

DJIBOUTI**National mechanism:**

Law n°167/AN/22/8th L relating to activities involving the launch, flight operation and guidance of space objects.

Decree n°2023-209/PR/MENSUR establishing the procedure for authorizing operations for launching or guiding space objects.

Description:

1. Law n°167/AN/22/8th L relating to activities involving the launch, flight operation and guidance of space objects.

The law relating to the activities of launching, flight operation and guidance of space objects was adopted in 2022. It established a national regime for the authorization and supervision of space activities in the Republic of Djibouti.

The activities and procedures implemented by the operator within the framework of the operation must be carried out in accordance with international law and, in particular, with the principles set out in the Outer Space Treaty and other international treaties which have entered into force for the Republic of Djibouti.

Authorizations are issued by the Minister of Higher Education and Research, on the basis of a technical assessment carried out by one or more experts designated for this purpose by the Minister. This assessment may take place at different stages of the activities.

The Minister determines the conditions for granting authorizations in order to ensure the safety of people and property, the protection of the environment, the optimal use of airspace and extra-atmospheric space, the protection of the strategic, economic and financial interests of the Djiboutian State, as well as to meet the obligations incumbent on the Djiboutian State under international law.

2. Decree n°2023-209/PR/MENSUR establishing the procedure for authorizing operations for launching or guiding space objects.

The decree establishing the procedure for authorising space object launch or guidance operations published in 2023 in application of the law relating to the activities of launching, flight operation and guidance of space objects contains the technical requirements with which all operators must comply. The decree is composed of a first part devoted to the launch of a space object and return to Earth of the launcher elements and a second part devoted to the control/return to Earth of a space object. Both parts contain provisions relating to the reduction of space debris.

- For launch of a space object and return to Earth of the launcher elements

Article 14 : Space Debris limitation

The launch vehicle operated by the launch operator must be designed, produced and operated in such a way as to comply with the following provisions for elements operating in outer space :

1. The Launcher must be designed, produced and implemented in such a way as to limit as much as possible the production of debris during nominal operations, including beyond the end of life of the Launcher and its constituent elements. In this respect, the launch operator shall implement in particular the following provisions :

- In the context of launching a single space object, only one element (for example a stage) of the Launcher may be placed in orbit;
- In the context of launching several space objects, a maximum of two elements (for example a stage, the adaptation structure or a balancing dummy mass) of the Launcher may be placed in orbit.

The above provisions do not apply to:

- Pyrotechnic systems. However, these must not generate products with a size greater than or equal to 1 mm in their largest dimension;
- Solid or hybrid propellant thrusters. However, these must not generate combustion debris with a size greater than or equal to 1 mm in protected regions A and B.

2. The Launcher must be designed, produced and implemented in such a way that the debris produced in compliance with the provisions of 1 above which manages to reach the surface of the Earth does not present an excessive risk to people, property, public health or the environment, in particular due to pollution of the environment by hazardous substances.

3. The probability of occurrence of an accidental disintegration must be less than 10^{-3} until the end of life of the orbited Launcher element(s); its calculation must include the failure modes of the propulsion and power systems, the mechanisms and structures, the passivation operations, but does not take into account external impacts.

If an orbited Launcher stage cannot perform its controlled reentry as planned, it must be passivated in a safe and controlled manner.

4. The Launcher must be designed, produced and implemented in such a way that, at the end of the decommissioning phase, all its elements are passivated :

- all onboard energy reserves are permanently depleted, or placed in a state such that their depletion is inevitable, or in a state such that they do not present a risk of generating debris;
- all onboard energy production means are permanently deactivated, or all equipment directly powered by these energy production means are placed in a state such that they do not present a risk of generating debris.
- at the end of the decommissioning phase the Launcher must be in a stable state with minimum internal energy.

5. Respect Region A

a) The Launcher must be designed, produced and implemented in such a way that, after the end of the launch phase, its constituent elements placed in orbits crossing protected region A are

deorbited in the context of a controlled atmospheric re-entry. In the exceptional, duly justified case of non-compliance with this provision, the Launcher must be designed, produced and implemented in such a way that its constituent elements are no longer present in protected region A, twenty-five years after the end of the launch phase. This result is achieved by an uncontrolled atmospheric re-entry. The Launch Operator must also demonstrate that it implements the necessary means to minimise the duration in orbit, to less than 25 years, after the withdrawal from service, of the constituent elements of the Launcher crossing protected region A.

b) If the orbit targeted by the constituent elements of the Launcher after the withdrawal from service manoeuvres has an eccentricity greater than 0.25, it must allow compliance with the requirements set out in a) of 5 of this article with a probability of at least 0.9, taking into account the effect of natural orbital disturbances and the associated uncertainties.

6. Respect Region B

a) The Launcher must be designed, produced and implemented in such a way that, after the end of the launch phase, its constituent elements placed in an orbit included in or crossing protected region B are placed in an orbit that does not interfere with this region for more than one year.

This orbit must be such that, under the effect of natural disturbances, the Launcher or its orbited constituent elements do not return to protected region B within one hundred years following the end of the decommissioning phase.

b) If the orbit targeted by the constituent elements of the Launcher after the decommissioning manoeuvres has an eccentricity greater than 0.25, it must allow compliance

with the requirements set out in a) of 6 of this article with a probability of at least 0.9, taking into account the effect of natural orbital disturbances and the associated uncertainties.

c) For missions to the Lagrange point L2 or with liberation orbit, the launch operator must implement all necessary means to comply with the requirements set out in 6 b) of this article, taking into account the state of the art of orbital calculation methods.

7. The probability of being able to successfully carry out the decommissioning operations referred to in 4, 5 and 6 of this Article must be at least 0.9. This probability is assessed over the total duration of the operation; its calculation, carried out before the start of the space operation, must take into account all the systems, subsystems and equipment that can be used for these operations, their possible levels of redundancy and their reliability, taking into account the effects of ageing reached at the time when these operations are scheduled to be carried out, as well as the availability of the means and energy resources necessary for these operations.

- For control/return to Earth of a space object

Article 33 : Protection of the space environment.

The systems implemented by the operator must be designed, produced and implemented such as to comply with the following requirements :

1. Intentional release of debris

The space systems implemented by the operator must be designed, produced and implemented in such a way as not to generate debris during operations when these are carried out in a nominal manner.

The above provision does not apply to:

- Pyrotechnic systems. However, these must not generate products with a size greater than or equal to 1 mm in their largest dimension;
- Solid or hybrid propellant thrusters. However, these must not generate combustion debris with a size greater than or equal to 1 mm in protected regions A and B.

2. Accidental disintegration

The probability of occurrence of accidental disintegration of any Space Object shall be less than 10^{-3} until the end of the decommissioning operations of this Space Object. Its calculation shall include failure modes of propulsion and power systems, mechanisms and structures, but shall not take into account external impacts.

3. Passivation

Any Space Object must be designed, produced and implemented in such a way that, at the end of the decommissioning phase :

- all on-board energy reserves are permanently depleted, or placed in a state such that they do not present a risk of generating debris
- all on-board energy production means are permanently deactivated, or all equipment directly powered by these energy production means are placed in a state such that they do not present a risk of generating debris;
- all radio transmission capabilities of the platform and payload must be permanently interrupted.

Article 34 : Intentional destruction.

1. The operator must avoid the intentional destruction of any space object in orbit.
2. When the operator intends to carry out intentional destruction, he shall notify the Ministry of its necessity. Such destruction may only take place at altitudes low enough to limit the orbital lifetime of the fragments produced.

Article 35: Devices for the active removal of debris

The design of any Space Object must provide a device on its structure to facilitate possible seizure or capture by a service vehicle in the event that the satellite is, after its withdrawal from service, the Subject of a withdrawal from its orbit.

Applicability:

Law n°167/AN/22/8th L relating to activities involving the launch, flight operation and guidance of space objects.

The scope of this law covers:

- Launch and return operations carried out from Djiboutian territory

As a law, it is mandatory for concerned space operators.

Decree n°2023-209/PR/MENSUR establishing the procedure for authorizing operations for launching or guiding space objects.

As a decree, the procedure for authorising launch or guidance operations of space objects is mandatory for the space operators concerned.

References:

- Law n°167/AN/22/8th L relating to activities involving the launch, flight operation and guidance of space objects.

<https://spatialdjiboutien.net/wp-content/uploads/2023/10/Loi-sur-Operations-Spatiales.pdf>

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<https://www.journalofficiel.dj/texte-juridique/decret-n2023-209-pr-mensur-fixant-la-procedure-dautorisation-doperations-de-lancement-ou-de-guidage-dobjets-spatiaux/>