The Uninsured Orbit

A global assessment of launch, in-orbit, liability and position-navigation-timing risk, with India as the principal worked case.

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Foreword by **Lt Gen A K Bhatt (Retd)**, Director General, Indian Space Association
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The protection gap is a *measurement problem* before it is a purchasing problem.

Two particle impacts eight weeks apart defined the year. SpainSat NG-2 was struck during orbit raising, roughly 50,000 km from Earth, and written off with a claim at a policy limit above $400 million — the largest insured space loss in a decade. Shenzhou-20's re-entry capsule window was cracked by a suspected debris impact and judged unsafe for crewed return, forcing the first uncrewed replacement capsule launch in China's programme.

Neither impactor was tracked. Neither has been identified, and neither could have been with current sensing. One loss was priced by the insurance market; the other had no mechanism by which it could be priced at all. That asymmetry is the subject of this volume.

Five fragmentation events occurred in orbit during the window and not one carries a published causal determination. A hazard whose cause is never established cannot be attributed, and what cannot be attributed cannot be priced, underwritten, reinsured or regulated. It can only be carried.

44
events in the register, each carrying its evidence state

132
sources, every one of them public

9
orbital launch failures identified in the window

5
fragmentation events, none with a published cause

>$400m
largest insured loss; sources give $400–405m

~97%
of active spacecraft reported without comprehensive in-orbit cover

1
crewed vehicle disabled by suspected debris impact

5:1
tracked debris to active payloads in the 700–1,000 km shell

44,964
catalogued objects on the ESA basis at end-2025; 15,883 tonnes in orbit

On method. Every quantitative claim is sourced to a numbered note. Each event carries one of seven evidence states, from Confirmed to Not established. Where sources conflict, the conflict is printed rather than averaged. Where a cause was never published, the register records the absence rather than supplying an inference. The volume makes no loss forecast.

THE CAUSAL RECORD IS BROKEN

FINDING 6

Five fragmentation events, and not one with a published causal determination. A constellation satellite at approximately 418 km in December 2025 and a second at 560 km in March 2026; a decommissioned Russian satellite in the geostationary graveyard in January 2026; a Chinese upper stage in June 2026; and a thirty-eight-year-old American satellite at 775 km in September 2026. No fragment count was published for any of them, and the debris from two will persist for decades or longer.

FINDING 4

Published failure causes ranged from ten days to never. One commercial operator published an initiating cause ten days after the failure — the only complete causal chain published for any orbital launch failure in the window. Another investigation traced a mechanism and stated plainly that the initiating cause had not been established. A third reported, and the minister responsible confirmed the findings could not be shared publicly.

FINDING 7

Official catalogues materially understate fragmentation, and the gap is now quantified. NASA had catalogued seven fragments from one upper-stage breakup by mid-July; independent commercial tracking estimated 100 to 150. Neither of the objects that caused the year's two consequential impacts appears in any catalogue.

OBLIGATION IS OUTRUNNING RISK TRANSFER

FINDING 2

The European Union's draft Space Act contains no liability and no insurance provisions. The compromise text mandates certification, debris mitigation plans, manoeuvrability above 400 km and compulsory collision-avoidance subscription. Liability remains governed by national law across thirteen divergent regimes, and legal analysis notes that potentially unlimited liability makes the risk harder to insure.

FINDING 3

Compliance obligation is growing faster than risk-transfer capacity, in every jurisdiction examined. Europe is legislating authorisation without liability. India issued two authorisation instruments while liability remained uncapped and no statute was introduced. The United States tightened disposal rules without addressing financial responsibility. The pattern is structural, not national.

WHAT THE GAP LOOKS LIKE FROM THE GROUND

FINDING 14

Six uninsured domestic payloads were lost on a single morning, beside one insured foreign payload. Six of the sixteen satellites aboard PSLV-C62 belonged to two Indian startups and none of the six carried cover. The only insured payload was foreign, insured because its licensing jurisdiction required it. That contrast is the clearest statement in this book of what a protection gap actually looks like.

NAVIGATION RISK IS LEAVING THE SPACE SECTOR

FINDINGS 11 AND 12

Asia-Pacific interference data is structurally unreliable, and the first insurance product has appeared outside space. ICAO's regional office recorded that over the preceding year not a single GNSS interference report had been shared with it, with two partial exceptions; every Asian interference figure in this book, including its own, is therefore a floor. Meanwhile a Japanese insurer launched what is reported as the first marine product covering economic loss without physical damage from navigation-signal interference. Aviation insurers have not followed.

A risk market needs four things: data to price from, capacity to bear risk, attribution to allocate loss, and standards to measure against. The scorecard tests all four against sixteen binary questions drawn from the window's evidence, so a reader can dispute a specific score rather than a general impression.

GAP	GLOBAL	INDIA
Data	1.25	0.0
No stage-level reliability published anywhere; no accessible loss and anomaly database at any level. The entire global score rests on voluntary commercial disclosure.		
Capacity	5.0	0.0
The only gap that scores, carried by two tests: capacity held through the year's largest loss, and the established markets have depth. It scores zero on affordability for emerging operators and zero on constellation appetite. The capital exists; it is not reaching the two populations that most need it.		
Attribution	1.25	1.25
The floor, and the same floor everywhere. No in-orbit loss was independently attributed anywhere in the window, and no forum or standing body exists to produce such a determination.		
Standards	2.5	1.25
The highest-profile regulatory instrument of the decade is unadopted, with an application date between 2030 and 2038.		
Composite	2.5	0.63

How to read a low score. This is a deliberately unforgiving instrument, and the book says so where it publishes it: "A low score does not mean the space sector is unsafe or badly run. The same twelve months produced a first-attempt private orbital success in India, a first orbital flight of a fully reusable super-heavy vehicle, the fastest published causal determination this research identified, and an insurance class that absorbed its largest loss in years without a carrier leaving. The scorecard measures one thing only: whether the machinery exists to price, allocate and transfer the risk that this activity generates." The methodology is published in full so that the scores can be disputed.

HOW CHEAP THE FIRST POINTS WOULD BE

The scorecard is built so a reader can see which tests could move within twelve months at essentially no cost. The answer is five of sixteen.

1. **Publish an underwriting-grade failure summary** — failure mode, mechanism, and the level of causal determination reached — even where the full investigation is withheld.
2. **Publish a maximum probable loss methodology.** A number without a methodology cannot be priced, verified or challenged. A regulator can publish one in weeks, at no cost.
3. **Constitute a pool on existing national machinery.** Most states running nuclear or terrorism pools already have the template.
4. **Establish a telemetry retention standard** — channel coverage, retention period, time synchronisation. A documentation requirement, not a technology programme.
5. **Any single operator binding first-party cover and disclosing it** establishes a reference point where none exists.

None of these requires a treaty, new capital, or a technological advance. Four of the five require a decision by a single institution.

Each recommendation in the volume names what to do, who can do it, and what it would move on the scorecard. Recommendations that could not name an owner were left out. A selection follows.

For policymakers and regulators

Separate third-party liability from first-party asset protection in any mandate. A mandate written to satisfy the international framework protects the exchequer; it does not put a rupee into the hands of an operator whose satellite is destroyed. Sequence capacity before mandate — a liability requirement arriving into a market with no domestic pool produces compliance premium placed offshore, meeting treaty obligations while developing no domestic capability.

For space agencies and national operators

Publish an underwriting-grade failure summary even where the full investigation is withheld. Release non-sensitive reliability data to a supervised actuarial group: agencies hold the only substantial reliability datasets in existence, and an underwriter pricing from the global record and loading for uncertainty produces exactly the rates operators call prohibitive. Publish fragment count and orbital regime within ninety days of any fragmentation event.

For insurers, reinsurers and brokers

Build products for the exposure that exists rather than the one that used to: demand in emerging space economies is concentrated in sub-$5 million payloads on rideshare manifests, while the product set is built for geostationary assets. Develop parametric triggers for the perils that cannot be proved — a structure that pays on a measured index rather than on established causation is the only mechanism that functions when causation cannot be established, which is the condition this book documents for space weather, for debris impact, and for every fragmentation event in the window.

For operators and investors

Instrument for evidence, not only for operations: telemetry channel coverage, retention policy and time synchronisation determine whether a loss can ever be proved, and must be designed in before launch. Make the self-insurance decision explicitly, at board level, and record it. Investors should ask for the insurance position in diligence — the risk-transfer gap is currently carried by equity holders who have largely not been shown it.

For the sector collectively

Adopt a minimum disclosure standard: failure mode within thirty days; failure mechanism and causal determination when reached, with the level stated; an explicit statement where an initiating cause has not been established; fragment count and orbital regime within ninety days for fragmentation events. Every element was met by at least one operator somewhere in this window; no operator met all of them. And establish a body capable of producing an independent cause determination for an in-orbit loss. One such determination, anywhere, by anyone, would move the global position off its floor for the first time.

AUTHORSHIP, INTEREST AND INDEPENDENCE

The author founded and leads OrbiX Global, a space risk intelligence company in Chennai, and writes here in a personal capacity. The volume is self-published and was not commissioned, funded or reviewed by any insurer, operator, agency or association; a full statement of interest appears in its front matter. The foreword was contributed by the Director General of the Indian Space Association. The findings, the scorecard and the recommendations are the author's alone.

THE FULL VOLUME

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