# Technical Question Set (TQS)

Guidance and Checklist

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| **Applicant Name** | |
| **Licence Reference** | |

The following pages, once completed, should be submitted to the UK Civil Aviation Authority (CAA) as part of the licence application.
The questions have been developed for applicants to build a baseline set of information upon which a technical risk assessment covering safety, sustainability and security can be performed in accordance with the provisions of the Outer Space Act 1986 and the Space Industry Act 2018.

Please attempt to complete ALL questions on each of the sections, providing your answer in the 'Response' field.

If a question is not applicable to the mission, then please state that it is not applicable and reasons why.

If you have provided information in a separate document, you need include this in your submission. Please provide references and details as to where, within the document, the information can be found in the 'relevant documentation/links' column.

Once completed, please return along with the Orbital Operator Licence application form, as well as any additional technical documentation referenced in this questionnaire to commercialspaceflight@caa.co.uk

## General Guidance

If responses to questions are contained within the applicant's own documentation (e.g. CONOPS, planning documents, internal design documents etc.), please submit the latest version of that document as evidence to support the application, clearly referencing where in the documents each question is answered. One piece of evidence can suffice for multiple answers. If you refer to documents previously supplied or attached to the TQS, then please provide page/paragraph/section references, as well as a link to the document so that we can easily find the information to which you are referring.

At the time of application submitting draft versions of documentation is acceptable however, as the applicant's programme develops, we would expect to see those documents being updated to final versions as part of a robust product and quality assurance regime. Delays in receiving such updated copies might result in delays to a licensing decision.

In the event of any substantive changes to answers given in this TQS, please notify the CAA as soon as possible.

## ALARP Guidance

For orbital operations, applicants should remember that the TQS is the primary opportunity to make their argument that the risks of their operations have been reduced to "as low as reasonably practicable", a safety requirement for the issuing of a licence. Proper processes and procedures, mission design and spacecraft design can all play a part in making this argument. Although arguments may be further developed in conversations and communications with the regulator after the submission of the TQS, the TQS will provide the core of the evidence the CAA will assess to determine if we agree with the applicant's assertion that they have reduced their risks to ALARP.

The technical element of this question helps the CAA to assess whether the applicant satisfies the safety. The names of the organisations is required for the National Security and National Interest tests.

The above information will be assessed in line four core principals of:

- Safety
- Security
- Sustainability
- Responsibility

For a more in-depth explanation of these four core principles applicants should refer to CAP2210 Section 5 "Assessment principles for orbital operator licenses"

## Section Guidance

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| **0) General** | Answer ALL questions | The first part (0) of the Technical Question Set is intended to give the CAA a high-level overview of the proposed mission, including what type of operations will be performed, the primary organisations involved and the goals and potential impacts of the mission. Much of this will be explored in more detail throughout this TQS, so responses in this part can be high-level. |
| **1) Launch** | Answer ALL questions | The first section (A) of the Launch part of the TQS is designed to give the CAA an overview of the selected launch system, providing details of how the applicant has selected and procured their launch opportunity, details of that launch opportunity, information about the launch vehicle and safety considerations for the launch segment and any necessary range operations.<br><br>The second section (B) of the Launch part of the TQS is designed to give the CAA an overview of the launch system's compliance with international space debris mitigation guidelines, particularly including the end-of-life disposal process, and the involvement of any orbital manoeuvring vehicles. |
| **2) Space Segment** | Answer ALL questions | The first section (A) of part 2, is where we ask the applicant to describe the design, assembly, integration and test of their spacecraft.<br><br>The second section (B) of part 2, is where we ask the applicant to describe the reliability, resilience and failure prevention mechanisms of their spacecraft.<br><br>The third section (C) of part 2, is concerned with the development, test and qualification of the spacecraft and the subsystems on board. If the development, test and qualification process for the spacecraft sub-systems and units has been answered in previous sections, there is no need to repeat that information in this section, focus your responses on the development, test and qualification of the integrated spacecraft. |
| **3) Operations** | Answer ALL questions | The first section (A) of the Operations part of the TQS is designed to provide us with a copy of your CONOPS that we can review so that we can get an initial overview of how your operations have been planned and designed to reduce the risks to as low as reasonably practicable. In sections below in part 3 you will have the opportunity to expand upon specific elements of your CONOPS to explain to us further detail of how this has been done.<br><br>The second section (B) of the Operations part of the TQS allows us to examine the pre-mission processes used for assurance purposes, the operational experience of the operator and the people responsible for practical operations. All of these play an important role in arguing that operations will be safely conducted.<br><br>The third section (C) of the Operations part of the TQS enables us to assess the process and procedures used after launch to move the satellite into the correct orbit, what checks will be made prior to the satellite starting mission operations and the approach to be taken if a satellite is deemed to be dead on arrival. |

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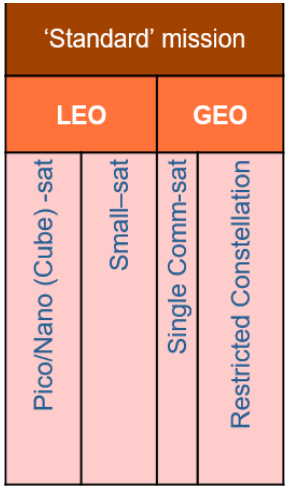
| | | The fourth section (D) of the Operations part of the TQS allows applicants to expand upon their approach to maintaining safe operations during the operational lifespan of their satellite. It covers the work the applicant has done on collision analysis and avoidance, trackability and operational monitoring. This allows us to examine how the applicant has considered the likelihood of conjunctions and the primary orbital risks. It also provides space for the applicant to introduce anything else that might affect the approach to monitoring so that this can be considered from early on in the assessment process.<br><br>The fifth section (E) of the Operations part of the TQS covers the end-of-life process being used for the satellite, whether that is graveyarding, atmospheric demise, non-destructive re-entry, or any other method.<br><br>The sixth section (F) of the Operations part of the TQS invites the applicant to introduce any bespoke or complex operations intended to be completed by their satellite. If the operator is intending to conduct these sorts of operations, then they will also be required to complete Part 4- Bespoke Operations, which allows the applicant to expand on these operations. |
| **4) Bespoke Operations** | Answer appropriate questions depending on the mission category (see below) | Some missions consist of very specific and bespoke operations. If this is the case, the purpose of these questions to determine whether these operations are performed in a safe and well thought out manner, adhering to the most appropriate and relevant best practices |
| **5) Ground Segment** | Answer ALL questions | The Ground Segment part of the TQS allows the CAA to assess the operation of the ground segment and consider how the applicant has considered their ground segment operations to reduce any risks to ALARP. |
| **6) Sustainability** | Answer ALL questions | All space missions will have an impact on the orbital environment and the expectation is that applicants will have assessed the impact their mission will have on the orbital environment for all phases of the mission from launch through to post-mission disposal. These impacts range from introducing debris into the orbital environment, defunct spacecraft, and the remnants of launch vehicle stages increasing the risk faced by other orbital users.<br><br>The need for applicants to assess their impact on the orbital environment is driven by the goals set out in the UN Outer Space Treaty, the UN Committee on the Peaceful Uses of Outer Space (UNCOPUOS) Guidelines on the Long-term Sustainability of Outer Space Activities, Inter-Agency Space Debris Coordination Committee (IADC) to which the United Kingdom is a signatory or member agency. |

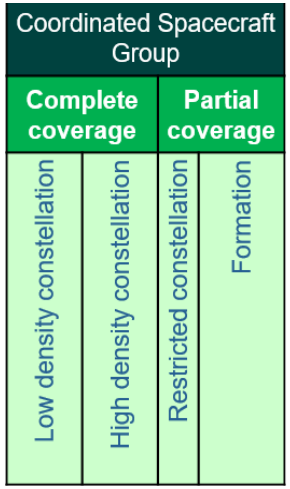
**Mission categories Table**

Missions are loosely categorised in the following way, as **standard** missions, **constellations** (e.g. coordinated spacecraft groups) and **Rendezvous and Proximity Missions (RPO)**.

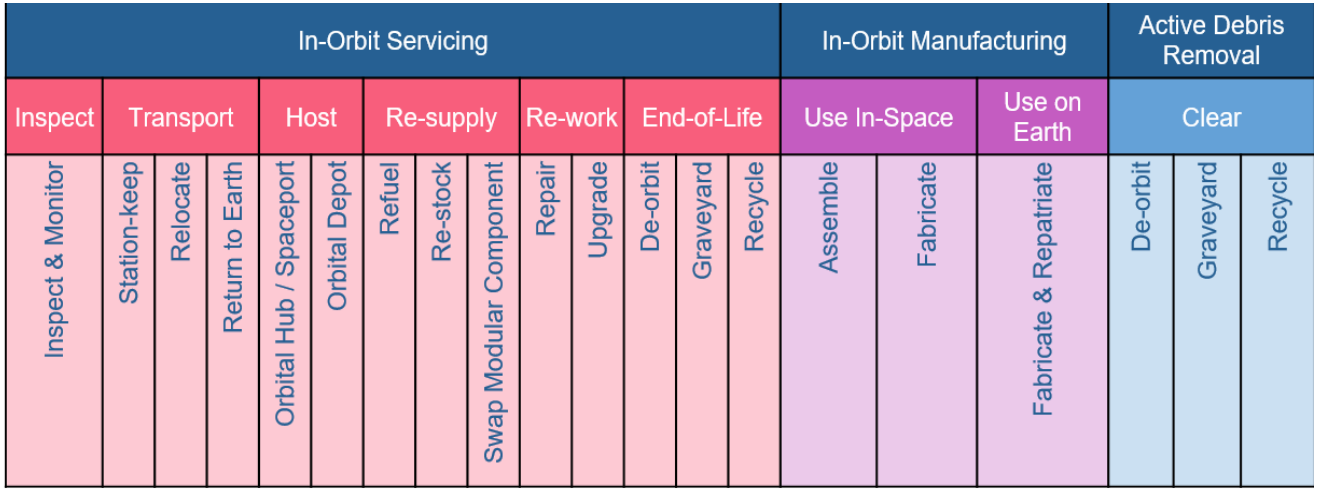
Note: this is not exhaustive and is merely meant as a guide to help clarify the mission type.




*'Standard'*




*'Constellations'*




*'RPO'*

## 0) General

The first part (0) of the Technical Question Set is intended to give the CAA a high-level overview of the proposed mission, including what type of operations will be performed, the primary organisations involved and the goals and potential impacts of the mission. Much of this will be explored in more detail throughout this TQS, so responses in this part can be high-level.

Please answer all questions.

| **Mission Overview** | | | | |
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| **ID** | **Question** | **Guidance** | **Relevant Document Link** | **CAA Comment** |
| 0-1 | What is the name of the mission? | | | |
| **Response** | | | | |
| 0-2 | Who will be overseeing the mission and who will be operating the spacecraft(s)? | | | |
| **Response** | | | | |
| 0-3 | Who is the customer for the services provided by the spacecraft or system? | | | |
| **Response** | | | | |
| 0-4 | Please identify the key organisations involved in the mission and their role in the delivery of the mission, including those responsible for design and manufacture of the spacecraft | *The description should provide details on the key organisations and interfaces/relationships between the partners e.g. prime, sub-contractor, operator, customer etc.* | | |
| **Response** | | | | |
| 0-5 | What is the purpose of the mission in terms of technology maturity? Please provide sufficient background to help support the classification. | *Technology demonstrator: Defined as a mission whose function is to test new technology in a relevant environment funded either by internal R&D funding or external contract to a commercial entity, government or institutional body.* | | |

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| | | *Path-finder mission: Defined as a prototype mission designed to test the CONOPS of a future, more complex mission (for example, a large constellation).*<br><br>*Commercial service: Defined as a mission providing a commercial service to a commercial entity, government or institutional body.*<br><br>*Follow-on mission: Defined as a mission with previous flight heritage either as a technology demonstrator or a repeat mission.*<br><br>*Other: Another type of mission that does not fall into these categories.* | | |
| **Response** | | | | |
| 0-6 | What mission type is being proposed? | *Please refer to Mission Categories table (page 3) for a description of different mission types, or, if not appropriate for this mission please provide a description.* | | |
| **Response** | | | | |
| 0-7 | Please provide a mission summary and overview of the concept of operations. | *The summary should provide sufficient insight into the nature of the mission being proposed (e.g. life extension, relocation, de-orbiting, removal, orbit modification (altitude, eccentricity, inclination), formations, constellations, other, or combinations thereof). The concept of operations should identify key details on the mission phases from launch to disposal (duration, orbit), expected interactions and interfaces with ground.* | | |
| **Response** | | | | |
| 0-8 | What is the mission scenario and schedule? | *Please provide details on the timeline and orbit characteristics through the mission. Details of the expected duration of key mission phases is expected alongside the orbit parameters for the parking, operational and disposal orbits etc.* | | |
| **Response** | | | | |

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| 0-9 | Will the spacecraft(s) be stored on ground for an extended period prior to launch? | *Please provide details on the maximum storage duration and storage facilities prior to launch.* | | |
| **Response** | | | | |
| 0-10 | What is the nominal lifetime of the mission(s)? | *Please provide details on the mission lifetime and if mission extensions are provisionally envisaged. Mission extensions are subject to the decision of the operator and consideration of the spacecraft and satisfaction of key mission objectives but awareness by the CAA is critical to ensure approval.* | | |
| **Response** | | | | |
| 0-11 | Please provide details on any planned follow-on missions which will incorporate technologies used on this mission to perform similar functions, or coordinate with existing spacecraft | | | |
| **Response** | | | | |

# 1) Launch

The first section (A) of the Launch part of the TQS is designed to give the CAA an overview of the selected launch system, providing details of how the applicant has selected and procured their launch opportunity, details of that launch opportunity, information about the launch vehicle and safety considerations for the launch segment and any necessary range operations.

If responses to the questions in this section are contained within the applicant's own documentation (e.g. CONOPS, service agreements, planning documents etc), please submit the latest version of that document as evidence to support the application, clearly referencing where in the documents each question is answered. One piece of evidence can suffice for multiple answers. If you refer to documents previously supplied or attached to this TQS, then please provide page/paragraph/section references, as well as a link to the document so that we can easily find the information to which you are referring.

At the time of application submitting draft versions of documentation is acceptable however, as the applicant's programme develops, we would expect to see those documents being updated to final versions as part of a robust product and quality assurance regime. Delays in receiving such updated copies might result in delays to a licensing decision.

In the event of any substantive changes to the answers in this section, please notify the CAA as soon as possible.

Please answer all questions.

| **A Launch System Overview** | | | | |
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| **ID** | **Question** | **Guidance** | **Relevant Document Link** | **CAA Comment** |
| 1-A-01 | Please describe how you have chosen/intend to choose a launch opportunity. | *Please provide a brief description of how/why you have chosen/intend to choose a launch opportunity or how you intend to do so.*<br><br>*The CAA uses the information gathered in this question to establish that the applicant's launch opportunity selection process takes into consideration safety and sustainability when choosing a launch opportunity, not solely a commercial decision and that due diligence is carried out on all parties involved in the launch procurement process.* | | |
| **Response** | | | | |
| 1-A-02 | Please tell us about the organisation(s) or company(ies) responsible for procuring the launch. | *The procurement of a launch system can involve many complex technical and commercial interfaces. This question seeks to gain an understanding of who is involved in the procurement of the launch of the applicant's satellite(s).* | | |

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| | | *Please tell us who your primary commercial and technical interface is with.*<br><br>*If it is not just the applicant involved in the procurement of the launch, additional information regarding the organisations or parties involved will be required.*<br><br>*Please indicate if a launch brokerage service, launch aggregation service, or other intermediary has been involved on the procurement process. If this is the case, then please name the organisation(s) involved. Please include the country in which the organisation(s) is registered.*<br><br>*The CAA will use the information gathered in this section to assess whether the launch procurement process only involves the use of organisations that are not likely to breach the UK's international obligations, national security, or cause or be perceived to cause undue reputational risk to the UK.* | | |
| **Response** | | | | |
| 1-A-03 | Please provide evidence to show that a specific launch opportunity has been agreed/identified. | *This question seeks to gain an understanding of how the details of the launch of the applicant's satellite(s) is negotiated and finalised.*<br><br>*Please provide documentary evidence in support of the specific launch opportunity (such as a letter of intent, launch services agreement, or other similar documents).*<br><br>*If there is no specific agreement in place, please provide details on the steps you are planning to take to secure a launch.*<br><br>*The applicant should be aware that finalised details of the launch is required for the CAA to complete the assessment of the licence application.* | | |
| **Response** | | | | |
| 1-A-04 | What is the nominal launch date for the mission? | *Based on information provided by the launch operator, what is the nominal launch date.* | | |

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| | | *The CAA understands that, at the time of making the application, an applicant may not have a confirmed launch date.*<br><br>*If a confirmed launch date has not been given, please notify the CAA as soon as possible once this information becomes available.* | | |
| **Response** | | | | |
| 1-A-05 | Please tell us whether your proposed launch opportunity is a dedicated launch or if you are sharing the launch opportunity with other satellites. | *Please state whether you are: -*<br>- *Launching as the sole payload on a dedicated launch vehicle*<br>- *The primary payload on a shared launch*<br>- *The secondary payload on a shared launch*<br>- *A payload share procured directly from the launch vehicle manufacturer/operator.*<br>- *On an orbital transfer vehicle either as a sole payload on the launch vehicle or part of a payload share*<br>- *Part of a launch aggregation service, such as a pod deployment service*<br><br>*If none of the above are applicable, please provide details.*<br><br>*The purpose of the question is to understand, as far as is reasonably practicable, which other organisations or launching states are present on the applicant's chosen launch opportunity. It also helps the CAA proportionately assess the degree of influence the applicant can have over the mission profile of the launch system to ensure that the launch system provider(s) behave responsibly with respect to international obligations and sustainability. An applicant whose satellite is the sole or primary payload on the launch system will be expected to exert far greater pressure on the launch system provider(s) to behave responsibly than an applicant whose satellite is launched from a deployment pod procured from a ride aggregation service provider.* | | |

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| | | *The CAA will use the information gathered in this section to assess whether the actions of the launch operator(s) and launch manifest only involves the use of organisations that are not likely to breach the UK's international obligations or cause or be perceived to cause undue reputational risk to the UK.* | | |
| **Response** | | | | |
| 1-A-06 | Please provide any supporting evidence that you as the applicant have had to provide to the launch service provider(s) in support of their activities to ensure compatibility between the applicant spacecraft and the launch system. | *Launch vehicle interfacing is both a technically and commercially complex activity. It is likely that the chosen launch system provider(s) will have their own interfacing requirements, set by the launch site operator/range operator, to satisfy. This may require the applicant to provide evidence that their spacecraft will not compromise launch site, range and launch safety.*<br><br>*The launch system provider(s) will also place requirements upon the applicant to ensure compatibility with the launch system to ensure that the safety and reliability of the launch vehicle is not compromised by the applicant's satellite and that the applicant's satellite is not damaged during the launch preparation activities and the launch, ensuring it that arrives on-orbit in optimum health and doesn't present a risk of being an orbital debris hazard.*<br><br>*The purpose of this question is to establish that the applicant has already fulfilled or has plans in place to fulfil all interfacing obligations as specified by their launch service provider.*<br><br>*Evidence might include safety plans, risk assessments, risk mitigation plans, range safety compliance matrices, launch system compliance matrices or similar documents.*<br><br>*The CAA will use the information gathered in this question to determine that safety of the launch system is not compromised by the applicant's satellite, and that the applicant and the launch system provider(s) are interfacing effectively, in pursuit of a common safety goal.* | | |

| Response | | | | |
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| 1-A-07 | Please tell us about your proposed/selected launch system, its manufacturer(s), country(ies) of origin and a summary of its recent flight history, success rate and reliability. | *The purpose of this question is to gain an understanding of all the elements and associated organisations that comprise the launch system, who is responsible for the design, manufacture, and operation of those elements and to understand the reliability and flight heritage of those elements.*<br><br>*The elements of interest would include the launch vehicle (the rocket, all stages), orbital transfer or manoeuvring vehicles, clamp bands or other hold-down mechanisms that perform an equivalent function, and satellite deployment pods.*<br><br>*Orbital transfer or manoeuvring vehicles are systems and vehicles subject to their own mission operations and management, distinct from the operations and management of the launch vehicle.*<br><br>*If any element of the launch system is new or has limited flight heritage (fewer than 5 launches in total with fewer than 3 consecutive launches resulting in the successful deliveries of payloads to orbit), please indicate the approach to test flights, date of the first orbital launch, date of the first commercial launch and whether the vehicle is derived from any other vehicle of programmes.*<br><br>*If the launch preceding your own proposed launch opportunity resulted in failure or did not successfully deliver its payloads to orbit, what level of assurance have you sought from or has been provided by the vehicle operator to demonstrate that they have adequately investigated the anomaly, identified the root cause and put corrective actions in place to satisfy themselves and you that they can proceed to the next launch with an appropriate level of confidence in mission success. For this we are only looking for evidence of the process, we are not requesting to see information that may be confidential between the applicant and the launch service provider. It should be noted here that due to timing of licence application* | | |

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| | | *processing and the operations of the selected launch systems this situation could occur at any time during the licence application process. It is incumbent upon the applicant to keep the CAA informed of any anomalies or failures of their selected launch systems.*<br><br>*For this question the notion of failure or the unsuccessfully delivery its payloads to orbit applies to all elements of the launch system; the carrier vehicle, launch vehicle (the rocket), orbital transfer vehicle, or deployment pod.*<br><br>*The CAA will use the information gathered in this section to assess whether the safety test is satisfied by the selection of a launch system and launch system elements with known good flight heritage, provided by organisations that are not likely to cause or be perceived to cause undue reputational risk to the UK.* | | |
| **Response** | | | | |
| 1-A-08 | Summarise the preparatory activities which will be performed involving your spacecraft from its arrival at the spaceport to the launch and who is conducting those activities. | *There can be an extended period of time between the satellite leaving the applicant's or spacecraft suppliers premises and the actual launch.*<br><br>*Please include such things as:*<br>- *System health checks*<br>- *Battery charging*<br>- *Pressurisation/fuelling*<br>- *Pyrotechnics installation/arming*<br>- *Integration with deployer/LV payload adaptor/separation system*<br>- *Post-integration communications with the spacecraft*<br>- *Any other potential hazardous operations*<br><br>*This should include activities performed by the applicant on their own spacecraft and those performed by others on the applicant's spacecraft. Where activities are subcontracted, provide evidence of technical Statement of Work (SOW), requirements flow down etc such that the CAA can be confident* | | |

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| | | *that the subcontractor is able to conduct those activities as effectively as the applicant themselves.*<br><br>*If the final integration step of the applicant's satellite is installation into a deployment pod or other such functionally similar device, then consider this question to apply to that integration step. The CAA may subsequently request information regarding downstream integration steps.*<br><br>*The CAA will use the information gathered in this question is to determine that the safety and reliability of the applicant's satellite is not compromised during transportation and launch preparation activities, ensuring it that arrives on-orbit in optimum health and doesn't present a risk of being an orbital debris hazard.* | | |
| **Response** | | | | |
| 1-A-09 | Please provide a description of the launch site / launch point indicating location, range authority and launch azimuth. | *Please tell us the site name, the site operator, the site location (LAT/LONG), planned or expected launch azimuth and the range operator/service provider.*<br><br>*If a map of the launch site/launch point can be provided, please do so.*<br><br>*In the case of a drop launch from a carrier vehicle please include descriptions of the departure and return locations of the carrier vehicle as well as launch vehicle prop point*<br><br>*The CAA will use the information gathered in this section to understand the launch location, in particular the nation from which the launch is being conducted, to determine whether UK entities working with a particular nation is likely to breach the UK's international obligations or cause or be perceived to cause undue reputational risk to the UK.* | | |
| **Response** | | | | |

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| 1-A-10 | Please identify who is responsible for identification, notification and control of land, marine, and airspace hazard areas. | *For this question, only identification of the organisation responsible for identification, notification and control of land, marine, and airspace hazard areas is required, not the specific hazard areas.*<br><br>*In the case of a drop launch from a carrier vehicle please include the organisations responsible for the hazard areas associated with the departure and return locations of the carrier vehicle as well as the organisations responsible for the hazard areas associated with the launch vehicle prop point, flight path and trajectory.*<br><br>*The CAA will use the information gathered in this section to establish that the applicant's proposed activity does not involve the use of organisations that don't take reasonable steps to ensure that public safety and the prevention of damage to property is not compromised during them conducting the activities they've been contracted to carry out.* | | |
| **Response** | | | | |
| 1-A-11 | Please identify the national administration responsible for approving the specific launch opportunity identified, and which has responsibility for assuring public safety in the domain of the launch site. | *For this question we do not need a description of the approval process, just evidence that the launch activities have been approved by a national administrator.*<br><br>*In many cases, these will be the same organisation(s) named in section 1-A-10. If they are not, please identify all bodies.*<br><br>*As an example, for a US launch we might expect to see FAA for the launch, 4th space wing for range (AFSPCAMAN).*<br><br>*Compliance with existing overseas administrations is not automatically a guarantee of a positive licensing decision.*<br><br>*The CAA will use the information gathered in this section to establish that the applicant's proposed activity does not involve the use of organisations that don't take reasonable steps to ensure that public safety and the prevention of damage to* | | |

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| | | *property is not compromised during them conducting the activities they've been contracted to carry out.* | | |
| **Response** | | | | |

The second section (B) of the Launch part of the TQS is designed to give the CAA an overview of the launch system's compliance with international space debris mitigation guidelines, particularly including the end-of-life disposal process, and the involvement of any orbital manoeuvring vehicles.

If responses to the questions in this section are contained within the applicant's own documentation (e.g. CONOPS, design documents, service agreements, planning documents etc), please submit the latest version of that document as evidence to support the application, clearly referencing where in the documents each question is answered. One piece of evidence can suffice for multiple answers. If you refer to documents previously supplied or attached to this TQS, then please provide page/paragraph/section references, as well as a link to the document so that we can easily find the information to which you are referring.

At the time of application submitting draft versions of documentation is acceptable however, as the applicant's programme develops, we would expect to see those documents being updated to final versions as part of a robust product and quality assurance regime. Delays in receiving such updated copies might result in delays to a licensing decision.

In the event of any substantive changes to the answers in this section, please notify the CAA as soon as possible.

Please answer all questions.

| **B Launch System Disposal** | | | | |
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| **ID** | **Question** | **Guidance** | **Relevant Document Link** | **CAA Comment** |
| 1-B-01 | How does the launch operator intend to comply with international space debris mitigation guidelines (lifetime, reducing probability of accidental breakup, minimisation of debris)? | *The purpose of this question is to establish that the applicant is and should be fully aware of the wider space environmental impact their mission has. This is not just about the applicant's own actions but those of the organisations that the applicant engages with in pursuit of their mission objectives.*<br><br>*Identify the passivation of any upper stage, e.g. venting of remaining propellant to prevent possible explosion or release of debris.*<br><br>*If known, identify the final orbit of any final stage, including expected margins (+/-) and explain how this will be confirmed.* | | |

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| | | *Please identify any additional items that will be released and injected into orbit as part of the launch event or separation process (circularisation stages, secondary structures, pyrotechnic materials). 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.*<br><br>*The CAA will use the information gathered in this section to determine that the actions of the launch system operator(s) are in line with the UK's commitment to the minimisation of space debris and to ensure the long-term sustainability of the orbital environment. This feeds into the wider goal of ensuring that the applicant's proposed activities do not breach the UK's international obligations and are not likely to cause or be perceived to cause undue reputational risk to the UK.* | | |
| **Response** | | | | |
| 1-B-02 | If the spacecraft is on an orbital manoeuvring vehicle (OMV), then how does the operator of the OMV intends to comply with international space debris mitigation guidelines (lifetime, reducing probability of accidental breakup, minimisation of debris)? | *The purpose of this question is to establish that the applicant is and should be fully aware of the wider space environmental impact their mission has. This is not just about the applicant's own actions but those of the organisations that the applicant engages with in pursuit of their mission objectives.*<br><br>*Identify the passivation of any upper stage, e.g. venting of remaining propellant to prevent possible explosion or release of debris*<br><br>*If known, identify the final orbit of any final stage, including expected margins (+/-) and explain how this will be confirmed.*<br><br>*Please identify any additional items that will be released and injected into orbit as part of the launch event or separation process (circularisation stages, secondary structures, pyrotechnic materials). 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.* | | |

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| | | *The CAA will use the information gathered in this section to determine that the actions of the launch system operator(s) is in line with the UK's commitment to the minimisation of space debris and to ensure the long-term sustainability of the orbital environment. This feeds into the wider goal of ensuring that the applicant's proposed activities do not breach the UK's international obligations and are not likely to cause or be perceived to cause undue reputational risk to the UK.* | | |
| **Response** | | | | |

## 2) Space Segment

The first section (A) of part 2, is where we ask the applicant to describe the design, assembly, integration and test of their spacecraft.

If responses to the questions in this section are contained within the applicant's own documentation (e.g. detailed design description, CDR data pack etc.), please submit the latest version of that document as evidence to support the application, clearly referencing where in the documents each question is answered. One piece of evidence can suffice for multiple answers. If you refer to documents previously supplied or attached to this TQS, then please provide page/paragraph/section references, as well as a link to the document so that we can easily find the information to which you are referring.

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In the event of any substantive changes to the answers in this section, please notify the CAA as soon as possible.

Please answer all questions.

| **A Subsystems and integrated spacecraft overview** | | | | |
|---|---|---|---|---|
| **ID** | **Question** | **Guidance** | **Relevant Document Link** | **CAA Comment** |
| 2-A-01 | Please provide a description of the spacecraft. | *The purpose of this questions is to understand the overall design of the spacecraft systems and mission they are planning to undertake.*<br><br>*Spacecraft design overview description should include:*<br>- *Spacecraft technical specification,*<br>- *Geometry (stowed and deployed views with dimensions),*<br>- *Spacecraft system level schematics or spacecraft architecture.*<br>- *Budget summaries (e.g. mass, power, propellent, link),*<br>- *Key subsystem characteristics (type, supplier, heritage), Payload/mission specific technology (type, supplier, heritage) e.g. rendezvous sensors, robotic arms etc,*<br>- *Software (supplier, heritage).* | | |

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| | | *Please provide a brief summary on how the subsystems or subsystem components (e.g. sensors) will be used during the various mission phases.*<br><br>*It is accepted that spacecraft design might not be advanced enough to provide all the details, so it is reasonable to list any TBDs and provide the information at a later date.* | | |
| **Response** | | | | |
| 2-A-02 | Please provide details on any novel technologies proposed for the mission. | *This question is designed is to understand what systems are onboard that may be new developments, have no existing flight heritage or are novel application of existing technology or new technology. We define 'novel' on the basis of technology readiness level (TRL), as described in a standard such as ISO 16290:2013 or described by NASA or ESA.*<br><br>*It would be useful to see development plans for any new developments or novel technologies but our primary interest that these new developments or novel technologies don't compromise safety or sustainability of the orbital environment.* | | |
| **Response** | | | | |
| 2-A-03 | Please provide the spacecraft Assembly Integration and Testing (AIT) flow including planned reviews leading up to the launch or launch readiness. | *This question is focused upon the nominal AIT (Assembly Integration and Testing) process flow, typically from spacecraft MRR (Manufacturing Readiness Review) through to FRR (Flight Readiness Review). We are not looking for a defined schedule or specific dates but evidence of the robustness of this process such as review minutes, actions tracked and closed out, non-conformances accepted, mitigated, or rectified.* | | |
| **Response** | | | | |
| 2-A-04 | Please provide details of the Attitude and Orbit Control System (AOCS). | *Please provide details of:*<br>- *Schematics of the system or details on system architecture*<br>- *Hardware list, quantities, supplier, TRL, heritage, qualification status* | | |

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| | | - *Fault tolerance*<br>- *Sub-System level Redundancy*<br><br>*Note: Above is a non-exhaustive list. Please add any specifics related to proposed mission.* | | |
| **Response** | | | | |
| 2-A-05 | Please provide details of the Electric Power System (EPS). | *Please provide details of:*<br>- *Schematics of the system or details on system architecture*<br>- *Hardware list, quantities, supplier, TRL, qualification status*<br>- *Power budgets*<br>- *Details on Thermal management for EPS hardware*<br>- *Fault tolerance*<br>- *Sub-system redundancy*<br><br>*Note: Above is a non-exhaustive list. Please add any specifics related to proposed mission.* | | |
| **Response** | | | | |
| 2-A-06 | Please provide details of the Telemetry, Tracking and Control (TT&C) system. | *Please provide details of:*<br>- *Schematics of the system or details on system architecture*<br>- *Hardware list, quantities, supplier, TRL, qualification status*<br>- *Link budgets*<br>- *Fault tolerance*<br>- *Sub-system redundancy*<br><br>*Note: Above is a non-exhaustive list. Please add any specifics related to proposed mission.* | | |
| **Response** | | | | |
| 2-A-07 | Please provide details of the Propulsion System. | *Please provide details of:* | | |

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| | | - *Schematics of the system or details on system architecture including type of propellant tank(s), volume and MEOP*<br>- *hardware list, quantities, supplier, TRL, qualification status*<br>- *Propellent budget*<br>- *Details on propellent management and book keeping*<br>- *Details on Thermal management for propulsion system hardware*<br>- *Fault tolerance*<br>- *Sub-system level redundancy*<br><br>*Note: Above is a non-exhaustive list. Please add any specifics related to proposed mission.* | | |
| **Response** | | | | |
| 2-A-08 | Please provide a description of the Payload chain. | *Where applicable to the payload chain, please provide details of: -*<br>- *Payload type; Optical, Radar, data store and forward, etc.*<br>- *Imager Ground Sample Distance for optical payloads*<br>- *Imager Swath Width for optical payloads*<br>- *Revisit time for optical payloads*<br>- *Optical Bands for optical payloads*<br>- *Payload data downlink operational bands*<br>- *Payload data downlink ITU/OFCOM/FCC filing reference.*<br>- *RF bands for Radar or data store and forward*<br><br>*Note: Above is a non-exhaustive list. Please add any specifics related to proposed mission.*<br><br>*In addition, please provide details of:*<br>- *Hardware list, quantities, supplier, TRL, qualification status*<br>- *How the payload interfaces with the platform and what level of interoperability there is between the payload and platform. Our primary interest is to see* | | |

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| | | *that the applicant has eliminated the risk of a payload anomaly propagating to the platform and disabling the spacecraft*<br>- *How degraded payload performance might impact mission viability. Is there a plan to dispose of the spacecraft in the event of a payload failure?* | | |
| **Response** | | | | |
| 2-A-09 | What stored energy is on-board and how is this managed through the design of the spacecraft? | *Please describe how the spacecraft has been designed to monitor and manage stored energies, for example:*<br>- *Battery charge states,*<br>- *Temperature management,*<br>- *Thermal stores,*<br>- *Pressure vessel pressures,*<br>- *Explosive/Pyrotechnic release mechanisms,*<br>- *Spring or mechanical release mechanisms*<br><br>*Note: Above is a non-exhaustive list. Please add any specifies related to proposed mission.*<br><br>*This section is less concerned (but still of interest) with the day-to-day housekeeping of onboard energy stores but more about how these energy stores behave in off-nominal conditions.*<br><br>*How has the risk of off-nominal operation of these energy stores, that could result in an explosive or uncontrolled release of the stored energy causing a release of debris or break up the spacecraft, been managed to ALARP?*<br><br>*This applies to all operational phases from LEOP to disposal. In the case of disposal this also includes the active depletion of these stored energy sources.* | | |
| **Response** | | | | |
| 2-A-10 | How have you assured yourself that the spacecraft will function as intended for the nominal mission lifetime? | *This question is linked to the answer in 0-10, What is the nominal lifetime of the mission(s)?* | | |

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| **Response** | | | | |
| 2-A-11 | What design controls are in place to mitigate or minimise the debris release possible in normal operation (e.g. deployment, mechanism etc..)? | *Under nominal operating conditions it is expected that debris will not be release as a result of activating the types of mechanisms listed below:*<br>- *Pyrotechnic Valves*<br>- *Tethers and thermal knives*<br>- *Bolt cutters*<br>- *Cable cutters*<br>- *Frangible joints*<br>- *Frangible bolts*<br>- *Non-explosive actuators*<br>- *Bolt catchers*<br>- *Hold-down and release mechanisms*<br>- *Clamp bands*<br>*Note: Above is a non-exhaustive list. please add any specifics related to proposed mission.*<br>*Where the release of debris cannot be eliminated at source, please describe the additional controls and mitigations put in place to contain any possible debris release. Please describe how these controls and mitigations have been developed, tested and qualified.* | | |
| **Response** | | | | |

The second section (B) of part 2, is where we ask the applicant to describe the reliability, resilience and failure prevention mechanisms of their spacecraft.

If responses to the questions in this section are contained within the applicant's own documentation (e.g. detailed design description, CDR data pack, FMECA, FDIR analysis etc.), please submit the latest version of that document as evidence to support the application, clearly referencing where in the documents each question is answered. One piece of evidence can suffice for multiple answers. If you refer to documents previously supplied or attached to this TQS, then please provide page/paragraph/section references, as well as a link to the document so that we can easily find the information to which you are referring.

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In the event of any substantive changes to the answers in this section, please notify the CAA as soon as possible.

Please answer all questions.

| **B Reliability, resilience and failure** | | | | |
|---|---|---|---|---|
| **ID** | **Question** | **Guidance** | **Relevant Document Link** | **CAA Comment** |
| 2-B-01 | What are the on-board safety critical systems? | *A Safety Critical System is defined as a system that, if it were to fail to operate within its operational parameters, could fail to prevent an occurrence.*<br><br>*"Occurrence" means:*<br>*a) any collision with another space object;*<br>*b) any other space debris-generating event; or*<br>*c) any other fortuitous or unexpected event arising out of or in the course of the Licensed Activities wherever occurring, including an event arising from the management of the Licensee's operations, which, if not corrected or addressed, could result in a platform failure, loss of control of the satellite or risk to other space objects.* | | |
| **Response** | | | | |
| 2-B-02 | Over and above mission assurance, what additional measures have been put in place where reasonably practicable, through design, analysis, manufacturing, test and operation lifecycle of the satellite to ensure the reliability of the safety critical systems and how have those reliabilities been quantified? | *Please provide documentary evidence of any quantitative or qualitative analysis performed to understand the reliability of the platform and sub-systems.* | | |
| **Response** | | | | |
| 2-B-03 | What failure mode analysis has been performed? | *Please provide details on the type of failure mode analysis (e.g. FMECA, Fault Tree Analysis, Event Tree Analysis, What If Analysis) that has been performed. The failure mode analysis can be qualitative, semi-quantitative or fully quantitative and could be performed at mission, system, sub-system or unit level.*<br><br>*Please provide an insight into the outcomes of the analysis including how the analysis may have been used to identify* | | |

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| | | *safety critical systems, identify single point failures and inform the design of the spacecraft modes and recovery options in case of failure is detected. (e.g. FDIR Analysis).*<br><br>*If no failure mode analysis has been performed, then please justify why not.* | | |
| **Response** | | | | |
| 2-B-04 | What redundancy or fault tolerance approach has been identified and implemented for safety critical systems? | *Following on from question 2-B-03, how has failure mode analysis been used to review or inform the design of the spacecraft with respect to the approach taken on fault tolerance and redundancy? Is there a documented policy either at mission level or organisation level on fault tolerance and redundancy?*<br><br>*Where requirements for low fault tolerance or a lack of redundancy has come from the spacecraft customer's, what have you done to push back on those requirements to achieve a higher-level fault tolerance or introduce redundancy in the interests of mission safety and sustainability?* | | |
| **Response** | | | | |

The third section (C) of part 2, is concerned with the development, test and qualification of the spacecraft and the subsystems on board. If the development, test and qualification process for the spacecraft sub-systems and units has been answered in previous sections, there is no need to repeat that information in this section, focus your responses on the development, test and qualification of the integrated spacecraft.

If responses to the questions in this section are contained within the applicant's own documentation (e.g. detailed design description, CDR data pack, FMECA, FDIR analysis etc.), please submit the latest version of that document as evidence to support the application, clearly referencing where in the documents each question is answered. One piece of evidence can suffice for multiple answers. If you refer to documents previously supplied or attached to this TQS, then please provide page/paragraph/section references, as well as a link to the document so that we can easily find the information to which you are referring.

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Please answer all questions.

| C Qualification and testing | | | | |
|---|---|---|---|---|
| **ID** | **Question** | **Guidance** | **Relevant Document Link** | **CAA Comment** |
| 2-C-01 | Please provide a summary of the development, test and qualification approach for the platform, subsystems, and payload. | *Please describe the model philosophy adopted in the development, test and qualification of the spacecraft i.e. Breadboard/Engineering Model/Qualification Model/Protoflight Model/Flight Model.*<br><br>*Where this mission uses a heritage platform with the flight spacecraft and sub-systems being subject only to acceptance testing, please name the mission(s) that the qualification activity(ies) was carried out on. This is initially just for our information, but we may choose to look it to this more closely during monitoring,*<br><br>*Please refer to any test standards (NASA GEVS, ECSS etc), launch vehicle requirements (Launch vehicle environments as detailed in launch vehicle user manual), Range safety documents (USAF Space Wing, FAA, RCC, CNES etc) which formed the basis for the development, test and qualification of the spacecraft. Where sub-systems or the platform has no flight heritage, please describe the development activities undertaken to achieve flight readiness.*<br><br>*Where the payload is an item procured from an external third party, the answers to this section need only describe the development, qualification and test of the integrated platform and payload system. There is no need to describe the development, qualification, and test of payload as a standalone item.* | | |
| **Response** | | | | |

## 3) Operations

The first section (A) of the Operations part of the TQS is designed to provide us with a copy of your CONOPS that we can review so that we can get an initial overview of how your operations have been planned and designed to reduce the risks to as low as reasonably practicable. In sections below in part 3 you will have the opportunity to expand upon specific elements of your CONOPS to explain to us further detail of how this has been done.

If responses to the questions in this section are contained within the applicant's own documentation (e.g. CONOPS, design documents, training or testing plans, process and procedural documents etc), please submit the latest version of that document as evidence to support the application, clearly referencing where in the documents each question is answered. One piece of evidence can suffice for multiple answers. If you refer to documents previously supplied or attached to this TQS, then please provide page/paragraph/section references, as well as a link to the document so that we can easily find the information to which you are referring.

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In the event of any substantive changes to the answers in this section, please notify the CAA as soon as possible.

Please answer all questions.

| **A Mission operations overview** | | | | |
|---|---|---|---|---|
| **ID** | **Question** | **Guidance** | **Relevant Document Link** | **CAA Comment** |
| 3-A-01 | Please provide details of the mission CONOPS. | *This should include the scope of the mission operations, orbital parameters at the various stages of the mission, timings of mission phases and any non-standard or novel operations.* | | |
| **Response** | | | | |

The second section (B) of the Operations part of the TQS allows us to examine the pre-mission processes used for assurance purposes, the operational experience of the operator and the people responsible for practical operations. All of these play an important role in arguing that operations will be safely conducted.

If responses to the questions in this section are contained within the applicant's own documentation, please submit the latest version of that document as evidence to support the application, clearly referencing where in the documents each question is answered. Multiple answers can be submitted as part of one piece of evidence. e.g. Detail design description, CDR data pack etc.

If you refer to documents previously supplied or attached to this TQS, then please provide page/paragraph/section references, as well as a link to the document so that we can easily find the information to which you are referring.

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In the event of any substantive changes to the answers in this section, please notify the CAA as soon as possible.

Please answer all questions.

| **B Operational planning** | | | | |
|---|---|---|---|---|
| **ID** | **Question** | **Guidance** | **Relevant Document Link** | **CAA Comment** |
| 3-B-01 | Who is responsible for overseeing the mission planning and preparation? | *If the operator is responsible, please state this.*<br><br>*If anyone other than the operator is responsible for, or significantly involved in mission planning and preparation please identify them here, including the organisation name, and country of registration.* | | |
| **Response** | | | | |
| 3-B-02 | What mission modelling and simulation is planned/has been performed with respect to mission operations? | *Please provide a summary of the type of modelling and simulation that has been performed relevant to the in-orbit phase of the mission.* | | |
| **Response** | | | | |
| 3-B-03 | What on-ground testing is planned/has been performed to test the critical mission hardware/software of the space segment? | *Please describe the tests performed to demonstrate the performance of the safety critical hardware/software in representative conditions (e.g. hardware in the loop tests, TVAC, vibration testing). Specific detail should be provided on the tests performed to demonstrate the Target Acquisition and Engagement and Servicing Phase of the mission.* | | |
| **Response** | | | | |
| 3-B-04 | What training exercises or mission rehearsals are planned/have been performed ahead of the mission? | *This should include full end-to-end exercises and rehearsals of both space and ground segments.* | | |
| **Response** | | | | |

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| 3-B-05 | What operational experience/heritage of operational planning does the operator have from previous missions? | | | |
| **Response** | | | | |
| 3-B-06 | Will any other third-party organisations other than the licensee be able to operate (including the command or control) the spacecraft, either remotely or in-situ at the operations centre? | *Please provide details (at least name of organisation and country of registration) of the third-party organisations and the scope of their ability to operate the spacecraft.* | | |
| **Response** | | | | |
| 3-B-07 | Are there any other mission considerations with respect to pre-launch preparations that have not been captured above? | | | |
| **Response** | | | | |

The third section (C) of the Operations part of the TQS enables us to assess the process and procedures used after launch to move the satellite into the correct orbit, what checks will be made prior to the satellite starting mission operations and the approach to be taken if a satellite is deemed to be dead on arrival.

If responses to the questions in this section are contained within the applicant's own documentation (e.g. CONOPS, design documents, training or testing plans, process and procedural documents etc), please submit the latest version of that document as evidence to support the application, clearly referencing where in the documents each question is answered. One piece of evidence can suffice for multiple answers. If you refer to documents previously supplied or attached to this TQS, then please provide page/paragraph/section references, as well as a link to the document so that we can easily find the information to which you are referring.

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Please answer all questions.

| **C Establishing safe operations** | | | | |
|---|---|---|---|---|
| **ID** | **Question** | **Guidance** | **Relevant Document Link** | **CAA Comment** |
| 3-C-01 | Please provide details of the ejection of the spacecraft from the launch vehicle. | *Details should include:*<br>- *the device used for the ejection,*<br>- *how ejection/deployment is expected to occur,*<br>- *who will be responsible for monitoring the ejection,* | | |

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| | | - *measures in place to ensure conjunctions do not occur between the objects released and/or the launch vehicle upper stage.* | | |
| **Response** | | | | |
| 3-C-02 | What is the proposed timeline of operations and location of the Spacecraft during the LEOP (e.g. early operations phase)? | *If this information is provided in an attached CONOPS document or LEOP plan, please link to it and identify which section in which it may be found.* | | |
| **Response** | | | | |
| 3-C-03 | Where will the satellites be monitored from during deployment (both cooperatively and uncooperatively)? | Please describe how and from where the satellite will be monitored once it's going through its launch and ejection phases. This could include monitor via cooperative means such as launch operator will be providing tracking information of the satellite, ground-tracking, use of radar/optical observation, launch or satellite telemetry etc. Or/and via uncooperative means such as tracking the satellite via other third-party methods, open-source data etc. | | |
| **Response** | | | | |
| 3-C-04 | What checks will be performed and what are the pass/fail criteria prior to commencing nominal operations service? | *Please provide details on health checks, in-orbit tests and/or calibration activities that may be performed, the pass/fail criteria of those activities and the acceptance procedure for moving into the next mission phase. This could also include procedures or thresholds for commencement of operation activities with partial functionality.* | | |
| **Response** | | | | |
| 3-C-05 | What is the process that will be used to decide whether a platform will be considered to have failed? | *This could include failure to establish comms link, or other loss of functionality which would terminate the mission before operational activities.* | | |
| **Response** | | | | |

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| 3-C-06 | What are the procedures and subsequent impact to the mission of spacecraft dead-on-arrival? | *If the decision is made that the spacecraft is dead on arrival or lost, then what process is in place to conclude the planned mission?* | | |
| **Response** | | | | |
| 3-C-07 | Will the spacecraft be inserted directly into its operational orbit from the launch vehicle, or will it be inserted into a staging orbit and raised using onboard propulsion or other means? | *Details should include, as a minimum, the approach used. For an approach other than direct insertion or orbit-raising, a detailed description should be provided.* | | |
| **Response** | | | | |
| 3-C-08 | If orbital manoeuvres are to be employed to reach the operational orbit, who will be responsible for manoeuvring the spacecraft into its operational orbit? Please provide details of the Concept of Operations for orbit-raising. | *This should include timescales and criteria for commencement and end of manoeuvring, as well as how the manoeuvres are to be achieved, including spacecraft systems and propulsion to be used, burn schedule and orbital trajectory.* | | |
| **Response** | | | | |
| 3-C-09 | What anomalies or failures specific to establishing operational orbit have been considered and what mitigation approaches are to be employed? What parameters and associated criteria/thresholds are to be monitored and used for evaluating the performance of the platforms during this mission phase? | *This should include details of the mitigation measures against anomalies and failures, definitions and criteria pertaining to platform loss, and procedures to dispose of the platform during this mission phase.*<br><br>*If this is not controllable by the orbital operator, please explain how potential launch/deployment anomalies have been considered.* | | |
| **Response** | | | | |
| 3-C-10 | Are there any other mission considerations with respect to establishing safe operations that have not been captured above? | | | |
| **Response** | | | | |

The fourth section (D) of the Operations part of the TQS allows applicants to expand upon their approach to maintaining safe operations during the operational lifespan of their satellite. It covers the work the applicant has done on collision analysis and avoidance, trackability and operational monitoring. This allows us to examine how the applicant has considered the

likelihood of conjunctions and the primary orbital risks. It also provides space for the applicant to introduce anything else that might affect the approach to monitoring so that this can be considered from early on in the assessment process.

If responses to the questions in this section are contained within the applicant's own documentation (e.g. CONOPS, design documents, training or testing plans, process and procedural documents etc), please submit the latest version of that document as evidence to support the application, clearly referencing where in the documents each question is answered. One piece of evidence can suffice for multiple answers. If you refer to documents previously supplied or attached to this TQS, then please provide page/paragraph/section references, as well as a link to the document so that we can easily find the information to which you are referring.

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Please answer all questions.

| **D Maintaining safe operations** | | | | |
|---|---|---|---|---|
| **ID** | **Question** | **Guidance** | **Relevant Document Link** | **CAA Comment** |
| 3-D-01 | Who will be responsible for overseeing and managing Conjunction Assessment and Risk Analysis (CARA) operations? | | | |
| **Response** | | | | |
| 3-D-02 | What quantitative assessments have been done to determine collision risk for the different phases of the mission, and for the duration for which the spacecraft will be active? | *If you have performed these assessments, then please provide a brief summary, and attach a copy of them to this technical question set. If you have not performed this yourself, please provide any details on modelling that is available to you.*<br><br>*Details of models and tools used, as well as any assumptions or limitations, are expected.* | | |
| **Response** | | | | |
| 3-D-03 | How will the spacecraft be identified individually (relative to any other spacecraft carried by the launch vehicle)? What unique IDs will be assigned? How will these be communicated to relevant agencies (e.g. JSpOC)? | | | |
| **Response** | | | | |

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| 3-D-04 | Is there any aspect of the spacecraft design that would impact the spacecraft's trackability from the ground? | *e.g. any dimension <10cm, or retroreflectors etc.* | | |
| **Response** | | | | |
| 3-D-05 | Does the spacecraft have any active and/or cooperative tracking capability and what is the nature of the system? | *Please provide a comprehensive description of the on-board sensors utilised by the spacecraft to determine its position, velocity, and time (PVT). Please Include systems, sensor types, and operational modes where applicable. Additionally, please provide information regarding any other on-ground tracking methods employed to monitor and track the satellites.* | | |
| **Response** | | | | |
| 3-D-06 | Please provide details of any data sharing or coordination arrangements with other operators and third parties, and what data is shared. (platform/payload status's/ephemeris) during the various mission phases? | *This could include details on who this data is being shared with and details of the data shared. Transparency of operations during the various mission phases is critical. Please identify the type of information that may be shared and the type of organisations (e.g. UNOOSA, 18th SPSS etc).* | | |
| **Response** | | | | |
| 3-D-07 | How have the satellite and its operations been designed to avoid collisions? | *Details of any approach should be supported by relevant information about the reliability and performance of the capability to perform avoidance manoeuvres, and any limitations or issues with the system, as well as evidence of previous use of this approach.* | | |
| **Response** | | | | |
| 3-D-08 | Please provide details of the proposed Conjunction Assessment and Risk Analysis (CARA) operational approach | *Details should include the operational approach employed to prevent collision of the primary spacecraft with third party objects, including documentation of proposed practices, proposed metrics and thresholds for collision avoidance and details on how this is to be managed operationally.*<br><br>*Please describe any procedures for manoeuvring, and coordination of manoeuvres with third parties (e.g. for station keeping for collocation). If you do not have manoeuvre capability, then what CARA approach has been considered?*<br><br>*If this information is provided in an external form, please briefly summarise here and provide a link to the document.* | | |
| **Response** | | | | |

| | | | | |
|---|---|---|---|---|
| 3-D-09 | Will any third parties be involved in CARA, for example to provide data, perform analysis or oversee activities? | *If there are third parties involved, please provide details of any agreements or contracts with third parties for which ephemerides might be exchanged for the purpose of CARA, including, if applicable, the US JSpOC or similar.* | | |
| **Response** | | | | |
| 3-D-10 | What is the timeline and process for performing collision avoidance in an emergency? | *Details of the timeline and process for responding to a collision avoidance emergency should be supported by relevant information about the reliability and performance of the systems involved with detection, alerting, resolution and logging.*<br><br>*Where those systems rely on operator intervention, details of the systems in place to ensure operator availability and the reliability of the systems in place to alert an operator.*<br><br>*Where those systems rely on operator intervention, details of the training and rehearsals that operators are required to perform.*<br><br>*Where collision avoidance responses are automated, details of the design and test of those systems.* | | |
| **Response** | | | | |
| 3-D-11 | What quantitative assessments have been done to understand the frequency of conjunction alerts (e.g. Conjunction Data Messages (CDMS)) and/or expected avoidance manoeuvres at each phase in the mission? What are the frequent conjunction partners in the background population? | | | |
| **Response** | | | | |
| 3-D-12 | What measures are in place to ensure that conjunctions do not occur between the operator's own spacecraft for all mission phases? | | | |
| **Response** | | | | |
| 3-D-13 | What telemetry is downlinked to ensure safety of the spacecraft and how is this maintained, analysed and acted upon in the context of anomaly management? | *Please provide information on the frequency of battery/wheel/tank housekeeping data downlinking, the retention of down-linked data, automatic flagging of unexpected conditions and review and management of* | | |

| | | | | |
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| | | *anomalous condition, and information on the spacecraft's autonomous safeguarding measures* | | |
| **Response** | | | | |
| 3-D-14 | What criteria will be used to evaluate performance of the platform as it conducts orbital manoeuvring (if orbital manoeuvring is possible)? | *Including trajectory analysis, thruster performance, fuel usage, temperature(s), pressure(s), and any other telemetry health metrics* | | |
| **Response** | | | | |
| 3-D-15 | Are there any plans for early end of life upon a failure condition covered by the authorised operational procedures? If there are, what are they? | *Please reference a plan as applicable.* | | |
| **Response** | | | | |
| 3-D-16 | Are there any other mission considerations with respect to maintaining safe operations that have not been captured above? | | | |
| **Response** | | | | |

The fifth section (E) of the Operations part of the TQS covers the end-of-life process being used for the satellite, whether that is graveyarding, atmospheric demise, non-destructive re-entry, or any other method.

If responses to the questions in this section are contained within the applicant's own documentation (e.g. CONOPS, design documents, training or testing plans, process and procedural documents etc), please submit the latest version of that document as evidence to support the application, clearly referencing where in the documents each question is answered. One piece of evidence can suffice for multiple answers. If you refer to documents previously supplied or attached to this TQS, then please provide page/paragraph/section references, as well as a link to the document so that we can easily find the information to which you are referring.

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In the event of any substantive changes to the answers in this section, please notify the CAA as soon as possible.

Please answer all questions.

| **E Disposal** | | | | |
|---|---|---|---|---|
| **ID** | **Question** | **Guidance** | **Relevant Document Link** | **CAA Comment** |
| 3-E-01 | Who will be responsible for disposing of the satellite? | | | |
| **Response** | | | | |

| | | | | |
|---|---|---|---|---|
| 3-E-02 | Please provide an overview of the Concept of Operations for the end-of-life process of the satellite? | *Details should include the operational approach to disposing of the platform, including where disposal is to occur, the mechanism for disposal, timescales, trajectories and required manoeuvres. This should also include explanations of the criteria used to make the decision to perform planned or unplanned disposal.*<br>*Please provide details on the vehicle mass at end of life prior to de-orbiting, the approximate surface area in the direction of the velocity vector, the overall probability of successful disposal, method selected for determination of residual propellant (e.g. PVT, thermal gauging etc), and the accuracy of the orbital altitude knowledge (e.g. ±Xkm)*<br><br>*For satellites moving to a graveyard orbit (e.g. GEO), 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 and the full manoeuvre sequence.*<br><br>*For satellites to be demised within the atmosphere, 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.*<br><br>*For satellites that will be adapting a control or uncontrol re-entry, please indicate the CONOPS of the re-entry operation, information regarding re-entry corridor, timelines of the operation, re-entry analysis, hazard analysis. Details of any procedures undertaken to perform the control/uncontrol re-entry should be provided.* | | |
| **Response** | | | | |
| 3-E-03 | What anomalies or failures during disposal have been considered and what mitigation approaches are to be employed? What parameters and | *This should include details of the mitigation measures against anomalies and failures, definitions and criteria pertaining to platform loss, and procedures to dispose of the platform should* | | |

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| | associated criteria/thresholds are to be monitored and used for evaluating the performance of the platforms during this mission phase? | *it be necessary during this mission phase. Parameters might include, for example, trajectory analysis, thruster performance, fuel usage, temperature(s), pressure(s), and should provide details on the redundancy for the de-orbit process in terms of command, attitude sensor, thruster, and power capability.* | | |
| **Response** | | | | |
| 3-E-04 | Please provide details on the manoeuvrability, including station-keeping and collision avoidance capability/limitations, of the platform during disposal. | *Details should include who will perform and how command and control of the station-keeping / collision avoidance of platforms is performed, and any nominal formation/ station-keeping parameters that will be used to ensure safe operation (not requiring specific manoeuvres), as well as any periods where control is expected to be lost.* | | |
| **Response** | | | | |
| 3-E-05 | What is the passivation approach at end-of-life? What did you consider when choosing this approach? If no passivation will be performed, please provide justification. | *Please provide details on the approach to reducing stored energy e.g. battery charge, pressure vessel operating pressure reduction etc....This should include details on the deactivation of the payload, stopping of the solar arrays, charge capability disconnection from the batteries, disconnection of the wheels from the wheel drive electronics, disconnection of the transmitter, propellant and pressurant tanks venting, use of heaters to drain the batteries etc.*<br><br>*Please provide details on the passivation timeframe and success probability (reliability of passivation process).*<br><br>*If you are not undergoing a passivation process, please briefly summarise how this decision was arrived at.* | | |
| **Response** | | | | |
| 3-E-06 | For spacecraft that will re-enter the atmosphere, what are the survivability/casualty expectation estimates for ground hazards? | *Details should include quantitative evidence for survivability and casualty assessments, as well as details of which tools or models were used, and any assumption made. 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.* | | |
| **Response** | | | | |
| 3-E-07 | Are there any other mission considerations with respect to the disposal segment that have not been captured in the answers to the questions above or summary information above? | | | |
| **Response** | | | | |

The sixth section (F) of the Operations part of the TQS invites the applicant to introduce any bespoke or complex operations intended to be completed by their satellite. If the operator is intending to conduct these sorts of operations, then they will also be required to complete Part 4- Bespoke Operations, which allows the applicant to expand on these operations.

If responses to the questions in this section are contained within the applicant's own documentation (e.g. CONOPS, design documents, training or testing plans, process and procedural documents etc), please submit the latest version of that document as evidence to support the application, clearly referencing where in the documents each question is answered. One piece of evidence can suffice for multiple answers. If you refer to documents previously supplied or attached to this TQS, then please provide page/paragraph/section references, as well as a link to the document so that we can easily find the information to which you are referring.

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In the event of any substantive changes to the answers in this section, please notify the CAA as soon as possible.

Please answer all questions.

| **F Bespoke mission operations** | | | | |
|---|---|---|---|---|
| **ID** | **Question** | **Guidance** | **Relevant Document Link** | **CAA Comment** |
| 3-F-01 | Does the mission involve bespoke or complex operations, including<br>- Rendezvous and proximity operations (RPO), or<br>- Coordinated systems (including formations or constellations)? | *Please see the guidance in 4-A-22 for examples of bespoke operations.* | | |

| | | | | |
|---|---|---|---|---|
| | If so, please complete the questions in 4 BESPOKE OPERATIONS | | | |
| **Response** | | | | |

## 4) Bespoke Operations

The Bespoke Operations part of the TQS considers novel or complex operations that might not otherwise be adequately captured by other parts of the TQS. Not all applicants will need to complete this part of the TQS.

The CAA considers the following sorts of operation to be bespoke operations, covered by this part:

- Constellations
    - Low density constellation
    - High density constellation
    - Restricted constellation
    - Formation
- Rendezvous and Proximity Operations
    - In-orbit servicing
        - Inspection and monitoring
        - Station-keeping
        - Relocation
        - Return to Earth
        - Orbital Hub/Spaceport
        - Orbital depot
        - Refuel
        - Restock
        - Swap modular component
        - Repair
        - Upgrade
        - De-orbit
        - Graveyard
        - Recycle
    - In-orbit manufacturing
        - Assembly
        - Fabrication
        - Repatriation
    - Active Debris Removal
        - De-orbit
        - Graveyard
        - Recycle

invites the applicant to introduce any bespoke or complex operations intended to be completed by their satellite. If the operator is intending to conduct these sorts of operations, then they will also be required to complete Part 4- Bespoke Operations, which allows the applicant to expand on these operations.

If responses to the questions in this section are contained within the applicant's own documentation (e.g. CONOPS, design documents, training or testing plans, process and procedural documents etc), please submit the latest version of that document as evidence to support the application, clearly referencing where in the documents each question is answered. One piece of evidence can suffice for multiple answers. If you refer to documents previously supplied or attached to this TQS, then please provide page/paragraph/section references, as well as a link to the document so that we can easily find the information to which you are referring.

At the time of application submitting draft versions of documentation is acceptable however, as the applicant's programme develops, we would expect to see those documents being updated to final versions as part of a robust product and quality assurance regime. Delays in receiving such updated copies might result in delays to a licensing decision.

In the event of any substantive changes to the answers in this section, please notify the CAA as soon as possible.

Please answer all questions.

**If the license application refers to a coordinated system (see definition on page 3) please answer questions 4-A-01 to 4-A-07**

| **Coordinated Systems** | | | | |
|---|---|---|---|---|
| **Category- Constellation** | | | | |
| **ID** | **Question** | **Guidance** | **Relevant Document Link** | **CAA Comment** |
| 4-A-01 | Who will be responsible for managing the establishment and operation of the constellation? | | | |
| **Response** | | | | |
| 4-A-02 | Please provide an overview of the constellation and its establishment. | | | |
| **Response** | | | | |
| 4-A-03 | Please identify the key risks associated with the establishment and management of the constellation, and describe the operational practices that have been incorporated to reduce these risks. | | | |

| | | | | |
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| **Response** | | | | |
| 4-A-04 | Please provide details of the assessed spectrum interference issues with other spacecraft and approaches and processes to mitigate against such interference. | | | |
| **Response** | | | | |
| 4-A-05 | At what point can the constellation be considered a minimum viable system capable of providing some degree of service? | | | |
| **Response** | | | | |
| 4-A-06 | What kind of testing / qualification has been performed to ensure the capability of the entire system to operate in a safe and secure manner? | *Please provide relevant testing and qualification documentation pertaining to the entire system (not platform level)* | | |
| **Response** | | | | |
| 4-A-07 | What contingency plans are in place should the system be unable to perform as intended or is no longer considered viable system? | *Please provide relevant documents (for example, a constellation withdrawal plan)* | | |
| **Response** | | | | |
| **4-A-08** | If the system is a constellation, who will be responsible for managing the establishment of the constellation? Please provide an overview of the Concept of Operations for the establishment of the constellation. | *Details should include the architecture of the constellation (including orbital elements), the order of the development of the constellation, the development schedule and details of any testing or qualification of the system.* | | |
| **Response** | | | | |

**If the licence application refers to an RPO mission (see definition on page 3) Please answer questions 4-A-09 to 4-A-22**

| **RPO: In-orbit Servicing** | | | | |
|---|---|---|---|---|
| **In-orbit Servicing phase** | | | | |
| **ID** | **Question** | **Guidance** | **Relevant Document Link** | **CAA Comment** |
| 4-A-09 | Please identify a timeline of operations and (orbital) location of the Servicing Spacecraft during the In-orbit Servicing Phase | | | |
| **Response** | | | | |
| 4-A-10 | Please identify the key risks associated with this mission phase (collision, interference etc) | | | |
| **Response** | | | | |
| 4-A-11 | Please provide details on the operational practices within the In-orbit Servicing Phase that have been incorporated to reduce the risks identified above | | | |
| **Response** | | | | |
| 4-A-12 | Please describe in detail the activity that will be performed between the Servicing Spacecraft and the Target Object? A detailed insight into the key features of the system including redundancies is requested. | | | |
| **Response** | | | | |
| 4-A-13 | What are the nominal formation/station-keeping orbital parameters that will be used to manage the connected platforms during the operational servicing phase and what are the nominal bounds for safe operation (i.e. not requiring specific manoeuvres to respond) | | | |
| **Response** | | | | |

| | | | | |
|---|---|---|---|---|
| **Docking and retreat** | | | | |
| 4-A-14 | Please identify a timeline of operations and (orbital) location of the Servicing Spacecraft during the Target Undocking and Retreat Phase | | | |
| **Response** | | | | |
| 4-A-15 | Please identify the key risks associated with this mission phase (collision, interference etc) | | | |
| **Response** | | | | |
| 4-A-16 | Please provide details on the operational practices within the Target Undocking and Retreat Phase that have been incorporated to reduce the risks identified above | | | |
| **Response** | | | | |
| 4-A-17 | Please describe in detail the activity that will be performed between the Servicing Spacecraft and the Target Object? A detailed insight into the key features of the system including redundancies is requested. | | | |
| **Response** | | | | |
| **Acquisition and engagement** | | | | |
| 4-A-18 | Please identify a timeline of operations and (orbital) location of the Servicing Spacecraft during the Target Acquisition and Engagement Phase | | | |
| **Response** | | | | |
| 4-A-19 | Please identify the key risks associated with this mission phase (collision, interference etc) | | | |
| **Response** | | | | |

| | | | | |
|---|---|---|---|---|
| 4-A-20 | Please provide details on the operational practices within the Target Acquisition and Engagement Phase that have been incorporated to reduce the risks identified above | | | |
| **Response** | | | | |
| 4-A-21 | Please define the docking/grappling/berthing concept between the Servicing Spacecraft and the Target Object? A detailed insight into the key features of the system including redundancies is requested. | | | |
| **Response** | | | | |
| 4-A-22 | What measures are in place to deal with neutralisation of differential rotation and trajectory differential dynamics and (electrostatic) charging environments? | | | |
| **Response** | | | | |

**Please answer the following question for ALL mission types**

| **Bespoke mission phases** | | | | |
|---|---|---|---|---|
| **ID** | **Question** | **Guidance** | **Relevant Document Link** | **CAA Comment** |
| 4-A-23 | Are there any other significant mission phases? If so, please provide details of each mission phase, its purpose, CONOPS, the parameters and associated criteria/thresholds are to be monitored and used for evaluating the performance of the platforms, details on the likelihood and effects in regard to platform explosive or collision induced break-up and information about collision avoidance and station-keeping activities during these mission phases | *This includes any controlled movement of a single or multiple spacecraft for a duration, for example, to stage the spacecraft (e.g. before de-orbiting or raising), to change orbits (such as J2 drifting in right ascension) or any other testing or transitioning orbits.* | | |
| **Response** | | | | |

## 5) Ground Segment

The Ground Segment part of the TQS allows the CAA to assess the operation of the ground segment and consider how the applicant has considered their ground segment operations to reduce any orbital risks to ALARP.

If responses to the questions in this section are contained within the applicant's own documentation (e.g. CONOPS, design documents, training or testing plans, process and procedural documents etc), please submit the latest version of that document as evidence to support the application, clearly referencing where in the documents each question is answered. One piece of evidence can suffice for multiple answers. If you refer to documents previously supplied or attached to this TQS, then please provide page/paragraph/section references, as well as a link to the document so that we can easily find the information to which you are referring.

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In the event of any substantive changes to the answers in this section, please notify the CAA as soon as possible.

Please answer all questions.

| **GROUND SEGMENT AND OPERATIONS** | | | | |
|---|---|---|---|---|
| **ID** | **Question** | **Guidance** | **Relevant Document Link** | **CAA Comment** |
| 5-A-01 | Who is responsible for overseeing the mission planning and preparation for the ground segment? | | | |
| **Response** | | | | |
| 5-A-02 | Please provide details of the ground segment. | *At a minimum this should include:*<br>- *infrastructure,*<br>- *facilities,*<br>- *location,*<br>- *ownership,*<br>- *performance,*<br>- *availability,*<br>- *redundancy,*<br>- *functionality,*<br>- *connectivity,*<br>- *team size and training considerations.* | | |
| **Response** | | | | |

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| | | | | |
| 5-A-03 | What is the Concept of Operations (CONOPS) for the ground segment during the mission? | *Please provide insight into the operational functions of the ground segment including the approach to monitoring, intervention during the mission, manoeuvring of the spacecraft, anomaly management, as well as any novel approaches to managing the spacecraft.* | | |
| **Response** | | | | |
| 5-A-04 | What mission modelling and simulation is planned/has been performed for the ground segment? | *This could include:*<br>- *ground station visibility analysis,*<br>- *ground segment sizing requirements etc.* | | |
| **Response** | | | | |
| 5-A-05 | What pre-mission testing is planned/has been performed to test spacecraft-ground segment integration and interaction? | *Please describe the tests performed to demonstrate the performance of the hardware/software in representative conditions (e.g. hardware in the loop tests, day in the life tests).*<br><br>*Specific detail should be provided on the tests performed to demonstrate the Target Acquisition and Engagement and Servicing Phase of the mission.* | | |
| **Response** | | | | |
| 5-A-06 | What operational experience/heritage does the operator have of the ground segment from previous missions? | | | |
| **Response** | | | | |
| 5-A-07 | Which, if any, other third-party organisations be involved in monitoring the spacecraft in orbit (via telemetry or visually)? | | | |
| **Response** | | | | |
| 5-A-08 | Please provide details of ground segment operational procedures, redundancy, and contingency plans. | *This should include details of planning and procedures in the event of the failure of key facilities, such as the Operation's Centre, as well as operational procedures for:*<br>*1. normal operations;*<br>*2. recovery from all safe modes;*<br>*3. identifying, reporting, correcting anomalous satellite* | | |

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| | | *behaviour;*<br>*4. identifying problems with procedures;*<br>*5. transferring data at shift handover;*<br>*6. transferring from prime to back up operations centres;* | | |
| **Response** | | | | |
| 5-A-09 | Is there redundancy in the ground segment elements – e.g. mission computer, antennas, software – and is there a backup control centre? | | | |
| **Response** | | | | |
| 5-A-10 | Which staff and teams are responsible for the operation of the satellite? | *Please provide an organisation diagram illustrating staff complement, roles and responsibilities for the mission. How are these managed in terms of shifts, scheduling and transitions between teams?* | | |
| **Response** | | | | |
| 5-A-11 | Is the ground segment protected by an uninterruptible power supply? | *If yes, please identify which elements of the ground segment are connected to the uninterruptible power supply* | | |
| **Response** | | | | |
| 5-A-12 | Are formal controls exercised for up-linking commands, new data or software to the space system? | *Please identify the process, referencing the applicable high-level management plans.* | | |
| **Response** | | | | |
| 5-A-13 | What is the planned reliance on ground command (e.g. days or orbital revs between essential uplink or downlink)? | | | |
| **Response** | | | | |
| 5-A-14 | Does the applicant subscribe to a data sharing scheme with other satellite operators such as an RF interference alert system? | | | |
| **Response** | | | | |
| 5-A-15 | Are there any other mission considerations with respect to Ground Operations that have not been captured above or summary information above? | | | |
| **Response** | | | | |

## 6) Sustainability

All space missions will have an impact on the orbital environment and the expectation is that applicants will have assessed the impact their mission will have on the orbital environment for all phases of the mission from launch through to post-mission disposal. These impacts range from introducing debris into the orbital environment, defunct spacecraft, and the remnants of launch vehicle stages increasing the risk faced by other orbital users.

The need for applicants to assess their impact on the orbital environment is driven by the goals set out in the UN Outer Space Treaty, the UN Committee on the Peaceful Uses of Outer Space (UNCOPUOS) Guidelines on the Long-term Sustainability of Outer Space Activities, Inter-Agency Space Debris Coordination Committee (IADC) to which the United Kingdom is a signatory or member agency.

If responses to the questions in this section are contained within the applicant's own documentation (e.g. CONOPS, design documents, training or testing plans, process and procedural documents etc), please submit the latest version of that document as evidence to support the application, clearly referencing where in the documents each question is answered. One piece of evidence can suffice for multiple answers. If you refer to documents previously supplied or attached to this TQS, then please provide page/paragraph/section references, as well as a link to the document so that we can easily find the information to which you are referring.

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In the event of any substantive changes to the answers in this section, please notify the CAA as soon as possible.

Please answer all questions.

| **Mission sustainability** | | | | |
|---|---|---|---|---|
| **ID** | **Question** | **Guidance** | **Relevant Document Link** | **CAA Comment** |
| 6-A-01 | Provide an overview of the work that has been conducted or is planned to be conducted to assess the impact your mission will have on the orbital environment and a summary of the findings of that work. | *Please provide details on the impacts the proposed mission will have on the orbital environment, which could include but are not limited to:*<br>- *Impact of spacecraft dead on arrival,*<br>- *potential debris release during operations,*<br>- *spacecraft break-up,*<br>- *potential impacts with other spacecraft/ orbital debris.* | | |
| **Response** | | | | |
| 6-A-02 | If national or international guidelines on space sustainability have been considered, how have they | *Several standards and guidelines have been published on the long-term sustainability of the space environment including but not limited to IADC debris mitigation guidelines; UNOOSA Long* | | |

| | | | | |
|---|---|---|---|---|
| | been implemented, and what was the justification for adhering to these guidelines? | *Term Sustainability Guidelines; ISO, NASA and ESA standards. The reusability of these documents may vary by proposed CONOPS. Please describe how these standards have been considered, and if the proposed mission adheres to them.* | | |
| **Response** | | | | |
| 6-A-03 | Please provide details on the mission modelling or simulation that is planned or has been performed to assess the impact of this mission on the orbital environment. | *All phases of the mission should be considered. Although it may not be within the control of the applicant, the applicant needs to demonstrate an understanding of the short-term and long-term impact the operations and actions of their selected launch system provider(s) will have on the orbital environment.*<br><br>*It is important for us to state that while we recognise that the actions of the launch system provider(s) may not be within the control of the applicant, the actions of the launch system provider(s) will have a material effect on the licensing decision. Ultimately it may not be a decision made on technical grounds but determined by one of the other six tests.* | | |
| **Response** | | | | |
| 6-A-04 | What work has been conducted to identify the hazards that could arise from the proposed in-orbit activity? | | | |
| **Response** | | | | |
| 6-A-05 | What is the likelihood and effects of platform explosive or collision induced break-up during this mission? | *Details should include the expected likelihood of explosive break-up (quantitative/qualitative) as well as any measures to mitigate against an explosive or collision induced break-up, and any assessments on the impact to surrounding spacecraft.* | | |
| **Response** | | | | |
| 6-A-06 | How has the spacecraft been designed to be resilient to impacts from non-trackable objects? Has any impact survivability testing or analysis been performed? | *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.* | | |
| **Response** | | | | |

| | | | | |
|---|---|---|---|---|
| 6-A-07 | What is the probability of accidental breakup and what is the expected failure rate due to the impact of lethal non-trackable objects? | | | |
| **Response** | | | | |
| 6-A-08 | Please provide details of any studies of the long-term impact (beyond mission life) on the orbital environment by the proposed system been conducted. | *Applicants should consider the long-term impact to the orbital environment that their mission has, this means consideration beyond the operational lifetime of the satellite. Details should include a comprehensive report of the long-term environmental impact based on sensible Post-Mission Disposal (PMD) success and spacecraft disposal times, as well as any assumptions made.* | | |
| **Response** | | | | |
| 6-A-09 | Have any aspects of the spacecraft design, operations, or mission CONOPS been developed with sustainability in mind? | *Please provide details on how sustainability has influenced the mission design or requirements capture. This might include, for example, aspects of design approaches that increase the trackability of space objects, regardless of the operational characteristics.* | | |
| **Response** | | | | |
| 6-A-10 | Please provide a space debris mitigation plan.<br><br>Please provide documentary evidence of How have current national and international guidelines and standards pertaining to long terms sustainability of the orbital environment been met? | *There is the expectation that the applicant has produced or plans to produce a space debris mitigation plan for the mission. As a minimum, a space debris mitigation plan should include:*<br>- *the applicable space debris mitigation requirements*<br>- *the verification and validation means to assess compliance with the applicable space debris mitigation requirements compliance matrix*<br>- *justifications for non-compliance.*<br><br>*Answers to other question in this section may also be included in a space debris mitigation plan.*<br><br>*Applicants may wish to refer to ISO 24113 for guidance on how to structure a Space Debris Mitigation Plan.* | | |
| **Response** | | | | |

**Technical Statement of the Operator**
We confirm that we are compliant with the terms and conditions of:

- Outer Space Act 1986
- Space Industry Act 2018
- Space Industry Regulations 2021, its implementing rules and applicable amendments concerning technical requirements and administrative procedures

Name of Accountable Manager: _____

Date: _____

Signature: _____