

Bridging the "Valley of Death"

The Role of State-Backed Funding in Commercializing Space Technologies through India's
Technology Adoption Fund (TAF)

Contributed by

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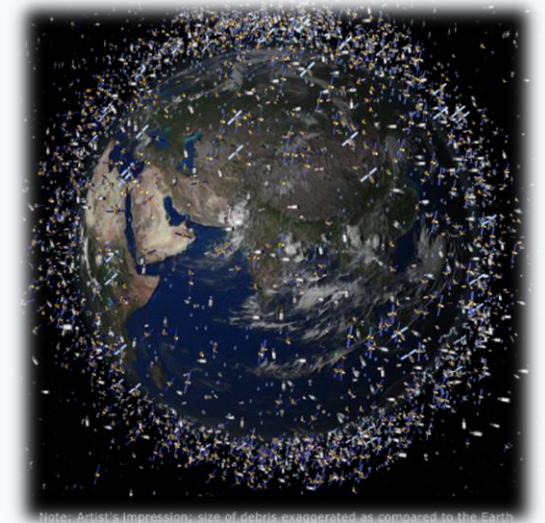
Presented by

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The "Valley of Death" in Emerging Space Nations

- **Rapid Ecosystem Growth:** The Indian space sector >400 space startups and valued at ~\$8.4 billion following recent space domain reforms.
- **Proven Foundation:** Core R&D fully achieved, offering immediate opportunity for industry leaders to drive the next stage of deployment.
- **The "Valley of Death":** Transitioning early-stage research (TRL 3/4) into market-ready products (TRL 7/8) requires massive financial and infrastructural resources.
- **The Need:** A strategic intervention through Sovereign Fund to de-risk these initial steps and attract private/venture capital downstream. (Technology Adoption Fund)



The Solution: Technology Adoption Fund (TAF)



Applicability

For Private Entities (NGEs) including Startups, MSMEs, and large industries.
Can be supported by Academic Institutions.



Strategic Outlay

₹500 Crores 5-year Revenue based Fund:

1. 60% of project cost for Startups & MSMEs,
2. 40% of project cost for large industries
3. Capped at ₹25 Crores per project.



Empower Innovators

Private entities (NGEs) retain complete ownership of the Intellectual Property (IP) generated, drastically increasing their valuation and downstream investor confidence.



Market-Driven Focus

Prioritizes innovative technologies with potential commercial outcome across Space Sector in Upstream, Midstream and Downstream.

Rigorous Assessment for Scalable Ventures

1. Proposal Assessment

- Technical Feasibility & Innovation
- Commercial Viability
- Domestic & International Demand
- Potential Socio-Economic Impact
- Technology Readiness Level (TRL)

2. Entity Assessment

- Past Experience & Track Record
- Facilities Availability
- Financial Capability & Business Plan
- Technical Expertise of the Team
- Intellectual Property (IP) Portfolio

Targeting the Entire Value Chain

Upstream & Midstream

Direct funding for critical space infrastructure and sovereign capabilities.

- Launch Vehicles & Propulsion
- Earth Observation & SATCOM Satellites
- Human Space Flight & Space Tourism
- Mission Control & TTC Data Links

Downstream (Applications)

Fostering terrestrial impact, immediate commercial scale, and socio-economic resilience.

- Precision Navigation (PNT)
- Earth Observation (EO) AI Models
- Satellite-IoT Communications
- Disaster & Agriculture Management

Transferable Lessons

- ➡️ **Government as a Catalyst:** By absorbing the high financial risk of early-stage prototyping (TRL 4 to 7), the state paves the runway for private capital to safely enter at the commercialization stage (TRL 8).
- ➡️ **Target Post-Research Product development:** Interventions must explicitly target technologies where core research is finished. The goal is building a sustainable product, not funding open-ended research.
- ➡️ **Aligning Incentives via Revenue Sharing:** Implementing a fractional revenue or licensing fee sharing model post-commercialization ensures the fund's long-term sustainability and accountability.
- ➡️ **Focus on Self-Reliance:** Prioritizing import substitutions builds local manufacturing resilience and aligns with broader national export visions.
- ➡️ **IP Retention is Non-Negotiable:** Allowing startups to fully own their IP ensures their company remains highly investable and globally competitive.

Landscape of Innovation: TAF Proposal Distribution (50+ Proposals)

Macro Snapshot: ~65% Hardware & Deep-Tech Subsystems | ~35% Software, Payloads & AI



1. Advanced Launch & Propulsion

- High-thrust closed-cycle LOX/Methane engines
- Green liquid bipropellant apogee thrusters
- Iodine-based electric propulsion (Hall thrusters)



2. Satellite Subsystems & ADCS

- AI-powered star sensors & neuromorphic tracking
- Hubless Control Moment Gyros (CMGs)
- Roll-out solar arrays (ROSA) & mechanisms



3. Space-Grade Microelectronics

- Indigenous digital ASICs & RF receiver SoCs
- Space-qualified SMD capacitors & EMI filters
- High-power RF/microwave passive components



4. Materials, Power & Thermal

- Silicon carbide (C-SiC) lightweight composites
- Space-grade Perovskite & multi-junction cells
- Sustainable nanocellulose for space structures



5. Next-Gen Payloads & Orbit Economy

- Synchronized SAR + Multispectral optical payloads
- Autonomous re-entry & microgravity platforms
- In-orbit refueling ports & active debris removal



6. Downstream AI, IoT & PNT

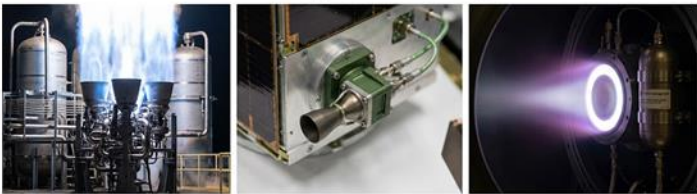
- Large Earth Observation Models (LOM)
- 3GPP-native hybrid satellite-IoT platforms
- LEO-based high-precision positioning services

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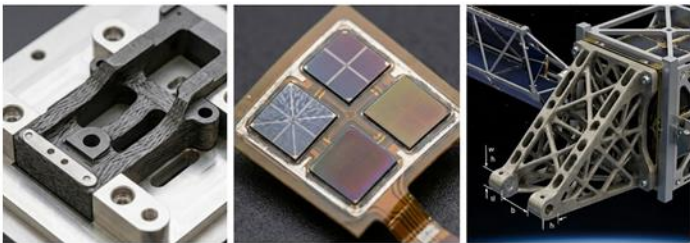
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3. Space-Grade Microelectronics



4. Materials, Power & Thermal



5. Next-Gen Payloads & Orbit Economy



6. Downstream AI, IoT & PNT



TAF in Action: Concrete Scaling Cases



Launch Vehicle Propulsion

Funding the development of high-thrust, reusable closed-cycle liquid rocket engines for medium-to-heavy lift launch vehicles.



AI-Driven Earth Observation

Creation of Large Earth Observation Models (LOM) serving as AI platforms for national-scale agricultural and disaster management insights.



Precision Subsystems

Engineering indigenous, high-precision AI-powered star tracker systems tailored for versatile spacecraft, from CubeSats to heavy payloads.

Key Transferable Lesson for Emerging Nations

Private capital eagerly funds downstream software, but avoids upstream hardware risk. Government funds like TAF must act as the essential bridge across the hardware "Valley of Death" to unlock true national self-reliance.

Thank You

Looking forward to a productive panel discussion.

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