

Satellite Self-Broadcasting (SS-B)

From space congestion to space governance

SS-B will close the gap between filings and in-orbit reality — every satellite identifies itself in orbit

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AGENDA

Four Chapters, One Question

"How do we bring order to the orbit?"

01

The Situation

Congestion is a fact

In this chapter

- Congestion today
- One filing, many satellites
- ITU's toolbox and its gaps

02

Successful Case

Experience from ADS-B

In this chapter

- The ADS-B formula
- One unique ID per aircraft
- Every dot becomes a who

03

The SS-B Solution

Spectrum
Unique Identifier
Broadcasting

In this chapter

- Principles and data fields
- Who takes part
- SSA + SS-B: complete awareness
- Legal basis

04

The Path to Action

Spectrum, an identifier,
and one ITU window

In this chapter

- Two levers, one window
- Three things to remember

01

THE SITUATION

Congestion is a fact.

For NGSO satellites, the gap between filings and in-orbit reality is widening.

01 • THE PROBLEM

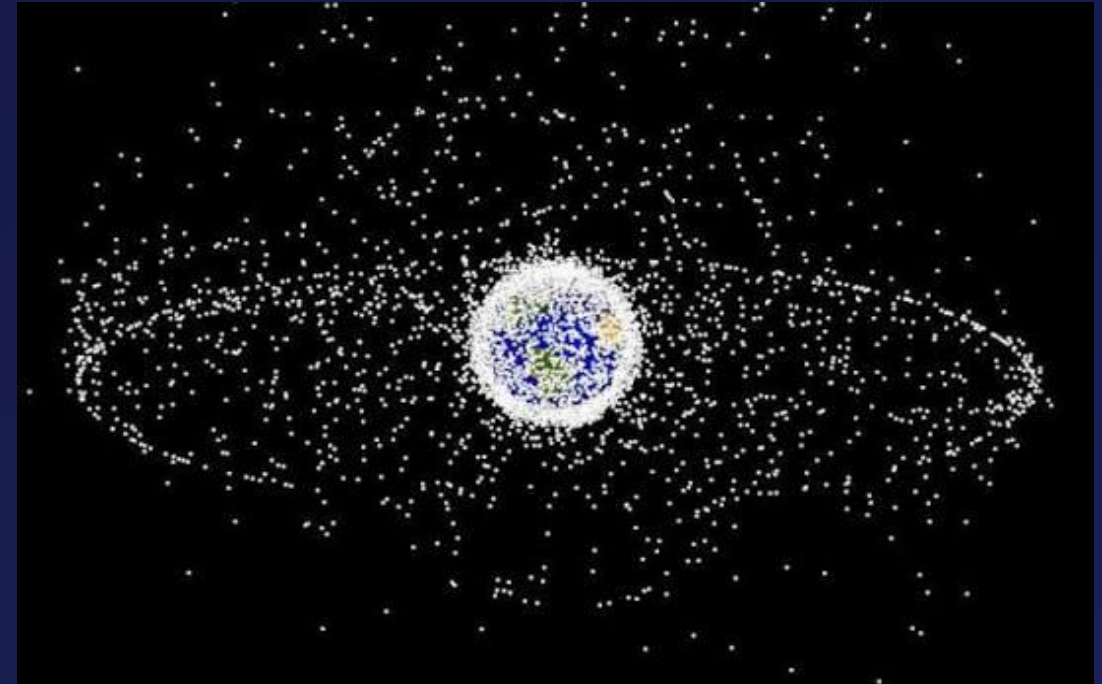
Congestion Is a Fact — and the Numbers Keep Rising

Congestion Is a Fact

16,700active satellites,
Oct 2026**68,450**objects > 10 cm
· 1.5 M > 1 cm

~**10** new satellites a day; only ~3 objects return
~**36 s** a pair comes within 1 km, anywhere in LEO
~**47,000** objects tracked, ~**11,000** unidentified

Yet coordination still runs by email
— often **weeks or months** per case.



Tens of thousands of tracked objects surround the Earth

Sources: ESA Space Debris User Portal (SDUP), updated 09 Oct 2026 — 47,010 objects tracked, 10,997 unidentified; ESA MASTER-8 model (ref. population 02/2026)

01 • THE PROBLEM

From GEO to NGSO — One Filing Now Covers Thousands of Satellites

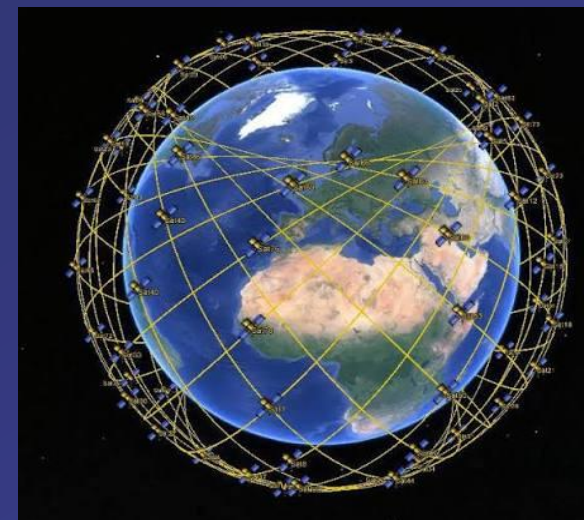
For NGSO satellites, the ITU registry — the MIFR — **no longer matches what is really in orbit.**

GEO • STATIONARY, ONE-TO-ONE



- 1 filing $\approx$ **1 satellite**
- One orbital slot is identified by a longitude
- Old abuse: **"paper satellites"**
- **Stationary** relative to the Earth

NGSO • DYNAMIC, ONE-TO-MANY



- 1 filing = **thousands of satellites**
- One satellite can activate a whole filing
- New abuse: **"ghost satellites"**
- Many altitudes, inclinations, planes — **always moving**

01 • THE PROBLEM

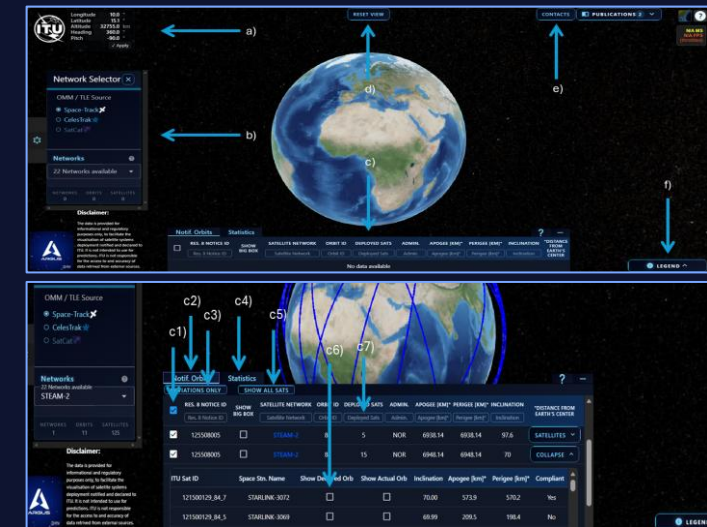
ITU's Toolbox Is Growing — Yet Gaps Remain

Under PP Res. 219 and ITU-R Res. 74, the Bureau is moving from static filings toward deployment visibility.

ALREADY IN PLACE — the ITU space-sustainability toolkit

- 1 **ARGUS**
NGSO deployment & orbital-tolerance view (WRC-23 Res. 8): notified vs. declared vs. actual orbits;
- 2 **Contact directory & CA/272**
Who to call for operations and harmful interference; post-mission disposal strategies collected (Circular CA/272).
- 3 **Space Explorer + MIFR**
Filings, frequency assignments and milestone status online; ARGUS links directly to them.
- 4 **Space Sustainability Gateway**
One portal for contacts, policies, radio monitoring and resources (PP-219 / ITU-R 74).
- 5 **Studies & dialogue**
SG4 handbook and end-of-life recommendation; the Space Sustainability Forum — this 3rd edition, Riyadh.

ARGUS • NGSO DEPLOYMENT VISUALIZATION



Notified · declared · actual orbits, with operator contacts and MIFR milestone links

Existing tools still cannot establish a correspondence between filings and the satellites actually in orbit.

For moving objects, “If we cannot measure it, we cannot manage it.”

02

SUCCESSFUL CASE

Experience from Aviation: ADS-B

Aircraft "announce themselves" — from being watched to self-announcing.

02 • SUCCESSFUL CASE

How Aviation Solved It — Every Aircraft Broadcasts Its Identity

The ADS-B success formula

- ✓ **GNSS position** — the location source
- ✓ **1090 / 978 MHz** — protected spectrum
- ✓ **DO-260B** — a common standard
- ✓ **ICAO 24-bit address** — globally unique identity



A long Road to a global standard

At peak, over **24,000 aircraft** are airborne at once — every one broadcasting its identity.

- Open global commons — receivable by every state
- One short message per second — interrogation-free
- **Minimum necessary data** — identity, position, velocity, callsign, heading

02 • SUCCESSFUL CASE

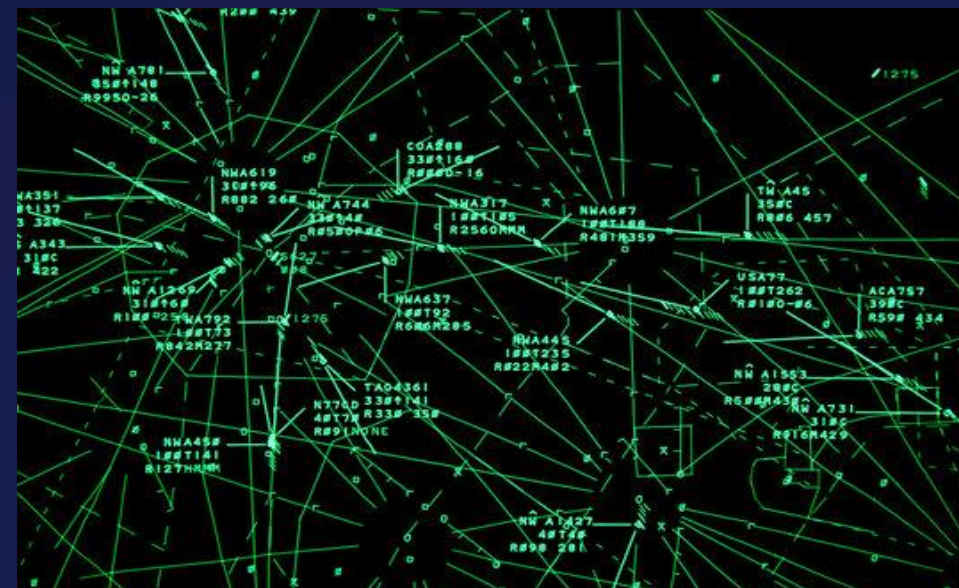
What makes a dot a "who"? — A globally unique, machine-readable identifier

Every aircraft carries one ICAO 24-bit address

- Globally unique, assigned once for its entire life.
- No duplicates, no ambiguity — anywhere on Earth.
- Machine-readable, instantly resolvable identifier

The address space — 16.8 million addresses

- Allocated by ICAO; assigned by each State.
- No address is ever shared between aircraft.
- Carried in every Mode S and ADS-B message.



A live en-route ATC display: every moving dot resolves to a flight ID, aircraft type and route — in real time.

02 • SUCCESSFUL CASE

ADS-B and SS-B — Space Is Not a Copy of Aviation

Aspect	Aviation — ADS-B	Space — SS-B
THE LINK	Short hops to a dense ground network.	Hundreds to thousands of km from the ground; no receivers over oceans or poles.
GEOMETRY & DYNAMICS	Corridors and flight levels at ~900 km/h; separated by air traffic control.	3-D orbits at ~28,000 km/h; no real-time separation service.
SCALE & ENERGY	Continuous broadcast, about once a second.	Tens of thousands of objects; power-limited, so broadcast on demand.
IDENTITY & REGISTRY	One ICAO 24-bit address; one State of registry.	One filing covers many satellites; ITU assigns pre-launch, UNOOSA registers post-launch.

KEY TAKEAWAY: Space is not a copy of aviation — keep the principle, redesign the link.

03 THE SS-B SOLUTION

Learn from ADS-B — Adapted for Space

Aircraft can announce themselves — why not satellites?

03 • THE SS-B SOLUTION

What Is SS-B — Four Principles and Data Fields

SS-B is a voluntary satellite identification broadcast for interference tracing and collision avoidance.

All these must be further studied and refined, with the active involvement of ITU, UNOOSA, Member States and Satellite Operators.

Voluntary

- Optional by design
- Low barrier to adoption

Triggered on-demand

- Broadcasts only when needed, such as first power-on, interference tracing or collision avoidance.
- no continuous transmission

Minimum Information

- A globally unique identifier
- Other data required for coordination

Fast Coordination

- Frequency coordination
- Orbital coordination
- Turn coordination into prompt action

Necessary Core field

Unique Identifier (like ICAO address)

Supplementary fields

Position (On-demand)

Operational status (optional)

Manoeuvre capability (optional)

Manoeuvre vector (optional)

Others...

03 • THE SS-B SOLUTION

Who Participates and Who Is Exempt?

Scope of SS-B — Who Needs to Speak

- ✓ **Core:** large civil constellations, OOS/ADR vehicles
- ! **Recommended:** upper stages, microsats, CubeSats, etc.
- ? **To study:** deorbit sails, suborbital objects, etc.
- × **Not applicable:** debris

Over 80% of active satellites are civil or commercial — and they account for most collision-avoidance manoeuvres. Covering them would solve most of the safety problem.

Security Exceptions — Who May Remain Silent

Under **RR No. 19.28:**
National-defence stations — each State decides.

Three Ways to Respond to SS-B — and Benefit from It

- Full silence** Transmit nothing in sensitive missions
- One-way reception** Receive civil broadcasts; self-avoidance
- Selective response** Transmit only on conjunction risk

Sources: ESA, Report on the Space Economy 2026 — commercial entities own 84% of active satellites.

03 • THE SS-B SOLUTION

SSA Tracks the Objects — but Their Identity Remains Unknown



space radar



optical telescopes

Ground-based Space Situational Awareness (SSA)

- Detects **where** an object is — but **not who** it is
- Blind zones over oceans and polar regions
- Costly and only affordable by a few countries
- Not in real time



SSA sees only a dot — it may assume, but cannot verify it.



**Cannot
identify**

Space objects cannot recognize each other



**Cannot hold
accountable**

Liability cannot be assigned



**Cannot
trust**

Regulations cannot be effectively implemented

KEY TAKEAWAY: Identity is **not "observed"** — it is **"announced"**. Confirmed identity is the premise of liability and trust.

03 • THE SS-B SOLUTION

SSA + SS-B = Complete Awareness

SSA gives the "where"
SSA keeps SS-B honest

SS-B gives the "who"
SS-B makes SSA actionable

SSA — Space Situational Awareness

SS-B — Satellite Self-Broadcasting

Answers

Where is it? Detects and tracks objects

Who is it? The satellite announces itself

How it works

Telescope & radar networks, run by specialists

Open radio standard — receivable by anyone

Cost & access

Expensive — only a few states can afford it

Cheap and open to every state and operator

Blind spot

Cannot identify what it detects

Voluntary — only cooperating satellites report

03 • THE SS-B SOLUTION

Existing Identifications — Why None Works for SS-B

Existing identifications were adequate for an earlier era of space — not for the crowded, fast-moving orbits of today.

Capability	UN Register	COSPAR designation	US 18 SDS (Space-Track)	SS-B (proposed)
Maintained by	UNOOSA	COSPAR / NSSDC	US Space Force (18 SDS)	ITU and UNOOSA
Core purpose	Object registration	Launch-based designation	Public catalogue and SSA	Spectrum and orbital resources
Broadcast in real time	No	No	No	Yes
Machine-readable	Partial	Yes — static ID	Yes — TLE	Yes, by design
Linked to the MIFR	No	No	No	Yes
Carries manoeuvre intent	No	No	No	Yes

03 • THE SS-B SOLUTION

Legal Basis — SS-B Under Existing ITU Instruments

CONSTITUTION • ART. 1

The purposes of the Union include recording frequency assignments and... or of any associated characteristics of satellites in other orbits, in order to avoid harmful interference(Nos. 1.11, 1.12).

RADIO REGULATIONS ART. 19

.....provide that all transmissions shall be capable of being identified either by identification signals or by other means, that transmissions with false or misleading identification are prohibited, ...(Nos. 19.1, 19.2).

PP-22 • RES. 186/21/219

On sustainability of the radio-frequency spectrum and associated satellite-orbit resources used by space services. on strengthening the role of ITU with regard to transparency and confidence-building measures in outer space activities.

WRC-23 • RES. 8

Defines orbital tolerances for non-GSO systems; its instructs 3 requires the Bureau to link each satellite to its network, including a naming convention.

KEY TAKEAWAY: No new rights, no new obligations within existing regulations.

03 • THE SS-B SOLUTION

Four Assurances — What SS-B Does Not Change

VOLUNTARY

Participation is at the discretion of the administration concerned or satellite operators. No obligation is created.

SUPPLEMENTARY

Complementary to existing registries — it replaces neither the Master International Frequency Register nor the UN Register of Objects Launched into Outer Space.

POWER-NEUTRAL

No new mandate and no new functions for the Union — existing ITU procedures apply unchanged.

RIGHTS-PRESERVING

Without prejudice to the rights and the priority of any satellite network filing; it does not alter the status of any frequency assignment.

04 THE PATH TO ACTION

Spectrum and Identity Can Move First

Two levers — building under existing ITU instruments:
usage rules for SS-B within existing allocations and one globally unique identifier per satellite

04 • THE PATH TO ACTION

Two Levers, One ITU Window

LEVER 1 • Spectrum & usage rules

137–138 MHz is a candidate band — already allocated to the space operation service. Additional candidate bands can be proposed.

LEVER 2 • Global unique identifier

A machine-readable identifier for each satellite — ITU-defined, registered in the Master International Frequency Register (MIFR).

★ KEY POINT • DECISIVE GATE

NOW • 2026

2027 • WRC-27

2027–2031

≈ 2031 • WRC-31

The clock starts

Build support for SS-B

WRC-27

Add SS-B under
Agenda Item 10

Technical studies

Study spectrum regulation
and identity specifications

Decision-making

Allocation decision,
followed by
industry deployment

KEY TAKEAWAY: The first key time is at **WRC-27**. Take SS-B forward — **starting now**.

04 • THE PATH TO ACTION

If You Remember Only Three Things

01

WHERE → WHO

SSA already shows **where** objects are.

SS-B adds **who** it is — a live identity on top of tracking.

02

WHO I AM

Each satellite **broadcasts one unique, defined identity**.

Minimal, on-demand and voluntary — the ADS-B idea, adapted for space.

03

WRC-27 • AI 10

Put SS-B on the **WRC-31** agenda — at WRC-27, under Agenda Item 10.

Miss this cycle and the decision slips by **four years**.

REMINDER: The SS-B decision could come as early as **2031** — or slip to **2035**.

5 to 10 years from now, **orbits will only become more crowded** — SS-B must be taken forward now.

Satellite Self-Broadcasting (SS-B)

Making Every Orbital Encounter a Known Pass!



THANK YOU

Voluntary

Supplementary

Power-neutral

Rights-preserving

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