NASA's 2027 GATEWAYS TO BLUE SKIES COMPETITION:
InfraAir | Aviation for Infrastructure Inspection

Q&A SESSION #1 SUMMARY DOCUMENT

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QUESTIONS RECEIVED IN ADVANCE: PROGRAMMATIC

1. **The Guidelines says pathways individuals are eligible, but later it says federal employees are not. As a Pathways intern and grad student, can I submit a proposal outside my scope of work?**
   Yes. U.S. government employees (including Pathways interns) may participate so long as they are not acting within the scope of their position, rely on no facilities, access, personnel, knowledge, or other resources that are available to them as a result of their employment except for those resources made available to all other participants on an equal basis.

2. **What is the definition of a lead institution? Can the advisor's university affiliation differ from the majority of the students' university affiliation?**
   The lead institution is defined as the U.S-based institution where the primary faculty advisor is affiliated. The primary advisor serves as the team's mentor and is responsible for managing any competition funds awarded to the team. As all monetary awards are disbursed only to the lead institution, the primary advisor's institution is considered the lead institution for administrative purposes.

   Team members may be affiliated with other colleges or universities. However, teams must meet the competition requirement of having at least two U.S. citizen or lawful permanent resident students from the lead institution who actively contribute to the project and, if selected as finalists, participate in presenting at the culminating Forum.

   Therefore, the primary advisor's university affiliation may differ from that of some team members, including the majority of the students on the team, provided the eligibility requirements described above are met.

   For teams that include participants from multiple institutions, NIA and NASA strongly encourage the participating universities to establish a Memorandum of Understanding (MOU) or similar formal agreement that defines roles, responsibilities, intellectual property considerations, and the distribution of any award funds.

   Please note that NIA and NASA will only disburse award funds to the lead institution through the primary faculty advisor's institution. Any subsequent distribution of funds among partner institutions is the responsibility of the participating institutions and should be addressed through their internal agreements.

3. **Are international students permitted to participate as official team members, provided the team meets the requirement for at least two U.S. citizens or permanent residents?**
   Students attending foreign universities are not eligible to participate. However,

international students attending the lead US-based institution can participate on the team as long as they are enrolled full-time, live in the United States, and sign the Foreign National Acknowledgement Form.

Please note that foreign national participants, however, are NOT eligible for prizes, which include monetary awards, internships, NASA site visit/tour, and attending the GBS Forum.

4. **Are teams permitted to consult external subject matter experts or industry professionals, and are there any restrictions on the type of assistance they can receive?** *Similarly:* **Can teams seek guidance from subject-matter experts, such as civil or structural engineers, dam inspectors, NDE researchers, or UAV specialists, to assess the feasibility of their concepts?** *And:* **Can students get industry sponsorship?**
   Yes. Teams are highly encouraged to contact appropriate non-government stakeholders to better understand the current industry and technologies used in infrastructure inspection and current gaps or opportunities that may be addressed through their proposed concept. Industry sponsorship is also permitted. However, proposed solutions must be student-led and originate within the academic environment. Projects should reflect the ideas and work of the student team rather than being developed on behalf of, assigned by, or primarily directed by an industry partner, advisor, or other external organization. Industry sponsors may provide funding, mentorship, or resources, but the project itself should remain student driven.

5. **Is there a desired video format for the phase one submission and is it preferred to be a formal presentation? What level of technical detail should be provided in the video?**
   General video expectations and information about formatting can be found on pages 12-13 of the GBS Guidelines. We **do not want** a formal research presentation - instead, use the video to creatively explain, visualize, and pitch the judges your idea.

   We do want videos to be shot in landscape (horizontal) format.

   We don’t want videos to incorporate:
   - a PowerPoint "slide deck" style
   - sped up audio
   - AI generated content or voiceovers
   - copyrighted music/images

6. **The Guidelines encourage having team members appear in the 2-minute video. Does everyone on the team need to be in the proposal video? Does judge scoring favor live on-camera student narration or is a voiced-over technical animation/CAD demonstration evaluated equally?**
   Every team member doesn't have to be featured “live, in person” in the video, but it is expected that all team members are introduced and appear in video, even if it is just

photos of them. More details, including general video submission expectations and formatting can be found on pages 12 and 13 of the Guidelines.

Video scoring is based only on the specific video evaluation criteria listed on the 2027 GBS Scoring Matrix (found on Page 14 of the Guidelines), and no one delivery method is preferred over another.

7. **Given the two-minute video limit, what balance do judges expect between high level value proposition/market context and detailed engineering/technical specifications?**
   Think of the video as a technical sales pitch. The judges expect a strong emphasis on the problem you are solving and overall system viability. Rather than providing an exhaustive breakdown of engineering specifications, teams should present a clear Concept of Operations (ConOps) and system architecture. The goal for the video is to include just enough technical depth to prove that your concept is functionally feasible and well-grounded. See "Video Expectations" on page 12 of the Guidelines for more detail.

8. **Can the proposal video demo a prototype under controlled conditions if we explain the path to real world operation?**
   Teams can choose what they include in the 2-minute video. Prototypes are not required for any part of the competition.

9. **Are we allowed to use footage that is not our own in proposal videos and what is the process for getting that approved and credit given?**
   Yes, in some instances. If the footage is in the public domain (such as a video produced by the government) or not copyrightable, you can use it. If you are unsure, contact the source and request permission. Neither NIA nor NASA can give teams permission to use copyrighted material.

10. **Are travel plans (such as booking the resort and tickets if we advance to phase 2) expected to be entirely handled by our universities financial coordinator who also receives the funds?**
    This is a question for your university/college. Each institution has a different process when it comes to managing funds, so we suggest having your advisor contact the school's financial coordinator. Teams who advance to Phase 2 will be given guidance on how/where/when to book hotel rooms under the GBS Forum Group, but it will be up to each team to handle their own individual travel reservations.

11. **Is physical prototyping required or given extra evaluation weight during either Phase 1 or the finalist forum, or are teams strictly evaluated on analytical modeling and studies? Is there a prototype budget cap and are off the shelf components available?**
    A prototype is not required, and as such, there is no associated budget or materials guidance. The proposals and final deliverables are scored strictly off the 2027 GBS Scoring Matrix (page 14 of Guidelines).

12. **Is a scaled hardware prototype with test data expected or is a well-supported concept sufficient?**
    A prototype is not expected or required.

13. **How do reviewers weigh innovation vs feasibility? How does the competition weigh innovation across different parts of the system? For example, are advances in autonomy, software, data processing, sensing, and inspection workflow valued similarly to innovations in the aircraft or physical hardware itself?**
    All proposals should feature a feasible concept with a credible pathway to deployment by 2035. Judges strictly adhere to the 2027 Scoring Matrix - see the link on page 14 of the Guidelines for specific values assigned to each evaluation category. Our judges will be from a variety of technical backgrounds, and with that will come varying views on the value of any innovation, but innovation evaluation is domain agnostic. We suggest innovating for impact, to address **your specific** use case challenges and goals. How necessary is this innovation? How much of a difference will it make? Do the benefits outweigh added complexity/cost?

14. **Which logos/icons from NASA are available for use to put on the report and other documents?**
    None. Use of the NASA "meatball" and "worm" logos is prohibited on all GBS Submissions. Instead, you may use the Gateways to Blue Skies logo (downloadable GBS image files can be found on the 2027 Competition Details webpage, under the "Logos/Usage Guidelines."

15. **The Guidelines restrict the use of generative AI in written submissions and presentations. Does this restriction extend to AI coding agents such as Claude Code and Codex when used for software development, simulations, or data analysis?**
    The guideline's restrictions apply to the deliverables of the competition. The competition does not require any coding, software development, or new data analysis. However, students should be able to verify and validate any information used, including data analyses used for the competition. Since a prototype, simulation, or otherwise is not part of the competition, any limitations on what you can use for non-competition deliverables would be determined by your class, professor, or other stakeholders.

16. **Can teams modify their technical approach or change their faculty advisor after submitting the Notice of Intent?**
    Yes. NOIs are nonbinding. Teams are allowed to modify their technical approach and change their faculty advisor or other team members after submitting the NOI. Any changes to the team composition must still meet eligibility requirements, and the way you would notify us about the change is simply to provide contact information for all current team members & advisors on the proposal submission form.

17. **Does the graphic depicting the teams concept need to be in a specific/preferred format?**

An image/graphic of all or part of the concept is a requirement of the proposal (on the Quad chart). While no specific format is required, we do not want to see hand-drawn sketches. Consider the graphic requirement as an "artist's depiction" of the concept, as opposed to a flow chart, diagram, UML, or similar.

18. **Are there any restrictions on using published research, existing technologies, manufacturer specifications, or advice from universities and industry partners? Should external assistance be acknowledged in the final submission?**
    There are no restrictions and there are no formatting requirements for citations (although teams should pick a consistent format), however, external assistance should be acknowledged in the Proposal. If you are quoting someone or indicating that you received support, materials, etc. from an external entity, include those types of acknowledgment in the body of the paper. However, citation and appendix would be the appropriate way to acknowledge references to a paper. Special note from the judges: Teams may want to consider if existing technologies they're considering using would be licensable, acquirable, etc., especially if owned by a potential competitor.

QUESTIONS RECEIVED IN ADVANCE: TECHNICAL

19. **How much does a proposed system need to differ from existing technology to be considered innovative?**
    This is not an easy line to define. Think about why a potential end user or customer would buy it over existing technology. Innovate with a purpose, to solve a specific problem. It can't become an innovation if it doesn't have a sound pathway to deployment. Innovations need to deliver measurable value/tangible upgrades. A true innovation can even set a new standard, displacing the existing technologies/systems.

20. **Does NASA favor concepts that solve one specific problem, or a system that inspects multiple kinds of infrastructure?** *Similarly:* **Do we need to look at only one inspection area or multiple?** *And:* **Is there a preference for systems that can inspect multiple types of infrastructure, or can teams focus on optimizing a solution for a specific inspection environment?**
    NASA does not favor one over the other, but we see students that try to tackle multiple kinds of challenges, infrastructure in this case, have a more difficult time getting into detail at an appropriate level on specific use cases and challenges in the limited page space of the proposal.

21. **Are you seeking a drone that can do a little of a lot of things or a lot of a few things?**
    See Answer in Question 20

22. **Does a narrowly scoped bridge inspection concept score differently from one covering broader infrastructure types?**

There is no preference between single-asset and multi-infrastructure concepts, and both are evaluated using the same scoring criteria.

23. **Is the public perception of a solutions capability a major component towards a proposal moving forward?**
    Public perception **is** important to the implementation of any concept, especially when used around items like infrastructure which are very often heavily used by the public or impact them. In the real world this will have more impact than at the proposal level in the competition, but if the judges see the proposal as something the public would never allow, it would be difficult to make a case for its advancement to the finals.

24. **Is there a desired TRL for a proposed idea, or is it something that could be bleeding edge with a path forward with 2035 marking when technology may potentially begin to be incorporated within infrastructure inspection?** *Similarly*: **Are we developing our drone based on current technology, or where we think technology will be by 2035?**
    2035 is expected as the latest deployment of proposed systems. It's up to the teams to determine whether they are looking to implement technologies or systems that today are considered lower or higher TRL and to explain how that technology will make its way through development to deployment by the expected date.

25. **How strictly will reviewers judge "Implementable by 2035"; is there a minimum TRL you expect today?**
    There is not a minimum TRL expected *today*, but it is up to the team to demonstrate through their proposal the system's feasible pathways to deployment by 2035.

26. **Is it better to focus on solving an issue that impacts a larger group of stakeholders/people or solve a somewhat niche topic with a well thought out proposal? Are there differences in scoring weights for these two proposal approaches?**
    There is not a difference in scoring weight for these approaches. Scoring comes down to how well students approach the criteria in the Guidelines. These approaches, however, can make cascading differences through a proposal in how the team approaches the topic, end users, CONOPS, and justifies the proposed concept.

27. **How in-depth do we need to be regarding FAA regulations in our report and as far as regulations for Beyond Visual Line of Sight drone operations, should we reference FAA Part 107 in our proposal, or should we assume that Part 108 will be released?**
    Teams should mention regulations throughout their report where appropriate. Teams may make assumptions that are reasonable and justifiable.

28. **Do we need to have detailed specifications for all parts used, or just a general function description?**
    No, you do not need detailed specifications for all parts used, it's up to teams to determine how to balance the written specificity of their concept's components with all

the required areas of the proposal. Teams may be asked about specifics by the judges though.

29. **Is a "use case" one asset and task inside an inspection area, like transmission line corridors under Hazardous Environments? The submission form says "area(s)," so can one use case span more than one area? (pp.5, 9, 12)**
    A use case focuses on a specific operational scenario, target asset, and inspection mission. While teams must select a primary inspection area, a use case can span multiple operational conditions (e.g., inspecting transmission lines located in hazardous or GPS-denied environments). Proposers should clearly define their primary target asset while explaining any overlapping operational areas.

30. **What is the budget for each drone?**
    There are no budget requirements related to any specific technology in this competition; however, teams should do an implementation analysis, carefully considering if budget would be an impediment to operability by 2035. It also important to consider potential stakeholders and the feasibility of operational integration and adoptability when thinking about cost.

31. **Would you intend on building new drones or retrofitting new systems on existing drones and is there a certain system/format that you would like data collected by the drones to be uploaded to/as?**
    It is up to teams as to whether they create a new design or utilize existing platforms for their concept. Details such as how data is collected and stored are also up to the team. Technical choices such as this should be reason-based and advantageous to the system and its end users.

32. **Should the drone be designed more as a standalone device or one that can connect and work together with multiple drones?**
    Whether the drone is standalone or connected to multiple drones is at the discretion of the team and largely depends on the concept being proposed.

33. **Do you want people to be flying drones or for the drone to lean more towards autonomously running itself?**
    It is up to teams to determine the level of autonomy of their system, and all the regulations, challenges, and caveats that come along with their choice.

34. **If our drone were to require a docking station, would there be an available space that could be implemented?**
    NASA and NIA do not provide physical space, infrastructure, or testbeds. Teams implementing docking stations should conceptualize them as part of their overall Concept of Operations (ConOps) and path to deployment by 2035, justifying how and where ground- or structure-mounted docking stations would be integrated into real-world operational environments.

35. **Do tethered UAS, lighter-than-air platforms, or satellites count as airborne platforms?**
    Tethered and lighter-than-air platforms are considered airborne. Satellites are not; they are considered spaceborne.

36. **Are proposed aircraft required to operate independently of ground-based connections? For instance, would a drone and ground charger used to inspect the infrastructure be an allowable design? Are ground-based robotics allowed along with an airborne platform?**
    The primary focus should be on the airborne platform tackling infrastructure inspection. A team can have ground assets for their airborne platform where appropriate, but ground-based robotics are not the focus of this competition.

37. **In past years, top concepts were either a complete system or components of a larger system. Do evaluators prefer a whole system concept or a focused component of a concept?**
    Evaluators are not preferential. However, even a focused component of a concept would need to consider how it fits into a larger system and all of the high-level considerations we ask for in the proposals to be deployable by 2035.

38. **For the ConOps, do we need a graphic OV-1 format or a written description of our product operations?**
    A graphic OV-1 is not required for your CONOPS. Graphics can be used in the proposal where it makes sense but make sure the body of the proposal addresses the requirements listed in the Guidelines and talks to any graphics.

39. **Are teams permitted to use publicly available or previously collected dam inspection data, including 3D models, LiDAR scans, thermal imagery, and documented structural defects, to support or validate our proposed system?**
    Yes. You are encouraged to research and use publicly available information as it relates to your concept.

40. **For technologies based on early-stage proof-of-concept research, what level of technical verification is expected? Is it expected to produce simulated/empirical validation to support the concept or is a reference in the appendix sufficient?**
    Physical prototypes and experimental test data are not required or expected for Phase 1. Analytical modeling, engineering calculations, computer simulations, and literature-backed trade studies are fully sufficient to demonstrate concept feasibility. If preliminary experimental data exists, it may be referenced or included in an appendix, but scoring is based on sound technical reasoning and system analysis per the Scoring Matrix.

41. **What level of technical validation is expected in Phase 1? Are analytical models and simulations sufficient to establish feasibility, or is preliminary experimental data preferred?**
    See Answer for Question 40

42. **What is the expected scope for our solutions? Are teams expected to detail implementation (UI/UX workflows, communication protocols, sensor hardware integration) or is the primary focus on system-level architecture, feasibility budgets, and functionality?**
    The primary focus of Phase 1 is system level architecture, operational feasibility, technical justification, and a clear pathway to deployment by 2035. Teams do not need to detail low-level UI/UX code or communication protocols, but must address high-level system integration, connectivity constraints and data flows within their ConOps.

43. **When discussing "Land-Based" Infrastructure, would coast-based infrastructure be allowed? For example, a highway located on a coast is experiencing coast erosion damage, is this considered "Hard" infrastructure?**
    Built, land-based civil infrastructure located near coasts is in scope, provided the inspection target is the physical built structure itself. The monitoring of natural coastal erosion or natural shoreline changes alone is out of scope.

44. **Are flood-based infrastructure like levees and pumping stations considered non-marine/legal for the competition?**
    Yes, levees and pumping stations are acceptable for the competition.

45. **For the purposes of the competition, how is “maritime infrastructure” distinguished from land-based infrastructure that has submerged or water-interfacing components? For example, would underwater portions of bridges, dams, and spillways be within scope?**
    Terrestrial hard infrastructure that interfaces with inland water (e.g., land-based bridges, inland dams, spillways, water treatment facilities, levees) is in scope, including inspection of their built components. Structures located in marine, oceanic, or deep-water offshore environments (e.g., offshore oil platforms, ocean buoys, marine ports) are strictly excluded.

46. **Does an inspection area need to be an existing geographic location that has issues or is it a specific type of infrastructure?**
    A specific geographic location is not required, although regions might come with their own challenges, laws, or regulations that teams choose to address.

47. **Are teams expected to address GPS limited conditions or is GPS-assisted navigation acceptable?**
    GPS availability would depend on the use case(s) chosen by the teams.

48. **For systems designed to operate in GPS-denied or communication-constrained environments, are there additional technical requirements or performance criteria teams should address?**
    Both GPS-assisted and GPS-denied navigation concepts are acceptable depending on the chosen use case. If a team selects a GPS-denied environment (e.g., transit tunnels, culverts, or bridge box girders), their ConOps and technical analysis should explicitly address localization, navigation, and signal constraints.

49. **Are concepts limited to improving only the inspections themselves or can the airborne platforms also be used to complete maintenance tasks in addition to the inspections?**
    The 2026 GBS Competition is specifically looking at innovative airborne platforms for land-based (hard infrastructure) inspection. While maintenance tasks could be a byproduct of your concept, it should not be the focus.

50. **Should concepts work year-round or is seasonal inspection acceptable?**
    Seasonal inspection concepts are acceptable if justifiable for the chosen use case and target infrastructure. Teams should explain and justify any operational limitations or seasonal constraints in their situation assessment and ConOps.

51. **Can we add other modes of travel in addition to being airborne (e.g., water travel, walking on land) or will it strictly be only air travel?**
    In GBS Competitions, proposed solutions/systems should be airborne platforms. Other modes of transportation can be included, but they should not be the primary focus (i.e. someone needs to use other modes of transport to deploy an airborne system).

52. **Does the final design require a full working airborne platform in a simulator or just a viable concept?**
    The competition seeks innovative concepts with sound technical analysis and justification. The final paper deliverable in Phase 2 should be a well-thought-out research paper **detailing the proposed** concept. No working prototype is expected.

53. **If we came up with an idea independently, would it be okay if there is similar research about the topic?**
    Yes, but proposed concepts should be innovative and offer unique advantages from existing research and capabilities.

54. **Are we allowed to use systems already made? For example, integrating a current company's digital twin system into our platform.**
    If existing technologies are licensable, acquirable, etc., you are allowed to consider their use. However, if systems are hard to acquire or owned by a potential competitor, teams may want to consider other options that will lead to a successful deployment by the target year.

55. **What are the limitations/qualities of an airborne platform?** *Similarly:* **Does airborne platform include only the aircraft itself for the competition, or can the aircraft do things such as perching on structures or releasing crawlers etc. count within the competition?**
    Proposed solutions must be aviation-first airborne platforms (e.g., multirotors, fixed-wing, VTOL, tethered UAS). Multi-modal capabilities, such as perching on structures, deploying secondary sensors/crawlers, or making contact with surfaces, are permitted, provided the primary focus remains on the airborne inspection platform.

56. **Are there any specific size, weight, payload, or power constraints that proposed aircraft must meet?**
    No. That information is for you to determine and justify, based on your use case.

57. **Are there predefined environmental or operating conditions that designs must account for, including wind, precipitation, visibility, and GPS availability?**
    No. That information is for you to determine based on the infrastructure inspection area and use case you choose.

58. **Will teams be evaluated against a common set of operating conditions and performance benchmarks, or can they establish their own based on the intended inspection application?**
    The 2027 GBS Competition Scoring Matrix (found on page 14 of Guidelines) is a valuable resource for teams to review to understand exactly how the proposals will be evaluated, including point-value assessment for each evaluation criteria. Based on their research, teams may determine the operating conditions and performance benchmarks appropriate for their use cases, relevant laws/regulations, etc.

59. **How does the evaluation distinguish between developing an entirely new technology and applying existing technologies in a novel way to solve an infrastructure inspection problem?**
    The competition values both brand-new technology developments and novel applications or integrations of existing technologies. Innovation is evaluated based on how novel the system or approach is in improving efficiency, safety improvement, or reducing cost for the specific use case, as defined in the Scoring Matrix.

60. **Are teams allowed to use commercially available hardware and existing technologies as part of their proposed system or is the emphasis on developing entirely new technology?**
    Yes. Teams may incorporate commercially available hardware or existing aircraft platforms into their system-level architecture. However, the overall proposed concept must be student-led, and the proposal must clearly articulate the team's novel integration, adaptation, or system-level innovation.

QUESTIONS RECEIVED DURING THE Q&A

61. **How would I go about putting the GBS Competition on my resume?**
    We do see this on resumes a lot, and it's a great resume booster. We recommend including that you participated in the competition in X year, your role on the team, what you did, what you designed, etc. However, please don't use the NASA Meatball or say you "worked at NASA" when referencing the competition.

62. **You said that assistance and interaction with industry and non-government stakeholders is encouraged. So does that mean that we should not be looking to government stakeholders, such as inspection officials for their take on the needs and issues in an inspection area?**
    Teams can contact the appropriate government stakeholders on a limited basis to understand laws and regulations governing infrastructure inspection, but we do ask that teams refrain from inundating government officials with requests for information. Additionally, students are **not permitted** to contact competition judges for their expertise. The judging panel should be posted by late January.

63. **A drone that travels closely along the ground or utilizes the ground effect considered an aviation or airborne system?**
    Ground effect is considered an airborne system and is appropriate for the competition. However, it won't be perceived very favorably if the only reason you're having it fly and use the ground effect is to "check the box" that it's an airborne system.

64. **Our school is already doing a project that is related to this. Are we allowed to use what we've started working on, or do we have to start from scratch?**
    If the project idea originates from the students and fits within the competition theme, then the answer is yes.

65. **In terms of concepts that are seasonal or year-round, is it more favorable to find something that's year-round vs. a concept that might deal with a natural disaster?**
    We don't have a preference, but we do think it's important for the students to consider their concept's business case. If you have a capability that is only used during natural disasters, it might be harder to justify the investment to the end user. Additionally, the seasonality should be limited by the use case, but the airborne platform itself should not be limited technically.