

# Legal and regulatory issues of suborbital and air launch systems

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**1. Various suborbital uses & purposes**

**2. Legal uncertainty**

**3. Public private initiative to address the challenges**

**4. Legal challenges triggered**



# 1. Various suborbital uses & purposes



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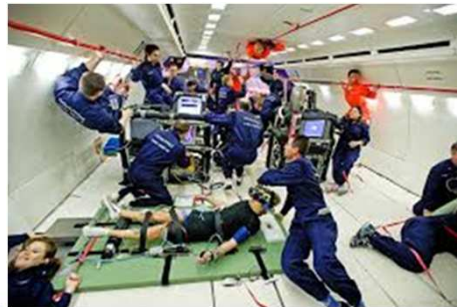
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# Various suborbital uses & purposes

- Suborbital aircraft will potentially offer opportunities and access to 'near space'

- There are various (manned or unmanned) proposed uses, with either suborbital or orbital purposes:

- *Science & Technology (~4 minutes of microgravity at altitudes beyond stratosphere ~ 80 to 120 km)*
- *(manned) Space flight experience for paying passengers*
- *(manned) Suborbital flights for crew training purposes on future orbital missions (stepped 'suborbital-orbital' continuous approach)*
- *(orbital purpose) Launch-to-Orbit (LtO) of small satellites*



## Suborbital operations potential uses

### Suborbital purposes

Science and Technology  
(~4 minutes of microgravity at 80 to 120 km altitude AGL)

(Manned)  
- Space flight experience (paying passengers)  
- Astronaut training

### Orbital purpose

Launch to (LEO)  
Orbit of small satellites



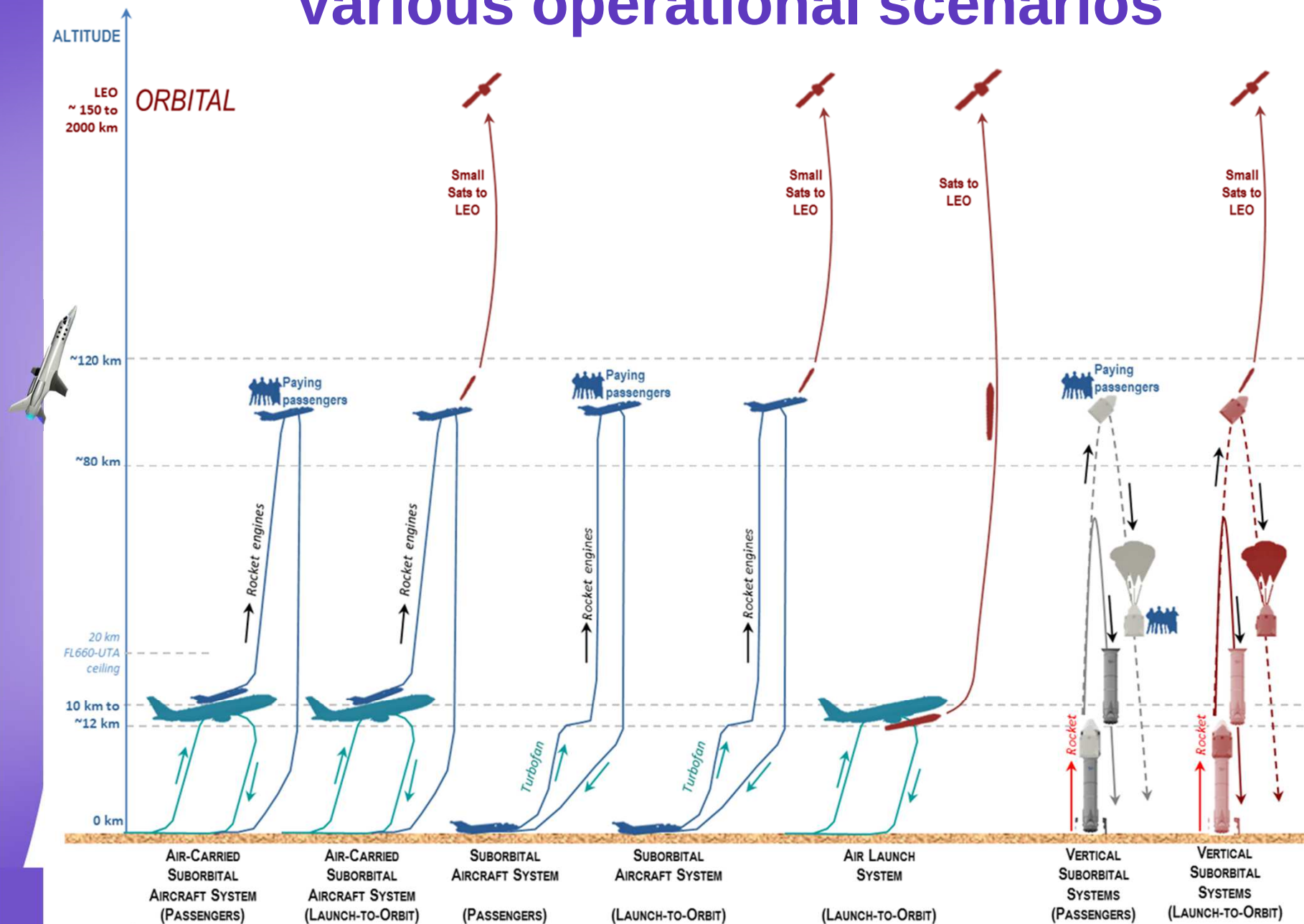
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# Various operational scenarios





## 2. Legal uncertainty

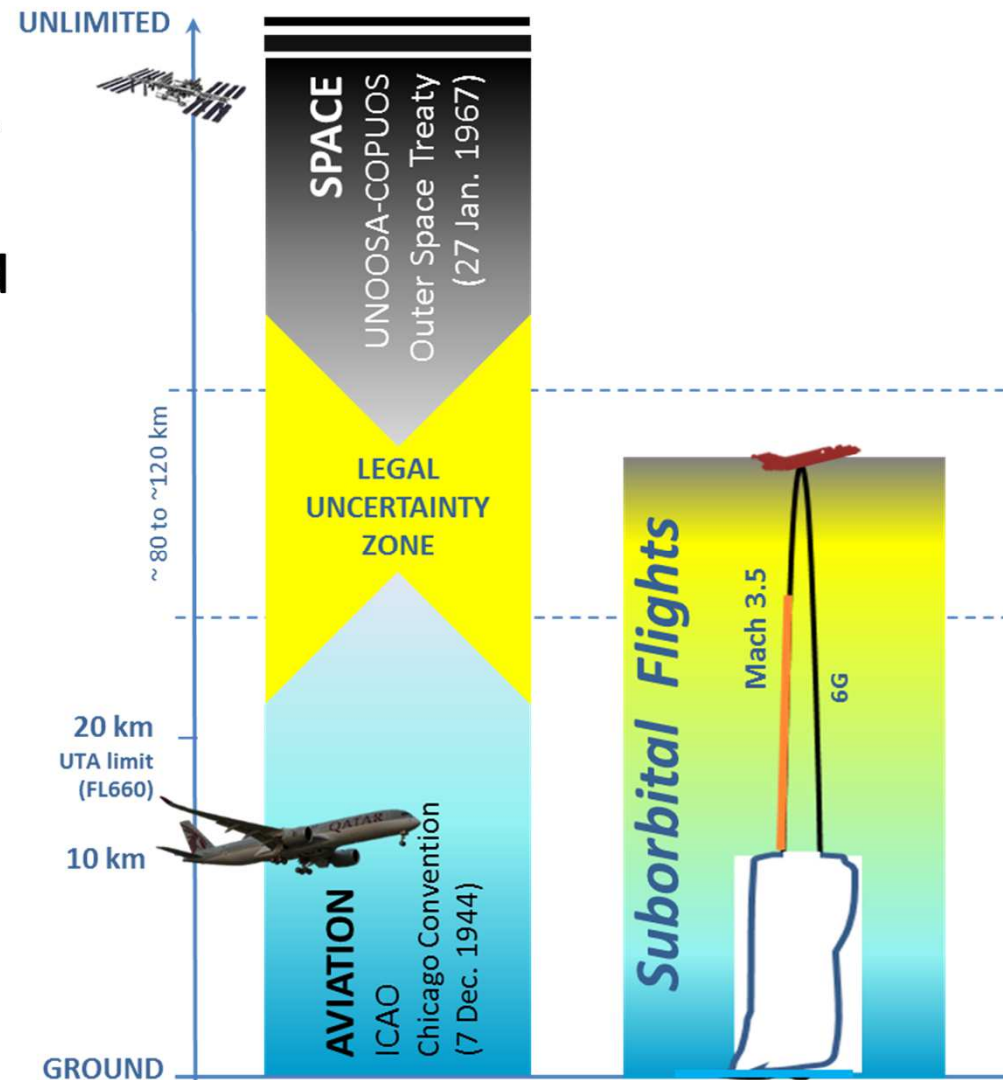


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# Legal uncertainty (1/3)

- Nowadays, there is a gray zone where either **aviation law** or **space law**, or even both could be applicable
- **Concurrent legal frameworks** could be applicable
- Should a **hybrid statutory scheme** be applicable or a *sui generis* one be created?



## Legal uncertainty (2/3)



Suborbital and air-launch operations could be considered either as 'aviation', 'aviation and space' and/or 'space' activities, depending on the system's architecture and the operation's final purpose (*'functionalist' approach*)

Today, there is **no clear indication** in International Law on

- The delimitation between 'Airspace' and 'Outer space'
- The applicability of either 'aviation law' and/or 'space law' to suborbital and air-launch operations



# Legal uncertainty (3/3)



Various stakeholders at different levels are studying the legal implications of suborbital and air-launch operations

- ICAO and UNOOSA/COPUOS started working together on the subject in the past few years
- The French WG on SoA (suborbital and air-launch systems) currently considers that it would be appropriate
  - to rather apply a set of rules inspired by 'aviation law' to manned suborbital aircraft and air launch systems operations (excluding the orbital satellite launching phases)
  - while the application of 'space law' to the satellite launching phase from a suborbital or air launch system seems more appropriate



# 3. Public private initiative to address the challenges



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# A public-private initiative in France on Air-launch & suborbital aircraft systems

- WG created in 2015, co-chaired by DGAC and COSPACE, the French government-industry coordination committee on Space
- It gathers all the relevant private and public stakeholders:
  - ✓ *Ministries (x 5), incl. Min. in charge of Transport (DGAC), Economy, Space, Defense and Foreign Affairs*
  - ✓ *CNES, the 'French Space Agency'*
  - ✓ *Industry and research organisations*
  - ✓ *ONERA, the 'French Aerospace Lab'*
  - ✓ *Academia / universities & external experts as required...*
- Periodic plenary meetings + *ad hoc* sub-groups + Workshops or meetings with European & International counterparts
- The group works on all aspects: *potential regulatory & legal frameworks, safety, airworthiness & operation regulations, security, liability, insurance, environmental & spaceports issues, export control regulations...*



# 4. Legal challenges triggered



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# Legal Challenges triggered (1/3)

Regulators face the same thorny issues

- **Aviation law and / or space law?**
- **Which Scope? What machines / systems are we talking about?**
- **Who should regulate? On what? (ICAO, UNOOSA, EU, States, space or aviation authorities?)**



# Legal Challenges triggered (2/3)

Regulators face the same thorny issues



## ➤ Safety issues ?

- Ensuring **acceptable levels of safety** for
  - the **suborbital and air launch systems' craft** → license or certification?
  - **potential participants / occupants** onboard? (Pilot, paying passengers, researchers)  
**“~1 fatal accident / 100 flights ( $10^{-2}$ )” is not acceptable for manned operations**  
→ **Commercial manned suborbital vehicles need to be airworthy and safe (ALOS comparable to those observed in general aviation could be envisaged)**
- **Zeroing** the risks or damage caused to:
  - **Participants onboard**
  - **Other Airspace users**
  - **Third parties and uninvolved public**
- **ATM / future STM: limiting the impact on the aviation system** and avoiding air traffic disruptions (due to launches & re-entries)? (*Segregated areas for launches & re-entries*)
- Application of **safety management regulations**



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# Legal Challenges triggered (3/3)

Regulators face the same thorny issues

- **Export control issues** : MTCR, Wassenaar Arr., CIEEMG, ITAR/USML issues...?
- **Liability** and **insurance** issues? Possibility
  - to foresee an **Informed Consent?** **Enforceability wrt ECHR issues & national & EU constitutional law / fundamental rights**
  - to foresee **cross waivers?** **constitutional law / fundamental rights**
  - for a **State to guarantee the operation** up to a certain amount?  
**wrt State aid's regulation**
- **Space & suborbital ports** issues?
  - Licensing?
  - Mutual recognition of licenses?
  - How to deal with the increased exposure to potentially dangerous rocket propellant?
- **Environmental** issues? (craft, suborbital port, impact studies...)



# Thank you



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