GUIDANCE FOR LICENCE APPLICANTS

OUTER SPACE ACT 1986

Please note that the application should be made as soon as possible, ideally at least six months in advance of any plans for launch or operation of a space system. Delays in making the application could result in the project having to be delayed.

1. Introduction and background

The Outer Space Act 1986 (OSA) is the legal basis for the regulation of activities in outer space carried out by organisations or individuals established in the United Kingdom or one of its Overseas Territories (OTs) or Crown Dependencies (CDs).

The Act confers licensing and other powers on the Secretary of State for Business, Energy and Industrial Strategy (BEIS), who carries out these powers through the UK Space Agency. The Act seeks to ensure compliance with the UK's obligations under international treaties and principles covering the use of outer space, including liability for damage caused by space objects, the registration of objects launched into outer space and the principles for the remote sensing of the Earth.

Download a copy of the Outer Space Act 1986, which includes the amendments made to it by section 12 of the Deregulation Act 2015. Applicants are strongly advised to make themselves familiar with its provisions before completing the application form.

2. Do I need a licence?

The Outer Space Act 1986 applies to United Kingdom nationals (as defined in the Act), Scottish firms, and bodies incorporated under the law of any part of the United Kingdom, the Bailiwick of Guernsey, the Bailiwick of Jersey, the Isle of Man and certain Overseas Territories carrying out the following activities in the United Kingdom or elsewhere:

- launching or procuring the launch of a space object
- operating a space object
- any activity in outer space

It is an offence for a person to whom the Act applies to carry out a licensable activity without a valid licence.

The following activities do not require a licence:

- the leasing of space segment satellite capacity (transponders) from international inter-governmental satellite organisations or privately-owned entities for use by the lessee or by a person sub-letting the capacity;
- the utilisation of space segment capacity (transponders) using earth stations for either transmission or reception purposes. **N.B.** This exception does not apply to persons involved in telemetry, tracking and control of satellites in orbit.

Notes:

- Applicants should consult the UK Space Agency (contact details may be found at the end of these notes and on the OSA Licensing website) if they are in any doubt as to whether they need a licence. The Agency encourages applicants to contact them as early as possible to discuss the best way forward for their mission.
- Applications should be submitted **at least six months in advance** of any plans for launch or operation. In certain circumstances, it may be possible to process an application in a reduced timescale (in some cases in as little as three months), although we are unable to guarantee this. Please contact us in plenty of time to discuss if a reduced timescale would be possible and the steps you would have to take.
- Applicants from one of the UK's Overseas Territories to which the Act has been extended (Cayman Islands, Gibraltar, Bermuda) will need to apply to their own Governor's office for an OSA licence.
- Applicants from one of the UK's Overseas Territories to which the Act has not been extended should approach the Government of the Overseas Territory, which would then liaise with the Foreign and Commonwealth Office (FCO) and UK Space Agency over whether it was appropriate to extend the Act to that territory. If decided upon, extension of the Act would be by Order in Council. This is a lengthy process and could take many months.

3. Obligations of licensees

Once a licence has been granted, licensees are obliged to:

- permit reasonable access to documents, and inspection and testing of equipment and facilities, by the UK Space Agency or their advisors as appropriate
- indemnify the UK government for any claims for third-party damage brought against the government which arise from the space activities
- in most cases, insure themselves against third-party liabilities arising from the licensed activity. Applicants should note that:
    i. Third-party liability insurance is required for both the launch and in-orbit phases of the mission.
    ii. For each licence application, a risk assessment will be performed to consider the potential risks posed by the mission and a commensurate level of insurance cover will be determined.
    iii. The UK government must be named as an additional insured on the insurance policy. In the case of applications from those based in the Overseas Territories and Crown Dependencies, the relevant territorial Government should also be named.
    iv. More information on the UK Space Agency's insurance requirements can be found in the Insurance section of the OSA Licensing webpage
- inform the UK Space Agency of any planned change to the licensed activity (e.g. change of orbit, change of owner) and seek approval prior to the change being made
- prevent contamination of outer space and adverse changes in the environment of the Earth
- avoid interference in the space activities of others
- avoid any breach of the UK's international obligations
- preserve the national security of the UK
- dispose of the licensed space object appropriately at the end of the licensed activity and inform the UK Space Agency of the disposal and termination of the activity.

Download a copy of a typical licence, which includes our standard conditions.

In addition to the standard conditions, the Secretary of State **has discretion to attach extra conditions** to the grant of a licence. These will depend on the circumstances of each application.

4. Conditions for the grant of a licence

Before a licence can be granted, the UK Space Agency must be satisfied that the proposed activities:

- will not jeopardise public health or the safety of persons or property
- will not undermine national security
- will not compromise the UK's ability to carry out its obligations under the various international treaties and agreements that govern space activities, including treaties regarding the responsible use of space.

During the licensing process set out below, UK Space Agency and its advisors will assess any information submitted. Should special conditions be required for a particular licence (e.g. that a parent guarantee be in place when a licence is granted to a subsidiary company), these will be explained to the applicant.

Applications are **considered on a case-by-case basis on their merit**. Granting of a licence does not imply that a licence will be granted for any future application an applicant may make.

5. Applying for a licence

How to apply

Applications for licences under the Outer Space Act may be made either in hard copy or electronically (by emailing a PDF of the signed application form), using the application form on the website. Supporting material that is requested on the application form or that the applicant sees fit to include should be submitted at the same time.

Applications should be sent by post or email to:

Outer Space Act Licensing Team
UK Space Agency
Polaris House, North Star Avenue
Swindon
SN2 1SZ

E-mail: regulation@ukspaceagency.gov.uk

Information required

Applicants should ensure that they submit all information appropriate to their activity (i.e launch-only or launch and in-orbit operations) listed in **Annex A**.

The following information will be required as a minimum:

- the nature of the space activity the applicant is proposing to carry out;
- the relationship of the applicant with other parts of the corporate group (if applicable);
- the applicant's financial standing, including certified accounts for the two most recent years; accounts information for parent companies may also be required if the applicant is a subsidiary;
- mission costs;
- insurance arrangements for launch (if applicable) and the in-orbit phase of the mission (including copies of all certificates and policies);
- technical details of the mission, including copies of the launch services contract, satellite supply contract and technical specifications, and ground station specification;

- plans for disposal of the space object at end of life;
- emergency procedures;
- radio frequencies and powers used during the mission;
- orbital location information.

The UK Space Agency has the right to request other information as appropriate.

Licence application fee

Once the UK Space Agency has received an application, we will request a non-refundable fee of **£6,500 per licence** to be paid via invoice. Please note that each satellite is licensed individually.

Note: Recognised educational institutions carrying out an activity to which the Act applies are not required to pay the fee if the activity is for scientific research or teaching.

UK Space Agency licensing procedure under the Outer Space Act

The UK Space Agency will assess the information provided in the initial application, and may request further information or clarification in the course of the assessment.

The UK Space Agency will normally seek a meeting with the applicants at an early opportunity to help us to understand the activity to be licensed. In particular, we will wish to ascertain whether there are any novel or special circumstances that may have a bearing on the licence.

At all stages of the licensing process, UK Space Agency will keep the applicants informed and explain the reasons for any decisions or for any additional requests for information.

The main stages of the licensing process are set out in the below graphic. Normally, these stages consist of:

Stage 0: Pre-application engagement

- Identification of whether a licence is required and initial contact/consultation: to explain the licensing process to the applicant and to enable the UK Space Agency to learn whether there are any special circumstances related to the mission
- At this pre-application stage, prospective applicants will also be offered the **Traffic Light System**. This will give prospective applicants an indication of the likelihood of a licence being granted, and may result in a more tailored, streamlined application form.

(Prospective applicants are not obliged to use the Traffic Light System.)

Stage 1: Application submitted

- Completed application form and initial supporting information, together with licence application fee, received by UK Space Agency

Stage 2: UK Space Agency's assessments

i. Suitability of applicant's **insurance** cover: to ensure that the cover for the mission provides appropriate cover for the UK government under the conditions of the licence.

ii. Applicant's **financial** status: to ensure that the applicant has adequate resources to carry out the proposed activity and to meet and maintain their obligations under the licence (e.g. continuing to meet insurance premium payments); to ensure that the applicant is sufficiently sound to enable a licence to be issued, bearing in mind (i) the UK government's potential liabilities for the activity under international treaties, and (ii) the statutory indemnity in favour of the government from everyone to whom the OSA applies.

iii. **Technical** assessment: to ensure that the launch and operation of the space object conform with international law (e.g. laws regarding the responsible use of space, including the need to avoid harmful contamination of space) and that neither activity poses a risk to people or property.

iv. Checks with **OFCOM** to ensure that correct ITU filings have been made (i.e. that the frequencies to be used will not cause interference issues).

v. Licence application **political and legal** review: we will liaise as appropriate with other government departments and partners (e.g. Ministry of Defence) to ensure that the planned activity will not affect government activities.

Stage 3: Decision

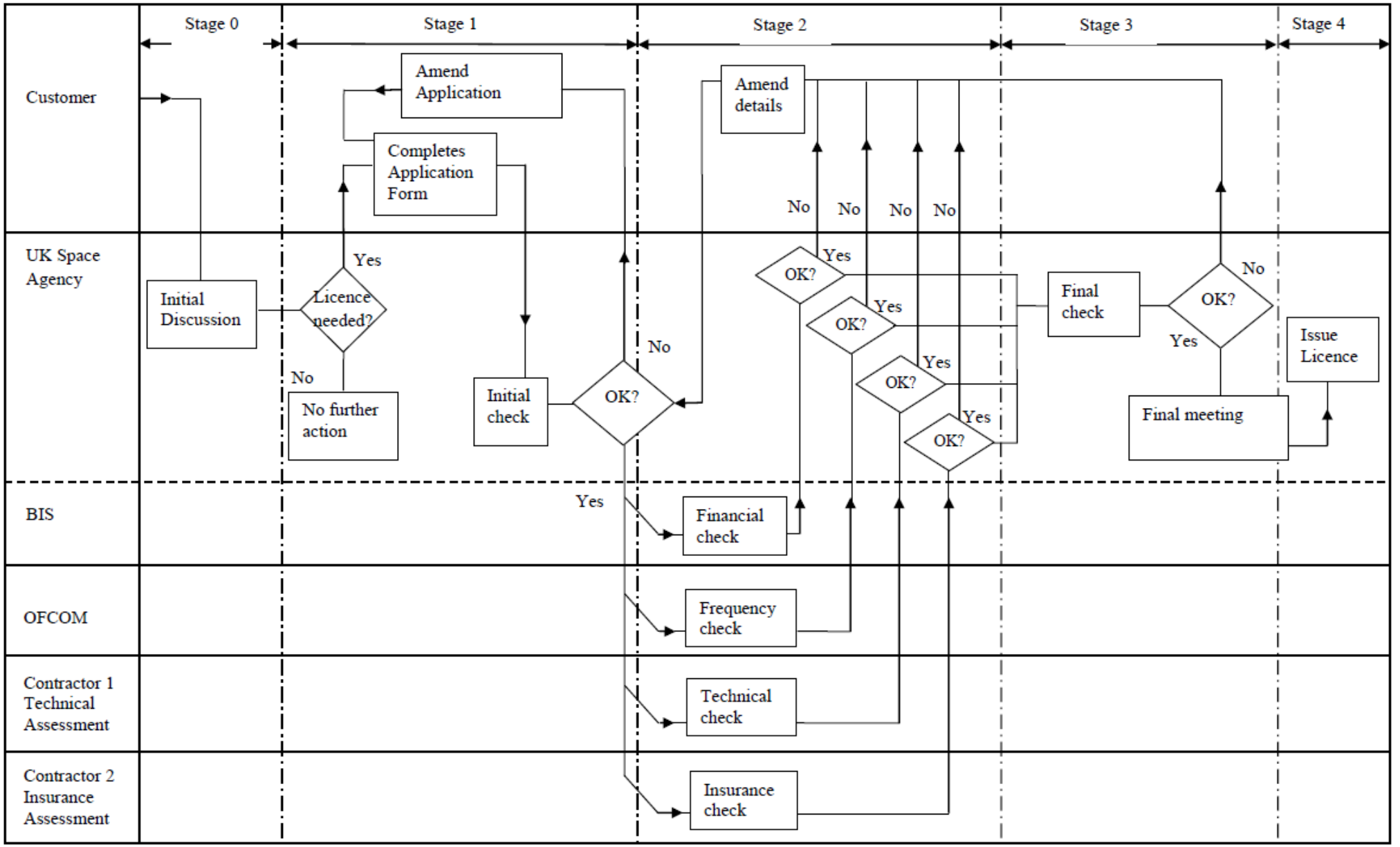
- UK Space Agency ensures that all checks are complete and decides whether or not to issue the licence.

- If the decision is made that a licence can be issued, the licence is prepared, adding conditions where necessary (e.g. in response to advice from any of the above points of the process).

- Final meeting with applicant to explain any conditions in the licence, if necessary.

Stage 4: Licence issued or refused

- A licence is issued from the UK Space Agency on behalf of the Secretary of State to the applicant, or the UK Space Agency refuses to issue a licence for the activities.


Stage 0
Stage 1
Stage 2
Stage 3
Stage 4
Customer
UK Space Agency
BIS
OFCOM
Contractor 1 Technical Assessment
Contractor 2 Insurance Assessment
Amend Application
Completes Application Form
Amend details
Initial Discussion
Licence needed?
Yes
No
No further action
Initial check
OK?
No
Yes
Financial check
Frequency check
Technical check
Insurance check
No
No
No
No
OK?
Yes
OK?
Yes
OK?
Yes
OK?
Yes
Final check
OK?
No
Yes
Final meeting
Issue Licence

6. Contact us

In case of enquiries, please contact regulation@ukspaceagency.gov.uk

ANNEX A: Licensing Questions

1.1 Introductory notes

The questions in this section are intended to allow the applicant to demonstrate:

- A clear understanding of the hazards involved in the space activity;
- That a reasonable attempt has been made to limit those hazards.

The information should be sufficient to allow the UK Space Agency safety assessor to understand the potential for all liabilities arising through launch, in-orbit operations and after disposal. In particular, the safety assessor will consider six main categories of information:

- System design, functionality, and performance
- System qualification, history, and reliability
- System and mission risk assessment
- Safety plans and procedures
- Safety requirements, constraints, rules and criteria
- Safety organisation, roles, and authorities

The process is expected to be iterative and time should be allowed for further questions. The UK Space Agency reserves the right to ask additional questions as part of the licensing process.

The applicant should first indicate which phase of the mission is subject to UK launch licensing (i.e. launch and/or in-orbit).

For launch-only licence applications, questions from section 1.2 should be answered.

Where in-orbit activities are also subject to licensing, questions from sections 1.2, 1.3, and 1.4 should be answered.

The criteria by which the applicant's responses are judged are derived principally from the following standards:

1. ISO 14620-1:2002, "Space systems — Safety requirements — Part 1: System safety",2002.

2. ISO 14620-2:2000, "Space systems -- Safety requirements -- Part 2: Launch site operations", 2000.

3. ISO 14620-3:2005, "Space systems -- Safety requirements -- Part 3: Flight safety systems", 2005.

4. IADC-02-01, "IADC Space Debris Mitigations Guidelines", IADC,15th October 2002,

5. IADC-04-06, "Support to the IADC Space Debris Mitigation Guidelines", 5th October 2004,

6. ISO 24113, "Space debris mitigation"

7. ISO 23339, "Propellant mass estimation"

8. ISO 26872, "GEO disposal"

9. ISO 27852, "Orbit lifetime estimation"

10. ISO 27875, "Re-entry risk management"

11. ISO 11227, "Test procedures for HV1 material ejecta"

12. ISO 11233, "Orbit determination and estimation"

13. ISO 14222, "Atmosphere density models"

14. ISO 14200, "Process based meteoroid/debris environment models"

15. ISO/TR 16158, Space systems — Avoiding collisions among orbiting objects

16. ISO/TR 18146, Space systems — Space debris mitigation design and operation guidelines for spacecraft

17. ISO/TR 20590, Space systems — Space debris mitigation design and operation guidelines for launch vehicles

18. ISO N615, "Disposal of spacecraft in LEO"

19. ISO N617, “Spacecraft passivation”

20. ISO 16126, Space systems — Assessment of survivability of unmanned spacecraft against space debris and meteoroid impacts to ensure successful post-mission disposal

21. ECSS-E-ST-35-01C Liquid and electric propulsion for spacecraft

22. ISO 23041, “Unmanned spacecraft operational procedures”

23. ISO 14623, “Pressure vessels and pressurised structures – design and operation”

24. ISO 26870, “Launch pad and integration site operational documents”

25. Satellite Users Interference Reduction Group http://suirg.org

26. ECSS E ST 10 -04C Space environment

27. ECSS E ST 33 11 Space engineering – Explosive systems and devices

28. ECSS Q ST 40C Safety

OFFICIAL SENSITIVE: COMMERCIAL – when complete

1.2. Questions applicable to launch-only activities

1	Please identify the proposed launch vehicle (e.g. variant of Ariane 5, Soyuz… etc), baseline launch date, and whether the launch is shared with other satellites (if so, please indicate the deployment order from the launch vehicle).
2	Please provide an overview description of the launch indicating site location, range size, overflight of countries, and drop locations for the stages. Please identify how the downrange area is cleared in advance of the launch, indicating if any evacuation notifications are provided in advance (e.g. to airmen, seamen, or landmasses overflown).
3	Is there a high-level safety plan aimed at limiting the hazards resulting from the launch activity? Please provide the document reference and identify the originating and approval organisations. If the originator of the document is not the applicant, please identify whether the document has been approved by the applicant. Also, please identify the flow of responsibilities between the relevant organisations in the safety process, specifically addressing the preparation for launch, launch, range definition control and flight path.
4	Is there a risk assessment and mitigation plan addressing the hazards to persons and property, including third parties, and the environment (including contamination) under nominal and failure conditions for the following phases – preparation for launch (including storage and handling of toxic propellants), ignition/initial ascent, trajectory down range to attainment of orbital status, and impact/disposal/recovery of launch related objects at the Earth's surface? For each risk assessment and plan, please also identify the originating and approval organisations.
5	Has a formal methodology been adopted in the identification of failure modes (e.g. FMECA) that could result in hazards to persons and property during the above-mentioned launch phases? Please briefly describe the approach and refer to any public standards that have been applied. Please identify the extent of the exclusion zone around the launch site, and how this has been judged to be adequate to protect the public in the event of an explosion. Also, please indicate the extent of any emergency services available on site to contain such occurrences.

6	Please summarise the means by which the specific launch event in question has been approved by the national administration(s) responsible for assuring public safety in the domain of the launch site. Please identify each organisation with roles in the approval process. Please describe any known guarantees relating to liabilities of procuring states. Please cite probability of casualty in the proximity of the launch site and drop zones, either due to

	termination down range, or due to a toxic cloud developing at the launch site.
7	If the selected launch vehicle has experienced a recent launch failure, please indicate what corrective action has been taken to ensure that a similar failure will not occur again?
8	What additional state territories could be at risk in a failure situation, for example in the event of a deviation in trajectory? What processes are in place for termination e.g. through range safety officer, or autonomous multiple redundancy voting etc, and how can these processes be judged to be fail safe? In the event of termination, please describe how the dispersal of debris is minimised, and how the detonation of remaining propellants is prevented.
9	Please identify the orbit of any final stage, and the expected orbital lifetime. Please identify any steps taken to minimise the lifetime in this orbit. In addition, please specify the probability of accidental break-up of the final stage, and the probability of successful disposal. Please confirm that the launch provider has performed relative distance analyses between the spacecraft and the launch vehicle upper stage following spacecraft separation, and that the results of these analyses show a large and growing separation between the spacecraft and the upper stage. For any objects re-entering the Earth's atmosphere, please identify if any items could reach the surface.
10	Please identify the passivation of any upper stage, e.g. venting of remaining propellant to prevent possible explosion or release of debris.
11	Please identify the potential for release of debris during separation of the spacecraft from the upper stage. In doing so, please cite mechanisms such as pyrotechnic devices (if included, are they fail-safe devices), and expected maximum size of debris particles if greater than 1mm.

1.3 Questions applicable to satellite in-orbit activities

1	Please provide the currently planned range of dates and orbital parameters for the intended operation of the space system. Please include both the 'transfer to on station' and 'on station' phases. Please identify the company responsible for the design and manufacture of the satellite.
2	Is there a high-level plan aimed at limiting the hazards resulting from the in-orbit activity (e.g. disabling or fragmentation of the in-orbit system)? Please identify the document reference.
3	Is debris release possible in normal operation (e.g. through pyrotechnics during release of solar arrays)? If pyrotechnics are included, are they fail safe devices, and what is the maximum size of particle which can be ejected. Please also state the risk assessment report reference(s).
4	Has a formal methodology (e.g. FMECA) been adopted in the identification of failure modes that could result in the release of debris or the disabling of any manoeuvre capability of the space system? Please reference the FMECA report, and specify an overall probability of accidental breakup.
5	Has any impact survivability testing/analyses been performed on structural elements? Please describe any design features of the spacecraft in terms of impact protection from debris or micrometeorites. The focus here should be the limitation of further debris release (e.g. protection of pressurised systems), and reference should be made to compliance with any relevant standards. What is the probability of accidental breakup?
6	For the battery system, please indicate the following information: 1. What is the battery type (e.g. Lithium ion) and name of supplier? 2. What battery parameters are monitored (e.g. voltage, temperature) at what frequency? 3. Is there any redundancy in the sensors or hardware (including charge regulation)? 4. What are the operational temperature limits, and how are they maintained (e.g. via radiators or heaters). If heaters, is there redundancy? If passively what are the predicted temperature excursions? 5. How is overcharging of the batteries prevented, and what protection exists to prevent explosion of the batteries?
7	For the wheels, please indicate the following information: 1. What is the name of the supplier? 2. What is the orientation of the wheels with respect to pitch, yaw, and roll

	axes? 3. What sensors are used to monitor /control the wheel speed (at what frequency)? 4. What is the design failure rpm and the maximum expected operating rpm? 5. How are the wheels desaturated (e.g. autonomously/manual commanding through thrusters or magnetorquers)? 6. Is there any redundancy in the sensors or hardware (including wheel drive electronics)? 7. Can software override the wheel torque/momentum limit? 8. If the wheels become disconnected from the wheel drive electronics, would attitude control recourse be through manual commanding of the thrusters or magnetorquers?
8	For the propulsion system, please indicate the following information: 1. What are the names of the suppliers for the thrusters, tanks, and valves? 2. What are the pressurant/propellants? 3. What tank parameters are monitored (e.g. temperature/pressure) at what frequency? 4. Is there any redundancy in the sensors or thrusters? 5. How many pressurant/propellant tanks are there, and what procedures exist for equalising pressure between the tanks? 6. What is the safety factor applied to the tanks and how have the tanks been qualified (e.g. test to failure of engineering model, and NDE testing of flight units)? 7. What protection is employed to prevent explosion (e.g. leak before burst)?
9	Please list any other form of stored energy on board the space system (e.g. pumped thermal control system, fuel cells etc), and indicate how operation has been assessed to be safe and any means for passivation at end of life. In the event of a single failed heat pipe, are all battery and propulsion system components still maintained within their qualification temperature limits?
10	Please include the payload & TM/TC operational bands and include the ITU filing reference.
11	At end of life is the payload turned off, the solar arrays stopped, charge capability disconnected from the batteries, the wheels disconnected from the wheel drive electronics, the transmitter disconnected, propellant and pressurant tanks vented, and the heaters turned on to drain the batteries? In what timeframe is passivation expected to be completed, with what success probability?

12	What procedures exist for de-orbiting at end of life – is there an end of mission disposal plan including contingency planning (please reference)? For geostationary (GEO) satellites please indicate the intended re-orbit altitude and eccentricity, the propellant reserve for this manoeuvre, the uncertainty on the propellant reserve, and confirmation that the manoeuvre will be initiated allowing for this uncertainty. Please describe the manoeuvre sequence. For low earth orbit (LEO) satellites please indicate the predicted de-orbit duration, and how this has been calculated by recourse to drag, ballistic coefficient, and surface area assumptions. Details of any procedures undertaken to precipitate de-orbiting should also be provided. In particular the response should include a statement addressing how any part of the space system undergoing atmospheric re-entry has been assessed to be safe in respect of likelihood of parts of the space system surviving to reach the surface of the Earth and the consequential risk to persons and property. For both LEO/GEO, what is the vehicle mass at end of life prior to de-orbiting, and the approximate surface area in the direction of the velocity vector? What is the overall probability of successful disposal? Which method has been selected for determination of residual propellant (e.g. PVT, thermal gauging etc), and what is the accuracy of the orbital altitude knowledge (e.g. ±Xkm)?
13	What redundancy exists for the de-orbit process in terms of command, attitude sensor, thruster, and power capability.

1.4 Questions applicable to ground segment and operational activities

1	Please provide an overview of the ground segment including number of sites, functionality, and connectivity.
2	Is the ground segment intended to be operated by the applicant or a third party? If a third party, please identify.
3	Do operational procedures exist for: - normal operations - recovery from all safe modes - identifying, reporting, correcting anomalous satellite behaviour - identifying problems with procedures - transferring data at shift handover - transferring from prime to back up operations centres
4	How frequently is battery/wheel/tank housekeeping data downlinked? Please describe the retention of down-linked data, automatic flagging of unexpected conditions and review and management of anomalous conditions. Does the spacecraft have any autonomous safeguarding measures?
5	How many staff are dedicated to the satellite, with what shifts and what responsibilities?
6	Is there redundancy in the ground segment elements – e.g. mission computer, antennas, software – and is there a backup control centre? Do the work stations have spare CPU, memory, and disk capacity (at least 30%) under initial loads?
7	Is the ground segment protected by an uninterruptible power supply?
8	Are there any plans for early end of life upon a failure condition covered by the authorised operational procedures? Please reference a plan as applicable.
9	Are formal controls exercised for up-linking commands or new data or software to the space system? Please identify the process, referencing the applicable high-level management plans.
10	What is the planned reliance on ground command (e.g. days or orbital revs between essential uplink or downlink)?
11	Please describe any plans for collision avoidance, including tracking of bodies in proximity to the satellite under consideration, procedures for manoeuvring, and coordination of manoeuvres with third parties (e.g. for station keeping for collocation).

12	Does the ground segment equipment include “Carrier ID” technology?
13	Does the applicant subscribe to a data sharing scheme with other satellite operators such as an RF interference alert system?