Toulouse Space Show'12

Space & Law programme

Imposition of space sustainability guidelines on the commercial space sector

Can national space law offer solutions ?
The French Space Operations Act's contribution

Philippe Clerc - Head of CNES' legal department

Toulouse, Tuesday 26 June 2012

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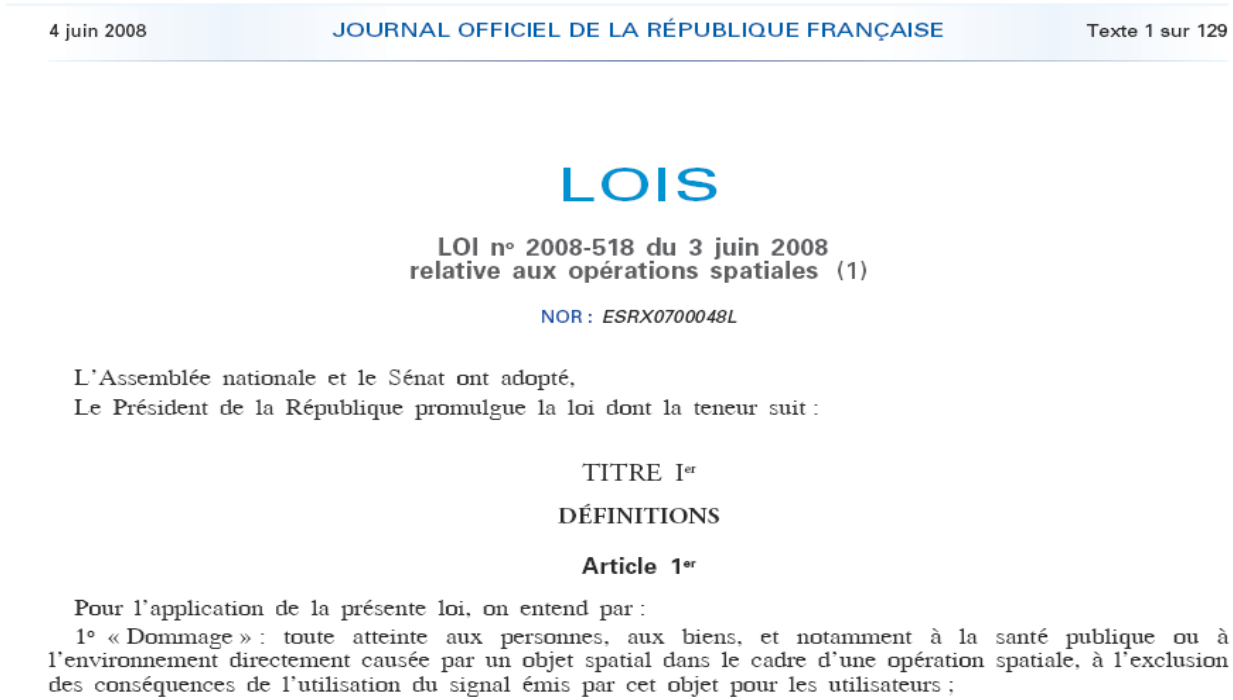

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LOIS

LOI n° 2008-518 du 3 juin 2008
relative aux opérations spatiales (1)

NOR : *ESRX0700048L*

L'Assemblée nationale et le Sénat ont adopté,
Le Président de la République promulgue la loi dont la teneur suit :

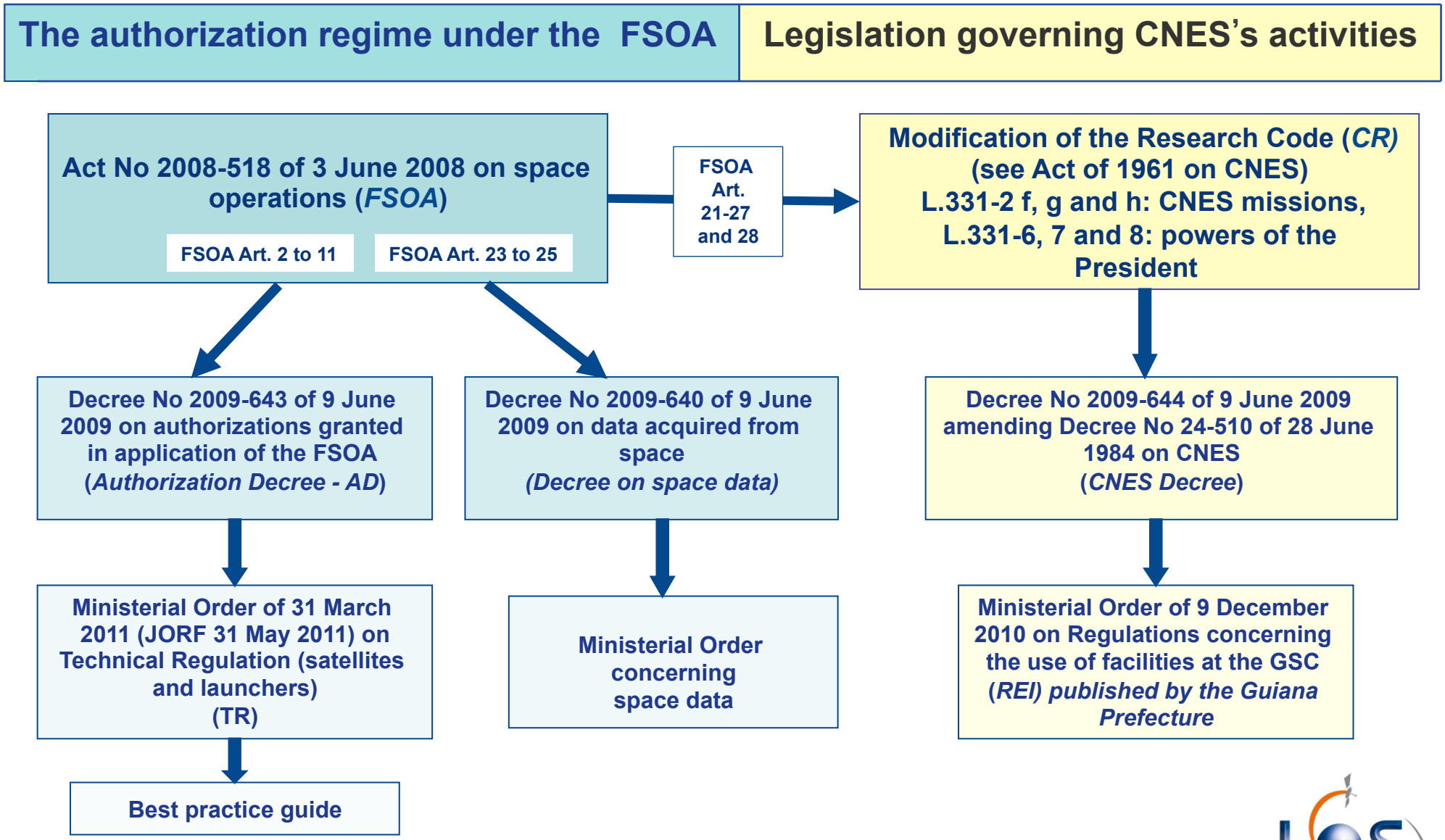
TITRE Ier

DÉFINITIONS

Article 1er

Pour l'application de la présente loi, on entend par :
1° « Dommage » : toute atteinte aux personnes, aux biens, et notamment à la santé publique ou à l'environnement directement causée par un objet spatial dans le cadre d'une opération spatiale, à l'exclusion des conséquences de l'utilisation du signal émis par cet objet pour les utilisateurs ;

Legal arborescence



Content (1/2): Part 1 – General Framework for authorizing and monitoring Space operations

- **What is the purpose of the FSOA?**
- **What are the activities covered by the FSOA?**
- **What are the entities affected by the FSOA?**
- **How does the FSOA work?**
  - Procedure of authorization (or license)
  - Monitoring of Space operations (post- authorization)
  - Sanctions : withdrawal and suspension of authorizations, penal sanctions…
  - Legal security and guarantees offered by the FSOA : liability issues, State guarantees…

FSOA	**=**	**French Space Operations Act**
AD	**=**	**Authorization Decree**
TR	**=**	**Technical Regulation**
GSC	**=**	**Guiana Space Center**

Content (2/2): Part 2 – Specific regimes applicable to:

1) Space-based data systems
2) CNES's operations
3) The exploitation of the Guiana Space Centre (REI- GSC)
4) Governmental space activities
6) Intergovernmental Organizations: ESA and the EU

What is the purpose of the FSOA?

The French Space Operation Act (FSOA) was adopted on **3th June 2008** and entered into force **on 10 December 2010. Its main purposes are to:**

- **set up a coherent national regime to authorize and monitor space operations** under **French jurisdiction** or for which the **French Government bears international liability as a Launching State**, in accordance with UN Treaties principles (Art. 6 and 7 of the Outer Space Treaty, Liability Convention, Registration Convention)

- **reflect international agreements** regularly signed **between France and ESA** since 1975, in particular, those related to the Guiana Space Centre (GSC).

- **implement commitments taken by France** under **the Declaration on the Launchers Exploitation** (an IGA since 1980) to other European States participating to the Ariane, Vega and Soyouz programs.

➡ **Before 2008:** despite a **lack of specific legislation, a legal framework (through dedicated agreements and contracts) did exist to govern** the authorization and monitoring of French space activities as well as liability issues.

What are the activities covered by the FSOA?

Space operations: - launching
- on-orbit command (or transfer of command) and
- return of a space object

- **"Space Operation" =** « any activity consisting in **launching** or attempting to launch an object in Outer space, or in ensuring the **command of a space object during its journey in Outer space** […], as well as **during its return** on Earth ». (FSOA, Art. 1.3)

- The rationale behind the **distinction introduced between the Launching Phase and the Command Phase** is to establish **an apportionment of liability** (towards third parties) between successive operators.

  - Launching Phase **=** the period of time which starts when the **launching operations become irreversible** and which ends when the object to be put in Outer space is **separated from its Launching vehicle.**

  - Command Phase **=** the period of time which starts **when the object to be put in Outer Space is separated from its Launching vehicle** and which ends when the first of the following events occurs:
    - the final maneuvers of de-orbiting and passivation activities have been completed;
    - the operator has lost control over the space object;
    - the return to Earth or the full disintegration of the space object into the atmosphere.

What does not (currently) fall within the scope of the FSOA regime?

- ***Human spaceflights*** *(applicable law = IGA)*
- ***Suborbital flights*** *(applicable law = combination of Air and Space law TBD)*
- ***Command of space interstellar vehicles*** *(probes): because they are not satellites as there is no terrestrial orbit after the launching phase (FSOA, Art. 1-5)*
- ***Sounding rockets*** *and* ***Balloons:*** *do not fall within the scope of the definition of a space operation (Air law applies)*

What are the entities affected by the FSOA?

The authorization regime applies to:

- **Space operators = any entity carrying out**, under its responsibility and in an independent way, **a space operation** (FSOA, Art. 1.4). It means an entity:
  - **having the effective control** of the space object and,
  - **being able to independently make all critical decisions** related to space maneuvers, and in particular « end of life maneuvers ».

- **The competent administrative authority** for authorizing and monitoring space operations = the Minister in charge of Space Affairs (currently the **Minister in charge of Higher Education and Research**) (AD, Art. 1)

- **CNES,** which **proposes the FSOA Technical Regulation** (TR), **monitors its implementation** by operators and **holds the national register** of space objects (FSOA, Art. 28; Art. 3 and f. of the AD; Art. 14 of CNES Decree).

- **President of CNES** who is entrusted with a **mission of "administrative police"** on the Guiana Space Centre (GSC): takes **preventive measures to avoid regulatory infringements** – (FSOA, Art. 21– Art.14-7 to 14-16 of the CNES Decree).

What are the entities not affected by the FSOA (in France)?

- *The Ministry of Defense with regard to ballistic missiles ;*
- *CNES as far as its own operations are concerned (but applies TR though) ;*
- *The Space industry (manufacturers), which are not operators except in case of in-orbit delivery and,*
- *ESA (as an Intergovernmental Organization) but dedicated arrangements will be implemented (see below – slides 16 and 30)*

How does the FSOA work? – Procedure of authorization (or license) – Who shall apply for an authorization? (1/2)

- **Prior authorization (or license) before carrying out a "space operation" is mandatory for:**

  - **Any operator** intending **to launch a space object** or proceed with its return **from or on the French territory** or facilities under the French jurisdiction;

  - A **French operator** intending **to launch a space object from abroad** or proceed with its return from or on a place under no State's sovereignty; (FSOA, Art. 2);

  - **Any French person or legal person** whose HQ are located in France, intending to:
    - **procure the launching of its space object** (satellite operator). **(NB:** Exception: **if the authorized launching operator is French, the satellite operator is exempted from** producing technical and administrative files if it already has an administrative license, see below) and/or,
    - **to command its space object.**

- An authorization is also needed for any operator intending to (FSOA, Art. 3):
  - **Transfer the** (authorized) **command of a space object** (**by selling** or any other means) to a third person (such as a GEO satellite)
  - **Take the** (authorized) **command (by purchase** or any other means) **of a space object** (transfer from a foreign country)

*How does the FSOA work? – Procedure of authorization (or license)- **Who shall apply for an authorization ? (2/2)***

Examples of entities that shall not apply for an authorization (e.g. foreign customers of Arianespace) :

- *A **foreign operator that intends to procure the launching of its satellite** by a French launching operator or from the French territory (regulated by Art. 2.1 and 2.2 of the FSOA)*

- *A **foreign satellite operator responsible for the Command Phase** following a launching authorized under the FSOA.*

How does the FSOA work? – Procedure of authorization (or license) – General conditions to fulfill (FSOA, Art. 4 – AD)

Authorizations are issued by the Minister in charge of Space Affairs (AD, Art.1) **subject to the following cumulative conditions:**

- Administrative and political requirements :
  - **the applicant** must present **moral, financial and professional guarantees,** under the Minister's assessment;
  - **the envisaged space operation** must **not jeopardize the national Defense interests** or the respect by France of its **international commitments**.
- The systems and procedures carried out by the operator must comply with:
  - **Technical Regulations** (TR), under CNES's assessment;
  - **GSC Safety Regulations** (REI) if the space system is operated from the GSC.

➡ The respect of such conditions aims at ensuring: « **the safety of persons and property, the protection of public health and of the environment** » (FSOA, Art. 4, 5, 8 and Art. 1 of the AD)

Derogation: Specific authorization for **operations carried out abroad** (see slide 16):
The applicant may be exempted from complying with TR provided that the foreign State provides sufficient legal guarantees or equivalents standards as regards the safety of persons and property, the protection of public health and the environment, and liability matters (FSOA, Art. 4.4.– AD, Art.12).

How does the FSOA work? – Procedure of authorization (or license)
Focus on Technical Regulation requirements (AD, Art. 1.II)

Technical files to provide by the applicant for the space operation to be conducted:

- **A description of the space operation to be conducted** as well as systems and procedures that the applicant intends to implement

- **A file including**:
  - The general notice of compliance with technical regulations
  - The internal standards and quality management provisions
  - Risk management plans for ensuring the safety of property and people, as well as protection of public health and the environment
  - Hazard studies and environmental impact studies (fall of space objects, damage to the environment, space debris mitigation, collision avoidance etc.)
  - Risk management measures
  - Planned emergency relief measures

How does the FSOA work? – Procedure of authorization (or license) – Timings for applications and granting of authorizations

1) General case: Operational systems already or ready to be commercially exploited

- **No fixed deadline** to apply for an authorization but **generally authorizations are granted 24 months before the launching** which creates a legal uncertainty. Consequently:
  - **The authorization is delivered subject to compliance, after its issuance, with specific requirements** ("prescriptions") **contained in the authorization** (FSOA, Art. 5).

- **Very short periods of time to obtain the authorization** from the competent authority:
  - **without a license** : regular authorization in **4 months with 2 months granted to CNES to carry out technical assessment** (AD, Art. 2 to 6),
  - **if a license has already been issued** : **1 month delay** with 15 days granted to CNES to carry out technical assessment.

2) Future systems not yet developed

- **"Pre-application procedure"** provided for in Art. 11 of the AD: issuance by CNES of a **certificate of preliminary technical conformity with TR** which may accelerate the issuance of a future authorization/license to the operator (see slide 16).

How does the FSOA work? - Procedure of authorization

The certificate of preliminary technical conformity with TR: a "pre-application procedure"

- Any person (and not only operators) can ask CNES to **assess technical conformity of an innovative system or sub-system under development** (AD, Art. 14)
- Such certification is a **non mandatory "consultation regime"** which is **prior and independent from the formal authorization procedure**
- Such certification is **nevertheless opposable to public authorities** and constitutes a valid reference when applying for an authorization.

➡ **Equivalent mechanism in the GSC Agreement (ESA/France) for the development of ESA launchers:** CNES consulted by ESA in order to facilitate the granting of authorizations or licenses for launches from the GSC. The French Government must contact ESA, prior to refusing Arianespace such authorization.

- Exchange of letters of 27 May 2011/5 Dec. 2011between **ESA/DG and the French Minister in charge of Space Affairs to implement the procedure set forth in Art. 11 of the AD for Vega launches** under ESA's responsibility and for **the on-orbit command of space systems** operated from the French territory (ex: ATV from the Toulouse Space Centre)
- Followed by an **Arrangement (15 Dec. 2011) between CNES and ESA regarding the coordination on the safety of ESA launch system operated from the Guiana Space Center.**

How does the FSOA work? – Procedure of authorization (or license)

Types of authorizations/licenses

Depending on the **experience of the operator** or the **degree of maturity of the project**, different kinds of authorizations/licenses are provided for:

- **Regular and standard authorization**: ordinary-law regime, decision is made within 4 months.
- **Simplified authorization**: specific authorization for foreign operations: exemption from complying with TR (FSOA, Art. 4.4.): see slide 11
- **Licenses** (authorizations granted for a determined period of time to a given operator for a given operation) in order to **facilitate the issuance of a standard authorization**:
  - «Administrative license»: **attesting the moral, financial and professional guarantees of the applicant.** Authorization for each operation will therefore be granted on the sole control of technical conformity.
  - «Technical license»: **certifying the technical conformity of generic systems and procedures used**. Authorization will be issued on a case by case basis to assess differences / certified generic systems and procedures. (issuance within 1 month with a 15 days period allocated to CNES' technical assessment). **Concerns mainly the launchers.**
  - License equivalent to an authorization: informative procedure for **orbital systems** consisting only of an obligation to inform 1 month before the beginning of the operation.

How does the FSOA work? – Monitoring of space operations (post authorization)

- During **preparation and carrying out of the operation** obligations for the operator to:
  - **respect relevant provisions of the FSOA, AD, CNES Decree, TR** (and the REI-GSC when applicable) **as well as** the **specific requirements** ("prescriptions") **provided for in the authorization** (FSOA, Art. 5)
  - **inform CNES of events not anticipated** under the authorization or of any **technical failure** affecting the conditions of the space operation as authorized (AD, Art. 7)
- **Control of the respect by the operator of its obligations:**
  - State's Agents (including authorized CNES agents - FSOA, Art. 7) commissioned by the Minister in charge of Space Affairs **ensure that operators comply with their obligations**:
    - visit and inspect the site from which the operations are undertaken, and the space object;
    - can require any useful document or file.
  - Sworn Agents **investigate and record violations of obligations** (willful misconduct) laid down by the relevant space legislations (the FSOA, AD, TR or specific requirements ("prescriptions") of the authorization) (FSOA, Art. 10)
  - CNES's Controllers **control the conformity of the operator's activities with TR** on a **daily, continuous and non intrusive manner** (FSOA, Art. 28 g) based on CNES general mission to control conformity with TR.

How does the FSOA work? – Monitoring of the space operation (post authorization)

Emergency measures taken by diplomatic, political and administrative authorities:

- The Minister in charge of Space Affairs:
  - takes any **emergency measures concerning the launching** or the on-orbit command of a space object for the protection of people, property, public health and the environment (FSOA, Art. 8)
  - **delegates powers regarding technical/operational measures to CNES President.**
- CNES President:
  - **controls technical risks relating to the preparation and performance of launches** (FSOA, Art. 21.I),
  - **takes any emergency measure** in order to ensure **safety of facilities and activities at GSC** (may even order the destruction of the launcher).

Technical regulation impact on Space sustainibility (1)

- Technical regulation provide an high standard technical requirement regime on space system design, operation control, limitation of space debris, planetary protection, risk mitigation.
- Such standards have been directly derived from the best international practice or recommendations from the Inter-Agency Space Debris Coordination Committee (IADC), the international governmental forum for the worldwide coordination of activities related to the issues of man-made and natural debris in space or by the *Committee on Space Research* (COSPAR) for implementation of article IX of the 1967 UN. Outer Space Treaty about Planetary Protection.
- As a consequence, with these input in its national legislation, France pave the way for a legal recognition of such international principles, despite the fact they have being originally designed as simple recommandation or guidelines not legally binding.

Technical regulation impact on Space sustainibility (2)

- **Article 1 – Definitions**

"End of life": end of the retirement phase of the space object or loss of control of it;

"Protected regions":

protected region A, low Earth orbit (LEO) – spherical region extending from the surface of the Earth up to an altitude (Z) of 2,000 km;
protected region B, geosynchronous region – segment of the spherical envelope defined as follows:

lower limit = geostationary altitude minus 200 km

upper limit = geostationary altitude plus 200 km

-15 degrees ≤ latitude ≤ +15 degrees

geostationary altitude " (Z GEO) = 35,786 km (altitude of geostationary terrestrial orbit);

"**Retirement phase":** final phase of the space operation during which steps are taken to make the space object safe in order to limit the risk from space debris;

"Return": period which starts at re-entry of the space object into the Earth's atmosphere and ends when it is immobilised on the ground, as part of a controlled or uncontrolled re-entry;

"Risk level": probabilistic estimate characterising the vulnerability of a system to a critical event, expressed by the probability of occurrence of this event;

"**Space debris":** any non-functional space object of human origin, including fragments and parts thereof, in Earth orbit or re-entering the Earth's atmosphere;

"**Uncontrolled re-entry":** atmospheric re-entry of a space object for which it is not possible to predefine the ground impact zone for the object or fragments thereof;

Technical regulation impact on Space sustainibility (3)

- Launch et general

  Article 8 – Impact assessment (33) - Article 9 – Hazard management measures (32) - Article 13 – Technical visibility - Article 20 – Quantitative objectives for human safety (44) - Article 21 – **Limitation of space debris** (40) - Article 22 – **Prevention of collision risks** (41) - Article 23 – **Prevention of risks arising from fall-back by the launcher or fragments thereof** (43, 46) - Article 25 – Nuclear safety (42) - Article 26 – **Planetary protection** (43) - Article 54 – **Guide of good practice** - Article 55 – **Interim provisions**

- In orbit control and return to earth of space object

  Article 39 – **Ability to control the space object** - Article 47 – Non-nominal re-entries - Article 48 – Status of the space object- Article 49 – Intentional destruction

How does the FSOA work ? - Sanctions

- **Withdrawal or suspension of authorization granted in case of:**

  - **violation of applicable legislation** (the FSOA, AD, TR or the specific requirements - "prescriptions"- imposed by the relevant authorization) or when the planned operations are likely to **jeopardize national Defense** or the fulfillment by France of its international commitments (FSOA, Art. 9.1),
  - **events not anticipated in the authorization** or **technical events** affecting the conditions of the space operation as authorized (AD, Art. 7)

  ➡ **In such case,** the **administrative authority may enjoin the operator to take**, at its own expenses, the **appropriate measures to limit the risks of damage** caused by the said space object (FSOA, Art. 9§2)

- **Fines (up to 200.000€), if** (CNES Decree):
  - launching or command of a space object **without authorization,**
  - launching or command of a space object **in breach of an administrative measure or court decision** ordering its ceasing or suspension.

How does the FSOA work? - Legal security and guarantees
Liability regime for damage caused to third parties (1/2)

Concentration of the burden of liability on one given operator :

- **Absolute, joint and several liability** (but limited by Governmental guarantee or ceiling: see next slide) for damage **on ground and in Air Space.**

- **Fault liability** for damage caused in **Outer Space** (orbit)

- **Limitation of liability**: except in case of willful misconduct, such liability ceases when all the obligations set out in the authorization or in the license are fulfilled, or **one year** after fulfillment of these obligations. The State is liable (and not the operator anymore) for damage occurring after this period.

➡ This is consistent with **the UN Liability Convention of 1972.**

How does the FSOA work? - Legal security and guarantees
Liability regime for damage caused to third parties (2/2)

State guarantee attached with the authorization**: limitation of the operator's liability** for damage to third parties occurring on ground or in Air space **limited to a fixed amount of approximately 60M€**, except in case of willful misconduct (FSOA, Art. 15 + Art. 119 of French Amending Finance Law of 2008). If compensation for damage caused goes beyond this amount, **the State supersedes the operator's obligation to indemnify**.

- **The French State is sued** under UN Space Treaties (1972 Convention…): **right of recourse against the Space operator limited to the fixed ceiling of 60M€** (FSOA, Art. 14)

- **The operator is sued** and condemned by a court (Art.13): **application of the State guarantee granted to the operator** for **damage caused to third parties** by authorized space operations carried out on the EU territory.

- **Contractors, subcontractors, customers or insurers can also benefit** from this guarantee for damage caused during the Launching phase.

How does the FSOA work? Legal security and guarantees - Validation and systematization of cross-waivers of liability (FSOA, Art. 20)

- Validation of an **internationally accepted practice** between space actors (manufacturers, operators, insurers, insured): **cross-waiver of liability clauses**– limitation of guarantee

- This cross-waiver of liability is **applicable and enforceable by default** to all contracts relating to a space operation (Launching Service Agreement, Satellite Maneuvers Contract etc.)

- Not applicable in two cases *only* :

- manufacturing incidents or failure of a satellite (for damage caused in orbit) which is the sole contractual authorized exception.
- willful misconduct

How does the FSOA work? Legal security and guarantees – Validation and systematization of cross-waivers of liability provisions

Rationale for imposing cross-waivers of liability provisions (FSOA, Art. 20):

- **Protection of (small) space manufacturers** activity (ratio liability risks/ price of the delivery).
- **Each participant involved, directly or indirectly, in the space operation, ensures its own risks and loss burden at its own expenses**. Insurers are bound by such clauses (subrogation).
- **Dispute avoidance**: **solidarity of manufacturers** – savings in legal expenses.
- This exception to usual business practices (no guarantee, limitation of responsibility, no claim possible) **is considered acceptable because of the FSOA Technical Regulation** which contributes to avoid failure and damage.
- Concentration of liability on the sole responsible operator.

Part 2 – Specific regimes applicable to:

1) Space-based data systems
2) CNES's situation
3) The exploitation of the Guiana Space Centre (REI- GSC)
4) Governmental space activities
6) Intergovernmental Organizations: ESA and the EU

1) A specific Space-based data regime (FSOA, Art. 23 to 25)

- **Obligation for any person intending to operate a space-based data system to declare its activity to the Government.**

- The **Government is entitled to limit the scope of such an activity** (shutter control), in order to **safeguard the fundamental interests of the Nation** (particularly Defense and foreign policy matters, and France international commitments)

➡ **Relevant Implementing Decree and Ministerial Order specify:**

- the technical characteristics of the concerned data
- the competent administrative authority and
- the types of restriction measures the Government may take.

2) How does the FSOA affect CNES's situation? 1/2
CNES's Operations

CNES operations **not subjected to the FSOA authorization procedure** are:

- CNES' own **regular activities under its "public service missions"** such as governmental programs, systems development…)
- Space **programs operated for other public entities** such as the Defense ministry, ESA, or in cooperation with other countries. (FSOA, Art. 27)

➡ BUT, these activities are naturally subjected to the TR (since CNES is the author of it and the enforcement authority)

As a consequence, CNES has to :

- **stop its pending business** relations with operators (through contracts or shareholding) if **possible conflict of interests with FSOA missions** (see later)

2) How does the FSOA affect CNES's situation ? 2/2
Licenses for allocated frequencies

- **Allocation to CNES of some frequencies bands,** formerly allocated to France in the frame of the ITU and **used for Earth observation, space research and exploration, meteorology, navigation…**

- Before allocating frequencies, **necessity to define order of priorities and balance interests between public missions and all other missions** when a conflict over such frequencies arises.

- **Necessity to set up a "one-stop shop" for frequencies allocation.**

3) The Exploitation of the Guiana Space Centre (REI-GSC)

Missions entrusted to CNES and to its President personally at GSC (FSOA, Art. 21)

- **enforcement of safety rules** applicable to GSC exploitation and concerning for example transportation of space object, tests and operation performed at GSC…

- **coercive powers to ensure safety of property and persons** (evacuation of facilities, ceasing of activities, administrative fines):

  - exercise of special police powers: emergency measures, overflowing risks prevention, preparation of launching campaign, common use of resources, technological assets protection, coordination mission (Art. 21.1.II) of the implementation by all companies located in CSG of any regulation aiming at ensuring the safety of the facilities and the activities conducted at CSG)

  - operational management of the site (still regulated by the GSC agreements and unchanged by the entry into force of the FSOA): logistical management of the site on a non commercial basis, management of EPCL)

4) Other Governmental Space activities in France (apart from CNES activities)

- **Defense activities** and **meteorological activities** not carried out by CNES **fall within the scope of the FSOA authorization regime**.

5) International Organizations: the situation of ESA and the EU as regards the FSOA.

- As Intergovernmental Organizations : **not submitted to the FSOA**
- Possibility for IGO to apply UN Space Treaties related to liability and registration of space objects (ESA in the 70's)
- **The EU** has a **shared space competence under Art. 189 of the Lisbon Treaty** BUT has no competence to harmonize space legislations of its Member States. The EU may **enact rules for space applications** (telecoms, remote sensing) or **undertake its own programs** (Galileo, GMES).
- The EU and ESA must **respect legislations of their Member States dealing with public order** (see ESA Convention - Art XXII)
- The EU and ESA may apply certain provisions of the FSOA and implementing decrees and regulations (e.g. ESA applies Art. 11 of the AD, see slide 16)

Thank you for your attention, any questions?