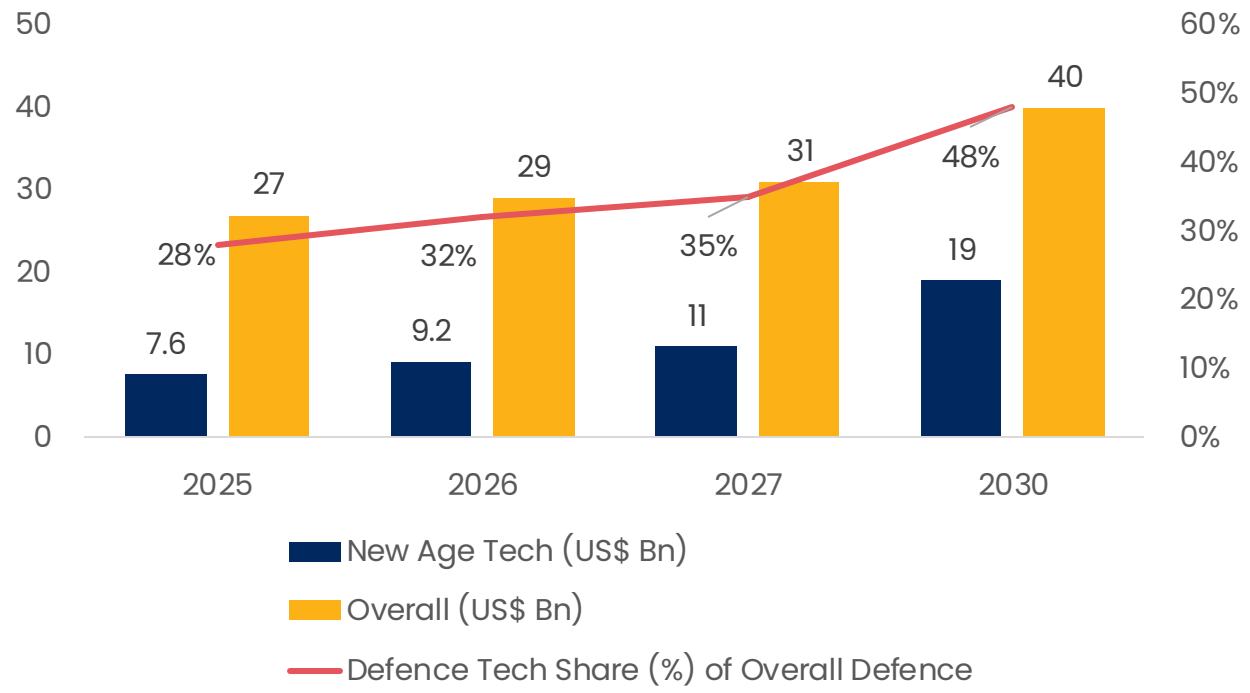
- The Defence Research and Development Organization (DRDO) is pushing the frontier of next-generation warfare through deep-tech investments.
- With **₹50 crore** allocated to projects in lasers, photonic radar, and quantum systems, India is laying the groundwork for leadership in directed energy and quantum-enabled defence applications.

Robotics and Human–Machine Collaboration

- Defence robotics is rapidly evolving from aerial platforms to humanoids and autonomous naval craft.
- While startups lead innovation in this space, many remain small and face a widening talent gap, nearly **40–45%** of UAV and robotics roles risk remaining unfilled without structured reskilling programs.

SHIFT TOWARDS TECH IN OVERALL DEFENCE

Defence New Age Tech vs *Overall Defence Market (2025–2030)



*The total market size is determined by adding the domestic market and defence exports.

By 2030, new age Defence Tech will no longer be a niche — Defence Tech will be the engine of growth for India's defence industry. Its share is projected to expand from 28% in 2025 to nearly 50% by 2030. This transformation will make technology, not just platforms, the **primary growth driver** of national defence capability

DEFENCE TECH GROWTH MATRIX (2025–2030)

Drones & Counter-Drone Systems

Current Scale (2025):

Accounts for 71 % of all Defence Tech startup funding (2014–25)

Future Momentum (2030):

Market projected to expand at ~17 % CAGR, reaching ~USD 1.4 Bn by 2029

The workforce remains heavily concentrated in drone design and assembly roles. Demand is shifting towards specialists in autonomous navigation, swarm algorithms, counter-drone EW, and sensor-fusion engineering.

AI Integration Across Defence Startups

Current Scale (2025):

89% of Defence Tech startups currently integrate AI modules in products or R&D

Future Momentum (2030):

AI expected to underpin nearly Defence Tech applications by 2030

Workforce demand is evolving towards AI/ML engineers, data-modelling experts, and embedded-AI developers. The talent gap lies in domain-specific AI for avionics, predictive maintenance, and autonomous mission systems.

Cybersecurity & Quantum-Secure Communications

Current Scale (2025):

Remains nascent with early-stage deployment across defence networks

Future Momentum (2030):

Forms part of the advanced-tech basket driving 2030 growth

The segment will require a new cadre of cyber analysts, quantum-security researchers, and firmware-protection engineers. Demand will increase for professionals with exposure to quantum-resistant encryption, secure C4ISR design, and penetration testing.

Space & Satellite Technologies

Current Scale (2025):

Identified as a policy-priority but still early in industrial maturity

Future Momentum (2030):

Expected to expand rapidly through ISRO–Defence collaboration by 2030

Growth will elevate demand for satellite-system engineers, ISR-payload specialists, and secure-satcom technologists. Talent shortages are anticipated in optical payload integration, ground-station software, and propulsion systems as India builds dual-use constellations and indigenous defence-space infrastructure.

EMERGING INNOVATION ENGINES IN INDIA'S DEFENCE TECHNOLOGY ECOSYSTEM

AI Project Funding

Current Scale (2025)

~USD 12 million allocated annually to defence AI R&D projects

Strategic Implications

- Demonstrates growing institutional recognition of AI as a force multiplier in defence operations.
- While funding levels remain modest compared to global benchmarks (e.g., DARPA's ~USD 2 billion "AI Next" initiative), the focus on targeted, mission-aligned research can strengthen India's AI readiness for autonomous systems, surveillance analytics, and logistics optimisation.

iDEX (Innovations for Defence Excellence)

Current Scale (2025)

~194 firms integrated into the iDEX innovation network (as of 2025)

Strategic Implications

- Represents one of the largest coordinated innovation ecosystems for defence startups globally, enabling rapid prototyping and technology validation.
- Further emphasis on scaling mature prototypes into production contracts will enhance the ecosystem's operational impact and contribute to sustained industrial capability development.

Key Insights:

- India is building innovation pipelines (iDEX) and seeding critical tech verticals (AI projects), but scale is still small relative to the US.
- To achieve the US$19bn Defence Tech market by 2030, India will need to expand annual AI funding beyond US$12mn and ensure that the 194+ iDEX startups graduate into production contracts rather than remaining in pilot stage.

TALENT IMPERATIVES IN KEY SUB-SECTORS OF DEFENCE TECH (2025–2030)

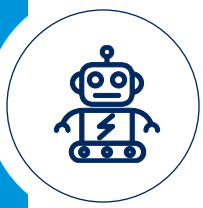
AI / ML

Critical Roles	• AI/ML Engineer • Computer Vision & Robotics Engineer • Autonomous Systems Engineer
Growth Outlook (2025–2030)	• Hiring demand CAGR: **15–20%.** • Senior AI roles rising **20–30% YoY.** • India's AI pool: **~800k engineers, but <5% defence ready.**
Strategic Workforce Implications	• Severe shortage of applied Defence AI talent. • **Only 20-25k of 800k Data science and AI skilled Talent** deployable for Defence today. • Upskill at least 50% of current pool within 5 years to avoid dependency on external partners.

Cybersecurity

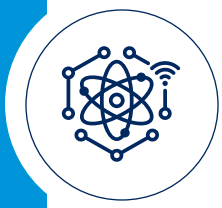
Critical Roles	• Cyber Architect • Threat Intelligence Analyst • Systems Security Engineer • Quantum Engineer
Growth Outlook (2025–2030)	• Defence cyber demand growing **20%+ annually.** • India has **<5k defence-grade cyber experts.**
Strategic Workforce Implications	• Less than **2% of India's ~400k cyber workforce** has defence-grade expertise. • Post-quantum & secure-systems capability is missing — **urgent need for a national defence cyber skilling mission.**

Robotics & Unmanned Systems



Critical Roles	• Robotics Engineer • UAV/Drone Engineer • Embedded Systems Specialist • SLAM/Control Engineer
Growth Outlook (2025–2030)	• Market expanding at **25–30% CAGR.** • UAV engineer demand: **1.5–2k today → 3–4k+ by 2030.**
Strategic Workforce Implications	• Defence robotics workforce must **double in 5 years.** • Without reskilling, **40–45% of UAV roles may stay unfilled,** risking India's export leadership in drones.

Quantum



Critical Roles	• Quantum Scientist • Quantum Algorithm Developer
Growth Outlook (2025–2030)	• Workforce demand to grow **20–30% by 2030.**
Strategic Workforce Implications	• Currently <1% of Defence Tech talent. • Needs 5–6× scale-up to support quantum cryptography, secure communications, and sensing. • Delay risks, locking India out of next-gen strategic deterrence.

Sensors (Radar, Optical, RF, MEMS)

Critical Roles	• Sensor Design Engineer • RF Engineer • Signal Processing Engineer • Optical Systems Engineer
Growth Outlook (2025–2030)	• Roles growing at 15–20% CAGR.
Strategic Workforce Implications	• Defence sensor workforce must **double by 2030.** • **20–30% engineer shortfall** projected, especially in RF & optical. • Should convert electronics engineers into sensor specialists via targeted reskilling.

CRITICAL WORKFORCE SEGMENTS

Engineering & Design

Critical Roles

- Systems Design Engineer (Avionics)
- RF / Radar Hardware Engineer
- Flight Mechanics Engineer
- Systems Engineer
- Structural / Stress Analysis Engineer

Workforce Risk & Readiness

- Radar/RF hardware engineers form **<5%** of India's defence design talent, creating high import dependence.
- Stress analysis & flight mechanics roles risk a **20–25% talent shortfall** by 2030 without targeted skilling.

25% Demand Gap is High

Software & IT

Critical Roles

- Mission Systems Software Engineer
- Embedded Software / Firmware Engineer
- Secure Comms Software Engineer
- RTOS Developer
- Software Architect – C4ISR

Workforce Risk & Readiness

- India's software depth is strong, but **3–5% is defence-grade.**
- Shortage of secure comms engineers may delay C4ISR modernisation by **2–3 years.**

20% Demand Gap is Moderate

Emerging Tech

Critical Roles

- Autonomous Systems Engineer (UAVs/ UGVs)
- Edge AI / Embedded ML Engineer
- Quantum Comms Engineer
- Hypersonic Systems Engineer
- Robotics / Mechatronics Engineer

Workforce Risk & Readiness

- UAV/robotics talent demand growing at **25–30% CAGR.**
- Quantum & hypersonics engineers are **<1%** of the defence workforce — a critical capability gap.

35% Demand Gap is Very High

Integration & Support

Critical Roles

- Systems Integration Engineer (Weapons/Avionics)
- Test & Validation Engineer
- RAMS Engineer (Reliability & Safety)
- Certification/ Compliance Engineer (MIL-STD/DO-178)
- Field Support Engineer – Defence Hardware

Workforce Risk & Readiness

- Certification engineers form **<5%** of the total pool — major export bottleneck.
- Systems integration demand projected to **double by 2030**, outpacing available workforce.

30% Demand Gap is Very High

Takeaway:

By 2030, India must **double its integration and sensor talent** and **5–6× niche roles in quantum, hypersonics, and certification**, or risk becoming a **prototype nation**. Without **20,000+ skilled defence-ready engineers** added in the next five years, India will struggle to convert innovation into platforms and export.

COMPOSITION OF DEFENCE TECH TALENT POOL

PSU and Large scale private Defence Enterprises

~55–60%

- Anchor employers – HAL, BEL, DRDO-linked labs, Tata, L&T, Mahindra, Adani.
- Engineers across avionics, radar, aerospace, weapons.
- Strong in scale and systems integration; limited agility in frontier tech.

Startups

~20–25%

- 1,000+ defence startups; ~US$432mn raised (71% drones/anti-drone).
- Small teams (20–200 engineers) but high innovation density.
- Anchor employers – Armory, Garuda aerospace, Constelli, Agnit, etc.

Component & Subsystem Firms

~15–20%

- Backbone of components & subsystems (aero-structures, electronics, composites).
- Smaller engineering teams but critical for depth and cost-competitiveness; capability gaps in high-tech domains (RF, quantum materials)

Key Insights:

- **Innovation Intensity:** Startups (~25% of pool) drive drones and AI, but limited by small team sizes; procurement conversion must accelerate.
- **Depth vs. Capability Gap:** Component & Subsystem firms (~20%) provide supply chain backbone, yet face shortages in high-tech areas like RF, optics, and quantum materials.

ENGINEERING & DESIGN ROLE MATRIX

Job Role	Avionics Systems Engineer	Aerodynamics / Flight Physics Engineer	Verification & Validation Engineer
Workforce Availability	Medium	Low	Low
Projected Supply Growth (2030)	20%	18%	30%
Projected Demand Growth :2030	30%	25%	40%
Gaps	Shortfall ~250–300 engineers.	CFD & supersonic expertise limited.	Undersupply risk in Validation roles.
Risk Level of Project Delayed	Medium	Medium	High
Impact if Gap Persists	• Delay in AMCA & LCA upgrade timelines. • Increased reliance on imported avionics subsystems.	• Indigenous high-Mach projects delayed. • Dependency on foreign consultants for supersonic CFD.	• Certification delays stall exports. • India perceived as a “prototype nation,” not export-ready.

Key takeaway:

By 2030, ~40% of validation/certification demand may go unmet, directly delaying AMCA and UAV export timelines.

SOFTWARE & IT JOB ROLE MATRIX

High Medium Low

Job Role	Workforce Availability	Projected Supply Growth (to 2030)	Projected Demand Growth (to 2030)	Risk Level of Project Delayed	Impact if Gap Persists
Embedded Systems Engineer	🟡	+20%	+28%	🟡	• Firmware timelines slip. • Dependency on overseas RTOS experts.
Cyber-security / InfoSec Engineer	🟡	+25%	+35%	🟢	• Vulnerable defence networks. • Brain drain to fintech/overseas.
AI/ML Engineer (Defence AI)	🔴	+30%	+45%	🟢	• ISR & decision support delayed. • Imports fill AI gap.
Data Scientist (Defence Analytics)	🔴	+22%	+32%	🟡	• Weak intelligence fusion. • Reliance on foreign toolkits.
Cloud / Simulation Engineer	🟡	+18%	+26%	🟡	• Defence digital twin capacity capped. • Simulation outsourcing rises.

Key take away:

Over 60% of demand growth in AI/ML & cyber risks going unfilled — leaving India vulnerable to talent flight abroad.

EMERGING TECH JOB ROLE MATRIX

Very High | High | Medium | Low | Very Low

Job Role	Workforce Availability	Projected Supply Growth (to 2030)	Projected Demand Growth (to 2030)	Risk Level of Project Delayed	Impact if Gap Persists
Robotics Engineer	Medium	+25%	+40%	High	• UAV/UGV timelines slip. • HAL risks overdependence on startups.
Autonomous Systems Engineer (UAV/UGV)	Low	+28%	+45%	High	• Autonomy gaps in naval/air platforms. • Swarm export readiness stalls.
Quantum Comms / Computing Engineer	Very Low	+35%	+55%	Very High	• India excluded from quantum-secure networks. • Strategic deterrence compromised.
Directed Energy Systems Engineer	Very Low	+30%	+50%	Very High	• High-energy laser projects stall. • Import reliance grows.
IoT / Sensor Networks Engineer	Medium	+20%	+30%	Medium	• Soldier wearable adoption delayed. • Weak battlefield integration.

Key take away:

Quantum & Directed Energy demand will outpace supply by 5–6× by 2030 — India risks being locked out of next-gen deterrence if not scaled.

INTEGRATION AND SUPPORT JOB ROLE MATRIX

High Medium Low

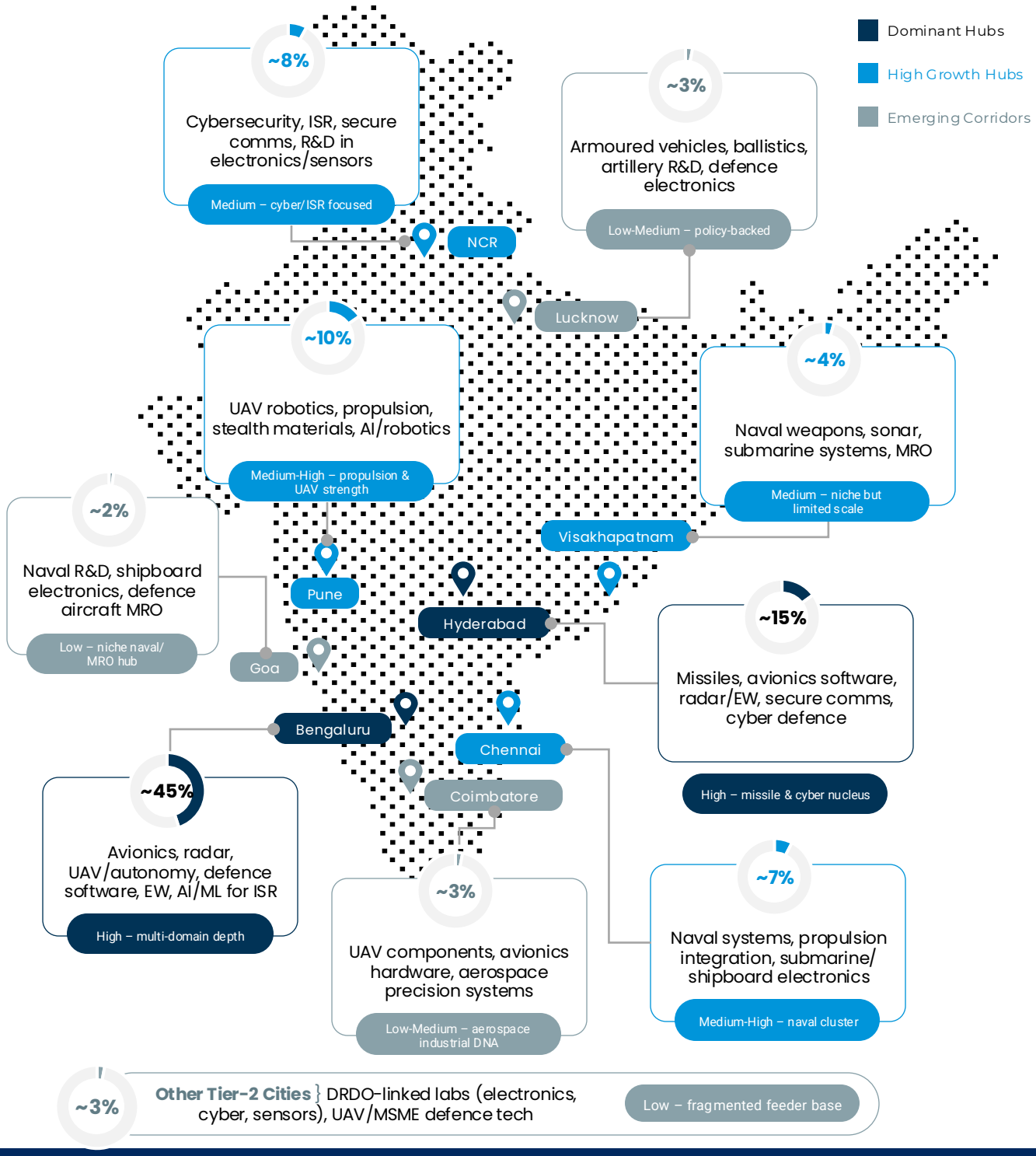
Job Role	Workforce Availability	Projected Supply Growth (to 2030)	Projected Demand Growth (to 2030)	Risk Level of Projects Delayed	Impact if Gap Persists
Systems Integration Engineer	Medium	+20%	+28%	High	• Platform delivery delays. • Slower export certification.
Test & Validation Engineer	Medium	+18%	+25%	Medium	• Longer prototyping cycles. • Increased project cost overruns.
Reliability & Safety (RAMS) Engineer	Low	+22%	+30%	High	• Export certifications delayed. • Reliability issues dent credibility.
Field / MRO Engineer	Medium	+20%	+28%	Medium	• Delays in predictive maintenance. • Fleet availability compromised.

Key take away:

Without scaling, 30–35% of integration & certification demand will remain unmet by 2030, stalling India's export push worth $5–7bn.

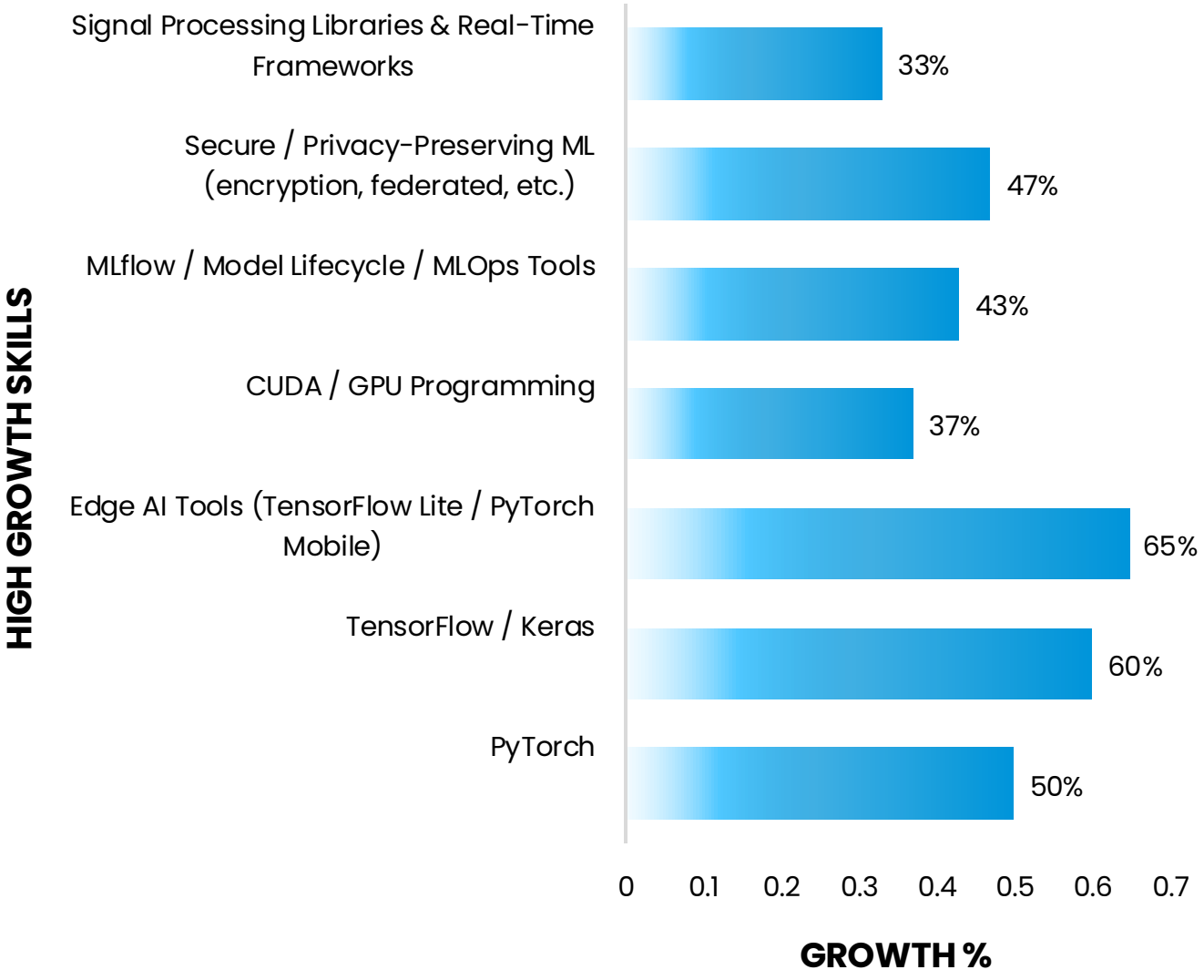
Defence Tech Talent by Geography:

As of 2025, India commands a Defence Tech talent pool of ~75–80k. While Bengaluru and Hyd anchors nearly half the workforce, emerging corridors in Lucknow and Coimbatore, and naval hubs in Chennai, Vizag, and Goa, are accelerating growth, setting the stage for a more distributed ecosystem by 2030.



Key takeaway: Dominant Hubs (Bengaluru & Hyderabad) hold ~60% of Defence Tech talent. To de-risk, High-Growth Hubs (~30%) must scale 1.5–2× by 2030, and Emerging Corridors (~10%) must triple, or India risks talent fragility and program delays concentrated in just two cities.

2025-2030 High Priority skills in Defence Tech



Key Insights:

- By 2030, Defence Tech will need to **blend AI frameworks (PyTorch, TensorFlow), Edge AI, GPU acceleration, and secure MLOps** with **domain-specific DSP and avionics skills.**
- The fastest talent demand growth lies in **Edge AI (60–80%)** and **AI frameworks (40–70%),** while **signal processing and microelectronics** remain stable but essential.

India's Defence Tech: Three Possible Trajectories by 2030

	Subcontractor	Trusted Integrator	Global Defence Tech Pole
Talent Dimension	Talent pool expands but remains software-centric (AI, cyber, cloud dominate; hardware/embedded).	Share of hardware and embedded roles rises to **20-25%** through targeted skilling.	Balanced workforce across AI, avionics, radar/EW, quantum, supported by a mature academia–industry–defence pipeline.
Business Dimension	Market reaches **~USD 19 bn;** exports **~USD 6-8 bn,** mostly in subcontracting and service work.	Market expands to **~USD 22–25 bn;** exports grow at **~17% CAGR** to **~USD 8-10 bn.** Indian firms secure Tier-2 integration mandates with global OEMs.	India becomes an IP-driven exporter; over **2,500** defence patents (filed since 2018) translate into deployable platforms.
Strategic Outlook	India achieves scale but risks being viewed primarily as a defence-tech service hub with limited IP ownership.	India evolves into a reliable partner nation, deeply embedded in global defence-tech supply chains.	India positions among the top global defence-tech powers alongside the US China, and Israel.

India's real race isn't just "growing the pie of defence talent" — it's **tilting the pie towards hard-tech + IP retention.** If that happens, India leapfrogs from being a service base to a **sovereign defence innovator** by 2030.

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