



POLITECNICO
MILANO 1863

DIPARTIMENTO DI SCIENZE
E TECNOLOGIE AEROSPAZIALI

FROM CHICAGO TO ORBIT: CAN SPACE LEARN TO FLY TOGETHER?

The 1944 Chicago Convention and the Future Governance of Outer Space

*80 years ago nations understood that the skies could not remain ungoverned.
Today the same realization is emerging beyond Earth*

05.06.2026 - Giuseppe Sala



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FROM CHICAGO TO ORBIT: CAN SPACE LEARN TO FLY TOGETHER?

*The 1944 Chicago
Convention and
the Future
Governance of
Outer Space*

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Where we come from

01

Introduction

- In 1944, nations created a framework to govern civil aviation.
- In 2026, humanity faces a similar challenge in outer Space.
- The governance of outer Space is entering a decisive phase.
- What happens when orbit becomes overcrowded?
- Who writes the rules for the Moon, Mars, and beyond?
- History offers a powerful precedent: the Chicago Convention of 1944.
- Can the lessons of Chicago help prevent chaos in orbit?

The historical context

- In December 1944 World War II was still ongoing.
- Air transport was becoming strategic for economics and security.
- Countries recognized the need for common rules before post-war expansion.



Military aircraft converted for commercial transport



Early post-war civilian flights operated with converted military aircraft

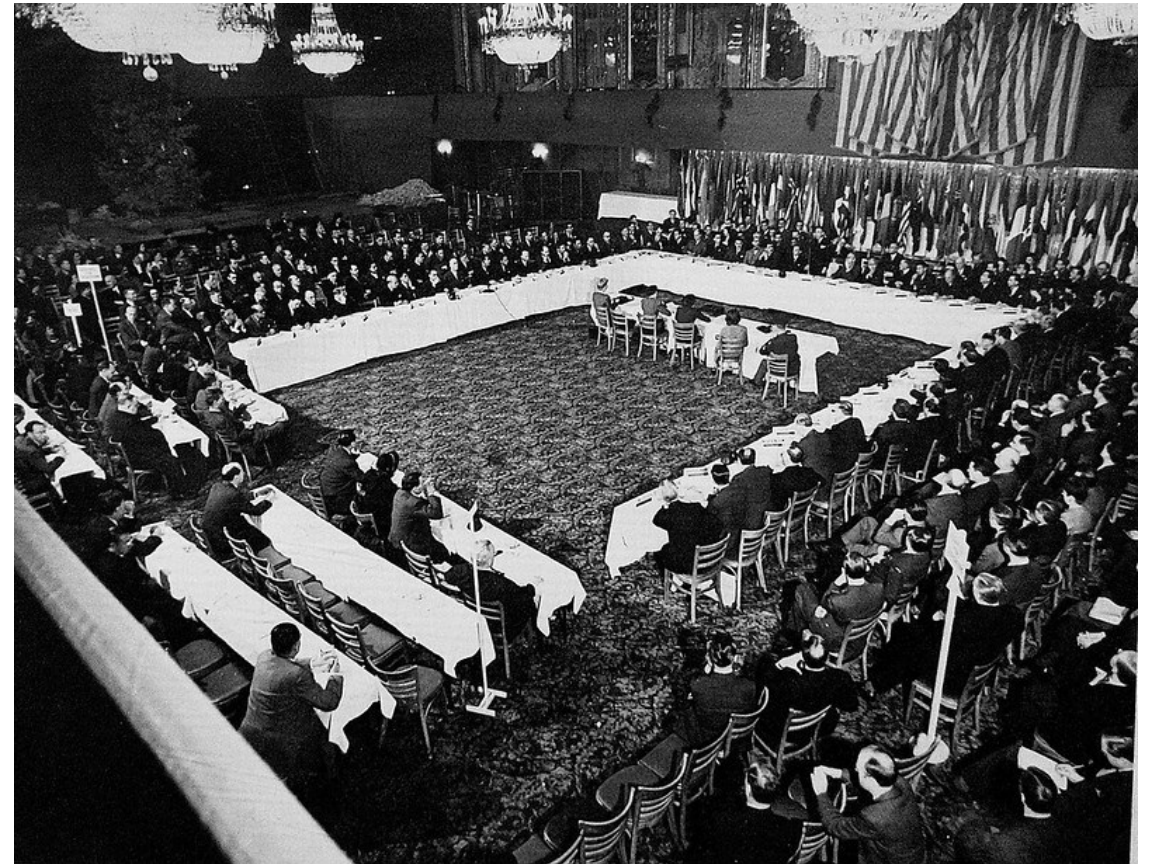
The Chicago Convention I

- Signed on December 7th 1944 by 52 States*.
- Established principles for international civil aviation.
- Created the framework for global civil aviation.
- Established International Civil Aviation Organization (ICAO) and common standards.

* to the exception of Axis Powers, USSR, PRC

Core principles:

- Safety, technical standardization and interoperability.
 - State sovereignty over national airspace.
 - International cooperation instead of fragmentation.
 - Peaceful development of global connectivity.
-
- The world organized the skies before chaos emerged.
 - The Chicago Convention created order from competition.



The grand ballroom of Stevens Hotel, where the Convention took place

The Chicago Convention II

CONVENTION ON INTERNATIONAL CIVIL AVIATION

PREAMBLE

WHEREAS the future development of international civil aviation can greatly help to create and preserve friendship and understanding among the nations and peoples of the world, yet its abuse can become a threat to the general security; and

WHEREAS it is desirable to avoid friction and to promote that cooperation between nations and peoples upon which the peace of the world depends;

THEREFORE, the undersigned governments having agreed on certain principles and arrangements in order that international civil aviation may be developed in a safe and orderly manner and that international air transport services may be established on the basis of equality of opportunity and operated soundly and economically;

Have accordingly concluded this Convention to that end.

Preamble to 1944 Chicago Convention on International Civil Aviation



December 7th, 1944: the signing

The role of ICAO

- Neutral technical coordination.
- Shared safety procedures and standards.
- Mechanisms for dispute resolution.*
- Continuous adaptation to innovation.

*

FOR PANAMA:

The Delegation of the Republic of Panama signs this Convention ad referendum, and subject to the following reservations:

1. Because of its strategic position and responsibility in the protection of the means of communication in its territory, which are of the utmost importance to world trade, and vital to the defense of the Western Hemisphere, the Republic of Panama reserves the right to take, with respect to all flights through the air space above its territory, all measures which in its judgment may be proper for its own security or the protection of said means of communication.

2. The Republic of Panama understands that the technical annexes to which reference is made in the Convention constitute recommendations only, and not binding obligations.

Signature conditional upon the presence of critical geographical zones

ICAO headquarter, Montreal





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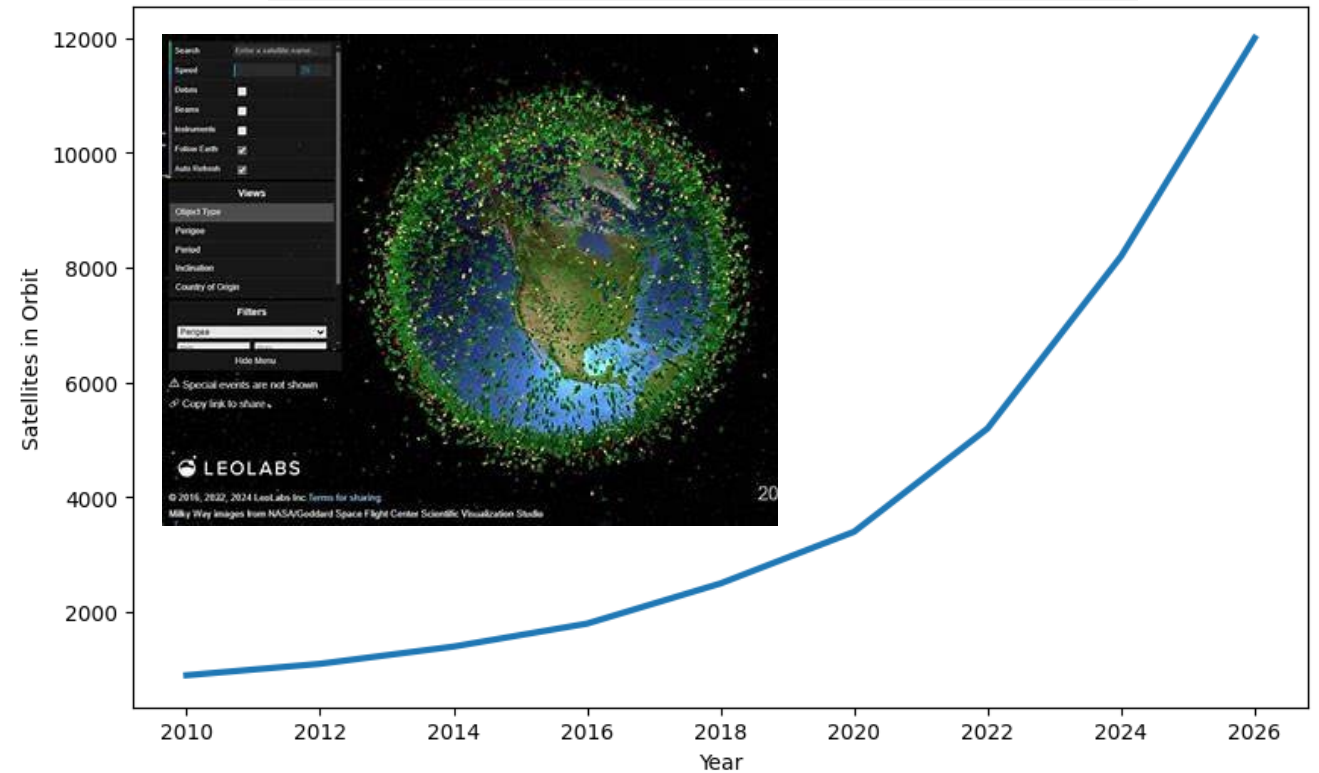
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Where we are

02

The new Space Era (I)

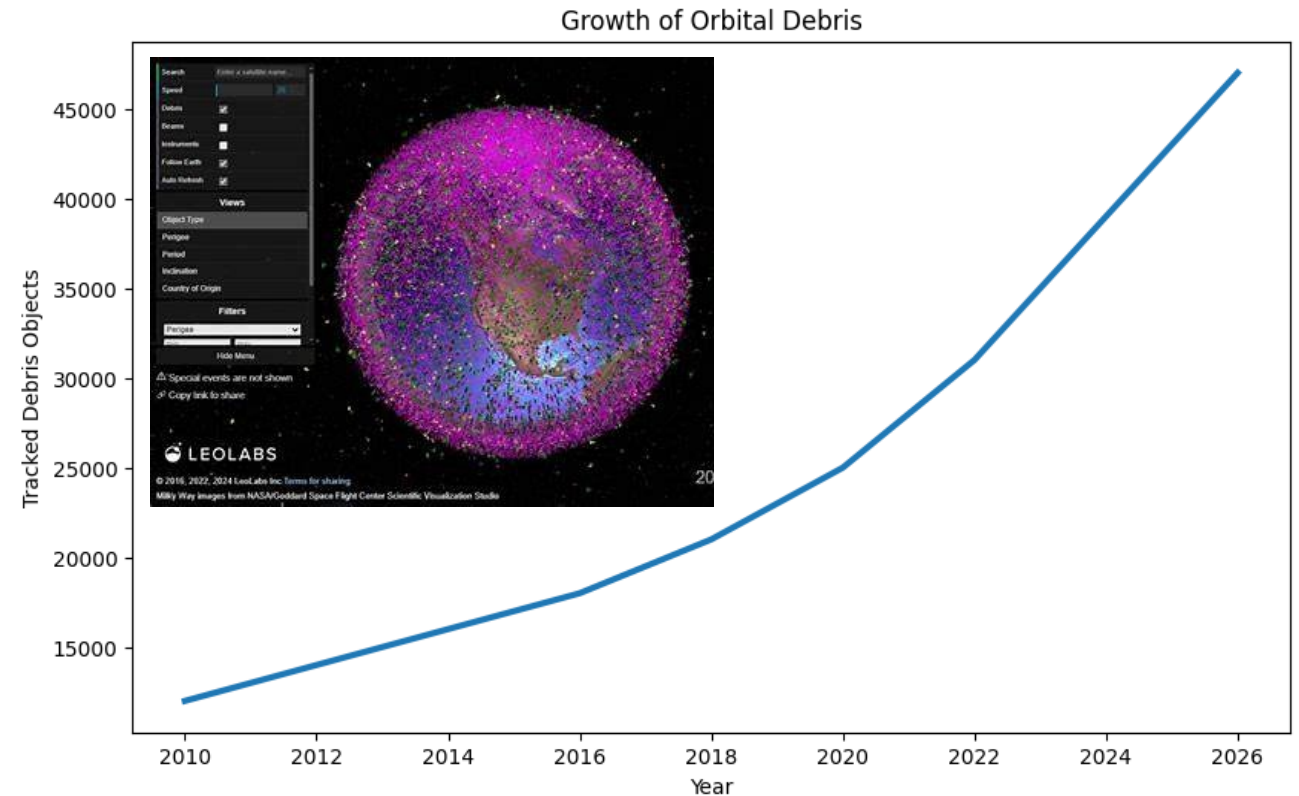
- **Rapid commercialization: private companies launch more satellites than nations.**
- **Mega-constellations and orbital congestion.**
- **Military/dual-use technologies increasing: strategic competition among powers.**
- **Orbital traffic is exploding.**



Growth of active satellites in Low Earth Orbit [credits: LEOLABS]

The new Space Era (II)

- Growing risks from debris and spectrum conflicts.
- Space is now a strategic infrastructure.
- Navigation, communications, intelligence, defense.
- Competition is accelerating faster than governance



Growth of orbital debris [credits: LEOLABS]

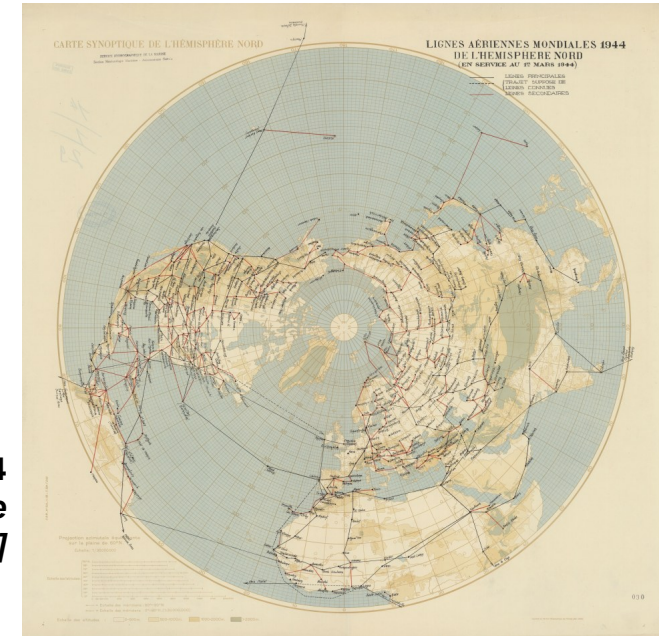
Why Aviation and Space are different

- Both domains are inherently international.
- Both require safety standards and interoperability.
- Both involve strategic, commercial and political interests.
- Both depend on trust and transparency.

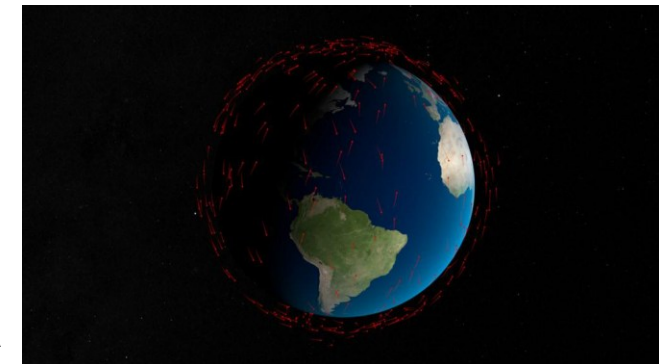
but:

- No territorial sovereignty in outer Space.
- Technology evolves faster than regulation.
- Private companies play a larger role than in 1944 aviation.
- Space has stronger military implications.

Civil Aviation routes in 1944
[Carte synoptique de
l'emisphere Nord]



Satellites orbits in 2024
Credits: NASA



Space Traffic Management

- Space debris collisions.
- Spectrum conflicts.
- Dual-use and military escalation
- Lack of transparency

Global Space Traffic Management Market

Report Segmentation

Regional Outlook

- North America
- Europe
- Asia-Pacific
- South America
- Middle East & Africa

End Use Outlook

- Civil and Government
- Commercial
- Military

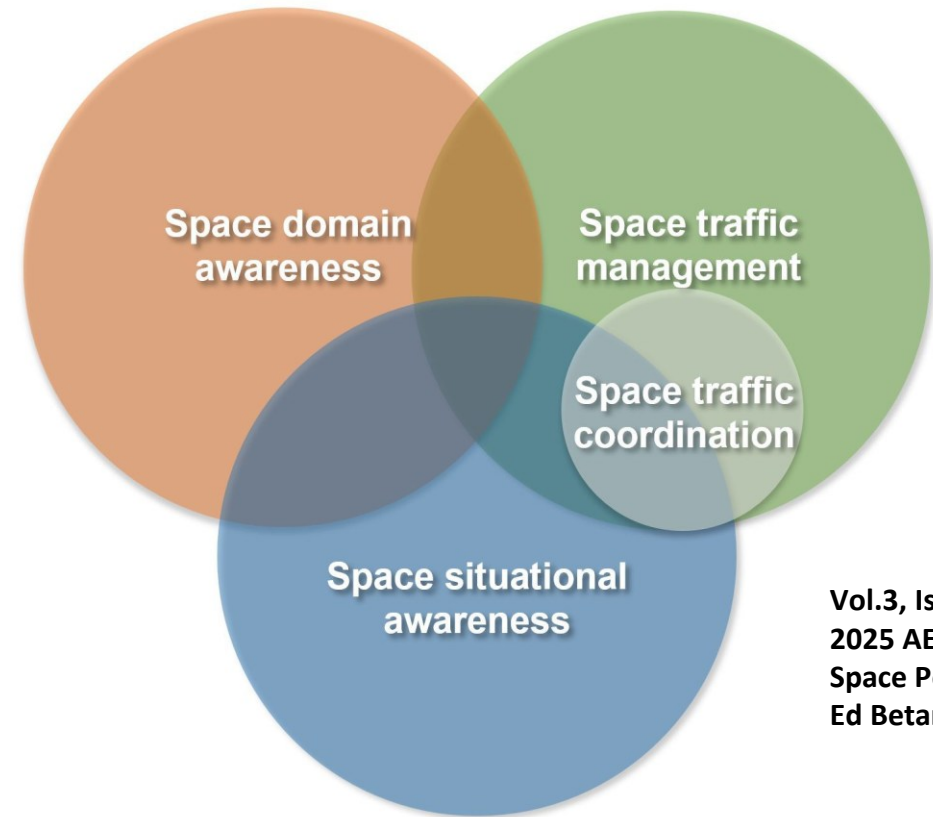


Orbit Outlook

- LEO
- MEO and Elliptical
- GEO

Application Outlook

- Communication
- Earth Observation
- Navigation
- Global Positioning System and Surveillance
- Technology Development and Education
- Others



Vol.3, Issue 1,
2025 AEST
Space Power
Ed Betar

Space Traffic Management:
Size, Share, Forecast 2029
[credits: techsciresearch.com]

Governance challenges

- **The 1967 Outer Space Treaty remains foundational.**
- **Navigation, communications, intelligence, defense.**
- **Governance is fragmented among national agencies and international bodies.**
- **Competition is accelerating faster than governance.**
- **No equivalent of ICAO exists for operational coordination**

AVIATION (1944)	SPACE (2026)
ICAO	No equivalent authority
Air traffic control	Fragmented STM
Sovereign airspace	Non-sovereign space
Shared standards	Emerging norms
Mature governance	Governance gap

Aviation vs. Space governance



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What has been done

03

EU Space Act

In June 2025 EU Space Act was introduced to harmonize fragmented national regulations governing space activities across Europe. Three main pillars:

Safety

- **Space Traffic Management (STM)**
- **Collision avoidance**
- **Space debris mitigation**

Resilience

- **Cybersecurity**
- **Protection of critical space infrastructure**

Sustainability

- **Long-term orbital sustainability**
- **Environmental responsibility of space activities**

Italian Space Law

In 2025, Italy adopted a comprehensive framework law on the Space Economy, which:

- Establishes authorization procedures for space operators;
- Regulates launch, in-orbit operations, and end-of-life disposal;
- Introduces liability and insurance requirements;
- Recognizes space activities as a strategic national interest.

*Nations are beginning to regulate space activities
in the same way they regulated aviation during '20s and '30s.*

However, there is a fundamental challenge:

- Space is inherently global;
- Satellites do not respect national borders;
- Debris generated by one actor can affect all others.

*For this reason, national legislation alone
cannot provide a complete solution*

EU Space Act & Italian Space Law vs. Chicago Convention

- EU Space Act and Italian Space Law: “pre-Chicago phase” of Space governance.
- International community recognizes the need for common rules.
- Level of institutional development achieved by civil aviation not yet reached.
- A “Space ICAO” has yet to come.

The Chicago Convention: not a mere technical agreement. It marked the moment when:

- States accepted common rules.
- Permanent coordination mechanisms were established.
- An international institution (ICAO) was created.
- A collection of national interests evolved into a global governance system.

EU Space Act and Italian Space Law: important developments demonstrating that:

- The challenge of orbital sustainability is now widely recognized.
- Governance mechanisms are beginning to emerge.
- Europe is positioning itself as a potential regulatory leader in the space sector.

Writing rules vs. building institutions

EU Space Act and Italian Space Law are the equivalent of national aviation laws before 1944, rather than the equivalent of the Chicago Convention.

**Chicago Convention created
*both rules and institution***

**The EU Space Act creates rules,
*but not yet a global ICAO for Space***

CIVIL AVIATION	OUTER SPACE
National aviation laws ('20s-'30s)	National Space laws (today)
Chicago Convention (1944)	?
ICAO	?
Air Traffic Management	Space Traffic Management
Global standards	Emerging standards

CURRENT GOVERNANCE GAP



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What has not yet been done

04

Lessons from Chicago Convention

- **Global systems require global rules.**
- **Standards reduce instability.**
- **Institutions create trust.**
- **Rules must arrive before crisis.**
- **Technical cooperation can reduce political tensions.**
- **Governance enables growth.**

A future Space governance system

- A global coordination framework for traffic management.
- Shared debris mitigation standards.
- Rules for responsible behavior in orbit.
- Mechanisms for transparency and crisis prevention.

ICAO for Space?

- Global orbital coordination center.
- Common rules for autonomous spacecraft.
- Emergency protocols in orbit.
- Shared responsibility for sustainability.

Conclusion

History suggests regulation works best before systems become unmanageable.

The Chicago Convention:

- **transformed aviation governance.**
- **transformed competition into cooperation.**

Space governance:

- **now faces a comparable historical moment.**
- **may require a similar institutional leap.**

In 1944, the world organized the skies. Today, we must decide whether humanity can organize Space. The challenge is not only technological: it is political and institutional.



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The question is no longer whether Space will become central to human civilization. The question is whether governance will evolve quickly enough to preserve stability before competition becomes irreversible

THANK YOU FOR YOUR ATTENTION