



**2024 GATEWAYS TO BLUE SKIES COMPETITION:
ADVANCING AVIATION FOR NATURAL DISASTERS**

Q&A SESSION #1 SUMMARY DOCUMENT

November 2, 2023
3:30 – 5:00 PM Eastern

Table of Contents

QUESTIONS RECEIVED IN ADVANCE: TECHNICAL 1
QUESTIONS RECEIVED IN ADVANCE: MISCELLANEOUS 2
QUESTIONS RECEIVED IN ADVANCE: PROGRAMMATIC 4
QUESTIONS RECEIVED DURING THE Q&A SESSION 6

QUESTIONS RECEIVED IN ADVANCE: TECHNICAL

1. What weather conditions should be considered? Should a certain kind of natural disaster be emphasized (i.e., earthquake, flooding, wildfire, etc.)?
 - Teams should frame their proposal by selecting one natural disaster and one phase of disaster management (preparation, response, or recovery)—See Step 1 on Page 5 of the [Competition Guidelines](#). Remember that the competition encourages teams to select a natural disaster that they are passionate about or that may affect them regionally or personally.
 - Due to available analysis space, teams should focus on one phase, though they may mention how solutions spill over into other disaster management phases (if applicable). Weather conditions impacting the proposed solution should be directly relevant to the selected natural disaster.
2. Should our plan be integrated into current facilities and/or devices or can it be entirely new and independent designs?
 - Teams can develop concepts that integrate into current operations or suggest new and independent technologies and designs. Remember that this competition is designed to develop concepts that modernize the approach to disaster management with the goal of closing gaps and improving operations. Proposals of new technology that creates new operational gaps or raises more questions than answers will not be as strong in this competition. Remember that teams are encouraged to consider high-potential technologies and systems that aren't currently mainstream or are not currently highly regarded as becoming mainstream in the future.
3. Can the concept include both air and space, or do we have to choose just one?
 - The concept must involve aviation related systems. The additional use of space systems would be up to the group and their concept. However, make sure to consider the development cost and timeline of any potential new systems when considering feasibility and ease of use.
4. Are satellites or similar “low orbit” technologies considered aeronautics, and are those technologies allowed in this competition?
 - For the scope of this competition, satellites, and objects in low earth orbit (LEO) are not considered aviation/aeronautics systems. However, this does not mean that these technologies are not allowed to be used in addition to any aviation/aeronautics systems. Be sure to consider the development cost and timeline of any potential new systems when considering feasibility and ease of use.
5. Are there any physical constraints in terms of mass or materials used?
 - The [Competition Guidelines](#) do not set such constraints. Mass and materials, if considered, are up to the group to determine and justify, based on research.

6. Will the navigation facilities, such as Instrument Landing System (ILS), Very High Frequency Omni-Directional Range (VOR), and Distance Measuring Equipment (DME) be operable? **Similar Question:** Will surveillance aids such as radar, Automatic Dependent Surveillance-Broadcast (ADS-B), or Airport Surface Detection Equipment (ASDE) be available to us? **Similar Question:** What resources can we consider available for purposes of our technology? More specifically, will cell reception/internet and/or electric/power be available?
 - Based on the natural disaster, weather conditions, theoretical locations, outages assumed, or other variables, groups may determine, set, and justify the operability of various systems.
 7. Do we need to be concerned with conducting approaches without navigation equipment into the disaster airport?
 - If various realistic conditions/potentialities for operations in certain conditions are not considered in papers or presentations, it may raise questions on the judging panel.
 8. Would the plans fall under control of any regional federal agencies (such as the FAA), or should we disregard local regulations?
 - Existing authorities, laws, regulations, agencies, etc. should be considered when preparing the ConOps of the system.
 9. Are high altitude platform station aircraft allowed?
 - High altitude aircraft are allowed to be considered as part of a system.
 10. How long does our technology need to operate for? Should it be seen as temporary, or, after implementation, something permanent?
 - This is for the group to determine in relation to the selected natural disaster, phase, and other aspects of their proposal. Consider costs and operability needs.
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QUESTIONS RECEIVED IN ADVANCE: MISCELLANEOUS

1. What is NASA's current disaster management technology and what changes are anticipated in the next decade? Specifically, how is NASA planning to improve its drone technology by 2035?
 - For the answer to this question, refer to remarks made by Dr. Marcus Johnson at the beginning of the Q&A Session, Competition Context & Theme.
 - **Marcus Johnson:** I talked a little bit about the ACERO project. There are some other activities in terms of improvement of drones and the use of drones in the national aerospace. We have our advanced air mobility initiatives, which are looking at how we can incorporate electric vertical takeoff and landing type of aircraft and

incorporate autonomy on board the aircraft, detect and avoid better communications and communications navigation, surveillance, and information type of work. Within ACERO, we're taking some of that and airspace management, we're taking some of that technology within my project and working directly with the stakeholders for applying that technology. We also have our Fire Sense Program and our Science Mission Directorate, which is looking at how to improve the sensing, how to improve the decision making, how to improve the risk modelling and the fire propagation modelling. We have some of our Space Technology Mission Directorate that's looking at early type of technologies that can help wildland fires and disasters, as well. (It's looking more on the operational decision making.) So, a lot of these are a combination of the disaster science mixed with our predictive modelling, mixed with more of the operational side on how we use drone technology. The integration across the board of those different aspects is really where our agency is headed towards incorporation of this technology into the disaster response missions, and drones really play a lot of where ACERO is focusing on, but we are reaching back into other activities, like UAS, traffic management and advanced their mobility and some of our earlier and lower TRL type of technologies to really have this more pipeline from research to operations and really start looking at what the future is going to be even beyond you know getting past A2 way radio type communication. So, there are plenty of resources across NASA to look at in terms of where we're going to be in the next, the next decade and in 2035 and beyond. If we want to create a systems level technology implemented by 2035, then what level of development of the technologies within the system have to be at now?

2. If we want to create a systems level technology implemented by 2035, then what level of development do the technologies within the system have to be at right now?
 - It would be easier to feasibly assume that a currently mid-high technology readiness level (TRL) end technology would be able to be produced and implemented by 2035. However, the timeline of technology development is not the same for all technologies.
3. To submit the Proposal & Video, do we need to show the results including all datasets? How in depth do we have to go for our metrics in our project proposal?
 - The proposal needs to reflect the total scope planned for the final paper, addressing all aspects described in the [Competition Guidelines](#), page 5 (Competition Theme Description and Details). It should be at the “convincing” level—demonstrating a strong basis of research analysis having already been conducted. Include enough detail to convince the judges that your proposed concept has been well researched and developed, that it is credible and viable with sound justification, and provide confidence that your team can further refine and develop your concept if selected as a finalist. Remember, special emphasis should be placed on analyzing innovative energy sources.

4. To submit the Proposal & Video, do we need to present a workable AI model, or to what extent should the proposed model go for the proposal?
 - Without details about the specific AI model this is hard to answer. However, we were not originally thinking/looking for AI models as part of this competition.
 5. Does implementation of our technology need to be capable of nationwide and/or worldwide deployment?
 - Natural disasters are a global phenomenon, exacerbated by climate change. Responses around the world can have similarities, differences, and varying opportunities. How your team chooses to frame your solution is up to you but consider that judges may ask questions about opportunities for global deployment in their evaluations and during finalist team presentations.
 6. Are we expected to submit a single design concept or a range of designs?
 - The competition is not limited to a single system; teams may present more than one if desired. However, it is not required nor expected to submit more than one solution. A team that chooses to examine more than one solution likely will do so if the systems are interrelated or required to help close the disaster management improvement opportunity that's been identified. Your page space is limited, so more designs will limit the amount each design can be spoken for.
 7. Is a conceptual design the final product or will we have to provide a preliminary design?
 - The proposal will focus on preliminary aspects of your final concept. It should paint the picture, in a convincing manner, of the intended system and analysis required to prove its relevance, feasibility, and viability in the natural disaster management landscape. To be selected as a finalist, teams must present as credible a proposal as possible. Finalists will have the opportunity to further develop their concepts as they work toward a final technical paper, infographic, and in-person presentation.
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QUESTIONS RECEIVED IN ADVANCE: PROGRAMMATIC

1. Can our concept change between submitting our Notice of Intent and submitting our Proposal?
 - Absolutely. Teams will develop new insights as they research this project and are not limited to the concept written in their NOI. It is anticipated and expected that concepts will at least evolve, if not change entirely between NOI and Proposal deadlines.
2. Are physical prototypes allowed for presentation?

- Physical prototypes are not required for the presentation but could be welcome depending on size. Finalist teams will receive additional direction regarding prototypes, if applicable. Teams do not earn extra points for physical prototypes. In this competition, the “how” of a system is likely more relevant than the “what.”
3. We have two teams from our institution, mentored by two different faculty. We were wondering if the two teams will be allowed to come up with different components of a larger solution.
 - Integrating concepts across university teams is a great idea! Bear in mind that each proposal must stand on its own, adhering to the full scope of the requirements and guidelines. As long as these criteria are met, integrated solutions from two different teams are welcome. The [Competition Guidelines](#) and [Evaluation Matrix](#) are how proposals will be evaluated by the judging panel to select finalist teams.
 4. What resources are available to us from you if we were to be selected in the final process of the competition?
 - Teams are expected to identify and use their own resources in their proposals. Peer-reviewed academic and scientific resources written by subject matter experts are recommended sources in your information search. Information sources may include FAA (Research & Reports, Aerospace Medicine Technical Reports, Fire Safety Reports, etc.), FEMA Reports & Data, NOAA (National Centers for Environmental Information, National Environmental Satellite, Data, and Information Service, etc.), National Technical Reports Library, NASA Open Source, the NASA Technical Report Server, etc.
 5. Can teams work with and have contact with industry professionals on technology used in their specific workplaces?
 - Absolutely! It is highly encouraged to work with industry professionals to understand the opportunities and needs that exist within your chosen natural disaster/management phase.
 6. Are there any limitations regarding the (overall theoretical project) budget?
 - NASA has not prescribed theoretical budget limitations. Agency budgets are typically tight, and cost is often a factor in technology adoption. Rather than prescribe a budget, teams should look at costs of current systems as well as the cost of the proposed service, technology, or capability and analyze whether it is affordable for the agency proposed as end user.
 7. Since none of us are videographers, can we have students outside of our group help film the video so long as the content is our own?
 - Videos should be produced by the team. Multi-disciplinary teams will be the most successful in this competition (consider the creative aspects of building an infographic, for example), so if it makes sense to add a creative member to the team, it may help position the team for success with the video and infographic.

That said, just as teams may (and should) seek subject matter experts for their research, teams may access outside resources to guide the development of the video.

8. Some undergraduate members of this group are graduating with Bachelors in May 2024 and are not seeking a Master's Degree after graduation. Will they be able to participate? If so, would the prize include an opportunity for full time employment offers instead of internship?
 - Team members who have active student status during the course of the 2023-24 school year are eligible to participate. In terms of internship prize eligibility, graduates in May 2024 are eligible to enter an internship, however, they may have already established post-graduate plans by the time winners are determined at the end of the Forum. The prize cannot be converted from internship into full time employment for a variety of reasons. However, taking an internship with NASA positions individuals for success in the application process!
9. Can non-U.S. Citizens participate in the competition? Even if they are legally allowed to work in the U.S.?
 - Non-U.S.-Citizens may compete in the competition. This year, non-U.S. Citizens should not have any trouble traveling to and participating in the Forum, even if it is held at a NASA Center, because Ames Research Center does not restrict who can access its Conference Center (a valid ID is required). However, non-U.S. Citizens may not be able to participate in the Center Tour, due to additional clearance requirements, and would not be eligible for a NASA internship.
10. Our team does not yet have an advisor secured. Is that a problem?
 - A mentor/faculty advisor can be secured at any time in the proposal development process. It's encouraged to have one in place during concept development, but at minimum, they must be secured prior to submitting a proposal to fulfill several duties, including: signing off on the proposal, accepting finalist stipend awards and distributing them to teams according to university policy, and guiding the development of final deliverables for finalist teams. See the [FAQ Webpage](#) for more information on the roles and responsibilities of a faculty advisor.

QUESTIONS RECEIVED DURING THE Q&A SESSION

1. Can a team have more than one faculty advisor?
 - Yes, your team can have more than one faculty advisor. We do want to highlight that most of the work should be done by the students with the faculty advisor(s) serving as guides.

2. I wanted some clarification about the prototypes and diagrams. There's expected to be a certain type of diagram required in the Proposal, and I just wanted to know what those expectations were.
 - It's going to be different with the topic every year. If it's a ConOps, there might be some sort of visual representation of how the system works, similar to the one Marcus had on one of his slides earlier in the presentation that summed up his project. It might have some pictures; it might have some arrows. It's not something that we would call a "prototype," but it's a picture that helps you explain what you're proposing and how it works.
3. Will we be receiving any further information, other than the Q&A Session #2, from the Program Team in case we need clarification about anything while we work on the proposal?
 - If you have questions in between the Q&A Sessions, feel free to reach out to the NIA team at blueskies@nianet.org.
4. Could reducing financial impact, or the economic cost impact of the disaster be considered a solution, assuming there's an aviation element?
 - Consider the financial impact/economic cost impact not as a solution but as a metric. So, one way that you may gauge the effectiveness of your solution is if it allows an agency to be more effective in the use of their resources by reducing the cost, but just reducing cost isn't a solution. It's important to conduct primary market research to be included in the solution. Some understanding of your solution compared to alternatives and some understanding of how the solution could be used and its viability is worth mentioning. There is no need to conduct a traditional market research in its comprehensiveness, but it's important to understand and convey why your solution is the best solution, why it's the most feasible, and what value it brings to the table.
5. Is Green/Blue UAS required for this challenge? Specifically, are Blue UAS, constructed with US-manufactured components, or Green UAS from the UK acceptable?
 - For the purposes of this particular competition, it's not necessary, but always great, to consider Blue/Green UAS in your proposal and analysis. However, don't limit the concepts with that specification, because where we're at today with Blue UAS may not enable the things that you're trying to transform. By the time we get to 2035, Blue UAS may have expanded from what it is today; for example, the amount of protections it has for larger vehicles and different configurations. So, it's great to consider the elements of Blue UAS and the cybersecurity considerations around it as part of the proposal, but don't limit yourself to the current fleet of what's acceptable in terms of Blue or Green UAS.
6. For a natural disaster, would focusing on a specific operation of disaster be efficient as a high-level system?
 - Another way of asking that question might be: Do you focus on the broad, or do you narrowly focus on an aspect of an operation? We recommend focusing more

narrowly on solutions/applications within a disaster, and discussing how that can expand to the broader picture, rather than taking the broader high-level system. The narrower solution is more likely to be able to be adopted and therefore have better feasibility and viability arguments.

7. Can we add/remove team members?
 - You can add or remove members from your team at any point up until the proposal deadline. Keep in mind that your team needs to be between 2 and 6 individuals. Refer to the Eligibility Criteria in the [Competition Guidelines](#) for more specifics.
8. Do you consider health reduction impacts as solutions? For example, a way of improving the air quality in New York or San Francisco caused by wildfires, assuming an aviation element.
 - Health implications can be a metric in the post-disaster recovery you're analyzing for impacts, or it could be within the active wildfire. Depending on the disaster phase, the goal would be to limit the amount of the wildfire getting out of control and one could factor in measurements of air quality for either phase. So, air quality and public health can be a measure of how impactful the technology is, similar to cost (see Question 4 above).
9. Does the technical aspect have to focus on aviation-related systems?
 - This competition focuses on aviation-related solutions. We don't expect you to spend seven pages talking specifically about the UAS or the plane, but the selected system link to an aviation solution and must be the focal point of your proposal. It must be addressed to a level of depth that you know would answer any questions judges might have.
10. Are we allowed to make any assumptions about the audience that we're speaking to with this project? Can we make any assumptions like the level of knowledge they have? Should we explain it at the baseline like they don't have knowledge of the system or any aviation related systems, or can we talk like a person has a general knowledge of most aviation systems?
 - This competition emphasizes the need to make your technical solution communications (i.e. proposal, video, technical paper, infographic, presentation) accessible to a wide audience. No one is an expert in everything, and even a subject matter expert may have questions about certain aspects of a technical solution. The more you can make your submission materials understandable by broad audience, including an audience without subject matter expertise, the better chance that you'll speak effectively to the full judging panel.

Notes:

- One of the things that you should also consider is disaster response and the use of aviation in disaster responses. It is somewhat unique in the sense that it is an element of connecting different portions of an operation. So, folks on the ground

need to know what's happening in the air, and vice versa. Make sure you have aviation technologies as part of the solution.

- Also, think about a solution's application as though you're using that aviation capability beyond just the pilots. It could be applicable to any disaster response personnel, because the information that the aircraft/aviation-related solution may collect during the mission may include its location, its activity, data collected, or activities achieved – and may be needed by a variety of personnel supporting the operation.
- Open your aperture a bit and think about how not only the inclusion of aviation, but also the use of aviation by others is an important aspect within this domain.