Robot Dexterity

Call for proposals

Date: 10 July 2024

V1.0

SECTION 1: Programme Thesis and Overview

This solicitation is derived from the programme thesis _Robot Dexterity: Handling our future_ within the _Smart machines need smarter bodies_ opportunity space.

Modern civilisation was built by human hands, the dexterity of which continues to underpin a great deal of the physical work in our lives and society. Cost-effective, dexterous robotic manipulators are therefore essential for the automation of tiresome, dangerous, and otherwise unfavourable tasks.

Breakthroughs in AI are transforming robotic abilities, but are limited by their embodiment. Compared to the staggering advances in computation, robot bodies have seen remarkably little development since the 1950s. Our thesis: Only by rethinking our approach to robotic hardware and control can we bring robotic manipulation beyond the tipping-point where it becomes of widespread utility.

This programme will fund innovation in robotic hardware (hardware here refers to the physical embodiment of the robot), such as sensing and actuation, which can improve dexterity. It will also exploit advanced simulation to learn the optimal design of a robot manipulator at the same time as the optimal control, just as biological bodies and nervous systems evolved together. We know from evolution that this can achieve exquisite control and great robustness with minimal compute and energy consumption.

We aim to demonstrate a paradigm-shift in robotic abilities by producing one or more robotic manipulators with unprecedented dexterity on a real-world task. Our goal is to establish the basis for a new industry that can help society better address the labour challenges of tomorrow, and lead to a step-change in human productivity and welfare.

SECTION 2: Programme Objectives

This solicitation seeks R&D Creators, which are individuals and teams that ARIA will fund to:

- Create one or more novel robotic manipulators, demonstrating a dexterous ability that far exceeds what's possible today or likely to be achieved by existing approaches. substantial improvements over the status quo in both performance and robustness, while not introducing any deal breakers in terms of cost, size, infrastructure or scalability.

- Develop new techniques for designing robotic hardware and control software.

- Produce advances in relevant technologies such as actuation and haptic sensing.
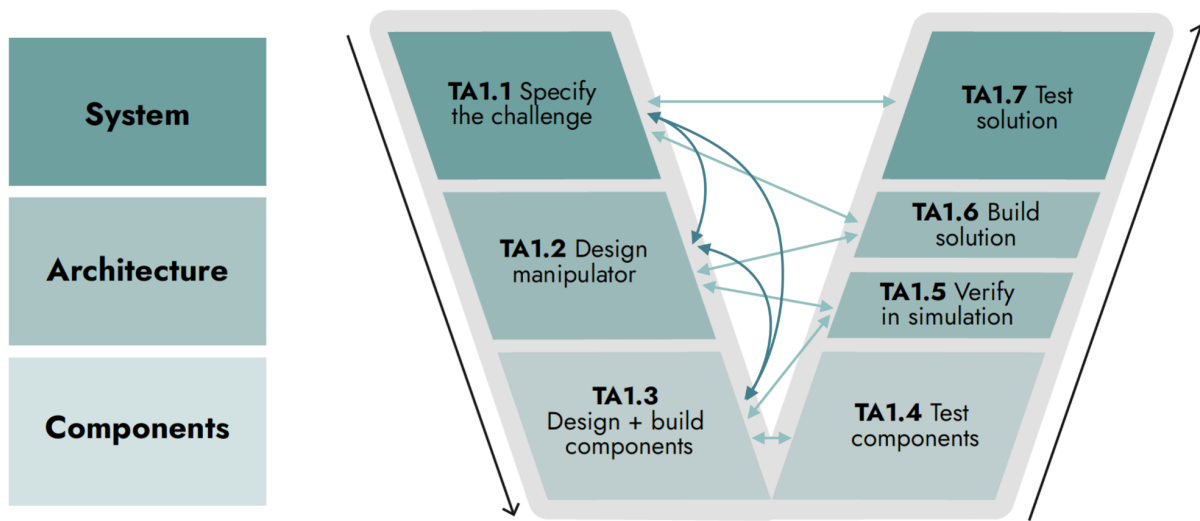
Programme Structure

Figure 1. Systems-engineering V diagram of the programme. The seven Technical Areas represent the smallest area where we envisage a single Creator contributing. Many Creators will contribute to several Technical Areas. Arrows join pairs of Technical Areas across which different Creators will usually be required to work closely.

Figure 1 shows a systems-engineering analysis of the programme. When building a manipulator, it's important to be very clear about the goal, task requirements and any constraints on the solution. However, we are also keen to fund novel components or materials which could have very broad applicability and are not necessarily limited to dexterous applications, or indeed to robotics at all.

Accordingly, we are soliciting proposals addressing one or more of the Technical Areas labelled in Figure 1. We envisage that Creators will work on both right and left arms of the V at a given level, and so are likely to cover pairs of Technical Areas at the same level (Systems/Architecture/Components, e.g. TA1.1+TA1.7, see Table 1). Some Creators may also wish to work across different levels. Thus we envisage that applications will usually combine Technical Areas in one of the four patterns A-D laid out below. However, we are open to other possibilities, other than applications focusing solely on the right-hand side of the V diagram (TA1.4, TA1.5, TA1.6 or TA1.7). These may be solicited in a later call if required by the programme.

Pattern A. Challenge specification (TA1.1 + 1.7)
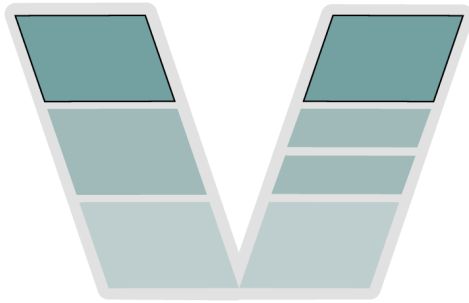
Applicants are invited to specify a dexterity challenge they believe is important for society and which should be targeted by the programme, without themselves creating a solution. At this stage we are not ruling out any sectors or use-cases, other than defence/military. Challenges may be very specific, e.g. a surgical end-effector for a particular operation, or very general, e.g. a manipulator capable of all household tasks. However, even a "general purpose manipulator" will necessarily have limits (e.g. on maximum load, power or tolerance to environments) which will bound its applicability, and these should be specified in the application. These applicants will participate in the programme by developing specifications and benchmarks for the task, and/or through testing solutions built by other Creators.

Pattern B. Integrated solutions (TA1.1 - 1.7)
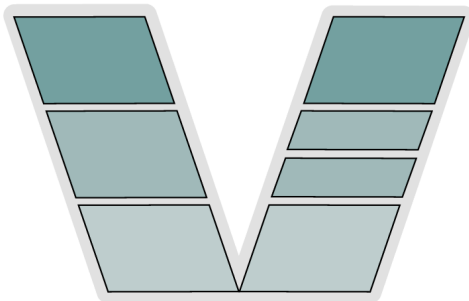
Some applicants may wish to propose an integrated solution encompassing all the areas - from the challenge and also the design and build of a novel manipulator to solve it. We expect that this would usually involve novel components as well.

Pattern C. Novel techniques for robotic design (TA1.2 + 1.5, perhaps also 1.6)
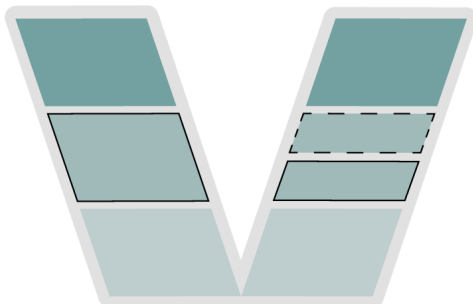
One area of particular interest is novel techniques for designing robotic manipulators. The programme thesis highlighted our desire to shift from a "Genesis paradigm", in which a robot's hardware is taken as a given and control is figured out independently, to a "Darwin paradigm", in which hardware (e.g. body morphology, material properties and sensors) and software (e.g. perception and control) are optimised jointly in a process reminiscent of evolution. We invite proposals to develop such techniques. Such applicants may work entirely *in silico*. If they are selected for the programme, ARIA will team them with other Creators who can

realise their designs. Alternatively, applicants may describe their own plans for rapid prototyping and/or final build (TA1.6).

Pattern D. Novel components (TA1.3 + 1.4)
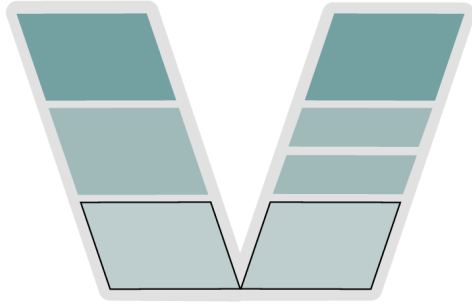
Applicants may also request funding only to build and test novel components which will aid robot dexterity, whether because they are useful for dexterity specifically or for robotics in general. These could be haptic or other sensors, novel actuators or artificial muscles, novel materials or anything else, provided that a case can be made for how they will benefit dexterity.

Budget and expected number of awards

Table 1 shows the number of funding awards we expect to make within each Technical Area, along with the expected budget. The amount requested for a given proposal will depend on its scope and duration. We would not usually expect proposals to be for less than £500,000 or more than £20M.

Technical Areas	Probable number of funding awards to be made	Probable total budget
Specify the challenge & test the solution (TA1.1 + 1.7)	3	£2M
Design manipulator & verify in simulation (TA1.2 + 1.5)	3	£13M
Design, build & test novel components (TA1.3+ 1.4)	10	£28M
Build complete manipulation solutions (TA1.6)	2	£10M

Table 1. Number of Creators we are expecting to select in each Technical Area, along with probable total budget. The total budget we expect to allocate to any one Creator is £20M. As described above, a given Creator may apply across multiple Technical Areas and thus draw on multiple budget lines. We accept that it won't always be easy to define a particular piece of work as lying strictly within one or another area; if you aren't sure choose the one that best fits.

SECTION 3: Technical Metrics

Proposals will be assessed based on their ability to contribute to solving an important challenge in robot dexterity. The metrics specific to this programme are laid out below, by Technical Area where appropriate. Where applicants are applying to more than one Technical Area or all the Technical Areas (e.g. Pattern B), they should address all the respective metrics as specified below for each Technical Area. We realise that all applications are different and there may be good reasons why you cannot address one or more of these metrics. If so, explain that to us.

One possible failure mode of this programme is that the work results solely in interesting lab demos that never make it out into real-world applications. In all Technical Areas therefore, we will be closely interested in the practicalities of the work. This does *not* mean that the proposed research has to be at a high Technology or Manufacturing Readiness Level, but it does mean that we will be assessing it based on its eventual real-world potential. At Stage 2, applicants will be asked to submit a commercialisation hypothesis describing the issues and opportunities around deploying their technology in real-world applications.

TA1.1 + TA1.7: Specify the challenge & test the solution

A successful challenge specification/test (e.g. Pattern A above) will:

- Require a dexterous ability that far exceeds what's possible today or likely to be achieved by existing approaches.

- Have a clear application in a particular domain, for example surgery, household, warehouse, agriculture, general human abilities etc. A particular solution might potentially have applications in many domains, but we need to see clear plans in at least one example area. We're not looking for challenge specifications in the defence/military sector.

- Involve relevant end-users from that domain. We want to see that there is a clear need for the proposed solution, and that the team is fully cognisant of any constraints on design or barriers to eventual take-up. We'll normally expect the applicant team to include end-users and other stakeholders, who have contributed to the design of the proposal.

- Clearly describe the abilities the proposed robotic manipulator will have, the task(s) it will be able to achieve and where it should exceed the current state of the art. Specify quantitative metrics wherever possible. Where these are not yet known, the application should describe plans to establish these.

- Articulate any special constraints which a solution must satisfy, for example: biocompatibility, easily cleanable, level of maintenance required.

- Discuss any existing or alternative solutions and explain why they are not adequate, again using quantitative metrics where possible.

- Clearly outline the potential societal benefit, supported by quantitative estimates, e.g. number of people who could benefit, eventual market size. We define societal benefit broadly and invite applicants to explain their view to us.
  - As befits an organisation working on decadal timescales, we will consider societal benefits integrated over time. For example, a particular use-case might offer relatively little societal benefit immediately, yet be attractive commercially. Thus through establishing a market, manufacturing techniques, supply chains etc, it might open up a pathway to much greater societal benefit in the future. If so, please explain this to us.
  - Without implying a strict utilitarianism, we will generally want to consider both the number of people who could plausibly benefit and the amount of benefit they obtain.
  - "Amount of benefit" is in turn hard to define but what people might plausibly pay is a reasonable proxy. On this basis, "better outcomes for brain surgery" would offer more benefit per person than "faster dispatch of online orders", though the latter might benefit many more people per year.
  - To account for the fact that humans pay to obtain items considered harmful either to them or to wider society, we will penalise challenges where the proposed use-case would be likely to harm human biopsychosocial health or be widely considered controversial.

- Have a clear plan of how to test the proposed solution, any special facilities required, and how success will be measured.

TA1.2 + 1.5: Design & verify manipulator

Where applying for these Technical Areas in isolation or with TA1.6 (e.g., Pattern C), the innovation must be in the design process itself. In this case, a successful project will:

- Explain the intended outcome of your proposed project. This could be one specific manipulator design, or software capable of producing general designs subject to particular constraints. Explain in what form the design will be produced and what, if any, validation, visualisation or animation will be provided.

- Have a clear innovation in the design process, tightly linked to improvements in hardware (e.g. novel approaches for learning control which require less precision from the hardware; a "Darwin paradigm" in which body morphology, material properties and sensors are optimised jointly along with control algorithms)

- Have access to the computational and other resources needed, adequate simulation packages, etc, or present credible plans for this.

- Explain whether and how you intend to incorporate challenge specifications and novel components, perhaps provided by other Creators.
    - If you are working solely on the novel design approach, you will need to work closely with other Creators in order to realise a manipulator for the programme.
    - For example, when designing an algorithm that can design a robot body to carry out a given task, it will need to be able to include challenge specifications developed under TA1.1 into the cost/reward function used for optimisation. There should also be a plan on how to incorporate data on a novel material or sensors developed under TA1.3, in order for these to be included in the design space available to the algorithm.

Where applying for the integrated solution encompassing all the Technical Areas (e.g., Pattern B), these metrics may not apply (ie., you may be using a conventional design process to produce a novel manipulator and/or novel components). In this case, a successful application will:

- Describe the abilities and performance characteristics intended to be achieved by the manipulator, and why these are valuable and a substantial improvement over the current state of the art (possible overlap with TA1.1).

TA1.6: Build a manipulation solution

Applicants who are applying to build a physical manipulator, in addition to other work on challenge specification, components and/or design, should:

- Be able to articulate what facilities, materials etc they expect to be required and demonstrate that you have the ability to access these and can build a good-quality product in a timely way. Depending on the needs of the project, this might include access to local 3D printers to enable rapid prototyping, or working with a national centre to develop new materials.

TA1.3 + 1.4: Design & build / test novel components

A successful novel component design & build/test (e.g. Pattern D above) will thus:

- Clearly explain the nature of the proposed new component, the key innovation and how this will benefit robot dexterity. This should include discussion of how the new component can be integrated into robot designs.
  - Some components may need to be deeply integrated into the body design and control architecture, e.g. a network of skin sensors where the control algorithm has to learn an idiosyncratic relationship between sensor outputs and motor responses needed for a required outcome.
  - Others may be more "plug and play", e.g. with an interface whose inputs and outputs can be precisely described in advance.

- Provide quantitative metrics for measuring success, explaining how these advance the state of the art.
  - For a tactile sensor, we would expect metrics relating to sensitivity/precision, accuracy, spatial resolution and spatial area covered (e.g. just fingertips or entire hand/arm?), temporal resolution (e.g. sensitivity to different vibrational frequencies).
  - For a novel actuator, we would expect metrics such as maximum force and power (both absolute and specific, i.e. relative to mass), maximum strain, efficiency, adaptive dynamic response and other details such as how energy is supplied, whether it can be stored locally etc.

- Cost, reliability, durability and sustainability considerations associated with the potential future scaling of the product for manufacture should also be discussed.

- Have wider applications or other spin-off benefits for the technology beyond robot dexterity.

- Clearly explain whether/how you plan to work with other Creators to enable them to use the components you are developing.

SECTION 4: What are we looking for/what are we not looking for

We are looking for:

- Robot manipulators, by "robot manipulator", we mean the parts of a robot which enable it to carry out dexterous manipulation. We don't mind whether your "manipulator" is an end-effector alone, an end-effector mounted on an arm; bimanual, multi manual or swarm approaches are also all within scope. Depending on the task, robot(s) may need to be mobile, but in order to keep the programme tightly focused on dexterity, we are expecting such robots to use standard mobility platforms (e.g. drones, quadrupeds) and for the innovation to focus on dexterity.

We are not looking for:

- Compute hardware; this is covered by the ARIA programme [Unlocking AI compute hardware at 1/1000th the cost](#) and so is out of scope here.

- Purely software/learning/algorithmic approaches are also out of scope, unless they are closely linked to robotic hardware. Examples of software work which is *in scope* include:
    - The main thrust of the work is to develop new hardware, but new software needs to be developed to control or operate this hardware.
    - The software aims to improve the design of robotic hardware (e.g. via the Darwin paradigm).
    - The software enables improvements in hardware, e.g. better simulation of contact physics in order to improve the design or control of a novel manipulator.
    - Examples which are out of scope include:
        - Improving algorithms to control/operate standard or conventional hardware.

Additionally, we are planning calls in related areas:

- For work facilitating modularity, interoperability and common standards within robotics;
- For work on the potential socioeconomic impacts of increased automation enabled by robot dexterity;
- For storytelling and other approaches to help visualise prosperous future societies supported by dexterous robots;
- To support efforts to attract and retain talent in robotics, including in currently under-represented groups;

Applications for these additional related areas should **not be submitted** in response to this call; instead applicants interested in participating in these elements beyond TA1 may register their interest by sending an email to clarifications@aria.org.uk and we'll notify you when the other TA solicitations go live.

Separate to this solicitation, we are also investigating whether to offer a challenge prize in robot dexterity.

SECTION 5: Programme and Project Management

This section aims to explain to applicants what to expect if selected for the programme. The maximum term of the programme is 5 years and individual projects cannot exceed November 2030. Teams selected at the full proposal stage will enter into a contracting phase with ARIA where the specific scope of work will be finalised. This phase will require updated and more accurate cost assessments. Individual teams can launch as soon as everything is in place; they do not need to wait for other teams except where there are dependencies. More information on how we select projects and the application stages can be found here.

During the negotiation phase, the shortlisted applicants and Programme Director will agree on a project management approach, project plan, testing / quality management, key risks and opportunities based on the defined scope. This will form a basis for how the project is managed. Creators are responsible for the day to day project management and will be responsible for delivery of the project, with dedicated support from the Programme Team.

Collaboration between applicants

Due to the integrated nature of the programme, we are encouraging a highly collaborative approach amongst all Creators, especially those who are submitting proposals which

address only a subset of the Technical Areas. For example, we might want a Creator working on a novel actuator (TA1.3+4) to share details about its response properties with a Creator working on novel design software (TA1.2+5), in order for their algorithms to be able to figure out whether use that actuator in a design for a manipulator. That TA1.2 Creator might also be working closely with a TA1.1 Creator to ensure the design meets their needs.

Applications may therefore be made by:

- A consortium consisting of two or more organisations that are proposing a cohesive proposal to work collaboratively. Here, the application should be made by a single lead applicant, to whom the funding will be awarded if successful. Other members of the consortium will be subcontracted/granted by the lead applicant. Note that this does not necessarily mean that the whole consortium stands or falls together - at negotiation stage, we may indicate an intention to fund only certain workstreams or organisations.
- Applicants who apply separately but plan to collaborate as part of the programme if both are funded. These applicants should tell us about their intended collaboration in their applications. Each will be funded separately if successful.
- Standalone applicants who have no current plans to collaborate with other applicants. If successful, we may try to facilitate collaborations with other applicants. For example, in our feedback on concept papers, we may ask applicants if they are willing for us to share contact information with other applicants whose work is complementary. If the applicants decide that this collaboration would be useful, they can tell us about it at full proposal stage, or indeed decide to apply as a consortium.

Creators who apply as a consortium or otherwise indicate an intention to collaborate with other applicants will be expected to enter into a formal collaboration agreement. A signed term sheet must be executed by the date of the funding contract/grant, and a full agreement must be executed between collaborating organisations within the first quarter of the programme. The agreements must at minimum cover roles and responsibilities, treatment of confidential information, intellectual property and ownership of results, and dispute resolution. If helpful, ARIA can refer applicants to established templates that can be helpful as starting points for these agreements.

Finally, we expect that all Creators will need to share some level of technology specification/interface information with other programme participants to allow for the coordinated work needed for the programme to be successful. During contract negotiations, the Programme Director will agree with each Creator what information they

can comfortably share with other programme participants. This information will be captured in the scope of work as "Specification/interface information," with a requirement that Creators not share information marked as such beyond the programme participants without the express permission of the source.

Project Milestones

Each project's progress will be monitored using milestones that are defined by Creators in the application and contracting phases, prior to the start of the project.

At project kick off, Creators will have a project plan and contract/grant milestones for the full duration of the project. We understand that project plans may be subject to change and iteration, especially for milestones further into the future. The Programme Director will work with you throughout the project to refine and pivot as required.

To the extent possible, milestones should:
- Signify a meaningful step towards reaching the overall programme goals.
- Include details on methods used for measurement and evaluation.
- Include major go/no-go decision points, typically on a quarterly cadence.

Programme and project management

In line with our standard programme management requirements (more detail can be found here), the Programme Director will review progress against the contract/grant milestones at least once a quarter. The quarterly reporting consists of a progress update and a check-in with the programme team focussing on achievements, key learnings and resolving any challenges encountered. There will also be written feedback to Creators. On an ongoing basis, the Programme Director will continue to shape and manage the project with you with the aim of achieving outputs most beneficial to the overall programme.

Community events

As part of fostering a collaborative research environment, ARIA will host regular Creator community events to allow all participants to exchange updates, ideas, and feedback on best paths forward. ARIA will also host annual in-person workshops at which Programme Creators can showcase their work to a wider research community.

SECTION 6: Eligibility & Application process

Eligibility

We welcome applications from across the R&D ecosystem, including individuals, universities, research institutions, research technology organisations, small, medium and large companies, charities and public sector research organisations.

Our primary focus is on funding those who are based in the UK. For the vast majority of applicants, we therefore require the majority of the project work to be conducted in the UK (i.e. >50% of project costs and personnel time).

However, we can award funding to applicants whose projects will primarily take place outside of the UK, if we believe it can boost the net impact of a programme.

In these instances, you must outline any proposed plans or commitments in the UK that will contribute to the programme within the project's duration (note the maximum project duration is 54 months). If you are selected for an award subject to negotiation, these plans will form part of those negotiations and any resultant contract/grant.

More information on the evaluation criteria we will use to assess benefit to the UK can be found later in the document here.

Finding Potential Collaborators and Teaming

For those seeking specific expertise to support their proposal or to form/join a team, we have created a teaming request form to facilitate finding potential team members who have registered their interest in this programme. By following a link to the sign up form here you will be able to register, submit your details, and gain access to a list of other individuals seeking to find/share their expertise. All requests are screened via ARIA's internal team prior to access, after which connections will be made by individual users based on aligned expertise.

Application Process

The application process consists of two stages, detailed below:

Stage 1 - Concept paper (max 3 pages)
Concept papers are designed to make the solicitation process as efficient as possible for applicants. By soliciting short concept papers (no more than three pages), ARIA reviewers

are able to gauge the feasibility and relevance of the proposed project and give an initial indication of whether we think a full proposal would be competitive. Since fit with the programme is one of our evaluation criteria, this will partly depend on the other concept papers. Based on our feedback, you can then decide whether you want to submit a full proposal.

To ensure the process is quick and open **we do not require your organisation's consent** prior to submission of a concept paper, nor do we require detailed costs.

For more details on the evaluation criteria we'll use, click [here](#). You can find guidance on what to include in a concept paper [here](#).

You can also submit a full proposal without having submitted a concept paper, but bear in mind that the scope may have been narrowed as described below.

Possible changes in scope between Stage 1 and Stage 2

At Stage 1, we are deliberately drawing the scope widely. Following review of concept papers, but prior to opening the call for submission of full proposals, we may refine our plans for the programme based on the concept papers received and update this document accordingly. We will not alter the focus on dexterity nor the technical areas (Figure 1), but we may decide to focus efforts on particular sectors or use-cases, and/or particular components or technologies. We may define others as being out of scope if we have not received enough relevant concept papers to applications to suggest that there is a viable programme in this area. This is because the programme aims to select a portfolio of projects which, as well as being individually excellent, also benefit from the synergy between them.

Accordingly, one of our [evaluation criteria](#) is the fit with the overall portfolio. This may depend on what other proposals are submitted, which is not something either we or applicants can easily assess in advance of the call opening. **Submitting a concept paper is therefore strongly encouraged (on average, only 8% of applicants that do not submit a concept paper are selected for award)**, even if some details remain to be finalised. It also enables applicants to benefit from early feedback. Full proposals will be evaluated independently of any previous concept papers, and applicants will not be penalised for any deficiencies in a concept paper that are addressed in the full proposal.

Stage 2 - Full proposals
You can submit a full proposal at Stage 2 even if you did not submit a concept paper at Stage 1, and regardless of any feedback we gave to your concept paper. However, as

described above, the scope of Stage 2 may be narrower than Stage 1, so do check that your proposal is still fully in scope. If it is not in scope, it will be rejected without review.

Stage 2 requires you to submit a detailed proposal including:

- **Project & Technical information** to help us gain a detailed understanding of your proposal.

- **Information about the team** to help us learn more about who will be doing the research, their expertise, and why you/the team are motivated to solve the problem.

- **Administrative questions** to help ensure we are responsibly funding research and development. Questions relate to budgets, intellectual property, potential conflicts of interest etc

You can find more detailed guidance on what to include in a full proposal here. Please note this guidance may be updated when the Stage 2 call is launched.

Information on the evaluation criteria we will use to assess your answers can be found later in the document here.

SECTION 7: Timelines

This call for project funding will be open for applications as follows (we may update timelines based on the volume of responses we receive):

Applications open	10 July 2024
Stage 1: Concept paper submission deadline	24 July 2024 (12:00 BST)
Concept paper review & response sent	25 July - 16 August 2024

As part of our review we may contact applications to seek clarification on certain aspects of their proposal.

Stage 2: Full proposals open for submission	16 August 2024
Stage 2: Full proposals submission deadline	19 September 2024 (12:00 BST)
Full proposal review	20 September to 5

As part of our review we may invite applicants to meet with the Programme Director to discuss any critical questions/concerns prior to final selection — this discussion can happen virtually or we may seek clarification on certain aspects of your proposal via email.

Successful/Unsuccessful applicants notified   7 November 2024

At this stage you will be notified if you have or have not been selected for an award subject to due diligence and negotiation. If you have been selected for an award (subject to negotiations) we expect a 1 hour initial call to take place between ARIA's Programme Director and your lead researcher within 10 working days of being notified.

We expect contract/grant signature to be no later than 8 weeks from successful/ unsuccessful notifications. During this period the following activity will take place:

- Due diligence will be carried out
- The Programme Director and the applicant will discuss, negotiate and agree the project activities, milestones and budget details
- Agreement to the set Terms and Conditions of the Grant/Contract. You can find a copy of our funding agreements here

SECTION 8: Evaluation Criteria

Concept Paper and Proposal Evaluation Principles

To build a programme at ARIA, each Programme Director directs the review, selection, and funding of a portfolio of projects, whose collective aim is to unlock breakthroughs that impact society. As such, we empower Programme Directors to make robust selection decisions in service of their programme's objectives ensuring they justify their selection recommendations internally for consistency of process and fairness prior to final selection.

We take a criteria-led approach to evaluation; as such all proposals are evaluated against the criteria outlined below. We expect proposals to spike against our criteria and to have different strengths and weaknesses. Expert technical reviewers (both internal and external to ARIA) evaluate proposals to provide independent views, stimulate discussion and inform decision-making. Final selection will be based on an assessment of the programme portfolio as a whole, its alignment with the overall programme goals and objectives and the diversity

of applicants across the programme.

Further information on ARIA's proposal review process can be found [here](#).

Proposal evaluation process and criteria

Proposals will pass through an initial screening and compliance review to ensure proposals conform to the format guidance and they are within the scope of the solicitation. At this stage we will also carry out some checks to verify your identity, review any national security risks and check for any conflicts of interest. Prior to review of applications Programme Directors and all other reviewers are required to recuse themselves from decision-making related to any party that represents a real or perceived conflict.

Where it is clear that a proposal is not compliant and/or outside the scope, these proposals will be rejected prior to a full review on the basis they are not compliant or non-eligible.

Proposals that pass through the initial screening and compliance review will then proceed to full review by the Programme Director and expert technical reviewers. All reviewers are signed off by ARIA leadership as qualified and conflict-free and enter into non-disclosure agreements.

In conducting a full review of the proposal we'll consider the following criteria for both Stage 1 and Stage 2:

1. **Worth Shooting For** — The proposed project uniquely contributes to the overall portfolio of approaches needed to advance the programme goals and objectives. It has the potential to be transformative and/or address critical challenges within and/or meaningfully contribute to the programme thesis, metrics or measures.

2. **Differentiated** — The proposed approach is innovative and differentiated from commercial or emerging technologies being funded or developed elsewhere.

3. **Well defined** — The proposed project clearly identifies what R&D will be done to advance the programme thesis, metrics or measures is feasible and supported by data and/or strong scientific rationale. The composition and planned coordination and management of the team is clearly defined and reasonable. Task descriptions and associated technical elements provided are complete and in a logical sequence with all proposed stage-gates and deliverables clearly defined. The costs and timelines proposed are reasonable/realistic.

4. **Responsible** – The proposal identifies major ethical, legal or regulatory risks and that planned mitigation efforts are clearly defined and feasible.

5. **Intrinsic motivation** – The individual or team proposed demonstrates deep problem knowledge, have advanced skills in the proposed area and shows intrinsic motivation to work on the project. The proposal brings together disciplines from diverse backgrounds.

6. **Benefit to the UK**

There is a clear case for how the project will benefit the UK. Strong cases for benefit to the UK include proposals that:

1. are led by an applicant within the UK who will perform the majority (>50% of project costs spent in the UK) of the project within the UK
2. are led by an applicant outside the UK who seek to establish operations inside the UK, perform a majority (>50% of project costs spent in the UK) of the project inside the UK and present a credible plan for achieving this within the programme duration.

For all other applicants we will evaluate the proposal based on its potential to boost the net impact of the programme in the UK. This could include:

3. A commitment to providing a direct benefit to the UK economy, scientific innovation, invention, or quality of life, commensurate with the value of the award;
4. The project's inclusion in the programme significantly boosts the probability of success and/or increases the net benefit of specific UK-based programme elements, for example, the project represents a small but essential component of the programme for which there is no reasonable, comparably capable UK alternative.

When considering the benefit to the UK, the proposal will be considered on a portfolio basis and with regard to the next best alternative proposal from a UK organisation/individual.

SECTION 9: How to apply

Before submitting an application we strongly encourage you to read this call in full, as well as the general ARIA funding FAQs.

If you have any questions relating to the call, please submit your question to clarifications@aria.org.uk. Please note that Programme Directors cannot answer questions about live calls.

Clarification questions should be submitted no later than 4 days prior to the relevant deadline date. Clarification questions received after this date will not be reviewed. Any questions or responses containing information relevant to all applicants will be provided to everyone that has started a submission within the application portal. We'll also periodically publish questions and answers on our website, to keep up to date click here.

Please read the portal instructions below and create your account well before the application deadline. In case of any technical issues with the portal please contact clarifications@aria.org.uk.

Application Portal instructions

APPLY HERE