2025 GATEWAYS TO BLUE SKIES COMPETITION:
AgAir | Aviation Solutions for Agriculture

Q&A SESSION #1 SUMMARY DOCUMENT

Q&A Session #1: November 20, 2024
3:30 – 5:00 PM Eastern

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Questions highlighted in yellow were answered during Q&A Session #1 on November 20.

QUESTIONS RECEIVED IN ADVANCE: TECHNICAL

1. Are we tasked with designing a specific technology? Or designing a larger system/workflow?
   - Gateways to Blue Skies is a competition seeking systems-level concepts and solutions. While many new technologies may be used, we don't expect teams to design new technologies.

2. How is 'agriculture' defined in the scope of the competition?
   - For this competition, participants were asked to focus on the areas of agriculture that included cropland, rangeland, and/or livestock management.

3. How is 'aquaculture' defined in the scope of the competition?
   - Per NOAA Fisheries, the definition of aquaculture is the breeding, rearing, and harvesting of animals and plants in all types of water environments.

4. How are 'mainstream technologies' defined in the scope of the competition?
   - It is a loose definition, we want people to consider new ways to use existing or widely used technologies in addition to new technologies.

5. What do you mean by "Extreme weather/climate resilience"? The pesticides? The planes?
   - Extreme to unusual and severe weather events (hurricanes, droughts, floods, heatwaves, severe storms) are events that would negatively impact agricultural production. Climate resilience in agriculture refers to the capacity of agricultural systems to withstand and adapt to these extreme weather events while maintaining productivity and ecosystem health. Key aspects include: diverse crop & livestock varieties; soil health management; water management strategies; crop rotation; technological innovations; insurance and financial planning; building a resilient infrastructure.

6. The competition RFP expresses using caution when including sensors in the system's design. Should the system limit its use of sensors, or can the design include sensors while also including other advanced, developing technologies? Can you explain more about what it means to think "beyond applying sensors to aviation systems"?
   - We used that wording in an attempt to get teams to think outside the box. We imagine most of the system will have some sort of sensors, but we wanted people to think about what else can be done beyond sensing to encourage diversity and innovation in proposals. If we received mostly applications that are primarily focused on the sensing aspect, we would likely have significant overlap in the proposed concepts and less unique proposals.

7. The rules indicate that we are excluded from developing on ideas of aquaculture, but what of intersections between aquaculture and agriculture? For example, are we allowed to pursue projects that track what happens with wastewater from pesticides?
    - Teams may propose projects that explore the downstream effects of agricultural land management because they focus on how farming practices influence water quality, soil health, biodiversity, and ecosystem services. Projects such as these would aim to understand both the immediate effects of agricultural practices and also promote sustainable land management strategies that safeguard environmental health and enhance agricultural productivity. This type of work woud be different from aquaculture as defined in the question above.

8. To what extent should our project reflect real-world feasibility based on today's research and technology, versus speculative advancements that might only be plausible by 2035? Should ideas be grounded in current technology, or should we explore possibilities that require significant technological advancements? Does the competition prefer realistic solutions or groundbreaking innovation that might be technically challenging today?
    - You have found one of the great challenges our teams face every year! There are groundbreaking things you can propose with today's technology as well as revolutionary things you can do with tomorrow's technology. Picking one or the other, or balancing the fine line in between can be a challenge. Teams on both ends of that spectrum have won awards in our competition. Speculative advancements only plausible by 2035 are welcome, as long as they are well-justified regarding how they are expected to come to be broadly and specifically related to the proposed technology. Arbitrary, science fiction worlds without reasonable justification will not be viewed favorably. After all, 2035 is just nearly 10 years away.

9. Can you clarify what is desired in addressing "rangeland, cropland, and livestock management?" Is this a list accompanied by 'and', 'or', or 'and/or'?
    - This list can be accompanied by an and/or, to read, "rangeland, cropland, and/or livestock management." Concepts do not need to address all three, but they also do not need to be limited to one area of agriculture.

10. Can you clarify whether we need to restrict our geographical scope for a solution to the United States, or can we focus on a different area of the world and/or address issues of a global nature? For example, Russia and Ukraine account for 12% of total calories traded. Would systems that consider the ramifications of conflict in breadbasket nations be permitted?
    - The geographical scope was intentionally not limited for this project. Teams may choose to address a challenge or gap in any area of the world, or choose to focus more broadly on global issues that a technology or concept can solve. If you select a broad scope, be sure you have ample space in your paper and supporting materials to adequately justify your concept and its application in the selected landscape. We imagine ramifications of conflicts would have analogues to other types of potential issues that agricultural systems deal with. If considering these ramifications, the

project should focus on the agriculture impacts of events and not the actual conflict or causes of conflict.

11. Can we address multiple issues related to agriculture and aviation, or must the focus remain on a single issue?
    - Teams may address as many issues as they'd like, as long as they can adequately meet the requirements as outlined in the Competition Guidelines. Space is limited, so teams should use discretion on determining how many issues to address while being sure to delve as deeply as possible into the required analytical elements.

12. Can you clarify whether this competition allows us to concentrate on the application of aerial remote sensing in agriculture, or is the emphasis more on innovations in aviation technology itself?
    - Both are options and teams have to make a case for their choices and show that the innovations will make an impact that is worth the investment.

13. Are there any specific technologies or advancements that NASA anticipates will be accessible or fully developed by 2035, which we should consider in our designs?
    - We are not trying to push the teams towards any specific technologies in this competition.

14. Does NASA envision that certain technologies, such as fully autonomous drones or AI-integrated robotics, will be commonplace by 2035? If so, which areas should we focus on to maximize relevance?
    - Autonomy is already in more places than many folks realize. The pathway to deployment by 2035 is different for every technology implementing autonomy, AI, etc., and often will depend on many regulations and public trust. We are not trying to push the teams towards any specific technologies in this competition.

15. What qualifies as an “improvement” on an existing technology? Improved efficiency, safety, cost?
    - There are many ways the teams may choose to try to improve an agricultural system. At the end of the day, the systems will need to financially make sense, but teams will be aiming for improvements in different aspects (safety, yield, cost, etc.).

16. To what extent does NASA use autonomous communication systems between devices?
    - Autonomy is a huge area of research at NASA across all of our missions.

17. Are we allowed to use patents from NASA’s patent portfolio for our project as long as they are approved for our use in the competition?
    - We encourage the use of any and all technologies teams think would make the concept impactful on the agricultural community. Be sure to justify the use of these technologies.

18. Are there any specific agricultural or environmental challenges expected to intensify by 2035 that NASA would like us to address in our design?
    - Water scarcity, conservation of soils, efficient inputs to save money and reduce environmental impacts, and extreme weather are all issues that will increase in the next decade. This list is not exclusive. We expect teams to do their research on specific agricultural or environmental challenges expected to intensify by the 2035 timeframe that affect or can be addressed by the proposed solution.

19. Is there a specific type of farm this is specifically targeting? Large or small, livestock or crops? Average American farm? Should we pick a case study farm to focus on?
    - We are not targeting any specific type of farm, but we are asking teams to focus on cropland, rangeland, and livestock management. Some teams might choose to focus on a case study or specific use case from a stakeholder or farmer they engaged, or even focus on a problem faced more generally.

20. Can we pick a type of crop we want to focus on?
    - Yes.

21. Does the size of the field matter? Can we pick based on our proposal?
    - You can pick any size field as long as you can justify your concept technologically, economically, etc.

22. Should the system be designed to address one single prominent issue concerning farmers, or can the team develop a system that helps farmers reduce workload on farmland such that it has multiple applications to a single system?
    - This choice is up to the teams! We want to see a range of solutions across the submissions.

23. Are there existing frameworks, metrics, or case studies in NASA projects that can measure quantifiable improvements (like yield gains or cost reductions) for small farms using precision agriculture tools?
    - You can certainly explore the work being done in NASA's Agriculture program under Science, but we do not have any specific frameworks, metrics, case studies we expect the teams to use. We also hope that teams look at all of the existing frameworks, metrics, case studies, etc. that they can for their concept's chosen area, looking well beyond what NASA is doing.

24. Are there any existing industry standards or regulations for aviation in agriculture? If so, are we allowed to develop a concept that aligns with those standards?
    - Regulations, laws, etc. are an important aspect and sometimes a potential barrier to innovative systems that our Gateways to Blue Skies teams consider every year when coming up with their concepts. Some teams might choose to align to existing regulations/standards or even advocate for some changes by 2035

25. Would using satellite data be a valid incorporation of aviation technology?

- For this competition, we do not consider satellites or their data to count as the aviation portion of the concept.

26. Can we consider a balloon or satellite as an aviation system?
    - From the Competition Guidelines, Page 4: "Aviation systems can be widely inclusive, with variation in vehicle system type and application (e.g., fixed wing, drones, traditional aircraft, tethered applications, balloons, autonomous or crewed flying vehicles). Proposed solutions should be aviation-first, with primary focus on the aviation systems being employed, but should include well-described end-user applications, system operations and methods, and user relevance and adoptability." Satellites are not considered aviation systems for this competition.

27. Are the incorporation of satellites or other non-aviation components in our proposal allowed, even if it is only part of the proposal? (Ex. The proposal would be a combination of a drone and a satellite.)
    - Teams are certainly allowed to incorporate data or satellite portions as part of their aviation concept. However, be prepared for questions and to justify the complexity, costs, cases if data is not available.

28. Is the system limited to aerial vehicles only, or would an assisting ground vehicle working with an aircraft be permitted?
    - A team could add capabilities via a ground vehicle, but that should not be the focus (should be aviation focused) as the competition is looking at aviation solutions for advancing agriculture. Be prepared for questions and to justify the complexity, costs, etc. for using a ground-based system to enhance or augment.

29. Are there altitude restrictions for how high we can design our systems to fly?
    - Teams should consider national airspace laws and regulations when thinking about altitude restrictions for their concept. Team concepts will have to operate in the national airspace, and there are a lot of things flying around.

30. Are there any restriction to the aircraft's size or dimensions?
    - Aircrafts of different size will have different laws and regulations governing them. Larger aircraft will also have increased complexity, costs, etc. that will need to be justified.

31. If the aircraft features autonomous capabilities, is it required to have a manual override feature?
    - Consider existing laws and regulations when planning requirements for autonomous systems.

32. Are there any restrictions for what we may consider as a fuel source for our aircraft?
    - Teams may consider different energy sources for their aircraft as long as it is justified.

33. How much should the restrictive nature of Part 107 inform our design? If flights using our solution do not conform to Part 107, should waiver submissions be included when charting a path to deployment, or can the regulatory environment be largely ignored?
    - Consider existing laws and regulations when planning requirements for all systems.

34. Who will be the main users of our designs: farmers, government agencies, private companies?
    - End users will vary by team based on their concept. Teams should think about their end user when developing their concepts.

35. Is NASA required to be considered as a stakeholder?
    - While NASA is a stakeholder for the competition, NASA is most likely not a stakeholder for the imagined end use case for the concepts that teams are developing.

36. Is cost a significant evaluated design factor for this competition? For example, should we provide estimated costs for the proposed methodology, e.g., operating cost, equipment setup, etc.?
    - Teams should try to make sure their concepts are economically viable (see Competition Guidelines, Page 5, Part 3). Teams will go into different amounts of detail on how they justify costs, depending on their proposed concept.

37. How much should available resources like funding, requirements for testing equipment, staffing requirements, influence our design?
    - While teams don't need those types of resources for participation in Gateways to Blue Skies, it's important to consider realistic costs and economic viability for the proposed concept.

38. For the development of our proposal, should we include estimated costs based on current prices, or is it more appropriate to provide a futuristic cost prediction aligned with expected advancements?
    - Teams should analyze their concept's economically viability for the proposed implementation. Teams will go into different amounts of detail on how they justify costs, account for inflation, etc.

39. If we incorporate AI into our solution, are we expected to include a full-scale analysis of the algorithm? What depth of analysis is expected? Similarly, if we develop software for the project, will it need to be submitted with the proposal, or is it sufficient to reference in the document?
    - This is a systems level concept, so we do not expect an in-depth analysis on the algorithm. Justifications of its use and impact will need to be present. We do not expect teams to develop software or physical prototypes for this project.

40. Are there any restrictions on the use of specific platforms or resources, such as software, hardware, or data?

- We don't have any specific restrictions, but for any use, teams would need be make sure it is viable and economical for implementation by potential end users.

41. Is it appropriate to use an off-the-shelf camera/sensor system, or should we be using developer ready cameras/sensors.
    - Teams can use either, depending on their goals.

42. What technology readiness level range is acceptable today, to be implemented into the 2035? How detailed should our justification be for meeting technology readiness by 2035?
    - Teams should "provide a pathway and timeline to deployment for the systems by 2035 or sooner," which includes technology readiness levels (see Competition Guidelines, Page 5, Item 4). Teams tend to include a timeline to show how their concept reaches implementation by 2035. Top teams will present justified arguments for their intended pathway, particularly for lower or mid-TRL items as they consider inherent risks and a deloyment schedule.

43. What are the mass constraints for this project?
    - Aircrafts of different size will have different laws and regulations governing them. Larger aircraft will also have increased complexity, costs, etc. that will need to be justified.

44. For our submission, are we expected to present concrete results based on data or simulations, or is it acceptable to discuss potential outcomes as projections or expectations, considering certain variables and constraints?
    - The latter, "potential outcomes as projections or expectations, considering certain variables and constraints." As a systems-level concept, we don't expect students to be running simulations.

45. How many types of fruits would need to be included in our system's testing for reviewers to consider it a versatile and robust model for detecting any fruit from aerial images?
    - Since the system is not being physically created by the team, the team should be able to talk about the capabilities of the system and its potential extensibility to different crops. The team could focus on one crop or conceptualize a system generally applicable in agriculture. Make sure to consider similar existing systems and talk about how the proposed system advances us beyond the state of the art.

46. For our problem, do we need to do a live demo?
    - We do not expect teams to physically create their concept for our competition.

QUESTIONS RECEIVED IN ADVANCE: MISCELLANEOUS

1. Are there specific problems that inspired this year's theme? What drove you to select agriculture as the focus?
   - There are not specific problems that drove this year's topic selection, but many challenges exist primarily due to the changing climate. With these challenges, agricultural business operators are among those more open to change and adoption of new technologies to secure their business and ensure resilience.

2. What defining features has set winning teams apart from others?
   - Winning teams tend to have solid deliverables across the board (proposals, videos, infographics, presentations, etc.). They not only complete all requirements of the competition, they are often innovating with today's technologies or pushing the boundaries of what could be done by the target date listed in the Competition Guidelines.

3. What are some common mistakes that we can avoid when creating our quad chart?
   - While the quad charts are not used for points in your evaluation, they are used as reference during judging to highlight the salient aspects of your project. Be sure to include all of the required quad chart components from your proposal in an effective, easy-to-read format that's easy for judges to reference.

QUESTIONS RECEIVED IN ADVANCE: PROGRAMMATIC

1. What constitutes a completed, fully-fleshed out project? Can you spend some time clarifying and providing more detail about the goal of our proposals?
   - A complete proposal will be a written paper that addresses all criteria listed in the Proposal & 2-Minute Video section of the competition guidelines, addressing all listed components with equal weight and adequate justification through research and projection grounded in reasonable thought. (See pages 9-14 of the Competition Guidelines.) The goal of your proposal is to conceptualize a solution at a higher, systems level for this years topic, justifying the needs and the various aspects of the conceptualized solution.

2. Should the proposal focus on a conceptual paper, or should it include a practical component with a prototype? If we create a prototype, will it be factored into judging? If it's not required, can we still include a prototype if we want to?

- Proposals should focus on the technology/concept and its application, justification, and technology readiness analysis. That said, prototypes can be a valuable additional modality for teams to display and discuss concepts for other stakeholders if they have any, but are not needed for this competition. Teams will not earn extra points for physical prototypes.

3. What is the grading criteria of the competition? Is novelty or practicality more important? Are there certain sections or content areas that are weighted more heavily? What aspect of the systemwide design should we focus most on?
   - Proposal and Video evaluation criteria can be found within the Competition Guidelines, on page 12. There is a link to the official scoring matrix on that page of the guidelines, which outlines how scores are allocated. Generally speaking, this competition asks teams to present novel ideas that are well-justified in all areas listed in the Competition Theme Description and Details (Page 5). Teams are responsible for determining how best to allocate their material within the allotted page count to present a compelling proposal. Innovation comes in many different forms; how each team chooses to balance the line of innovation practicality and pushing the boundary is unique. While proposals are scored on innovation, they are also scored on concept of operations and implementation.

4. Are we permitted to reach out to agricultural companies or organizations to understand common challenges in the industry and gather insights on potential aviation technologies they would find beneficial? What about anyone at NASA?
   - Absolutely! It is highly encouraged to work with industry professionals to understand the opportunities and needs that exist within your chosen area of research and development. Teams may additionally contact individuals at NASA, provided the NASA contact is not serving on the judging panel (it is expressly forbidden for judges to interact with teams related to Blue Skies prior to the forum) nor are sponsors of the program (i.e., teams may not reach out to anyone at the University Innovation Project for anything related to Gateways to Blue Skies). While NASA may have many subject matter experts in many innovative technologies that would be happy to talk, NASA would most likely not be the target end user or stakeholder for the types of concepts this competition seeks.

5. Will the competition staff/NASA sponsors or PIs facilitate connections between our teams and potential on-the-ground users, such as farmers who can help inform our concept?
   - No. Teams may forge their own connections, but there is not a mechanism within the competition to link teams with potential on-the-ground users, experts in the field, or other useful subject matter experts to help inform the project.

6. What resources are provided to us by NASA in this competition?
   - There is a small list of resources provided on the competition website (https://blueskies.nianet.org/competition/) - keep in mind that the list is not

exhaustive, and that teams should use any and all resources available to them to fully inform the project.

7. Are we allowed to use other companies' technologies in our proposal?
   - Teams may use existing technology wherever possible, particularly if it helps raise the technology readiness level. If you choose to utilize another company's technology, be sure that you consider its integration opportunities and challenges as you're presenting the concept of operations. Additionally, teams should be innovating and proposing something that does not yet exist in it's proposed form.

8. When is the deadline that I can change our team? We need to add in a team member and a possible collaboration University/professor.
   - Teams, including partnerships, may change at any time prior to submitting the proposal. At the time of proposal submission, the submission form requires that teams enter full and complete information for all team members, after which the team should not change except in extenuating circumstances. Remember that team size is limited to 6 members and an advisor(s).

9. When is the deadline that we need to submit our technical paper for evaluation?
   - Proposals are due by 11:59 PM Eastern Time on February 17, 2025. All dates and deadlines for the competition can be found in the dates and deadlines table, located on the competition website (https://blueskies.nianet.org/competition/).

10. Is there a format requirement for the technical paper?
    - Proposals must be formatted according to the "Proposal Formatting Guidelines" found on Page 11 of the Competition Guidelines.

11. Is there a page limit?
    - Proposals are limited to 5-7 pages, not including the cover page, quad chart, and abstract/summary (see pages 9-10 of the Competition Guidelines). Appendices are also not included in the page count and are also not scored.

12. Is there a limit to how much can be in the appendix section?
    - There is no limit, however, teams should keep in mind that judges are not obligated to read beyond the 7 page proposal limit (not including cover page, quad chart, and abstract/summary pages). Teams should not include anything in the appendices that is substantially important to their concept proposal (see page 10 of Competition Guidelines).

13. When providing graphical depictions, other than the exclusion of hand-drawn images, are there any additional constraints?
    - There are not additional constraints for including graphical depictions in the proposal. Advice from judges and program sponsors is to be sure that graphics augment the proposal and are more effective than using words in the same space allotment.

14. Are there any filming regulations or copyright considerations groups need to especially consider when making the video?
    - It is the responsibility of each team to appropriately handle copyright issues related to anything you choose to use in your video and/or presentation (including, but not limited to: music, images, graphics, and photos). Neither NASA nor NIA can grant permission to use copyrighted material. (see FAQs on competition website). Videos must be able to be published as "public" or "unlisted" on YouTube for inclusion in the proposal submission (see page 12 of the Competition Guidelines)

15. Should our video aim to summarize our written proposal or should we use the time to add additional information? Are there recommendations for what needs to be included in the video? Can you shed light on the most important aspects of our design that must be higlighted in our proposal video?
    - The video should introduce the team, concept, and value proposition. It additionally provides an opportunity to augment the proposal with animation, graphics, or other creative ways of showcasing unique aspects of the proposed concept (see page 11 of the Competition Guidelines). It should be a summary, augmentation, or in the style of a sales pitch, and should not contain new material.

16. What is the difference between the final technical paper (for finalists) and the proposal?
    - The final technical paper should be treated as a standalone document, clear to someone who has never read the initial proposal. While a certain amount of overlap is to be expected, the final technical paper should be reflective of the team's entirety of findings in the competition period. It should expound upon initial findings in the proposal and take into consideration the listed final paper details, evaluation criteria, and judge feedback. It should be robust, creative, well-researched, and well-justified. (See Page 16 of the Competition Guidelines.)

17. Are we permitted to use the research and concepts developed for this competition in future NASA competitions or other related projects? Can we submit our technical paper to other conferences?
    - Yes, concepts can be used in future work. However, by participating in Blue Skies, teams release their intellectual property to NASA (see IP Statement in Competition Guidelines). Similarly, teams can absolutely submit research as an abstract to other conferences, as long as it is presented to the public at the Blue Skies Forum first. It's also OK to present the work at your university (to other students/faculty/internal school events) before the Blue Skies Forum. (See FAQ on competition website.)

18. What is the extent of the role of the advisor for the project? How involved should they be in proofreading and/or brainstorming?
    - The Gateways to Blue Skies Competition is a student-led initiative. Academic advisors should serve as mentors, allowing students to do the work on Blue Skies projects. Academic advisors must physically sign off on proposal and final research

paper submissions on behalf of the team. Additionally, they'll be responsible for managing the funds sent to the college/university on behalf of the challenge, and assisting teams to participate fully in the culminating Forum. As long as the advisor is employed by the college/university to teach a class and/or perform research, and either a U.S. Citizen or a lawful permanent resident, they qualify as an academic advisor. (See FAQ on competition website.)

19. What are the limits for international students' involvement?
    - Foreign Nationals (FNs) attending the proposing U.S.-based university can participate on a Blue Skies Competition Team, with notable exclusions. Due to NASA security restrictions and policies, FNs will not be able to attend culminating Blue Skies Forum events that take place on-site at a NASA Center (including tours). FNs are also ineligible for the internship prize. There will be no exceptions to this policy. FNs can, however, participate in any portions of the culminating Blue Skies Forum that take place off-Center. Note that Blue Skies Competition forums typically take place at a NASA Center with limited activities off-Center. Eligibility is limited to universities in the United States. Foreign universities are not eligible to participate in the Blue Skies Competition. (See FAQ on competition website.)

20. What if you don't have a team, how do you find and join one?
    - Interested participants are responsible for building their own teams. Neither NIA nor NASA provides assistance in linking potential team members. Recommendations for finding team members are as follows:
        - 1. Contact a faculty member at your college or university to inquire about supporting the project, with the first step being identifying avenues for locating interested peers.
        - 2. Connect with engineering student groups on campus to spread the word and attend a meeting or two to gauge interest.
        - 3. Tap friends in similar programs at different universities to see if anyone would be interested in collaborating or building a team at their location.

21. Would we be able to see past submissions (proposals included)?
    - Technical papers, infographics, and chart decks from past competitions are available on the competition website under Competition Records and are listed by year. Proposals are not published.

22. If a finalist team has leftover funds from the $8k award are there restrictions on what we can use those funds for?
    - The $8,000 check received by finalists in the Gateways to Blue Skies competition is provided as an unrestricted sponsorship intended to facilitate full participation in the 2025 Blue Skies Forum at NASA's Armstrong Flight Research Center in Edwards, CA, May 19-21,2024. There is no other contract or agreement attached to the use of the funds, and as such, there is no period of performance or other regulations placed on the funds by NIA. Any leftover funds (if any) should be reinvested into the engineering department at the discretion of each team's advisor. Checks are

provided directly to the university via ACH, and it is the advisor's responsibility to access and distribute the funds in accordance with university policy.

23. Will the question hotline remain open after Q&A sessions?
    - Yes! Questions can be submitted at any time to blueskies@nianet.org. There is also another Q&A Session scheduled for 3:30-4:30 PM ET on January 23, 2025, which will follow an open-call format (questions will not be received in advance). All teams who submit an NOI will be invited to this additional Q&A Session.

QUESTIONS RECEIVED DURING THE Q&A SESSION

1. I go to a school that is a part of a group of community colleges. I was wondering do my teammates need to be from my college or can they be from partnering institutions as well?
    - Yes, the competition is open to partnering universities, and you can work across institutions. Do make sure, however, that you your team lead and advisor are both from the *primary* institution. If selected as a finalist, the lead (primary) institution will receive the $8,000 in funding, so it's important that your academic advisor is at the lead institution so they can distribute funds accordingly and make sure the project is managed according to university protocol.

2. How involved are people outside of the team allowed to be? For instance, if I get a friend to hold the camera for the video or if one of my peers is already performing related research and they want to discuss their ideas?
    - Having someone hold the camera so everyone on the team can be in the shot at one time is one thing, and that is acceptable. What we don't want are people who are not on the team doing the work. You shouldn't hire someone outside of the team to do the recording and graphics. The team should be doing the work, making the graphics and the videos and coming up with the ideas.

3. Is there any way to change members of my team before the video proposal if one or more of them have had to leave the group?
    - Yes. Teams are able to change team members up until the proposal time frame. By the time you're submitting your 5-to-7-page proposal and video, your team should be more or less set. After that, it's only in extenuating circumstances that we permit team changes.

4. I saw the question about the satellites, but I was wondering if pseudo-satellites or other high-altitude aircrafts also be counted in this category.
    - An aircraft is an airborne platform. I think the reason they are labeled pseudo-satellites is because sometimes they can provide capabilities that some people

associate with satellites, but they are not in LEO or beyond. High altitude aircraft are an option, but sometimes those platforms are larger or more expensive. So, if a team decides to go for a high-altitude option, definitely consider the costs and complexity of the system and also any regulations. Sometimes at high altitudes, you might run into different air spaces, and especially if you're going across different borders of countries there's going to be some complexity as well.

5. I know high-resolution satellites images are hard to obtain; is it possible to get any support from NASA for this?
   - Because this competition is asking for concepts, we're not expecting teams to utilize high-resolution images, but you can certainly talk about it in the paper.

6. Would NASA offer any support connecting me to farmers?
   - While we encourage teams to talk to people who are end users, we don't connect students to end users. We encourage you to reach out to a faculty member who may be able to help and to also take a look at research going on across industry and academia.

7. To what degree should our up-to-2035 timeline cover the potential regulations jurisdictions in the way of drones being readily used in all fields of agriculture?
   - Teams can consider what is current or upcoming and can make their own predictions or suggestions for changes that need to be made for their system as well. We don't expect the whole paper to be about regulations and such, since you have 5 to 7 pages, but we do want teams to consider what types of barriers and limitations there are.

8. Can the term of extreme weather be expanded upon?
   - Depending on what your system is, you might have to deal with different challenges or operational environments. Every geographic area that you might be thinking about will likely have different types of weather. Some areas might deal with flooding or droughts or tornadoes, or if you have a system at a high-altitude vehicle, you're going to be dealing with different levels of wind or maybe sun exposure. **[Also see Question 5 in Technical Questions, above]**

9. Do all types of drones belong to aviation?
   - Autonomous systems in aviation come in all different shapes and sizes. There are autonomous vehicles that are your everyday aircraft, as well as helicopters…We have commercial and off-the-shelf drones. We have bigger drones that we see being used in agriculture. Some are vertical takeoff and landing, some are tube and wing, some might have different shapes. Aviation encompasses all different types of drones.