AWE – Advanced Electronics and Electromechanical Devices
FAQ

Question: Regarding Challenge 1, what is the metal barrier made of and how thick is it?

Answer: The metal barrier would be 1mm thick and we can sandwich to 3mm. Whatever solution you come back with could drive the choice of the material and the thickness and show up any limitations that have to be negotiated as a trade-off. The materials that we're looking to pass through are all fairly standard. Grade 304 or 316 stainless steel, series 6000 or series 7000 aluminium alloy, grade 5 titanium alloy and nickel alloy. Material needs to be high melting point, high strength, and non-magnetic.

Question: Regarding Challenge 1: When discussing being tolerant of high radiation environments, is that both inside and outside the sealed containers?

Answer: Yes. It would be both inside and outside, and we're talking about space environments, normal space weather cycle, severe space weather cycle based on sunspot activity and any artificial radiation hazards that might or might not happen.

Question: Regarding Challenge 1: What exactly does the metal barrier mean? Are we talking about a sealed device, for example in a space environment?

Answer: Yes, we're looking at space environments specifically. So it has to be resistant to the mechanical environment of vertical ballistic launch into low Earth orbit. It would also be subject to normal space weather cycling, severe space weather cycling and potentially, artificial man-made radiological events.

Question: Regarding Challenge 1: There's a specification on the number of channels and data rate per channel, is there a restriction on the frequencies?

Answer: Frequencies should be in a range not naturally occurring or common RF communication frequencies.

Question: Regarding Challenge 1: There wasn't any guidance on the power specifically, is power a priority? Or can we focus on data transfer?

Answer: No, we need both power and data transfer. You can submit what's the best you can do. The data transfer rate per channel is 66 megabits per second and we're aiming for 9 channels. So that's where we're starting from. Power and Data transfer can be separated in frequencies or a number of approaches can be used to deliver power and data independently, if preferred.

Question: Can you further clarify what TRL 5 means, given the space context, what's the expectation around the TRL 5?

Answer: We're looking for testing for the space environment, but we also need to have an understanding of how robust the component is to the launch environment in terms of acceleration and spin.

Question: What is the required duty cycle for operation of the data link?

Answer: Rare bursts.

Question: Regarding Challenge 1: Are holes allowed in metal barrier?

Answer: No.

Question: Are you able to say why there can't be a hole or a pathway through?

Answer: Hermetically sealed environments are ideal because you can effectively maintain physical and chemical isolation to each region either side of the physical partition.
Holes degrade the overall physical integrity of any part they're introduced to, as far as quasi static properties (e.g. mechanical strength, fatigue resistance etc.) are concerned because they can act as crack initiators (you are literally putting a defect into the part).

Question: Regarding Challenge 1: Orbital location- is it lower earth, orbital higher or geostationary?

Answer: Low Earth Orbit.

Question: Regarding Challenge 1: re there any restrictions on magnetic field strengths and associated frequencies to be used to address this requirement?

Answer: The magnetic fields are to be minimised but there might have to be some kind of subsystem trade off discussion around that.

Question: Regarding Challenge 1: How much usable electrical power needs to be transmitted through the metal barrier?

Answer: We have not defined this yet; it is more a case of what you believe you can do to get power across that metal barrier.

Question: What is the power requirement limitations for the system?

Answer: There will be an assortment of possible voltages with solution yet to be defined.

Question: Are there any restrictions when it comes to the nationality of the applicant? I am a foreign national, can I submit a proposal?

Answer: Nationalities of applicants are evaluated on a case-by-case basis. It is recommended you contact your local Innovation Partner directly.

Question: When planning our finances and resources, what can be costed and what is a suitable range for this competition?

Answer: This depends on the totality, we would rely on you to put your best price on your proposal. When proposals are assessed, value for money is something that will be evaluated.

Question: Regarding Challenge 3: What is low temperature?

Answer: -100°C to +100°C. It's a space-based application.

Question: Regarding Challenge 3: I'm assuming it's a transitory condition and so it's not steady state?

Answer: Not steady-state.

Question: Regarding Challenge 3: Is the flux going to be bi-directional or omnidirectional?

Answer: Bidirectional

Question: We also have the advantage that we can demonstrate this under vacuum conditions. Test if the device would actually work and that would be part of our feasibility study as well, a demonstration of the device under those kind of facsimile conditions that it may experience in deployment. Would that be of interest to this panel if our proposal included that testing regime?

Answer: AWE could support with GFX for testing in those areas if you haven't got access to the correct spec although our facilities are heavily scheduled. It would be prudent for innovators to have a Plan B for testing if AWE facilities are fully booked.

Question: Regarding Challenge 2: What are you looking at in terms of the voltage ranges?

Answer:

- Voltage: >5kV
- Current: >5kA
- Rate of Change of Current (dI/dt): kA/µs
- On-State Resistance: Sub-Ohm to a few Ohms (the lower the better)
- Switching Time: <100ns (faster if possible)

Question: Regarding Challenge 2: Have you looked at Gallium Nitride (GaN) in the past as well and already ruled that out?

Answer: We haven't ruled it out. Silicon carbide is preferential because it's less poisonous.

We are thinking about sustainability.

Question: Regarding the vibration, thermal, vacuum, radiological. Would you pick a subset of those as a minimum for TRL 5?

Answer: A subset of testing to TRL5 has not been derived. In some instances, evidence of previous testing in the related environment may be acceptable

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Question: Regarding Challenge 2: Is it AC or DC?

Answer: DC power switching.

Question: Are we switching on and off or switching multiple times?

Answer: It should be considered a one-shot device, but for testing purposes etcetera it needs to be repeatable.

Question*:* Please could you provide an idea of how 'low' with reference to 'low drift inertial sensing'. Is this an integrated IMU or separate gyroscope and accelerometer components?

Answer: Please see the table below for more information:

Performance Parameter	**Gyroscopes**	**Accelerometers**
Low noise	0.001°/s/√Hz	5µg/√Hz
Low bias instability	0.0035°/√hr	1µg
Low random walk	0.0035°/√hr	NA
High Dynamic range	±0.005°/s - 900°/s	±10µg – 150g

Question: What percentage of the project cost can an innovator win through this competition?

Answer: A successful innovator can win 100% of their project cost on contract.

Question: Can an innovator still apply to this competition if they have previously achieved DASA funding in the past?

Answer: Yes, this does not preclude you.

Question: Am I allowed to use European subcontractors to support my innovation?

Answer: Effectively, yes. But there is a preference to have a UK supply chain to build sovereign capability. For specific guidance, we'd recommend contacting your local innovation partner.

Question: Are dual-use items/products in scope?

Answer: We wish to avoid if possible the import of restricted goods. However, this does not preclude eventual UK export, but clarity can be sought from the UK Gov's Export Control Joint Unit.

Question: Is there any guidance for temperatures regarding Low Delta T?

Answer: With regards to conceptual space, if there are at least some solutions that are capable of going to below 500°C we would certainly be interested in knowing about them, but below 250°C is right for any and all the kind of applications that we can foreseeably envisage.

Question: Can an innovator submit more than 1 proposal?

Answer: Yes.

Question: Collaboration is welcome in terms of the application process. How will that be structured?

Answer: The innovators submitting the proposal will be the lead applicant, and they will subcontract to the others. It will be with one entity, and we'll be expecting you to manage your relationship with any subcontractors that you have to deliver the project.

Question: Are the slides from the Webinar available?

Answer: Yes, the slides are available here.

Question: How can I contact an Innovation Partner, including for Northern Ireland?

Answer: Please submit a contact request form through the DASA portal on our website, and your regional Innovation Partner will contact you within 10 working days.

Question: Is there any preference for collaborative or solo submissions?

Answer: For this competition, we will consider collaborative bids. There is no particular preference of solo or collaborative.

If you are working in collaboration, the contracting will be with one organisation.

If you're subcontracting various activities as part of your project, we would look to have some assurance that you have agreements in place before the project starts. For more information, please contact your local Innovation Partner.

Question: Is the competition open to submissions from universities?

Answer: Yes, we welcome submissions from universities.

Question: Do we need security clearance in order to submit a bid?

Answer: No. We also require that you keep your submission at OFFICIAL.

Question: Are high grade inertial sensors highly likely to be controlled goods?

Answer: We wish to avoid if possible the import of restricted goods. However, this does not preclude eventual UK export, but clarity can be sought from the UK Gov's Export Control Joint Unit.

Question: Are dual-use items or technologies in scope?

Answer: This depends on where the IP is being generated, and where the goods are being generated. We wish to avoid if possible the import of restricted goods. However, this does not preclude eventual UK export, but clarity can be sought from the UK Gov's Export Control Joint Unit.

Question: Can we include a subcontractor in the team of the project?

Answer: Yes.

Question: You mentioned past work on Challenge 1; are you okay to receive new proposals on work in those particular areas?

Answer: Yes.

Question: Will more detailed specifications be available? For example specific power level targeted?

Answer: We will be able to provide some bounding conditions and it might be that through an Expression of Interest we might be able to give a better indication whether the submission is within scope.

Question: Please can you define the TRL levels, as there are different definitions?

Answer: Within the Competition Document we've linked the Technology Readiness Level definitions that we use at DASA, which should give you a clear insight of what to expect for this competition.

Question: What duration of project are you looking for?

Answer: We're looking for projects that go up to 24 months from the contract beginning. Contracts are expected to start from April 2025.

Question: ITAR vs performance of 4. Isn't there a contradiction?

Answer: Minimising reliance on an overseas supply chain remains an objective. The context of Performance of 4 is not understood.

Question: The increase of resilience and robustness. Those two account of each other, which would you prime in your view or which relate to the specific challenge?

Answer: We're more interested in survivability and environments.

Question: Regarding Challenge 1: Does the technology have to cover both power and data transfer, or can one be addressed on its own?

Answer: We are looking for both. If you can only achieve one, we will still look at it, but we are looking to address both through this competition.

Question: In Section 5.7 of the competition document, you mentioned that you are not interested in proposals that have reliance upon an international supplier chain. Does this mean we can only source devices from UK based suppliers if developing new SIC switches to TRL 5, for example, does this mean any full custom SIC devices have to be fabricated in the UK? And do you have a recommended UK semiconductor manufacturer?

Answer: There are UK based companies that will do that work. If they can be made in the UK and as much of the general supply chain are sourced that way then that would be our preference.

Please submit a contact form to speak to your local innovation partner or submit an EOI with your question as we will deal with this on a case by case basis.

Question: You only mention accelerometers. What about gyros?

Answer: We're interested in both accelerometers and gyroscopes.

Question: Is it compulsory to submit an Expression Of Interest (EOI)?

Answer: Expressions of Interest are completely optional. They are an opportunity for you to run your idea by one of our Innovation Partners before you submit your application.

Question: Is there a suggested or compulsory deadline for submitting Expressions of Interest (EOI)?

Answer: We recommend that you allow two weeks for a response on EOIs so we suggest having sent it in by the 25th of November to ensure that you've got ample time to get a response.

Question: Is there a format for submitting an Expression of Interest (EOI)?

Answer: There's no specific format, we ask for it to be no more than 500 words.

If you're asking whether a particular idea would be in or out of scope of the competition, we need to know what your idea is, the current TRL and future TRL to be able to give you a response

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Question: Are you interested in novel uses of existing thermoelectric modules in low Delta T generation applications, or is the interest primarily new thermoelectric materials?

Answer: We have interest in thermos-electrics for 2 key purposes - 1) diagnostics (low voltage, low power) and 2) charging (>1A, >1V). So, as far as uses are concerned, the novelty of use is of some degree of interest, but not the primary one. Researching new thermoelectric materials and actively contributing to the science around that, however, would be of great interest to us

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Question: Do all the subcontractors have to be in the UK?

Answer: This will be looked at on a case-by-case basis. Please submit an Expression of Interest, explain the circumstances and who your partner is, and we will get back to you with a response.

Question: Would you require university applicants to be partnered with an existing business for evidence of a viable pathway to higher TRL beyond the project's conclusion?

Answer: Please submit an Expression of Interest so we can give you the best advice on how to write your application.

Question: Can an organisation submit multiple submissions?

Answer: Yes.

Question: What is the appetite for technology validation through simulation? For example, in cases where the TRL 5 relevant environment may require specialist facilities

Answer Whilst simulation is useful, we have a preference for real data. Those innovators requesting GFA are recommended to have a non-GFA Plan B

Question: Will projects that start and end with a higher TRL than 5 meet the project scope?

Answer: Proposals that reach up to TRL 6 will be considered. Proposals that reach TRL 7 and beyond will not fit the scope of this competition.

For Challenges 1,2 and 4, we are looking for proposals that start at a minimum of TRL 3 and reach a minimum of TRL 5 by the end of the project.

For Challenge 3, we are looking for proposals that start at a minimum of TRL 2, and reach a minimum of TRL 4 by the end of the project.

Question: Are you interested in thermal management technology for high power or temperature applications? For example Challenge 2 and 3, including under variable vibration and acceleration environments.

Answer: Yes, anything that can demonstrate a wider and more robust ability to see practical use in the form of work that's been done or studies is very much of interest to us.
