

Guidelines for applying for approval of Danish space activities

It is essential to read these guidelines carefully before applying for approval of a space activity. Not only do the guidelines provide information for filling out the application form, but they also explain the application procedure and what level of documentation that is required from the operator, both prior to approval and throughout the lifetime of a space activity.

The application form requirements are based on the Outer Space Act, cf. Act no. 409 of 11 May 2016 (hereafter OSA) and Executive Order no. 1116 of 3 June 2021 on requirements in connection with approval of activities in outer space etc. (hereafter EO). Both can be found [here](#).

Information on the application process

When to apply for approval?

Under the OSA, a space activity undertaken in the state of Denmark, on a Danish vessel or by a Danish operator can only be carried out after prior approval from the Danish Agency for Higher Education and Science (hereafter the Agency).

The term space activity refers to launching space objects into outer space (more than 100 km above sea level), operation, control and return of space objects to Earth as well as other essential activities linked to the space activity.

Approval is necessary if the activity is a key part of operating a space object. However, approval is not necessary if, for example, work is carried out in connection with satellite projects conducted by foreign organisations or companies. Approval is also not necessary if a subcontract is carried out on a single component of the space object, e.g. an instrument or an operating system.

An application covers all aspects of a space activity, including launch, orbit (incl. manoeuvres), ground segments, control software etc. Should an activity involve more than one space object, it is only required to submit one application, including details of constellation management. However, it may be necessary to address space objects individually, in case they differ significantly from each other or have different objectives in the activity.

Timeline and deadlines

As early as possible, and no later than sixteen months before the scheduled launch of the space object, the operator must notify the Agency about the space activity for which the operator requests approval (cf. EO section 4(1)). This deadline makes it possible for the Agency to prepare the steps needed to approve the activity. This is also a possibility for the Agency to inform the applicant of the procedure and for the applicant to ask questions to the Agency.

Next step, or even before notifying the Agency, is to initiate the coordination of radio frequencies. Please note that this takes time (expect over a year), and that the Agency for Higher Education and Science is not involved with the process of frequency coordination, but requires documentation that the process complies with relevant regulations on use of frequencies, cf. EO section 2(7). The authority for radio frequency notification in Denmark is the Agency for Digital Government.

A provisional application for approval of a space activity must be submitted by e-mail to **`rummyndighed@ufm.dk`** no later than 12 months prior to the expected launch of the space object. At this point, the application addresses all of the points in the application form to the extent possible. The operator should bear in mind that the level of detail in the documentation is sufficient for the Agency to understand arguments or assumptions and that underlying calculations are included when appropriate.

When the Agency has received the provisional application with attached documentation, it will initiate a preliminary assessment of compliance with the provisions of the OSA and EO. It is expected at this point that the operator needs to elaborate the text further in dialogue with the Agency. Further, some documents are not yet completed at this time, e.g. documentation from the frequency authority or test results of space objects. In such cases, it is of great importance to keep the Agency closely informed about the specific process with due diligence in all cases.

The preliminary assessment includes whether the Agency should stipulate any supplementary requirements, cf. EO section 5 (safety requirements), section 7 (environmental requirements) and section 11 (insurance). The deadline for submission of additional documentation regarding safety requirements and environmental requirements, if stipulated, is six months prior to expected launch, while the deadline for documentation on insurance is two months prior to launch.

The Agency holds an agreement with the European Space Agency (ESA) to provide technical reviews of applications. Some activities may be exempted from external review based on a preliminary assessment. The operator will be contacted before initiating an external review, as the operator must cover the associated costs.

The operator should observe that the space activity does not conflict with national security interests, Denmark's international obligations or foreign-policy interests. Whether this is the case is assessed by the Danish Ministry of Foreign Affairs and the Danish Ministry of Defence on behalf of the Agency.

In practise, the operator will be given possibility to correct the application and additional documentation before decision on approval is taken. The final application, where all of the points in the application form are responded to, has to be submitted two months prior to launch at the latest.

Finally, a decision will be made as to whether to approve the space activity and under what conditions. This decision cannot be appealed cf. [Executive Order on the delegation of powers of the Minister for Higher Education and Science to the Danish Agency for Higher Education and Science \(only available in Danish\)](#).

One condition for approval may be that the operator takes out insurance to cover damage to third party. Such a condition will be determined on the basis of the application and, primarily, on the basis of the risk of the space object causing damage.

After approval of the space activity

After the launch of the space object, the operator is obliged to report the final orbit parameters at latest thirty days after launch cf. EO section 8.

It is important that the operator immediately and at its own initiative informs the Agency in case of new or changed circumstances of significance for an approval, cf. OSA section 8. Examples include significant adverse incidents or anomalies, e.g. failure of components that are essential to control the space object, lost contact with space object, incidents that increases the risk of space object fragmentation or prevents the space object to perform planned end-of-life manoeuvres etc. With “immediately”, it is understood that the Agency is informed as soon as the information comes to the attention of the operator. Please note that non-compliance with this requirement is punishable, cf. OSA section 21.

If the operator plans changes to the approved space activity, it is important to contact the Agency in due time. The requirement for documentation is the same as when applying for approval of a space activity. Based on the documentation, the Agency decides if the change calls for a change to or withdrawal of the original approval, cf. OSA section 8 and 9. Examples include (but are not confined to) changes that influence the orbit, deorbit, change of radio frequency, termination of the space activity etc.

The Agency supervises compliance with the OSA and EO. As part of its supervision, the Agency conducts inspections on a regularly basis, typically once a year. Inspections include a visit to the operator’s premises when appropriate, or be conducted as a desktop inspection if the required documentation can be provided by e-mail and/or traditional mail. The first inspection usually involves a visit. Operators are obligated to provide all information necessary for the Agency to carry out its supervisory obligations.

Information on the application form

General instructions for completing the application

The application form is not a standalone document. While some short statements fit into the form, e.g. expected date of launch, others require an extensive documentation of calculations and other relevant background information. An example on the latter could be the risk estimate of the space object(s) to cause damage to people on ground. In those cases, all relevant information is written into separate document(s).

There are no formal requirements for the structure of additional documents, as long as it is clear where to find the information.

It is essential to back numbers or statements up with background information, e.g. description of underlying assumptions and calculations.

Please note that the application form must be completed in English in case a technical review of the application by international experts is required.

Items 1 - 4: Information relating to the operator and ownership

A distinction is made between operator and owner. An operator is a natural or legal person who performs, or undertakes to perform, space activities. The operator has overall responsibility for the space activity. All requirements are therefore attached to the operator, including the responsibility to ensure that the activity is carried out safely and that all relevant regulations and obligations are complied with.

If the operator uses subcontractors, the operator must attach the contracts between the operator and the subcontractors to the application. It is important to note that the overall responsibility and liability for the space activity is placed with the operator in any case.

An owner is the natural or legal person who owns the space object.

Items 1 and 2: The operator's name and address. If the operator is a natural person, please provide the full name here. If not, please provide the name of the company, the address, CVR number (business registration number) and name(s) of relevant contact person(s).

Item 3: Only fill in this section if the owner is not the same as the operator. Please provide the name and CVR no. of the company or the name of the person who owns the space object.

Item 4: Only fill in this section if a sub-contractor is used for the space activity. It is important to specify the services that the sub-contractor performs on the activity to understand the competencies needed by the sub-contractor.

Items 5 - 10: Exhaustive description of the space activity and space objects

It is essential that all information is given in great detail. For use of software, please state the name of the software, version, settings and assumptions. The validity of assumptions shall be addressed as part of any analysis.

Item 5: Describe the purpose of the space activity. Examples could be surveillance of maritime or aerial traffic, education, demonstration of new technology or scientific observations.

Item 6: Describe the planned activity in detail. Information on projected functional period for involved space object(s), expected lifetime in orbit and projected orbit data (nodal period, inclination angle of orbit in relation to the Earth's equator, apogee and perigee) are mandatory but not sufficient.

From the description, it shall appear what the phases of the activity are and what constitutes each phase, together with an indication of the duration of each phase. Examples may include launch and early orbit phase, manoeuvres phase and disposal phase. Even pre-launch phases, such as transport to launch site, shall be included. Manoeuvres, if any, shall be explained at a level of detail where risks, redundancy of operations etc. appear.

All parts of the space activity shall be explained, including ground segments, control software etc.

The information could be provided by attaching the Mission Analysis Report (as stipulated in the ECSS-E-ST-70C standard).

Item 7: Technical specifications and function of the space object. The system design report may be attached to the application, but is not mandatory.

- a. Physical dimensions of the space object. If the space object includes deployable devices (e.g. antennae and solar panels), please state dimensions w/o devices deployed.
- b. Description of the platform shall include all parts, including power control, battery packs, flight computer, solar panels, communication devices (including antennae) and attitude control devices. The level of detail should be sufficient for the Agency to understand the function and backup options of the devices, in particular for deployable devices. On the other hand, details regarding e.g. design of electronic circuits are not required unless it is important in relation to risks of satellite break-up or collision.
- c. Description of the payload shall include a list of the devices in use. Details of electronic design and function of devices are not required, unless the payload incorporates moving parts like an instrument boom or energy storing devices.
- d. List all radio frequencies here. To use the frequencies, please contact the frequency assignment authority in Denmark. See also item 16 in the application form regarding documentation from the frequency authority.
- e. State the total mass estimated by utilising a mass budget approach.
- f. State whether the space object(s) use own propulsion. If so, please describe the propulsion unit and the type and volume of propellant.
- g. If the space object carries dangerous substances, please provide a list of those here. Also, state the volume of each substance and total activity if radioactive materials are used. The information given will be used by the Agency to assess if further documentation for the environmental impact of the space activity on the Earth, the atmosphere and outer space is needed.

h. State other relevant technical information not addressed in the points above, in particular information relevant to an assessment of risks of the space activity, e.g. by causing satellite break-up, risk of collision with other space objects, release of substances into outer space etc.

Item 8: Provide information on the date and location of the planned launch. Please note that the Agency must have received final information by no later than 30 days after launch, cf. EO section 8.

Item 9: Fill in the company name and address on the launch operator responsible for launching the space object (Launch Service Provider, hereafter LSP). Additionally, please provide information relating to the type of launcher or other device that will be used, including success rate. In some cases, the space object is sent into orbit from the international space station, ISS. If this is the case, please state so here, and provide information on the vehicle, which will be used to transport the space object to the ISS. Further, attach the documentation that the launch fulfils the safety requirements of launches from the ISS.

Item 10: The contract documents the conditions that has been agreed between the LSP and the operator. In particular, it documents that the LSP has taken out indemnity insurance. If the contract between the LSP and the operator does not address third part liability issues, please attach additional documentation that an indemnity insurance has been taken out and what the insurance sum is.

The Agency may request documentation that relevant authorities in the state where the LSP is based have approved the launch.

Items 11 - 12: Risk assessment

The operator must state the risks involved with the space activity, including the risk of damage being caused by the space object. This information is important for the Agency to overview and assess the risk of the space activity, and will also be part of the decision of whether the applicant will need to insure the space activity against third party liability.

It is very important that all calculations are backed up by details of the calculation (assumptions, used software, settings and input parameters in software etc.). Screenshot from software may be part of the documentation. Where possible, it is recommended to make use of ESA software, as it is known software to the Agency and its technical adviser.

Item 11: Describe risks in relation to manoeuvres, risks of space object disintegration (will be addressed in item 18 in relation to space debris management as well) etc. Also, estimate the demise altitude (altitude where all parts of a space object are evaporated upon its return to Earth).

Item 12: Estimate of the risk of the space object causing injury to persons during its return to Earth.

Items 13 - 14: Information regarding the qualifications of the operator

Item 13: Include documentation of the relevant professional qualifications of the operator and sub-contractor(s) (if relevant), including technical qualifications to perform the space activity. In the application

form, please provide the names of employees central to the operator's tasks in the activity under application and attach CV's to the application.

Emphasis is on professional qualifications and experience that support safe execution of the activity, e.g. qualifications within relevant engineering disciplines.

The affiliated staff may change during the preparation of the space activity or after launch. In this case, the operator must immediately provide the Agency with an updated list of staff and their CV's.

Item 14: Please indicate whether the operator is or has been the operator of previous space activities. If so, briefly describe the previous space activities.

Item 15: Financial capacity of the operator

Please enclose documentation on the financial capacity of the operator. The needed document is the most recent financial statement (årsrapport), signed by a state-authorized public accountant. The Agency will use the documentation to assess whether the operator has the necessary financial capacity to carry out the space activity during the entirety of its functional phase.

Item 16: Documentation from the frequency authority

Documentation from the national frequency authority that the operator is compliant with relevant regulations on use of frequencies and allocation of orbit positions. The documentation can be an email or similar sent from the frequency authority to the operator, for example. If the coordination procedure is still on-going at the time of application submission, please indicate the status in the application form. Note, however, that launch cannot take place before the proper documentation for use of radio frequencies has been received by the Agency.

Item 17: Declaration of export controls

Attach a declaration of compliance with regulations on export controls. Questions relating to export controls regulation should be referred to the Danish Business Authority (Erhvervsstyrelsen)

Items 18-21: Space debris management

The Agency stipulates that space activities comply with the most recent ISO and ECSS standards. Based on the operator's documentation, the Agency assesses whether sufficient measures are taken with regard to space debris management. The Agency may use external technical advisers to perform the assessment.

Item 18: Please state the applied ISO and ECSS standards, and demonstrate that the activity complies with the standards.

Item 19: As a general rule, within 25 years of the end date of the functional operating period of the space object, the space object must either safely leave its Earth orbit (deorbit) or safely be placed in an orbit where it is deemed not to constitute a risk to other space activities. Attach documentation of calculations for when the space object is expected to leave its orbit following natural orbit decay. There are no requirements as to which software to use for the calculations, but it is recommended to use ESA software, as this is well known to the Agency and its technical adviser.

Item 20: If the space object is not expected to have left its orbit within 25 years from the time its functional operating period ceases, please describe the plans to actively deorbit the space object or alternatively move it to a safe orbit. Be sure that the technical solution for decreasing the time in orbit is described under item 7f or 7h.

Item 21: With regard to placing the space object in geostationary orbit, please state, which orbit it will be moved to at the end of its functional operating period.