Department for Business, Energy & Industrial Strategy

UK SPACE AGENCY

Space Based Solar Power Innovation

Guidance Document

July 2022

Any enquiries regarding this publication should be sent to us at:
sbsp.innovation@beis.gov.uk

Contents

1 Space Based Solar Power Innovation – Overview

This guidance sets out the context, application process, and assessment criteria for the Space Based Solar Power (SBSP) Innovation Competition. This document should be read in advance of submitting any application and should be referred to throughout the SBSP competition process.

This Competition follows the recently published independent report[1] which found SBSP technically feasible, economically competitive and aligned to UK government priorities, hence supporting a clear strategic case for developing SBSP in the UK.

The overall objective of this Competition is to support, through grants, the development of technologies associated with space based solar power systems which could potentially contribute to the UK's Net Zero ambition, some of which may also have terrestrial applications. The total budget available for the Competition is from £3m with potential for an additional amount of up to £3m which is split into 4 lots:

- Lot 1: Wireless power transmission (nominally £1.25m budget)
- Lot 2: High concentration solar PV (nominally £1.25m budget)
- Lot 3: Systems energy engineering focusing on the design, integration and management of systems relating to Lot 1 and 2 (nominally £500k budget)
- Lot 4: SBSP Mission Architecture Feasibility Study which will be undertaken in two consecutive parts:

  Part 1: Phase 0/A (up to £1m budget)

  Part 2: Phase B1 (up to £2m budget for further work in prospect)

  Further details of how the two parts will be awarded is given in Section 2.

Due to the allocation process in deciding between projects and ensuring a well-rounded portfolio of projects, the amounts allocated to each area may differ from the values shown. BEIS/ UKSA reserve the right to allocate more or less than the total and allocated budget depending on the number and quality of applications received and budget availability.

During the application process, applicants will be expected to demonstrate a robust evidence-based case for funding, which will include but not be limited to:

- The level and nature of their innovation and contribution to Net Zero and the development of SBSP

[1] https://www.fnc.co.uk/media/e15ing0q/frazer-nash-sbsp-executive-summary-final.pdf

- The technical feasibility of their innovation
- Value for money
- Impact on UK R&D strength
- Impact on UK space capability

The Competition is open to applications between 20th July 2022 and 23rd September 2022 which has been extended until 27th September 2022 due to the death of Queen Elizabeth II and associated Bank Holiday for the day of the State Funeral to allow more time for completion of applications. The application form and other required documentation is available to download from our gov.uk website.

The Competition is eligible for all sizes of organisation but the technologies in scope must be between TRL 1-6. Projects can work with **international partners, but at least 50% of the project funded must be conducted in the UK.** Applicants will be expected to demonstrate that their project proposals meet the definition of either Fundamental Research, Industrial Research, Experimental Development or a Feasibility Study.

1.1 Definition of Fundamental Research

Fundamental research is defined as experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts, without any direct commercial application or use in view.

1.2 Industrial Research

Industrial research is defined as 'the planned research or critical investigation aimed at the acquisition of new knowledge and skills for developing new products, processes or services or for bringing about a significant improvement in existing products, processes or services.'

Activities may include:

- the creation of component parts of complex systems
- the construction of prototypes in a laboratory environment or in an environment with simulated interfaces to existing systems
- pilot lines, when necessary for the industrial research and notably for generic technology validation.

1.3 Experimental development

Experimental development is defined as: 'acquiring, combining, shaping, and using existing scientific, technological, business, and other relevant knowledge and skills with the aim of

developing new or improved products, processes, or services. This may also include, for example, activities aiming at the conceptual definition, planning and documentation of new products, processes or services'.

Activities undertaken may include prototyping, demonstrating, piloting, testing and validation of new or improved products, processes, or services in environments representative of real-life operating conditions where the primary objective is to make further technical improvements on products, processes or services that are not substantially set. This may include the development of a commercially usable prototype or pilot which is necessarily the final commercial product and which is too expensive to produce for it to be used only for demonstration and validation purposes.

Experimental development does not include routine or periodic changes made to existing products, production lines, manufacturing processes, services, and other operations in progress, even if those changes may represent improvements.

1.4 Feasibility Study

A Feasibility Study is defined as 'the evaluation and analysis of the potential of a project, which aims at supporting the process of decision-making by objectively and rationally uncovering its strengths and weaknesses, opportunities and threats, as well as identifying the resources required to carry it through and ultimately its prospects for success.'

2 Eligibility for Funding

To be eligible for funding, proposed projects must meet all the following criteria:

Innovation and technology readiness

The project is at TRL 1 – 6. See Appendix 2 for more information.

Projects must fall within the definitions of Fundamental Research, Industrial Research, Experimental Development, or Feasibility Study (as described above in Section 1) and be eligible under the subsidy requirements described in Section 4 of this guidance.

Project Status

BEIS/UKSA are unable to fund retrospective work on projects. The value of retrospective work may, however, be considered in the assessment process.

Aid intensity including cumulation: The funding levels applied for must be consistent with the appropriate aid intensity levels (including consideration of the cumulative effect of other forms of aid) and costs must be consistent with the eligible cost criteria (as set out in Appendix 1).

Project Location

Over 50% of the project's activities must be conducted in the UK. The fraction of the project activities that take place in the UK is measured as the proportion of the total eligible project costs that are spent in the UK, as opposed to spent outside the UK. See Section 5.4 for more information about eligible costs.

This includes England, Scotland, Wales, and Northern Ireland. This does not include the Isle of Man, the Channel Islands or British Overseas Territories like Gibraltar.

Grant Amount:

The total requested grant does not exceed £1m for Lots 1 & 2 or £0.5m for Lots 3 & 4 (Part 1). The maximum total project value must not exceed £2.5m for any project in any lot. Since BEIS/UKSA are seeking to maximise the impact of government funding, projects looking for public funding intensities that are lower than the applicable maximum are likely to score higher in the appraisal process for value for money.

Match funding

Given the subsidy categories (see Section 4), applicants will need to have match- funding in place to cover the balance of the eligible costs within three months of the grant agreement being approved. Such funding may come from a company's own resources or external private sector investors but may not include funding attributable to any public authority. Before the grant letter is issued, the applicant will need to demonstrate a credible plan to raise the match-funding required for the whole lifetime of the project. The match-funding can be contributions-in-kind where it can be shown that these have a market value commensurate with the need for match-funding and are required by the project (for example, free labour to complete one aspect of the work or free access to equipment). If an applicant has not secured match-funding within three months of grant agreement being approved. BEIS/UKSA will have the right to terminate the grant agreement.

Technology scope

The project must fit within one of the technology areas defined below. Applicants should seek to quantify the benefits of the technology in a SBSP system:

- Lot 1: Wireless power transmission

This lot aims to support the development of high power wireless electromagnetic power transmission system with high efficiency and directionality over a long range beyond the state-of-the-art. The work could be based on using established electromagnetic modelling software to show a feasible concept or could be based on a small-scale practical demonstration or a mixture of both. Efficiency of transmission and size of the ground station are important to the feasibility of the concept.

- Lot 2: High concentration solar PV

Weight is an issue for space based solar systems due to the need to lift everything into orbit. Hence many designs use light-weight mirrors to focus the sunlight onto a limited area of solar panels and so require panels that are efficient at high radiance intensities. This lot aims to support the development of innovative solar cells to increase efficiency and reduce the cost of working with high irradiance levels. This could include work on new materials with higher saturation limits or new designs using conventional materials that are more resilient at high solar electromagnetic radiation fluxes.

- Lot 3: Systems energy engineering focusing on the design, integration and management of systems relating to Lot 1 and 2

Activities in this lot include systems studies, management, design, and integration of wireless power transmission and high concentration solar PV and studies looking at how space based solar power will affect the whole performance of the decarbonised grid. This work should aim to model the performance of SBSP in the decarbonised UK grid; seeking to discover what other low-carbon technologies SBSP will displace and hence why in future work the UK government should develop SBSP further. Where relevant, applicants should explain non-space applications of their technologies and how these could also be exploited. For example, high irradiance solar panels could be used with solar concentrators and power transmission systems, and once developed, could be used to connect offshore wind turbines to land.

- Lot 4: Space Mission Architecture Feasibility Study Phase

This activity builds upon a recent independent report[2] on SBSP and is expected to produce a Phase 0/A study (for which internationally agreed best practice is set out in Appendix 3) to develop system requirements, develop and assess the architecture and design options, performance, risks and through life costs to a greater degree of confidence. The system in this lot refers to Figure 1.

A Phase B1 study is a possible follow-on to the Phase 0/A study (for which internationally agreed best practice is set out in Appendix 4) and will be the subject of a future competition open to successful bidders for the Phase 0/A study only. (Note: Breadboarding is not a requirement of Phase B1. However, should the bidder want to include breadboarding activities to de-risk key technologies, this may be included in the Phase B1 proposal):

Part 1: Space Mission Architecture Feasibility Study Phase 0/A to be applied for in this competition

This part might include parallel studies and is expected to be completed by June 2023

Part 2: Space Mission Architecture Feasibility Study Phase B1 (to be the subject of a future competition)

[2] https://www.fnc.co.uk/discover-frazer-nash/news/frazer-nash-report-for-uk-government-shows-feasibility-of-space-solar-power/

Only consortia awarded contracts in Part 1 will be able to apply for Part 2 and it might include parallel studies. This study shall not extend beyond March 2024. The proposals for Part 2 shall be submitted by 28th April 2023.

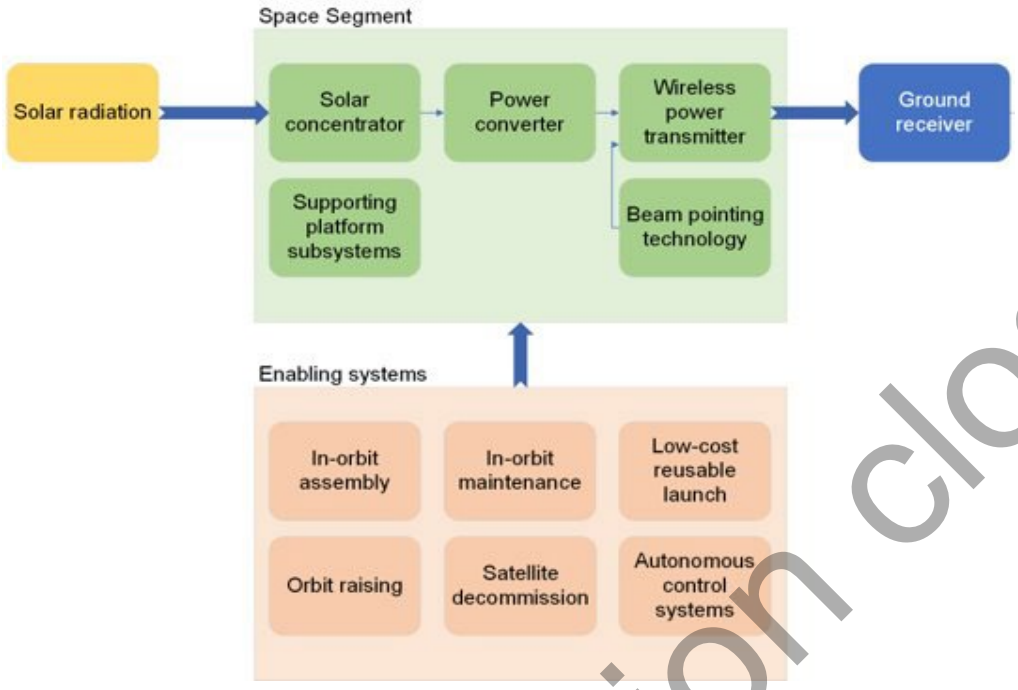


Figure 1: Notional SBSP block diagram

Project duration

All grants will end no later than 31st March 2025 for Lot 1, 2 & 3 or 30th June 2023 for Lot 4 Part 1. All work carried out under the grant must be completed by this date. BEIS/UKSA will not meet claims for any work carried out on, or after the relevant date indicated.

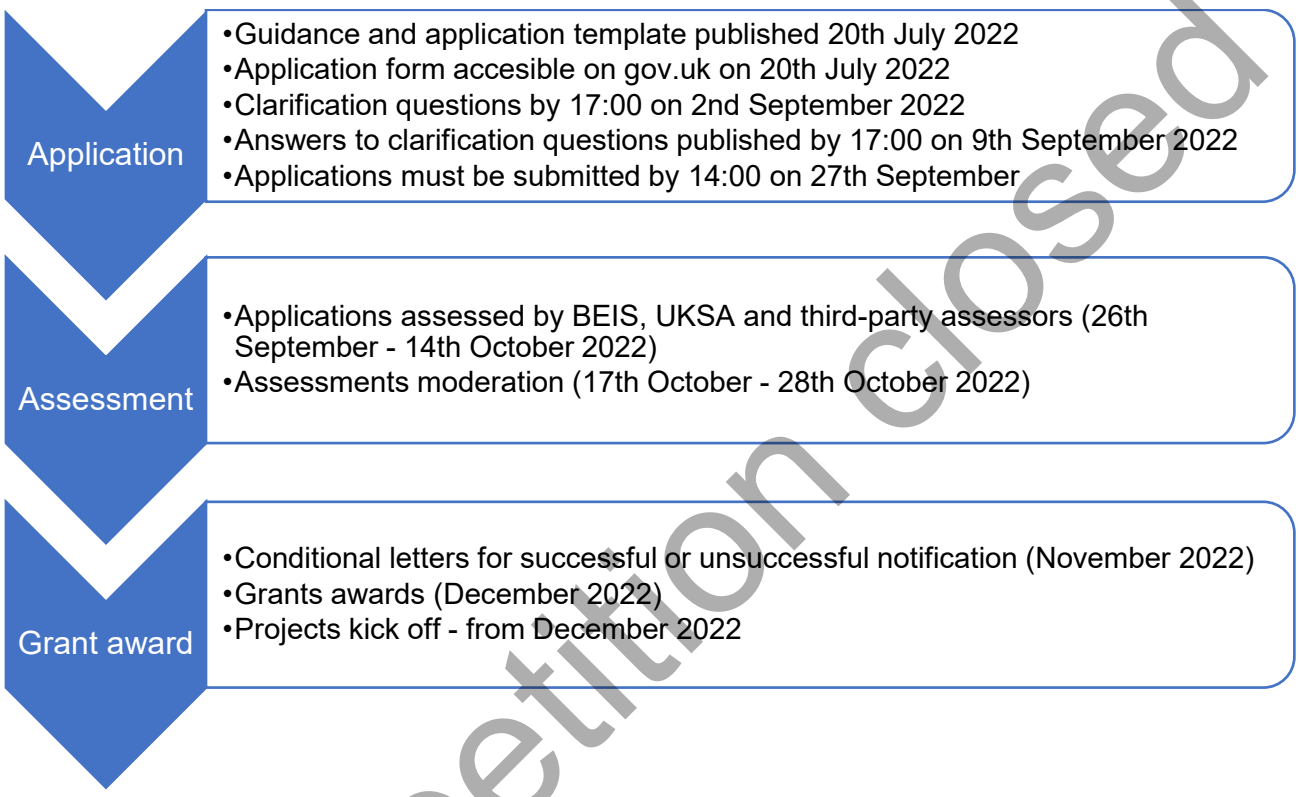
General conditions

Companies of any size are eligible to seek funding however applications from research organisations and SMEs, as defined in Section 4 are particularly encouraged. An individual organisation may not submit more than one application to a specific funding lot. An individual organisation can only lead one bid into any lot, but can be a partner in multiple applications.

3 Application and Assessment Process

3.1 Competition timeline

The following dates outlines the application and assessment process within the SBSP Competition. All dates are subject to change due to unforeseen circumstances.



3.2 Application process

The notes below explain the details of the application process.

Questions about the Competition

If you have any questions about the call after reading these guidance notes, please submit them to sbsp.innovation@beis.gov.uk. All questions should be submitted by 5pm BST 2nd September 2022. Questions submitted after this date may not be answered.

We will reply to any queries which, in our judgement, are of material significance through an final anonymised Q&A sheet published on our gov.uk website by 5pm BST 9th September 2022 and may publish answers earlier if queries that are material are received earlier, so please keep referring to the website for any updates.

All applicants should take these replies into consideration when preparing their own applications and we will evaluate applications on the assumption that they have done so.

Submission of Application

The full application for the competition must be submitted online by the deadline: 14:00 BST on 23rd September 2022 which has been extended until 14:00 BST on 27th September 2022 due to the death of Queen Elizabeth II and associated Bank Holiday for the day of the State Funeral to allow more time for completion of applications. The online application form will be closed for submissions after this time.

You must apply using the online form. If you need a version of the application in a more accessible format, please contact sbsp.innovation@beis.gov.uk.

Application documents

All application documents must be submitted via the online application form. In the form there are opportunities to upload relevant supporting documents. In some sections we specify the supporting information we would like to see uploaded.

Each online application must include the following documents. More information about how to fill out these documents and how they will be assessed can be found in Section 8.1 of this guidance.

- Application Form (the online application form can be found here)
- Gantt chart (to be uploaded in the Project Plans section of the application form)
- Risk register (to be uploaded in the Project Risks and Management section of the application form)
- Project Cost Breakdown Form (to be uploaded in the Project Funding Section of the application form)
- CVs for the main people involved in the project
- Optional: additional letters of support or other supporting information can also be submitted before you submit your online application form. Supporting documents should provide substantive information to the proposal. However, you should not assume that any additional information will be cross-referenced or reviewed as part of the selection process.

You should endeavour to answer all the questions on the application in full, some questions will be required fields in the form and you will not be able to proceed to the next section until these questions are complete. Incomplete applications and any containing incorrect information may be rejected. However, BEIS/UKSA may, at their discretion, request clarification before making a final decision.

3.3 Assessment process

Eligibility

Applications will initially be assessed against the Eligibility Criteria in Section 2. Applications which fail the Eligibility Criteria will not be assessed further, so it is essential to ensure that your project meets these criteria before you submit your application.

Assessment and Moderation

The eligible projects will be assessed against the assessment criteria (see Section 7) to determine an overall ranking list which will be used to allocate the funding for the competition.

Technical reviewers will independently assess against the specific criteria summarised below and described in more detail in Section 7:

- Level of innovation
- Impact and relevance to Net Zero and development of SBSP
- Dissemination activity
- Project plans including risks and risk management
- Project cost breakdown and value for money/case for public funding
- Experience and skills

Projects are typically assessed by three reviewers, for technical viability. The reviewers will be both internal and external low carbon technology professionals appointed jointly by BEIS/ UKSA, and the assessments will be quality assured by BEIS and UKSA.

The reviewers will score the application against the criteria and will provide feedback and recommendations to BEIS and UKSA based on these considerations. Those recommendations by the reviewer to BEIS and UKSA will either be recommendations for funding, recommendations not to fund or the identification of applications where clarification would be needed before funding could be recommended. A moderation meeting will either be held at the end of the assessment process to agree the overall consensus scores for each of the projects or moderation will be achieved between the reviewers by correspondence.

Note: In the event of a large number of applications being received, BEIS/UKSA will moderate applications, where either the reviewers' largely agree on scores or where the reviewers agree that the application does not make the minimum 60% threshold, by an alternative process where the final score is agreed by correspondence between the reviewers.

Funding allocation

A total score will be allocated to each project by summing the moderated scores for each marked criteria. To be eligible to receive funding, a project must be allocated a minimum total score of 60% against the assessment criteria.

Applications which pass this minimum threshold will be placed in a ranked list with the highest total scoring project first. The funding will be allocated starting with the highest scoring project. Once an application for a specific lot has been allocated, the next highest ranked application from a different lot will be funded. Once a project from each lot has been funded, remaining funding will be allocated to the next highest ranked projects in order, irrespective of lot, until all the funding has been allocated or until no more projects meet the minimum funding criteria.

If the next ranked project is more expensive than the amount of funding left, than the project will not be funded. The funding will be allocated to the next highest scoring project passing the minimum threshold which costs less than the amount of funding remaining.

In allocating the funding to the projects, BEIS/UKSA reserve the right to allocate a minimum level of funding to each lot. So, for example, if BEIS/UKSA allocate £1M to Lot 4, projects ranked higher in other lots may not be funded compared to a project ranked lower but in Lot 4.

If two or more projects score identically overall, the ranking will be decided based on the following criteria, in priority order:

- Project cost (lowest first)
- Time to deliver (shortest duration first)
- Impact on climate change targets and/or UK security of supply (highest assessed score first)
- Project plans (highest assessed score first)

Should two projects still be drawn after considering all these criteria in order, the order of the ranked-list will be decided by a throw of a coin.

3.4 Notification and feedback

All applicants will be informed by email whether their application has been successful or unsuccessful. Grant awards for successful applications are subject to compliance with the terms and conditions of the Conditional Offer that will be received.

Feedback

All applicants will receive a short summary of key feedback regarding their applications irrespective of whether they are successful or not. BEIS/UKSA aim to have provided all feedback to applicants once all applications have been reviewed, assessed, and moderated.

Feedback will be given at the same time the successful/unsuccessful letters are sent to the applicants.

A short summary of key feedback regarding the applications will be provided to all applicants, this feedback will be based on the summary comments of the Assessment Stage. No additional feedback will be provided and there will be no further discussion on the application.

Right of appeal

There is no right of appeal – the reviewers' scores are final – so it is important that you make any points you wish to make clearly and concisely in the application form.

3.5 Grant award

Due diligence

Following notification of a successful application, the eligible costs of proposals will be checked, and the company's financial viability confirmed (see Section 5 for more detail). Any funding pre-requisites identified will be conditions of the grant. It will be a requirement before issuing the grant to show that a clear credible plan exists to raise the required match funding, potentially in-kind, for the project. Where due diligence checks identify any issues with the project which were not clear from the application documents or which may impact on the successful delivery of the project, BEIS reserves the right not to proceed to the Grant Offer Letter stage.

Successful applicants will be given the opportunity to discuss the Grant Offer Letter with an official from BEIS to explain the conditions of the letter and respond to any queries which the applicant may have at this stage.

Project monitoring officers

Successful applicants will be assigned a Project Monitoring Officer (PMO). The PMO will then become the projects main point of contact. PMOs are ultimately responsible for reviewing and approving evidence at milestones claims so that invoices may be paid by BEIS finance. Therefore, projects will be required to have regular contact with their PMO; the project lead should report progress and raise any issues with project delivery to their PMO.

4 Funding Levels and Subsidy Requirements

While BEIS will operate within the UK-EU Trade and Co-operation Agreement (TCA) requirements and World Trade Organisation (WTO) rules, we may decide to offer lower levels of funding than the maximum permitted under the rules; additionally, the funding rules set out in this Guidance Document for SBSP Innovation are specific to this Competition only.

4.1 Subsidy control

The SBSP Innovation Competition will support successful applicants through subsidies awarded in the form of grants towards the eligible costs of the proposal. Since 1 January 2021, public authorities must comply with our international commitments on subsidies in the UK-EU TCA, and other trade agreements, as well as the WTO rules on subsidies[3]. Subsidy rules dictate the types of costs that applicants can claim grant support for, as well as the maximum level of grant funding that they can receive which may differ by organisation type, size, and location.

Rules in Scope for subsidies in Northern Ireland Protocol

The rules set out in this document apply equally to all applicants from England, Wales, Scotland and Northern Ireland that are eligible to receive funding. Grants awarded to applicants and partner organisations from Northern Ireland will also be subject to scrutiny from the European Commission in accordance with Article 10 of the Northern Ireland Protocol in the UK/EU Withdrawal Agreement[4].

If the European Commission considers a business or any undertaking to have been incorrectly in receipt of grant funding, that undertaking is likely to be required to repay any aid received to the value of the gross grant equivalent.

4.2 Subsidy categories

The size and type of funding that the project can receive will depend upon the type of lead organisation and which aid category they qualify under. The different subsidy categories and their eligibility criteria are described in this section, while the different levels of funding can be found in Sections 4.4 and 4.5.

[3] https://www.gov.uk/government/publications/complying-with-the-uks-international-obligations-on-subsidy-control-guidance-for-public-authorities
[4] https://www.gov.uk/government/publications/complying-with-the-uks-international-obligations-on-subsidy-control-guidance-for-public-authorities/technical-guidance-on-the-uks-international-subsidy-control-commitments#section7

This scheme operates under two different categories for aid. The two categories for aid are Aid for start-ups and Aid for research and development.

If you're a sole applicant, you can apply for either:

- Aid for start-ups
- Aid for research and development projects

Consortia must apply for Aid for research and development projects.

Aid for start-ups

You can apply for Aid for start-ups if you meet all the following criteria and your organisation is a business (as defined below). Your company

- is a small or micro business (see Section 4.3 for definitions)
- has existed for fewer than 5 years since the date you were registered with Companies House
- has not been listed on any stock exchange
- has not been formed through a merger or takeover, or taken over another business
- has not paid out profits to shareholders through dividends yet
- has spent at least 10% of turnover on research and development in at least 1 of the past 3 years (if you're a start-up with no turnover yet, you are exempt from this requirement but you must have this validated by an independent party)

Companies that are successful in receiving funding and that have indicated that they are eligible for funding under this subsidy category, may additionally be asked to provide a copy of their business plan prior to the final award letter being issued.

If your company does not meet all of these criteria, then you must apply for Aid for research and development.

Aid for research and development

You should apply for Aid for research and development if your organisation does not meet the criteria for Aid for start-ups or if you are applying as part of a collaboration.

4.3 Organisation types

Business

A business is defined as an organisation undertaking economic activities. Businesses are categorised as micro, small, medium, or large determined by both their:

- staff headcount
- either turnover or balance sheet total

Company category	Number of full-time employees	Annual turnover	Balance sheet total
Micro	< 10	≤ £2 million	≤ £2 million
Small	< 50	≤ £9 million	≤ £9 million
Medium	< 250	≤ £45 million	≤ £39 million
Large	≥ 250	> £45 million	> £39 million

Research organisation

When referring to research organisations, BEIS uses the following definition:

'research and knowledge dissemination organisation' or 'research organisation' means an entity (such as universities or research institutes, technology transfer agencies, innovation intermediaries, research-oriented physical or virtual collaborative entities), irrespective of its legal status (organised under public or private law) or way of financing, whose primary goal is to independently conduct fundamental research, industrial research or experimental development or to widely disseminate the results of such activities by way of teaching, publication or knowledge transfer. Where such entity also pursues economic activities, the financing, the costs, and the revenues of those economic activities must be accounted for separately. Undertakings that can exert a decisive influence upon such an entity, for example in the quality of shareholders or members, may not enjoy a preferential access to the results generated by it.

- Within this competition, this means:
- universities (higher education institutions)
- non-profit research and technology organisations (RTOs), including Catapults
- public sector organisations (PSO)
- public sector research establishments (PSRE)
- research council institutes

- research organisations (RO)
- charities

This list is not comprehensive and is subject to change and exceptions.

Consortia

Consortia are groups of organisations that combine together in order to deliver the work in the application. The consortia can be any combination of Businesses or Research Organisations. One organisation must be nominated as the lead organisation which BEIS will communicate with and pay claims to. This organisation will then be responsible for paying other organisations in the Consortia any payment due for the work. Before a Grant Offer Letter can be issued, an agreement must be in place between the organisations in a Consortia outlining as a minimum the handling of intellectual property, payments of monies due, a dispute resolution process and the parts of the project that each organisation is responsible for delivering. More detail is given in section 5.2.

4.4 Funding levels for Aid for Start-ups

Applicants to the scheme are eligible to receive up to £1m of grant funding for Lots 1 & 2 or £0.5m for Lots 3 & 4 (Part 1) for a project under Aid for start-ups if they meet the criteria described in Section 4.2. Applicants within this subsidy category requesting grant funding of up to and including £500,000, will be required to demonstrate 10% of their total eligible project costs for their match funding. Applicants within this subsidy category requesting grant funding of over £500,000 will be required to demonstrate 20% of their total eligible project costs for their match funding. The maximum amount of aid they can apply for and the minimum company contribution that can be provided for a project is summarised in the table below.

Aid for start-ups for all applications

Grant funds requested	**Minimum company match funding**	**Maximum aid toward eligible project costs**
≤ £500,000	10% of the total eligible project costs	90% of eligible project costs
> £500,000	20% of the total eligible project costs	80% of eligible project costs

For example, a small innovative start up could apply under this category for a project with a total eligible project cost of £300,000. The maximum amount of aid they could apply for is 90% of those total project costs, so the largest grant value they could request for this project is £270,000. The minimum company match funding that they would be required to contribute is 10% of the eligible project costs, which is £30,000 in this example.

4.5 Funding levels for Aid for research and development

For businesses, in the Aid for research and development category, the amount of grant funding available and minimum match funding requirements depends on the type of project, the size of the organization, and whether you are applying as a sole applicant or part of a consortium. The tables below summarise the different funding levels available under each category for sole applicants and for consortia. The types of projects are described in Section 1.

For Research Organisations, we welcome university partners, but as with other government funding bodies funding higher education institutions, we will not pay more than 80% of the Full Economic Costs (FEC) calculated using the Transparent Approach to Costing (TRAC) methodology. Any applications requesting items that would ordinarily be found in a department, for example non-specialist computers, should include justification.

Where applicable, other Research Organisations that are not higher education institutions undertaking non-economic activity (NEA; activity which cannot be carried out the private sector) can receive up to 100% funding. Research organisations should be 'non-profit distributing' to qualify. They should explain how they will disseminate the output of their project research as outlined in the application. Research organisations which are engaged in economic activity as part of the project will be treated as business enterprises for the purposes of funding.

Aid for research and development for applicants who are not Research Organisations

Project type	**Organisation size**	**Minimum company match funding**	**Maximum aid towards eligible project costs**
Fundamental Research	All	0%	100%
Industrial research	Micro/small	30%	70%
	Medium	40%	60%
	Large	50%	50%
Experimental development	Micro/small	55%	45%
	Medium	65%	35%
	Large	75%	25%
Feasibility study	Micro/small	30%	70%
	Medium	40%	60%
	Large	50%	50%

For example, a small company that does not qualify for Aid for start-ups could apply under Aid for research and development for a feasibility study with a total eligible project cost of £1,000,000. The maximum amount of aid they could apply for is 70% of those total project costs, so the largest grant value they could request for this project is £700,000. The minimum company match funding that they would be required to contribute is 30% of the eligible project costs, which is £300,000 in this example.

For Consortia, the maximum grant intensity applies individually for each organisation in the consortia. For example, if a Consortia is made up of

- University: Total FEC costs £200,000 so 80% FEC claimable is £160,000
- Start-up: Contributing £100,000 of work – maximum grant £90,000
- Large Company contributing £100,000 Industrial Research: Maximum grant £50,000
- Research organisation contributing £50,000 of work: Maximum grant £50,000
- Total grant claimable is £350,000 out of £450,000 of work.

It is possible that some projects contain elements of work that qualify for Fundamental Research and other elements that qualify as a Feasibility Study. In this case, applicants can declare this in their applications and funding rates can be agreed pro-rata for each element and for each organisation.

Applicants are asked to justify both the organisation type and research type on the application form and then calculate the maximum grant recovery rate. The actual grant recovery rate should always be less than this amount.

Note: that as part of the evaluation criteria, there is a value for money test. Hence all applicants should verify that their application offer significant value-for-money to UK taxpayers. This is especially important for Consortia where assessors will be looking at contributions from individual organisations and that the work is balanced between consortia organisations. This is discussed in more detail below.

4.6 Public funding considerations

When considering levels of aid intensity (described above), public funding includes the grant and all other funding from, or which is attributable to, other government departments, UK public bodies, other governments or government organisations. Such funding includes grants or other subsidies made available by those bodies or their agents or intermediaries (such as grant funded bodies).

In applying to this call you must state if you are applying for, or expect to receive, any funding for your project from public authorities (in the UK or elsewhere). Any other public funding will

be cumulated with BEIS funding to ensure that the public funding limit and the aid intensity levels are not exceeded for the project.

Whilst BEIS will check the information provided to try and ensure that applicants meet the requirements of the subsidy categories, applicants should establish that they fall within the aid rules before submitting applications. BEIS requires applicants to notify them of any change to situation or circumstance during the project.

If there is a breach of aid requirements, for whatever reason, BEIS will require repayment of any grant received, including interest, above that which was due. In this situation, applicants will be required to repay all funding received. It is essential to ensure that the total grant funding for the project from public sources does not exceed the permitted percentages stated for the relevant subsidy category.

As part of the assessment process, the added value and additionality of public funding will be assessed and applicants will need to demonstrate why public funding is required to deliver this project.

5 Project Plans, Finances and Financial Viability

5.1 Project timeline

All projects must be financially complete by 31st March 2025 for Lots 1, 2 & 3 or 30 June 2023 for Lot 4 Part 1. All projects must submit a detailed Gantt chart (template provided) as part of their application, which details the project timeline, work packages, and the project milestones.

5.2 Project lead organisation

BEIS specifies that there should only be **one lead organisation assigned to each project proposal**. Grant Offer Letters for successful applicants will be made out to the delegated lead organisation and as such BEIS is only responsible for making claim payments to the delegated project lead. Payments to collaboration partners or sub-contractors are the responsibility of the lead organisation.

BEIS require that all partners in a Consortia application have signed a Collaboration Agreement (CA) prior to a Grant Offer Letter being awarded. The CA should as a minimum reference the terms of the GOL and GFA, specify the work division, intellectual property arrangements and a dispute rectification process. BEIS will, in event of a dispute between partners, expect for the dispute to be resolved within the terms of the CA.

5.3 Project Costs

All applicants must complete the Project Cost Breakdown Form, detailing their expected expenditure and spending profile for the project on a quarterly basis. Further details about this form can be found in Section 8.1 of this document. You should complete a single form covering your entire project and including all of your partners, clearly identifying which costs relate to which partner and the funding levels requested.

During the assessment of applications, the project costs and plans that are submitted as part of the application process will be assessed along with the answers to the questions on the application form to ensure they are what might be reasonably expected.

The eligibility of all costs under subsidy rules and the financial viability of your organisation will be checked following the decision to pre-select an applicant but before a formal offer is made. Being contacted for this information does not indicate either success or failure in the assessment process.

While BEIS understands that project costs may be subject to change prior to agreeing a Grant Offer Letter and throughout the course of the project, we do expect the final version of the Finance Form to be our guide to project expenditure through delivery, and costs should not vary significantly from this without prior agreement of the department.

5.4 Eligible Costs

Eligible costs are defined as the following:

- Personnel costs: researchers, technicians and other supporting staff to the extent employed on the project;
- Costs of instruments and equipment to the extent and for the period used for the project. Where such instruments and equipment are not used for their full life for the project, only the depreciation costs corresponding to the life of the project, as calculated on the basis of generally accepted accounting principles are considered as eligible;
- Directly identifiable costs of buildings and land, to the extent and for the duration period directly used for the project. With regard to buildings, only the depreciation costs corresponding to the life of the project, as calculated on the basis of generally accepted accounting principles are considered as eligible. For land, costs of commercial transfer or actually incurred capital costs are eligible;
- Costs of contractual research, knowledge and patents bought or licensed from outside sources at arm's length conditions, as well as costs of consultancy and equivalent services used exclusively for the project;
- Indirect costs: Additional overheads and other operating expenses, including costs of materials, supplies and similar products, incurred directly as a result of the project. What is covered is discussed in section 5.7 below.

5.5 Ineligible Costs

Under no circumstances can the grant be claimed or used:

- For activities of a political or exclusively religious nature;
- In respect of costs reimbursed or to be reimbursed by funding from other public authorities or from the private sector;
- In connection with the receipt of contributions in kind (a contribution in goods or services as opposed to money);
- To cover interest payments (including service charge payments for finance leases);
- For the giving of gifts to individuals, other than promotional items with a value no more than £10 a year to any individual;
- For entertaining (entertaining for this purpose means anything that would be a taxable benefit to the person being entertained, according to current UK tax regulations);
- To pay statutory fines, criminal fines or penalties;
- In respect of VAT that you able to claim from HM Revenue and Customs.
- For costs for protection of intellectual property including patent fees and the production of patent specifications.
- You cannot claim any costs for the project prior to the signing of the Grant Offer Letter, this includes any costs or expenses incurred in preparing your bid. BEIS is unable to fund retrospective work on projects.

5.6 Sub-Contract Use

You will be expected to state and justify in your project application the amount of sub-contract funding (if any) within the expected spend of the project. You will be expected to explain the necessity for this spend as opposed to the addition of collaboration partners in a Consortia within the project proposal.

BEIS would not normally expect to see contractors in key posts, e.g. CEO, FD, etc. included in applications. Exceptionally, where BEIS is willing to provide a grant which covers the cost of contractual staff in key posts, the day rate attributed to each member of key staff within the project must be agreed with BEIS at the outset and cannot be varied without written agreement.

5.7 Overhead Rates

Overheads are additional indirectly incurred costs that are necessarily incurred by the applicant in undertaking the work. For organisations not using FEC, BEIS normally calculate overheads as a fixed percentage of all direct labour costs at 20% but will consider overhead rates in

excess of 20% where a strong justification has been provided. The overhead rate is agreed with BEIS before the Grant Offer Letter is issued and cannot be changed during the work.

Costs incurred by university partners

We welcome university partners when they can add value, but as with other government funding bodies funding higher education institutions, BEIS will not pay more than 80% of the FEC calculated using the Transparent Approach to Costing (TRAC) methodology. Any applications requesting items that would ordinarily be found in a department, for example non-specialist computers, should include justification. Applications should attach the TRAC funding calculation to the application so assessors can see how 80% FEC has been calculated.

Non-university government-funded RTOs e.g. catapults, can claim up to 100% of project costs so long as they do not claim any central funding from government for research. As part of the value for money criteria, applications will be assessed as whether having a RTO as part of the consortium offers value for taxpayers.

5.8 Financial Viability Checks

BEIS will undertake financial viability checks on all successful business applicants. These will include (if applicable) the latest independently audited accounts filed on the Companies House database.

Where a business is not required to file accounts with Companies House, other financial information may be requested to enable an appropriate financial viability review to be undertaken. We will be looking for evidence of your ability to resource the project appropriately, so the information we request will be focused on understanding how your business operates in this respect.

Within three months of signing the grant agreement BEIS will ask for credible evidence that you have the funding mechanisms in place to manage your cash flow across the life of your project. This could include letters of credit, letters of intent to invest from individuals or organisations or other such mechanisms. We do not expect you to have cash deposits to cover the entirety of your project at the start. If you do not complete your project due to cash flow problems that you could have anticipated and managed, we may request repayment of any grant already issued to you.

BEIS will not make payments in advance of need. BEIS understands, however, the difficulties which small businesses may face when financing this type of project. BEIS will explore cash flow issues with the applicant as part of developing the financial and milestone profile within the Grant Offer Letter. BEIS will offer flexibility in terms of profiles and payments, within the confines of the requirements for use of public money within which it operates.

5.9 Grant Use

Companies should note that the grant may not be used to subsidise commercial activities and that where BEIS awards a grant for the purpose of the development of commercially usable prototypes or pilot projects, any revenue generated from such commercial use will be deducted from the grant (and, where the grant has already been paid, will be required to be returned to BEIS).

6 Confidentiality and Freedom of Information

Where any request is made to BEIS under the Freedom of Information Act 2000 ("FOIA") for the release of information relating to any project or applicant, which would otherwise be reasonably regarded as confidential information, then BEIS will notify you of the request as soon as we become aware of it. An applicant must acknowledge that any lists or schedules provided by it outlining information it deems confidential or commercially sensitive are of indicative value only and that BEIS may nevertheless be obliged to disclose information which the applicant considers confidential.

As part of the application process all applicants are asked to submit a public description of the project. This should be a public facing form of words that adequately describes the project but that does not disclose any information that may impact on Intellectual Property (IP), is confidential or commercially sensitive. The titles of successful projects, names of organisations, amounts awarded, and the description of the project may be published once the award is confirmed as final.

All reviewers used during the assessment of applications will be subject to a confidentiality agreement.

6.1 Media engagement

BEIS may wish to publicise the results of the scheme which would include engagement with the media. At the end of the application and assessment process, BEIS may issue a press release or publish a notice on its website. These may, for example, outline the overall results of competitions and describe some of the projects to be funded.

Some organisations may want their activities to remain confidential and you will be given a chance to opt out of any involvement in media relations activity and further case study coverage of projects, should you see this as being necessary. However, the public description of the project you provide in your application will be made available in the public domain if your

application is successful, and you are not able to opt out of the project description being published.

Any organisation that wishes to publicise its project, at any stage, must contact the Programme Lead of the SBSP Innovation Programme at BEIS before doing so.

7 Assessment Process and Criteria

All applications will be considered against the assessment areas and ranked against each other. The online application form and guidance notes are designed to inform you about the types of information you should provide to BEIS for your proposal to be assessed.

We will select projects that offer the best value for money based on their assessment against the criteria outlined in this section. The projects will be scored using assessment rubric set out in the table below. Projects must score a minimum of 60% (based on total score) to be eligible for funding.

Score	**Description**
1	Not Satisfactory: There is no evidence to very little evidence that the question has been satisfactorily answered and major omissions are evident.
2	Partially Satisfactory: There is little evidence that the question has been satisfactorily answered and some omissions are evident. Much more clarification is needed.
3	Satisfactory: There is reasonable evidence that the question has been satisfactorily addressed but some omissions are still evident and further clarification is needed.
4	Good: The question has been well addressed with a good evidence base, with only minor omissions or lack of clarity
5	Excellent: There is clear evidence that the question has been completely addressed in all aspects, with question answered clearly, concisely with a strong evidence base.

The scoring guidance and the criterion weighting is summarised in the table below.

Criterion 1	Technical concept and level of innovation
Weighting	30%
Guidance	A maximum of 3000 words is allowed for this field. Where relevant, applicants are expected to: • Explain why their solution is innovative and to what extent it is technically feasible • Provide evidence to demonstrate that the proposed approach is technically feasible in the context of SBSP, providing justifications for all technical data provided. • Describe and provide evidence of the current TRL of the technology including details of work that has been done to date and describe how the project demonstrates innovation in SBSP. Using the guidance in Appendix 2 of this document, you should choose the TRL you feel most appropriate to the current state of your technology. The TRL chosen should be supported by the information provided. Please note to be eligible for this competition your technology must have a TRL of 1-6. • Describe the TRL that will be achieved by the project including evidence that will support this claim. • Explain their approach to identifying key mission and system drivers and development of requirements. • Explain their approach to identifying and down-selecting candidate mission architectures against key factors such as cost, complexity and risk. • Explain their approach and understanding of critical areas for technology development, including the state of the art and applicability of UK supply chain. The proposal should identify key breadboarding activities which will be implemented within the framework of this contract or outside of this contract. • Provide a study logic identifying the key inputs and steps towards the delivery of the outputs. This should include the key milestones and reviews, identifying where there will be major outputs and engagements with BEIS and UKSA. Furthermore, this should provide initial insight into how the work performed under this contract would feature in a broader implementation plan towards launch.
Scoring Guide	Strong answers will comprehensively explain all the above where relevant and:

	• Provide clear evidence and justification for the proposed technical approach and data. • State and justify credible TRL, within the 1-6 range • Describe the key innovation that clearly fits within the category's Technology Scope.

Criterion 2	**Credibility of the technical approach, relevance to the specific challenge to the development of SBSP, and relevance to wider Net Zero target**
Weighting	10%
Guidance	A maximum of 1,500 words is allowed for this field. Applicants are expected to: • Describe how the proposed innovation compares to the state-of-the-art and why your project would be a more attractive solution • Describe the technical challenges that will be addressed with the proposed solution and the technical advances that will be achieved by the project in transitioning towards the longer-term technologies, as well as how this will be achieved. • Provide justification on what makes your approach / technology the best suited to address the challenge of the development of SBSP • Describe any spin-off technologies or applications that can be derived from your innovation and how they can help achieving Net Zero target by 2050 • Describe what needs to happen to achieve the stated performance, the risks that may prevent it and how these risks might be mitigated. • Describe the additional work that is needed to develop the technology further and enable future deployment.
Scoring guide	Strong answers will comprehensively explain all the above and highlight the key barriers and challenges to the long-term development plan for the technology.

Criterion 3	Dissemination Strategy
Weighting	10%
Guidance	A maximum of 1000 words is allowed for this field. Applicants are expected to: • Describe your plans for taking the knowledge and experience arising from this project and ensuring that these are effectively communicated and shared within the relevant space and energy communities • Describe how you will ensure your innovation will boost UK's reputation as a pioneer and leader in the field of SBSP
Scoring guide	Strong answers will comprehensively explain all the above and provide clear effective dissemination and knowledge-transfer plans and resources to deliver them.

Criterion 4	Project Plans
Weighting	10%
Guidance	A maximum of 1500 words is allowed for this field. Applicants are expected to: • Describe your project plan, including practical steps and actions you will take to develop your innovation needed for SBSP. This may include approaches to co-engineering with the consortium to achieve the milestones or outputs identified in the lots. Complete the Gantt chart template with your project plan and upload it in this section. Give as much detail as possible and use evidence to prove your claims when you can. • Provide a Work Breakdown Structure (WBS) and high-level Work Package Descriptions (WPD) for the project for the delivery of the lot. The WBS and WPD should identify the responsible organisations and should be provided as annexes. • Justify why the technical approach taken is suitable for SBSP and how this approach will be achieved through the planned work packages • Explain important deliverables and milestones, including when you expect to reach them and what you need to do to reach them. These could include producing a computer model,

	working prototype, proving a theory, running a test in a real-world environment, obtaining a patent, points for go/no-go decisions, or many other critical stages for your project. • Explain how important milestones or work packages depend on other factors in the project
Scoring guide	Strong answers will comprehensively explain all the above. Some factors our assessors will consider include but are not limited to: • Is the technical and methodological approach appropriate to the needs of the project and are the innovative steps achievable through the proposed approach? • Is the project plan sufficiently detailed in comparison to the complexity of the project? • Is the timing of key milestones realistic?

Criterion 5	**Project Risks and Management**
Weighting	5%
Guidance	A maximum of 1000 words is allowed for this field. Applicants are expected to: • Describe the top three critical success factors for this project and how these success factors will be measured • Describe the top three challenges to delivering this project • Please provide a risk register covering key commercial, technical, regulatory, operational, environmental risks, including how these will be monitored and managed and the arrangements for managing any significant sub-contractors. • Summarise how these key risks will be monitored and managed
Scoring guide	Strong answers will comprehensively explain all the above and • Explain the highest priority challenges to project delivery, including a plan for managing or overcoming these challenges • Explain the key risks to the project success, how likely they are, and how you plan to monitor, manage, and mitigate them

	• How important are the critical success factors to the project? • Have the challenges been sufficiently described and can these challenges be realistically addressed during the project? • Have the risks been assessed realistically and is the risk management strategy appropriate?

Criterion 6	**Project Funding**
Weighting	10%
Guidance	A maximum of 1000 words is allowed for this field. Applicants are expected to: • Complete and upload the Project Cost Breakdown form • Describe the basis of the project costs with reference to delivery of the milestones in the project plan. • Explain sources of match funding and justify subcontract use and overhead costs. • Justify that the proposed costs meet the competition's Eligibility Criteria, are realistic in terms of the project plan and are sufficient to yield the proposed deliverables. The full list of eligible project costs is set out in Appendix 1. • Justify personnel including actual labour costs, material costs and depreciation of capital items. More information about how to fill out the Project Cost Breakdown Form can be found in section 8.1.
Scoring guide	Strong answers will comprehensively explain all the above and • Explain the sources of match funding, how certain these are, and when you expect to receive them if you do not have it already. • Justify subcontract use and overhead costs if necessary • Explain important underlying assumptions • Justify the budget is realistic for the scale and complexity of the project • Show the budget breakdown is realistic • Show the work packages align with the predicted spend profile shown on the project cost breakdown form

Criterion 7	**Value for Money**
Weighting	10%
Guidance	A maximum of 1000 words is allowed for this field. BEIS/UKSA aim to fund projects which offer good value for money for the UK taxpayer. Applicants are expected to: • Explain why your project offers good value for government's investment • List all grant funding currently being applied for, including funding body, project/activity funded, amount, and date. • Explain what would happen to the project without this funding, outlining the extent to which any of this project would still occur and why. • Describe all previous investments in the innovation given by category, for example grant funding, own cash invested, external funding received/invested, non-cash investment (personnel, resource, etc.). For each investment, please give a high-level breakdown of what has been achieved to date.
Scoring guide	Strong answers will comprehensively explain all the above and • Describe all previous investments in the innovation and how they have helped achieve progress to date. • Explain why your project would not be able to go ahead without public support and what would happen the project and the match funding contribution if it does not. • Outline the barriers currently stopping the project from going ahead and how SBSP funding can overcome these barriers Factors our assessors will consider include but are not limited to: • Does this project offer good value for UK taxpayer money? • Have previous investments in this innovation resulted in good progress? • How strong is the case for added value of public funding?

Criterion 8	**Experience and Skills**
Weighting	15%
Guidance	A maximum of 1500 words is allowed for this field. Applicants are expected to: • Describe the relevant skills and experience that will enable successful project delivery and address the key development areas or work packages in the specific lot • Detail the main people involved in the project, including both lead and partner organisation personnel if relevant. Please upload brief CVs for these individuals (CVs should be no longer than 2 pages each). • Detail your approach to filling any skills or expertise gaps in your lead or partner organisation that will be required to successfully deliver the project. • Highlight any relevant industry contacts, supply chain relationships, or subcontractors that will allow you to complete your project
Scoring guide	Strong answers will comprehensively explain all the above and • Include relevant experience, sector expertise, and/or academic background for all people who are critical to delivering the project • Identify any gaps in the project team and explain the plan to address these gaps • List relevant important contacts and relationships that will aid in project delivery, for example current suppliers, suppliers you have approached, contacts you have worked with before, professional or industry groups you belong to, etc. Factors our assessors will consider include but are not limited to: • Do the organisations delivering the work have the right available mix of skills and experience to deliver the project successfully? • Do you have the right contacts and relationships to deliver the project? • Is the use of subcontractors appropriate? Where they are being used, does the management team have experience managing external contractors?

8 Completion of the Application

8.1 Supplementary Forms to Upload

Gantt Chart

This form should be uploaded as part of Criterion 4.

Field	Guidance
Task name	Enter the type of activity that you need to do in this column. For instance, research, analysis, development, testing, administration. We expect this will correspond to your project work packages.
Sub-task name	Enter a more detailed description of the activity related to the task or work item. You can also include key deliverables and milestones as sub-tasks.
Dates	Update the column headers to reflect your project dates. This template Gantt chart is split into quarter years. You can use months, weeks or days instead if that is more appropriate for your project. Then fill in the cell(s) corresponding to the date range of each task or subtask. Add additional rows and columns as necessary.

Risk Register

This form should be uploaded as part of Criterion 5.

You should consider risks and issues of the following types: Operational, Commercial, Technical, Personnel, Environmental, Health and Safety, Regulatory, Financial, etc.

BEIS recognises that projects of this type are inherently risky. However, it seeks assurance that the projects it funds have adequate arrangements for managing this risk.

Field	Guidance
Risk description	Enter the details of the potential risk to your project. Many factors could present a risk to your project. Every project will have different risks.
Likelihood (low, medium, high)	Select the how likely this risk is to occur. • Low: < 30% • Medium: 30% – 70% • High: > 70%
Description of impact	Describe the potential impact of the risk occurring. Impacts could include: • delays to reaching important milestones • going over your budget • needing to find other suppliers • having to replace equipment • stopping the project altogether
Level of impact (low, medium, high)	Select the level of impact this would have on the project if it occurs. • Low: minimal impact on timing and quality of project delivery • Medium: project achieves some but not all objectives and deliverables • High: project may not be completed successfully or would only be completed with delays lasting months or more
Mitigation	Describe what measures you'll take to prevent this risk from happening, or minimise its impact if it does occur Common examples of risk mitigation include: • work processes and procedures • insurance policies • legal agreements between you and partners, suppliers, or contractors • contingency plans
Mitigation risk assessment (red, amber, or green)	Select a risk factor appropriate to the information you've given in the previous columns. The examples are below are for guidance. You should use your own judgement to classify a risk. • Red: impact and likelihood are high, or a combination of high and medium

	• Amber: impact and likelihood are medium, or a combination of high and low • Green: likelihood and impact are low, or a combination of low and medium You could also classify risks as amber-green or amber-red if needed.

Project Cost Breakdown Form

This form should be uploaded as part of Criterion 6.

Your project cost breakdown form should individually show all the costs of all your project partners, if you are applying as a Consortia. You need to show clearly how funds will be split between partners. Submit only one project cost breakdown form for the project.

Additionally, please note:

- You can navigate between sections using the bar at the bottom of the worksheet.
- The grey cells in the spreadsheet automatically make calculations based on data you input elsewhere on the sheet – you should not enter anything in these cells
- The blue cells are manual entry boxes or drop-down options
- There are examples of what to enter throughout the sheet

You only need to complete sections if you have costs in the respective categories. For example, if you do not have any planned capital equipment or subcontract use, leave these sections blank.

Summary

Enter the amount of match funding you will contribute to the project.

See Section 4 for more information about the minimum match funding requirements and maximum grant amounts. For example, if you found your project is eligible for a grant of up to 65% of total eligible project costs, you cannot ask for more than this percentage, but you could request less.

Check the values on this sheet after you complete the other sections. The sheet will calculate the total value in GBP of the BEIS grant you are applying for and the total company match funding. Together, the BEIS grant and the match funding should add up to the total eligible project costs.

Partner Breakdown

You should enter the different project partner organisations and the share of the total project costs to be spent by each organisation. The spreadsheet will use these to automatically calculate the total costs in GBP for each organisation.

If you are applying as a sole applicant, the % total cost will be 100%.

Labour & Overhead Costs

List the labour and overhead costs you expect during the project on the table below.

If in a consortium, this should include all partners involved in the project and reflect the amount each of you is allowed to claim, based on the subsidy category guidance.

The applicant should fill in the table in the spreadsheet. If one of your project partners is a higher education institution like a university, they should also provide the FEC TRAC breakdown of the labour costs as a separate attachment.

Field	Guidance
Position, name, grade, or role within the project	Name the person and list their role, title, or grade level
% of time allocated to project	Specify the share of working time that the person will have allocated to this project
Total days of project time	Specify the duration over which this person will be involved in the project
Total days worked on project	You should not enter anything in this cell. It will calculate the number of days from the project time duration and percentage of time on this project.
Total project labour costs/staff costs	Specify the amount of money this person would cost for the project.
Day rate	You should not enter anything in this cell. It will calculate the day rate (GBP/day) based on the other information given.

Capital Equipment

Provide information about any capital equipment you will use for your project.

Field	Guidance
Capital equipment description and use	List the items your project needs and their purposes

New purchase or Existing item	Enter the most applicable option: • New purchase if you need to buy the item • Existing item if you already own it
Net price value of item at project start or purchase price	Enter the price of the item when you bought it, or at the start of project. For new equipment, enter the price of the item minus VAT. For items you already own, enter the item's approximate Net Present Value (NPV). This is the value of the item now. Check the price of similar used items to get an idea of how the value of equipment you own.
Residual value at project end	Enter the estimated value of the item at the end of the project
Utilisation of equipment on project	Estimate the proportion of time that the equipment was used on the project. A 50% use would mean 50% of the depreciation becoming net cost
Net cost to project	You should not enter anything in this cell. It will be automatically calculated based on your other entries.

Material costs

Enter the materials you think you will need for the project, including how many units of each and the cost per unit in GBP.

Subcontractor costs

Field	Guidance
Name of subcontractor	Give the name of the company that you will use for subcontract work.
Location of activity	State which country the work will be carried out in. If the work is carried out abroad, you should show how using this subcontractor will have a net benefit to the UK in the main application form text box. If you are applying for Cornwall-based funding, state the county in which the work will be undertaken.
Project role / type of work	Briefly describe the type of work the subcontractor will do for the project.

Reason for sub-contractor	Briefly explain why you need to use a subcontractor. You can elaborate on this more in the main application form text box.
Cost	Enter an estimate or a quote for the total cost for the subcontractor.

Travel & subsistence

If relevant, enter your estimated travel costs on this sheet. Include brief details about each trip, the reason for it, how much each trip would cost, and how many times a project team member would make this trip over the course of the project.

Other costs

If applicable, you can enter other cost details here. Include a description of the item or service and a brief reason for the other expense in addition to the cost in GBP. Please see Section 5 for more information about eligible and ineligible costs.

Partner breakdown

Enter details of consortium organisation names, roles and costs as a proportion of total project costs.

Project location

Enter the location information about each project site for every project partner. This includes details about the address, a description of the activities taking place at the site, and specifying what share of the total eligible project costs will occur at each location.

The spreadsheet will automatically calculate the value in GBP of total eligible project costs and value of the BEIS grant requested which will be spent in each location.

Quarterly breakdown

Enter the quarterly cost breakdown by cost category for every quarter from now until March 2025. These costs should align with the project costs you entered on the other sheets.

HEI Overhead costs

Use this sheet if one of your project partners is a higher education institution like a university.

Specify the total amount of money you will spend in each category. You can explain or elaborate on in the text box of the application.

Admin support costs should be counted as indirect costs. Directly allocated other costs could include shared costs for example use of facilities.

Appendix 1 – Eligible Costs

BEIS will only provide the grant to cover eligible costs incurred and defrayed in the period between acceptance of the BEIS grant and the deadline specified in the grant offer letter for completion of the project.

The definition of eligible costs includes the applicant's own costs, eligible costs incurred by consortium members and eligible costs incurred by companies connected to any of these. The cost of work contracted to connected companies, to consortium members or to companies connected to consortium members should be on the basis of eligible costs.

Costs must be denominated in GB pounds. Applicants should indicate where conversion has been made to GB pounds from other currencies and indicate the rate and assumptions used.

List of Eligible Costs

Eligible costs are defined as the following:

- Personnel costs: researchers, technicians and other supporting staff to the extent employed on the project;
- Costs of instruments and capital equipment to the extent and for the period used for the project. Where such instruments and equipment are not used for their full life for the project, only the depreciation costs corresponding to the life of the project, as calculated on the basis of generally accepted accounting principles are considered as eligible;
- Costs for of buildings and land, to the extent and for the duration period used for the project. With regard to buildings, only the depreciation costs corresponding to the life of the project, as calculated on the basis of generally accepted accounting principles are considered as eligible. For land, costs of commercial transfer or actually incurred capital costs are eligible;
- Costs of contractual research, knowledge and patents bought or licensed from outside sources at arm's length conditions, as well as costs of consultancy and equivalent services used exclusively for the project; and,
- Additional overheads and other operating expenses, including costs of materials, supplies and similar products, incurred directly as a result of the project.

List of Ineligible Costs

Under no circumstances can the grant be claimed or used:

- For activities of a political or exclusively religious nature;
- In respect of costs reimbursed or to be reimbursed by funding from other public authorities or from the private sector;

- In connection with the receipt of contributions in kind (a contribution in goods or services as opposed to money);
- To cover interest payments (including service charge payments for finance leases);
- For the giving of gifts to individuals, other than promotional items with a value no more than £10 a year to any one individual;
- For entertaining (entertaining for this purpose means anything that would be a taxable benefit to the person being entertained, according to current UK tax regulations);
- To pay statutory fines, criminal fines or penalties; or
- In respect of VAT that you are able to claim from HM Revenue and Customs.

Staff Costs

BEIS would not normally expect to see contractors in key posts, e.g. CEO, FD, etc included in applications. Exceptionally, where BEIS is willing to provide a grant which covers the cost of staff in key posts, the day rate attributed to each member of key staff within the project must be agreed with BEIS at the outset and cannot be varied without written agreement.

Appendix 2 – Technology Readiness Levels (TRLs)

Technology readiness levels are an indication of the maturity stage of development of a technology on its way to being developed for an application or product. TRLs for space applications are defined in ECSS-E-HB-11A[5] "Technology readiness level (TRL) guidelines" and shall be used for all lots.

Appendix 3 – Space Mission Architecture Feasibility Study Phase 0/A

The approach defined in Appendix 3 and 4 follow internationally agreed best practice for delivering a study to the maturity of a Phase A or B1 mission architecture. The elements described can be refined and discussed in partnership with the UKSA but set initial expectations on the type of work to be performed within this grant. Part 1 (Phase 0/A) focuses on the initial concept development and review of possible mission architectures, while Part 2 (B1) seeks to further define the architecture and elaborate on key areas. For Part 2 (B1) the bidder may consider to propose additional breadboarding activities to de-risk key technologies identified during Part 1 of the study. These breadboarding activities/de-risking activities are to be proposed within the proposal delivered for Part 2 (B1).

Part 1: Space Mission Architecture Feasibility Study Phase 0/A

Areas of study that will be assessed in the evaluation:

- Identify the demand and assess the market to develop an initial business case for SBSP, to ensure the architecture that is developed is suitable and scalable to the end need.
- Identify and characterise the system needs, better understand the system1 requirements in the space environment, and how it will scale to the full size.
- Identify dependability and safety goals and mission operating constraints with respect to the physical and operational environment.

[5] This can be downloaded from ecss.nl once a login has been created (access is free).

- Analysis of carbon footprint throughout the mission lifetime (Phase A-F)
- Develop the preliminary technical system requirements specification
- Produce a preliminary flow down to space, ground and enabling systems requirement specifications
- Identify possible system architectures and their feasibility, trading-off candidates at system and sub-system level using clear criteria and methodology
- Perform preliminary assessment of programmatic aspects supported by market and economic studies as appropriate
- Identify relevant data to inform the system design and validate computer models, assessments and analyses, to give confidence that the full-size system will perform as expected
- Generate top level models/analysis/assessments to demonstrate system concept feasibility
- Perform preliminary risk assessment identifying impact, probability, and potential mitigation strategies
- Revisit the independent study[6] technology roadmap and re-confirm the identification of key technologies that require development to enable SBSP and recommend the TRL raising activities/early-stage demonstrations.
- Establish the preliminary management plan, system engineering plan and product assurance plan for the project.
- Elaborate the most promising system(s), operations concept(s) and system architecture(s) and compare these against the identified needs, to determine levels of uncertainty and risks.
- Establish the function tree.
- Assess the technical and programmatic feasibility of the most promising concept(s) identified in Phase 0 by identifying constraints relating to implementation, costs, schedules, organization, operations, maintenance, production, additional benefits and their economic and environment impact and disposal.
- Quantify and characterize critical elements for technical and economic feasibility.
- Propose the system and operations concept(s) and technical solutions, including model philosophy and verification approach, to be further elaborated during Phase B.
- Elaborate the risk assessment.
- Identify and propose the development activities on the necessary enabling technologies such as In-orbit Service and Manufacturing (IOSM), low cost reusable launch, orbit raising, satellite decommission, autonomous control system

[6] https://www.fnc.co.uk/discover-frazer-nash/news/frazer-nash-report-for-uk-government-shows-feasibility-of-space-solar-power/

- Assess current manufacturing capability required both in and outside the UK and suggest the areas that need to grow to make SBSP feasible.

Outcomes:

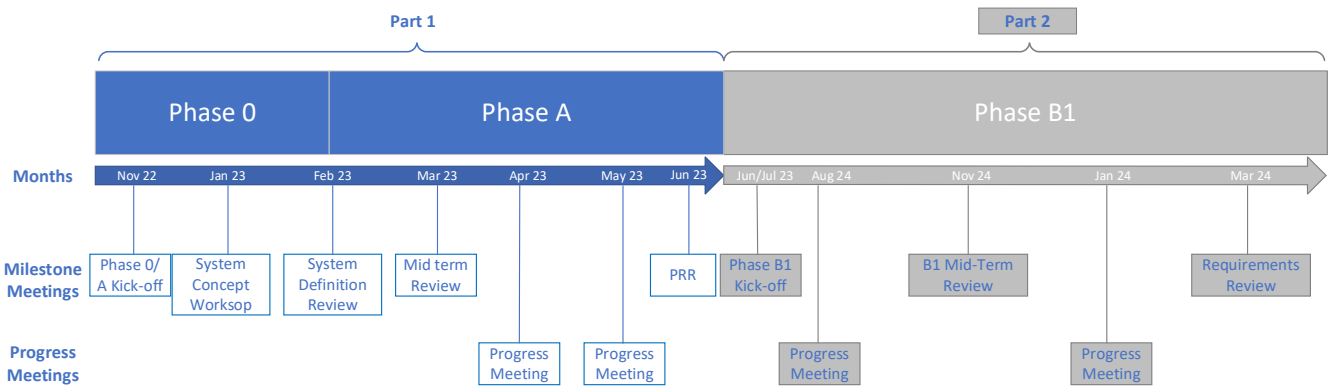
Please refer to the Table 1 for deliverables.

Workflow and timeline:

The Phase 0/A study shall be completed by the end of June 2023. The project will be punctuated by a series of progress meetings and project milestone meetings. At these meetings the teams will be required to present the relevant outputs and deliverables to the UKSA panel for review. The main milestones for the project will be set by the grant recipient but are expected to include the following:

- **Kick-off:** Opportunity to share key assumptions and requirements, discuss roles and responsibilities, methods of communication
- **System Concepts Workshop:** A workshop between the study consortium and the UKSA to review the preliminary top level requirements defined by the study consortium and the corresponding system concepts, a subset of which will be subject to further analysis towards the System Definition Review (SDR)
- **System Definition Review (SDR):** A review on the more detailed definition of the selected system concept(s)
- **Midterm Review (MTR):** The Midterm Review will allow for a review on the progress of the study highlighting key drivers and an opportunity to challenge/refine open trades or design decisions
- **Preliminary Requirements Review (PRR):** Final review of Phase 0/A study presenting the baselined system architecture (s), the preliminary requirements and highlighting key technology demonstrations /TRL raising activities

The indicative timeline for the project is as follows (Part 2 milestones are greyed out):



These dates should be proposed in the Application Form and discussed during the Project Kick-off.

Deliverables:

Table 1 provides a list of suggested deliverables required in Phase 0/A and allocates them to project milestones. All deliverables shall be delivered 15 working days ahead of the milestone dates to allow for review and return of Review Item Discrepancies (RIDs) – which the review panels(s) will aim to return 3 working days before the review meeting. The only exceptions to this are the summary presentations for the KO, MTRs, SRR and PDR – grant recipients should provide them at least 24 hours ahead of the corresponding review colocation meeting.

Applicants are invited to consider and propose additional deliverables and milestones needed to progress their project.

Potential grant recipients are advised to consult the ECSS Documents Requirements Definition (DRD) webpage (https://ecss.nl/standards/ecss-standards-on-line/drd-list/) when considering the content of the deliverable documents. Grant recipients shall utilise their own document templates but are invited to use the ECSS DRD as a reference to ensure that key content is provided. Additional content that the grant Recipient believes clarifies or improves the document is strongly encouraged.

An indicative list of the suggested deliverables required in Phase 0/A part of the study are:

Table 1 Phase 0/A Suggested Deliverables

#	Title	SDR Delivery	PRR Delivery	Notes
1	Business Case	Draft	Issue 1	
2	Report: Critical review of global SBSP systems and associated technology developments	Issue 1		
3	Mission Objectives and List of key stakeholders	Draft	Issue 1	
4	Technical Requirements Specification (TRS) Documents • Mission Requirements	Draft	Issue 1	This document should take the UKSA system requirements provided below, critique and elaborate them as a first step in defining the top-level (system) requirements

	• Space System (Segment) Requirements • Ground Segment Requirements • Subsystem Requirements (Space and Ground segment, including software specifications) • Operational Requirements • Major/key Ground Support Equipment (GSE) Requirements			baseline for the SBSP system.
5	Report: Regulatory review of SBSP	Draft	Issue 1	
6	Report: Synthesis of system architecture concepts	Issue 1		
7	Systems Engineering Plan		Draft	
8	System Design Definition File (including satellite design description, enabling systems, Function tree, Product tree, technical budgets)		Issue 1	
9	System development plan including the development of key technologies		Issue 1	
10	Technology matrix – Defining TRL level for each required technology with justification and recommendation on TRL		Issue 1	

	raising activities/key technology demonstrations			
11	Mission Analysis Report		Issue 1	
12	CONOPS report		Issue 1	
13	Enabling Technologies Analysis and Design Report		Draft	
14	Project Management Plan		Draft	
15	Project Gantt Chart (from Phase B2 to Phase F inclusive)		Issue 1	
16	ROM cost estimates (from Phase B2 to Phase F inclusive)		Issue 1	Expected to include launch cost
17	Risk Management Plan and Report (including Risk Register)		Issue 1	
18	Final report and executive Summary		Issue 1	
19	Product Assurance Plan		Draft	
20	Monthly Progress Reports	To be delivered on the last Thursday of each month		
21	Milestone Reports	Issue 1	Issue 1	It is a new issue at each review
22	Meeting Minutes	Draft minutes shall be dis-tributed for review within 5 working days of the meeting		
23	Review presentations	Issue 1	Issue 1	Unlike the datapack itself (which shall be delivered 15 working days in advance of the corresponding review colocation meeting) the grant recipient should deliver the summary

presentations at least 24 hours in advance of the corresponding colocation meeting.

General requirements:

SBSP-GEN-001: The proposal shall be for a Phase 0/A Feasibility Study, which addresses the system concept and meets the requirements of the call.

SBSP-GEN-002: The proposal shall be led by a UK organisation who will receive a grant from the UK Space Agency.

SBSP-GEN-003: As part of the application for funding, applicants shall review and accept the terms of the UK Space Agency's published Grant Funding Agreement.

SBSP-GEN-004: The proposal shall detail the applicant's suggested milestones for payment. All milestones of Part 1 must be completed by 30th June 2023.

SBSP-GEN-005: Proposals shall include consideration of the commercial or scientific viability of the proposed innovation. This should demonstrate that the innovation would support development of a realistic and sustainable market.

SBSP-GEN-006: Proposals shall demonstrate that the investment sought from the UK government represents clear value for the UK public, through measurable benefits for the UK economy.

SBSP-GEN-007: All projects shall demonstrate that they have an effective structure in place for managing the administration of the grant requested and demonstrate that they have a sound approach to planning to achieve their programme aims on time and within budget.

SBSP-GEN-008: The system cost shall be estimated by the grant recipient

Note: All systems cost estimates shall be supported by relevant support documentation and analysis (e.g. launch cost, economic analysis, market assessments)

System requirements:

SBSP-SYS-001: The mission shall use a space based solution for power collection and transmission

SBSP-SYS-002: All stages of the system must demonstrate compliance with the space debris mitigation requirements stated in IADC Space Debris Mitigation Guidelines.

SBSP-SYS-003: The SBSP system shall deliver a minimum 1GW (TBC) of power

Note: the power value required here is the power available from SBSP at the SBSP ground station interface to the grid.

SBSP-SYS-004: After commissioning the space segment shall have an operational availability of 99% during each year of its lifetime.

Note: This means that the system has to deliver its nominal performance with in any one year of its operational lifetime with a maximum of 1% down-time throughout the operational lifetime.

SBSP-SYS-005: The space segment shall utilise incident solar radiation to generate electrical power

SBSP-SYS-006: The space segment shall transmit power to a UK owned ground station.

Appendix 4 - Space Mission Architecture Feasibility Study Phase B1

The approach defined in Appendix 3 and 4 follow internationally agreed best practice for delivering a study to the maturity of a Phase A or B1 mission architecture. The elements described can be refined and discussed in partnership with the UKSA but set initial expectations on the type of work to be performed within this grant. Part 1 (Phase 0/A) focuses on the initial concept development and review of possible mission architectures, while Part 2 (B1) seeks to further define the architecture and elaborate on key areas. For Part 2 (B1) the bidder may consider to propose additional breadboarding activities to de-risk key technologies identified during Part 1 of the study. These breadboarding activities/de-risking activities are to be proposed within the proposal delivered for Part 2 (B1).

Part 2: Space Mission Architecture Feasibility Study Phase B1 Study

Input:

- Results of Phase A

Areas of study that will be assessed in the evaluation:

- Requirements Analysis/Consolidation
    - Starting from the preliminary requirements established in Phase A the grant recipient shall expand, refine and elaborate the requirements baseline at system (space and ground segment) and subsystem level, providing justification for any updates/changes.

Note: Phase B1 ends with a Systems Requirements Review (SRR) a key objective of which is to assess the completeness, and adequacy of the requirements baseline, as such the development of a requirements baseline is a fundamental activity in this phase.

  - Identify requirements that would drive complexity, cost and schedule, trace them back to UKSA requirements, challenge those requirements and propose modifications (with rationale).
  - Identify system, operation and other constraints to be considered during each phase of the mission, e.g. safety, failure recovery, etc.
  - Identify the applicable environments for each mission phase and establish the relevant requirements

- Revisit and adapt the proposed baseline design (from Phase A) to reflect requirements maturation.
- Considering the mission architecture and its implementation, establish preliminary interface requirements among the mission architecture elements (e.g. space and ground segments, subsystems) and inside the key subsystems. Satellite command and control/data interfaces shall also be defined
- Identify and propose the initial breadboarding tasks (Note: Breadboarding is not a requirement of Phase B1. However, should the bidder want to include breadboarding activities to de-risk key technologies, this may be included in the proposal)
  - Breadboarding tasks shall aim to inform the grant recipient's understanding of key technologies/techniques that have been identified as key to SBSP and/or serve to advance the TRL level of those technologies
- Mission Analysis and Ground Segment and Operations definitions
  - All mission phases shall be analysed for both ground and space segments, elaborating the top-level the concept of operations (CONOPS) for the most promising system concept(s) identified in Phase A
    - Mature operational scenarios, sequences and timeline for all mission phases
    - Establish/mature the mission phases duration and operational modes for each phase
    - Establish nominal and credible degraded operations
    - Allocate tasks to space & on-ground segments and derive/ensure consistency with requirements for space and ground systems, (e.g. on-board sensors to monitor attitude rates, pointing), ground systems to process house-keeping/maintenance data etc
    - Establish end-to-end command and data flows in support of commandability and observability architecture, ensure commandability/observability requirements are consistent with baseline design

- Communications Concept
    - Establish communication architecture for uplink and downlink, to achieve commandability and observability in nominal and degraded operations, e.g. data production rate and transmission volume, data availability (real-time or not) and quality (bit rate) for all phases
    - Define communications scenarios for all mission phases
    - Map communication requirements into communications infrastructure, ground and space segments, demonstrating suitability/adequacy for purpose
    - Propose the frequency band and modulation scheme to be used in line with International Telecommunication Union (ITU) Radio Regulations
    - Establish preliminary link budgets
- Ground Segment Definition
    - Produce a preliminary design of the Ground Segment in accordance with the UKSA requirements and those flowed-down from them.
    - Iterate the design based on the outputs of analyses carried out during the various Tasks of Phase B1, ensuring consistency with the requirements, operational concepts and other constraints (e.g. cost, schedule)
    - Establish the configuration of the Ground Segment
    - Define the ground segment software architecture
    - Consolidate the functional analysis and functional architecture
    - Perform Reliability, Availability, Maintainability and Safety (RAMS) analysis: failure tolerance, redundancy concept, safe-modes for each mission phase, robustness/countermeasures to external interference (both naturally occurring and malicious)
    - For all ground subsystems
        - Establish, analyse and maintain consistency of requirements
        - Produce preliminary design concepts of the key subsystems and perform supporting analyses (e.g. regarding bandwidth, maturity, functionality/performance) to justify/confirm suitability
        - Define and maintain system technical budgets for the ground segment (e.g. size, power, data)
    - Space Debris Mitigation Concept
        - Develop the preliminary Space Debris Mitigation and Disposal Plan
- Design and analysis of enabling technologies
    - For the enabling technologies identified in Phase A, perform initial design studies supported by preliminary analyses to demonstrate their underlying feasibility and robustness

- Note: this shall include any and all payload elements of the space segment (e.g. novel/lightweight PV panels, wireless transmission technologies, mirrors) whether novel or not.

- Space segment platform(s) analysis and design definition
  - Develop and a preliminary level the platform design for the SBSP space segment, this should identify the fundamental aspects of the design, justifying their selection. Key areas of the design shall include (but not necessarily be limited to):
    - Mechanical design
    - Electrical power design/electrical subsystem
    - Thermal design/thermal subsystem
    - Propulsion subsystem
    - Communications subsystem
    - Guidance Navigation and Control (GNC)
    - Attitude and Orbital Control Subsystem (AOCS)
    - Data handling subsystem and on-board computer (DHS/OBC)
    - Flight software architecture
  - Iterate the design based on the outputs of analyses carried out during the various Tasks of Phase B1, ensuring consistency with the requirements, operational concepts and other constraints (e.g. cost, schedule)
  - Establish the configuration of the satellite platform including the accommodation of the payload
  - Consolidate the functional analysis and functional architecture
  - Ensure allocation of requirements to key subsystems is comprehensive, ensure consistency as requirements and designs evolve throughout the phase.
- Perform Reliability, Availability, Maintainability and Safety (RAMS) analysis: failure tolerance, redundancy concept, collision avoidance strategies, safe-modes for each mission phase, robustness/counter-measures to external interference
- Define and maintain system technical budgets for the space segment e.g. mass, power and energy, delta V and propellant, processing power and data storage, GNC budget (e.g. pointing and pointing knowledge)
- Produce preliminary design concepts of the key subsystems and perform supporting analyses (e.g. mechanical/thermal) to justify/confirm suitability
- Refine primary and back-up launcher selection, maintain compatibility status between baseline design and launchers, refine launcher selection and/or baseline design to maintain compatibility (with respect to volume constraints, mechanical/thermal launch environments, for example)

- Development, validation and verification approach
    - Define a preliminary development, validation and verification approach for the preferred system concept(s) identified in Phase A and matured in Phase B1.
        - This shall identify the development tasks needed to mature key technologies (including software) and identify protype system models/simulators needed to advance the overall SBSP system maturity.
        - Validation and verification planning shall identify the necessary models (both physical and virtual), simulators and facilities (TVAC, EMC, Vibration, shock etc), required to validate/verify the SBSP design and shall provide a top-level validation/verification flow chart identifying the key steps proposed to ensure the SBSP system is suitable for flight.
        - Analyse the level of definition of the technologies selected, analyse the readiness of the technology[7], suitability for the mission, the qualification status down to equipment level, the source of supply (UK/Non-UK, etc.)
        - Analyse critical areas/items: items with single sources of supply, long lead items, non-UK suppliers, ITAR/EAR and other associated export control issues
        - Mature the model philosophy, providing justification for the selected approach
        - Identify any required Ground Support Equipment (GSE)
        - Identify any validation to be performed in orbit and supporting on-ground activities
- Product Assurance and Risk
    - A preliminary approach to product assurance and risk management for use in subsequent mission phases (B2 to F) shall be defined considering the unique aspects of the SBSP system (e.g. scale, likely mas production of some elements, significant number of launches etc). It should include at least:
        - Definition of the product assurance organisation (including responsibilities and authorities), the activities, processes and procedures to be implemented by the Grant Recipient throughout the entire mission lifecycle.
        - Approach to software product assurance
        - Definition of waiver/deviation/non-conformance processes
        - Definition of configuration management and change control processes
        - Approach to control of critical items
        - Approach to documentation and data control, including security of storage, access, and transfer

[7] See Appendix 2 for a reference to the ECCS TRL assessment handbook.

        - Product assurance of materials and processes
        - Product assurance of Electrical, Electronic and Electromechanical (EEE) components
    - Identify and propose in the Proposed Standards Baseline Report the standards to be used in the subsequent mission phases (e.g. ECSS, tailored ECSS, MIL, etc.) with justification for their appropriateness (e.g. prior use on successful missions, internationally accepted standard, cost etc.)
    - Perform a Hazard and Operability (HazOp) analysis
    - Perform Failure Modes and Effect Analysis (FMEA) (ECSS-Q-ST-30-02C provides an example of a suitable FMEA table)
    - Highlight key risks across all project phases and associated mitigation strategy.
- Project Management
    - The grant recipient is expected to co-ordinate the tasks defined in this document in a timely manner and supply the deliverables required in accordance with the timetable
    - Fortnightly call via MS Teams
    - Report monthly on progress, with reports sent on the last Tuesday of every month and prepared following the 'monthly written report template' outlined by UKSA
    - Attend the end of phase meeting, Project Manager and Engineering Manager/Technical Lead must be in attendance
    - Convene and manage sub-contractor SRRs in good time to enable a system (i.e. ADR mission) SRR to take place with the constraints of the project timeline.
    - Define detailed mission schedule (Gannt Chart) including clear identification of critical path and key delivery milestones for all project phases
    - Provide an estimate ROM cost from Phase B to the end of the mission (Phase and activity to a level sufficient to allow identification of cost-drivers through to completion of Phase F) including operations, broken down by each mission phase.[8]
        - This estimate shall be built upon engagement with sub-contractors/suppliers and quotes provided (which shall be made available to UKSA) by them rather than from internal databases/assessments.
        - Internal costs/labour shall be reported, and sufficient context/explanation provided to allow the robustness of the ROM to be assessed

[8] A template for the submission of the ROM costs will be provided by UKSA after grant award

Note: UKSA shall be invited to any and all subsystem/equipment SRR and reserve the right to attend/observe these meetings and raise RIDS.

Outcomes:

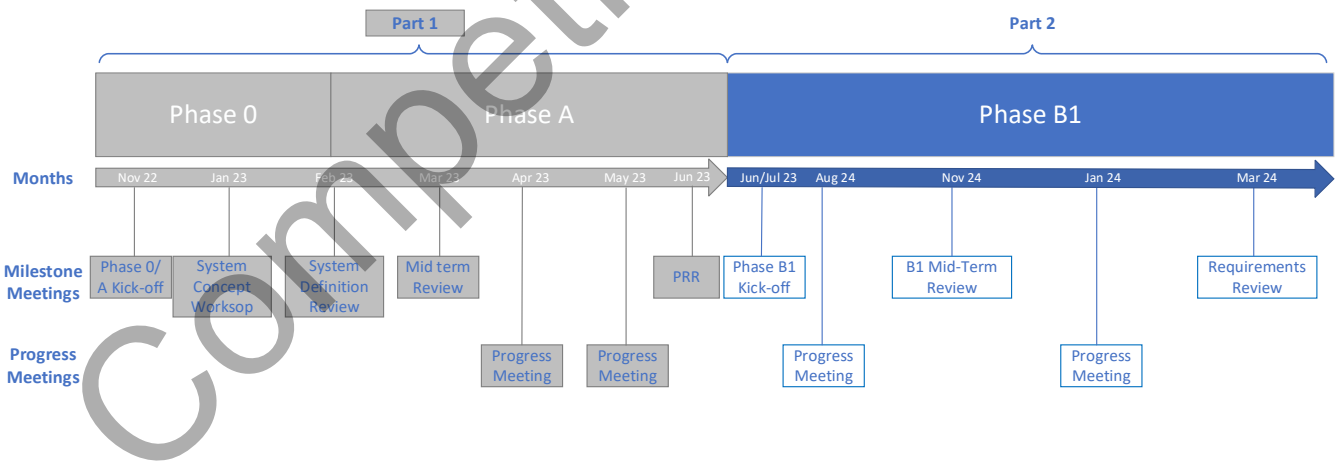
Please refer to the Table 2 for deliverables.

Workflow and timeline:

The Phase B1 is expected to be completed by the end of March 2024. The project will be punctuated by a series of progress meetings and project milestone meetings. At these meetings the teams will be required to present the relevant outputs and deliverables to the UKSA panel for review. The main milestones for the project will be set by the grant recipient but are expected to include the following:

- **Phase B1 Kick-off:** This will be the kick-off of Phase B1
- **Progress Meetings:** There are two progress meetings during Phase B1
- **B1 Mid-Term Review:** Half-way through the Phase B1 study there will be a Mid-term review that will allow for a review on the progress of the study
- **Systems Requirements Review (SRR):** This is the final review of Phase B1 presenting the outcomes of the study along with detailed system requirements

The indicative timeline for the project is as follows (Part 1 milestones are greyed out):



These dates should be proposed in the Application Form and discussed during the Phase B1 Kick-off.

Deliverables:

Table 2 provides a list of suggested deliverables required in Phase B1 and allocates them to project milestones. Phase 0/A deliverables are greyed out but they can be used to indicate the possibility of up issuing some of the documents issued in Part 1 study. All deliverables shall be delivered 15 working days ahead of the milestone dates to allow for review and return of

Review Item Discrepancies (RIDs) – which the review panels(s) will aim to return 3 working days before the review meeting. The only exceptions to this are the summary presentations for the KO, MTRs, SRR and PDR – grant recipients should provide them at least 24 hours ahead of the corresponding review colocation meeting.

Applicants are invited to consider and propose additional deliverables and milestones needed to progress their project.

Potential grant recipients are advised to consult the ECSS Documents Requirements Definition (DRD) webpage (https://ecss.nl/standards/ecss-standards-on-line/drd-list/) when considering the content of the deliverable documents. Grant recipients shall utilise their own document templates but are invited to use the ECSS DRD as a reference to ensure that key content is provided. Additional content that the grant Recipient believes clarifies or improves the document is strongly encouraged.

An indicative list of the suggested deliverables required in Phase B1 part of the study are:

Table 2 Phase B1 Suggested Deliverables

#	Title	SDR Delivery	PRR Delivery	SRR Delivery	Notes
1	Business Case	Draft	Issue 1		
2	Report: Critical review of global SBSP systems and associated technology developments	Issue 1			
3	Mission Objectives and List of key stakeholders	Draft	Issue 1		
4	Technical Requirements Specification (TRS) Documents • Mission Requirements • Space System (Segment) Requirements	Draft	Issue 1	Issue 2	This document should take the UKSA system requirements provided below, critique and elaborate them as a first step in defining the top-level (system) requirements baseline for the SBSP system.

	• Ground Segment Requirements • Subsystem Requirements (Space and Ground segment, including software specifications) • Operational Requirements • Major/key Ground Support Equipment (GSE) Requirements			
5	Report: Regulatory review of SBSP	Draft	Issue 1	
6	Report: Synthesis of system architecture concepts	Issue 1		
7	Systems Engineering Plan		Draft	Issue 1
8	System Design Definition File (including satellite design description, enabling systems, Function tree, Product tree, technical budgets)		Issue 1	Issue 2
9	System development, validation and verification plan including the development of key technologies		Issue 1	Issue 2

10	Technology matrix – Defining TRL level for each required technology with justification and recommendation on TRL raising activities/key technology demonstrations	Issue 1		
11	Mission Analysis Report	Issue 1		
12	CONOPS report	Issue 1	Issue 2	
13	Interface Requirements Document		Draft	
14	Environmental Specifications (all mission phases)		Issue 1	Including Carbon footprint analysis throughout the mission lifetime
15	Space Debris Mitigation and Disposal Plan		Draft	
16	Ground Segment Design Report (to include supporting analyses as annexes)		Issue 1	
17	Enabling Technologies Analysis and Design Report	Draft	Issue 1	
18	Project Management Plan	Draft	Issue 1	Project Management Plan
19	Project Gantt Chart (from Phase B2 to Phase F inclusive)	Issue 1	Issue 2	

20	ROM cost estimates (from Phase B2 to Phase F inclusive)		Issue 1	Issue 2	Expected to include launch cost
21	Risk Management Plan and Report (including Risk Register)		Issue 1	Issue 2	
22	Final report and executive Summary		Issue 1	Issue 2	
23	Product Assurance Plan		Draft	Issue 1	
24	Safety Analysis Report (including FMEA and HazOp)			Issue 1	
25	Proposed Standards Baseline Reports			Issue 1	
26	Monthly Progress Reports				To be delivered on the last Thursday of each month
27	Milestone Reports	Issue 1	Issue 1	Issue 1	It is a new issue at each review
28	Meeting Minutes				Draft minutes shall be dis-tributed for review within 5 working days of the meeting
29	Review presentations	Issue 1	Issue 1	Issue 1	Unlike the datapack itself (which shall be delivered 15 working days in advance of the corresponding review colocation meeting) the grant recipient

should deliver the summary presentations at least 24 hours in advance of the corresponding colocation meeting.

Requirements

UKSA reserves the right to update the requirements based on Phase 0/A.

This publication is available from: www.gov.uk/government/publications/space-based-solar-power-innovation-competition

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