

6. Space Insurance Ecosystem in India- Science & Technology

The failure of India's PSLV-C62 mission in January 2026, which resulted in the loss of 16 satellites including DRDO's EOS-N1 and multiple commercial payloads, has renewed focus on the need for space insurance, especially as private startups absorb heavy losses—with industry estimates suggesting combined launch and payload losses could range up to ₹500–₹800 crore or more in such failures, underscoring the financial risks of uninsured space ventures.

Indian Space Economy- Structure and Growth Trajectory

Current Status

1. Estimated value- \$13 billion
2. Share in global space economy- ~2%
3. Annual government expenditure- ~\$2 billion
4. 381 foreign satellites launched for 34 countries since 1999
5. Revenue earned- \$279 million from commercial launches
6. Expected growth- \$40 billion by 2030

Institutional Backbone

1. Indian Space Research Organisation (ISRO) – sixth-largest national space agency globally
2. IN-SPACe – regulator and promoter of private participation
3. NewSpace India Limited (NSIL) – commercialization arm

Components of India's Space Economy

1. Satellite manufacturing
2. Launch services (PSLV, GSLV, SSLV)
3. Ground segment and applications
4. Navigation (NavIC)
5. Remote sensing and GIS
6. Emerging New Space startups (Agnikul, Skyroot, Pixxel etc.)

Growth Drivers

1. 100% FDI liberalization in space sector (recent reforms)
2. Demand-driven commercial launches
3. Defence-space integration
4. Global satellite broadband demand
5. Rising private innovation ecosystem

Space Insurance- Concept and Significance

Space insurance is a risk-transfer mechanism covering financial losses associated with-

1. Launch vehicle failures
2. Satellite malfunctions
3. Payload damage
4. Third-party liability claims

It is essential because space missions involve-

1. Extremely high capital expenditure
2. Low probability but high-impact risk events
3. Complex technological uncertainty

Need for Space Insurance in India

Commercial Space Expansion

India is transitioning from a state-led to a commercially integrated ecosystem. Private participation increases exposure to financial risk.

Investor Confidence

Insurance reduces risk perception for-

1. Venture capital investors
2. Institutional investors
3. Foreign partners

It complements India's FDI reforms in the space sector.

Protection Against Catastrophic Loss- A single launch failure may cost hundreds of millions of dollars. Insurance cushions financial shocks.

Treaty Compliance- India's liability is governed by international space law-

Outer Space Treaty- States bear responsibility for national space activities, including private missions.

Liability Convention- Absolute liability for damage on Earth or to aircraft.

Registration Convention- Mandatory registration of space objects.

Thus, third-party insurance is critical for protecting the State from financial exposure.

Types of Space Insurance Coverage

Pre-Launch Insurance

1. Covers damage during transport, storage, integration.
2. Lowest risk phase; least opted.

Launch Insurance

1. Covers ignition to orbital insertion.
2. Highest-risk phase.
3. Premiums range between 15–20% of mission value.

In-Orbit Insurance

1. Covers early orbital failure and long-term operational risks.
2. Often structured as multi-year policies.

Third-Party Liability Insurance

Covers damage to-

1. Other states
2. Aircraft
3. Property or persons

Crucial for treaty compliance.

Space Situational Awareness (SSA) and Sustainability

Concept of SSA

Space Situational Awareness (SSA) refers to-

1. Tracking objects in orbit
2. Predicting collisions
3. Monitoring debris
4. Assessing threat to space assets

Institutional Measures

ISRO has strengthened SSA through- IS4OM (ISRO System for Safe and Sustainable Space Operations Management)

1. Spaceflight safety
2. Debris mitigation
3. Collision avoidance

Debris Free Space Mission (DFSM)

1. Target- Debris-free missions by 2030
2. Applies to all Indian space actors
3. Aligns with global sustainability standards

Global Space Insurance Market

1. Market size (2025)- \$4.06 billion
2. Expected size (2026)- \$4.43 billion
3. CAGR- ~9.1%
4. Driven by commercial satellite growth and mega-constellations

India's insurance market must evolve to match global commercial trends.

Regulatory Framework in India

Indian Space Policy 2023

1. Clarifies roles of ISRO, IN-SPACE and NSIL
2. Encourages private participation

Draft Liability Framework- "Policy framework and guidelines addressing State's Liability towards third party damages arising due to Indian Space Objects" under consultation

Launch Operator Responsibility- Mandatory third-party insurance envisioned. Aligns with international best practices.

Key Challenges

High Premium Costs- 15-20% of mission value for launch insurance. Significant burden on startups.

Limited Domestic Insurance Capacity- Reliance on foreign reinsurance markets. Exposure to global volatility.

Rising Orbital Congestion- Growing debris risk. Threat of Kessler Syndrome (chain-reaction collisions).

Limited Historical Data- Insufficient risk pricing data for private launches. Difficulty in actuarial modelling.

Cybersecurity Risks

1. Satellite hacking
2. Ground station vulnerabilities
3. Software-driven space assets create new liability categories

Strategic Importance for India

Economic Security- Protects multi-billion-dollar infrastructure

Technological Sovereignty- Reduces dependence on foreign insurers

National Security- Safeguards critical communication, navigation, defence satellites

Sustainable Space Governance- Integrates SSA + insurance + regulatory compliance

Way Forward

Develop Indigenous Space Insurance Pool

1. Public-private reinsurance model
2. Dedicated space risk underwriting units

Strengthen Actuarial Data Collection

1. Build domestic failure databases
2. Use AI for risk modelling

Integrate Cyber Insurance- Specialized policies for satellite cyber risk

Encourage Start-up Support Mechanisms

1. Subsidized premiums
2. Government-backed risk guarantees

Global Cooperation

1. Data-sharing on debris
2. Joint SSA initiatives
3. Participation in multilateral sustainability frameworks

Conclusion

India's space economy is transitioning from a state-dominated scientific model to a commercially driven strategic sector. As private participation expands, space insurance becomes indispensable for risk management, investor confidence, treaty compliance, and sustainable governance.

The integration of regulatory reform, SSA mechanisms, domestic insurance capacity, and international cooperation will determine whether India can scale from a \$13 billion ecosystem to a projected \$40 billion space economy by 2030 while ensuring safety, sustainability, and financial resilience.

Source- <https://timesofindia.indiatimes.com/blogs/voices/pslv-c62-a-stress-test-for-indias-space-framework/>