



GATEWAYS TO **BLUESKIES**



2023: GATEWAYS TO BLUE SKIES COMPETITION

CLEAN AVIATION ENERGY

*The Gateways to Blue Skies: Clean Aviation Energy competition is managed by
the National Institute of Aerospace (NIA) on behalf of
the National Aeronautics and Space Administration (NASA)*

2023 GATEWAYS TO BLUE SKIES: CLEAN AVIATION ENERGY COMPETITION

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NASA Aeronautics & University Innovation Project Overview

NASA's Aeronautics Mission Directorate (ARMD) has always been about improving aviation efficiency and safety, while reducing noise, fuel use and harmful emissions. For decades, NASA-developed technologies have contributed to making aviation more sustainable – environmentally and economically. Now, NASA is expanding research for sustainable aviation by developing and testing new green technologies and designs for next-generation aircraft, new automation tools for greener and safer airspace operations, and new sustainable energy options for aircraft propulsion. NASA is partnering with industry, academia, and other agencies through the [Sustainable Flight National Partnership](#) to accomplish aviation's aggressive climate change agenda.

ARMD's [University Innovation Project \(UI\)](#) funds university-led innovation to address system-level challenges in NASA Aeronautics' [strategic thrusts](#), which guide the Aeronautics programs. This is done through NASA-complementary, independent, alternative, and multi-disciplinary research.

UI's University Leadership Initiative (ULI) program helps NASA to address the long-term challenge of Zero-Emissions Aviation by the 2050s, focusing beyond the next generation aircraft and pioneering new concepts, technologies, and operations to achieve a zero-emissions future. In this case, zero-emission technology refers to any technology that provides a pathway to the eventual adoption of aircraft that do no environmental harm in all operating modes. Unlike the Gateways to Blue Skies Competition, ULI's zero emissions aviation focus is specifically on reducing aircraft emissions and not on emissions associated with energy production.

Gateways to Blue Skies Competition Overview

The Gateways to Blue Skies Competition (Blue Skies) expands engagement between universities and NASA's University Innovation Project with the intent to reach as many college students as possible. **Submissions from ANY and ALL academic levels (i.e., freshman, sophomore, junior, senior, and graduate) and majors are highly encouraged and anticipated.** The purpose of this competition is to encourage diverse, multi-disciplinary teams of college students to explore and contribute unique systems-level ideas and analysis of the source-to-flight lifecycle of future zero-emissions aviation propulsion energy sources.

The Blue Skies Competition is open to teams of undergraduate and graduate college students with diverse academic backgrounds who have an interest in aviation and/or aeronautics. Blue Skies projects allow students to work on real aviation/aeronautical design concepts together in a team environment, with a new project theme each year. Multi-disciplinary teams are highly encouraged.

Through the 2023 Blue Skies Competition, **teams of 2 to 6 students will conceptualize the source-to-flight lifecycle of one potential, primary clean aviation energy source of the future.** In the push towards climate-friendly aviation and emerging aviation markets, this challenge seeks to investigate alternate energy sources that, if developed further, could be a solution to major climate impacts due to aviation. Initial participation involves a conceptual study, submission of a 5-7 page proposal, and creation of a video summarizing the team's proposal.

Based on the review of proposal submissions, up to 8 teams may be chosen to present their findings in a competitive review during the Gateways to Blue Skies Forum at a NASA Center next June. Each finalist team will receive a monetary award to facilitate full participation in the competition. Internship opportunities with NASA's ARMD serve as the competition prize for members from the winning team.

2023 Competition Theme Background/Context

The 2050s aviation landscape will incorporate new technologies and designs that enable new aircraft to fly safer, faster, cleaner, and quieter. This future landscape includes the use of alternative energy sources to reduce climate impacts caused by aviation. These alternative sources could include a myriad of viable options beyond those popularly researched (e.g., fully electric, liquid and gaseous pure hydrogen, the hydrogen fuel carrier, and liquid ammonia). NASA is particularly interested in energy sources that are currently less explored.

Although the proportion of harmful global emissions attributable to aviation is low, they are released high in the atmosphere and create a relatively larger climate impact than emissions released at ground level. This triggers chemical reactions and atmospheric effects that heat the planet. Increased air travel demand and dependence on fossil fuels has created a critical global issue that necessitates the move toward new energy sources. Additionally, studies suggest that contrails (made up primarily of water) have large short-term effects on climate.

This competition seeks to crowdsource potential new energy sources and analyze the entirety of the supply chain's climate impacts, to help inform the "clean aviation energy" source of the 2050s. Teams are encouraged to research fuels that aren't currently mainstream or highly regarded as becoming mainstream in the future.

2023 Competition Theme Description and Details

In the 2023 Blue Skies Competition, **teams will conceptualize the source-to-flight lifecycle of one potential clean aviation energy source of the 2050s, in terms of feasibility, viability, and climate impact.** Start by selecting a potential energy source that, under reasonable assumptions for propulsion and zero-emissions, can be applied to aviation. Teams should briefly overview the aviation landscape in which the selected energy source will be implemented. Teams should provide an assessment of today's technology, manufacturing, and supply chain readiness levels, and how the readiness timelines will need to proceed to achieve realistic application of the clean aviation energy source in the 2050s. The bulk of the analysis should be spent on assessing the source-to-flight lifecycle of the energy source, not the specifics of the storage/use of the energy source on the airplane or after flight.

Proposing teams will:

1. Select one alternate energy source [**excluding Jet A and Sustainable Aviation Fuel (SAF)**], that would serve as the primary energy source for most flights longer than 2 hours with zero or close-to-zero environmentally harmful emissions.
2. Provide the justification for choosing this energy source. Can you reasonably assume an aircraft can be designed to use that energy source, that it can theoretically produce enough power for the flights, and that it is likely to have zero or close-to-zero harmful emissions?
3. Provide an overview of the source-to-flight lifecycle of the energy source. This includes but is not limited to the creation/generation, storage, and transportation of the energy source. ***For purposes of this competition, the source-to-flight lifecycle ends when the energy source is transferred into the aircraft.***
4. Conduct analysis of the selected energy source's supply chain as it relates to climate impacts, safety, and its current technology readiness levels, manufacturing readiness levels, and supply chain readiness levels. These analyses will include an evaluation of the timeline of necessary technological advances needed for the energy source's entrance into the 2050s aviation market.

Eligibility

The Gateways to Blue Skies competition is open to full-time or part-time undergraduate and graduate students at an accredited U.S.-based community college, college, or university. Teams may include senior capstone students, clubs, multi-university teams, and/or multi-disciplinary teams. **Multi-disciplinary teams and Minority Serving Institutions are highly encouraged to apply!**

UNIVERSITY TEAMS MUST INCLUDE:

- At a minimum, teams must contain one faculty advisor with a university affiliation at a U.S.-based institution, and 2 U.S. citizen (or legal permanent resident) students from that U.S.-based university who work on the project and present at the culminating Blue Skies Forum.
- Team size is limited to a maximum of 6 student team members.
- A faculty advisor is encouraged to attend the Forum with each team.

SPECIAL ELIGIBILITY CONSIDERATIONS

- An individual may join more than one team.
- A faculty advisor may advise more than one team.
- A university may submit more than one proposal.
- Team members may not be a federal employee acting within the scope of employment (this includes co-op students with civil servant status).
- The expectation is that Blue Skies projects are student-led initiatives (i.e., students are doing the work).
 - Faculty take on the role as mentors, and if a team is selected as a finalist, help manage any monetary awards sent to the university.

SPECIAL NOTES REGARDING FOREIGN NATIONALS

Foreign Nationals (FNs) attending the proposing U.S.-based university can participate on a Blue Skies Competition Team, with one notable exclusion. ***Due to prohibitive restrictions and ever-changing NASA security regulations, foreign nationals will not be able to attend culminating Blue Skies Forum events that take place on-site at a NASA Center (including tours).*** 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.

FOREIGN UNIVERSITIES: INELIGIBLE

Because this is a NASA-sponsored competition, eligibility is limited to universities in the United States. **Foreign universities are not eligible to participate in the Blue Skies Competition.**

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Dates and Deadlines

Note: All deadlines must be met by 11:59 p.m. EST on the date specified below, unless otherwise indicated.

DATE	DESCRIPTION
October 17, 2022	Notifications of Intent (NOI) deadline
October 26, 2022	Deadline to submit questions in advance for 1 st Q&A Session
November 3, 2022	Q&A Session #1 for interested teams (3:30-5:00 PM Eastern Time)
January 26, 2023	Q&A Session #2 for interested teams (3:30-4:30 PM Eastern Time)
February 28, 2023	Deadline to submit Proposal and Video
March 28, 2023	Teams are notified of their selection status
May 1, 2023	Deadline for Online Registration and Payment for the Gateways to Blue Skies Forum
May 1, 2023	Deadline for Hotel Reservations at Gateways to Blue Skies Group Rate
May 14, 2023	Deadline to submit Final Research Paper & Infographic
May 29, 2023	Deadline to submit Presentation/Chart Deck Files (Noon Eastern Time)
June 1-2, 2023	2023 Gateways to Blue Skies Forum at a TBD NASA Center

How to Compete in the Gateways to Blue Skies Challenge

1. Thoroughly review this document.
2. Find a qualified advisor and a team of students with diverse knowledge, skills, and abilities relevant to the theme.
3. Ensure that your team meets the eligibility requirements.
4. Submit an NOI by the deadline.
5. Attend one or both Q&A sessions with the competition judges.
6. Develop and submit a Proposal and 2-minute Video by the deadline.
7. Proposals are reviewed and evaluated by the Blue Skies judges.
8. Based on a review of the proposals, up to 8 teams will advance to the next phase of the competition – more fully developing their concept into a technical paper and infographic, and presenting their concepts in a face-to-face review during the Blue Skies Forum in June.
9. Winning team members receive NASA internship offers.

Notice of Intent

Notice of Intent Deadline: 11:59 PM Eastern Time on October 17, 2022

Interested teams are strongly encouraged to submit a Notice of Intent (NOI) to compete by the deadline to stay informed of competition news, and for program managers to ensure an adequate number of proposal reviewers. Teams who submit NOIs by the deadline will be invited to participate in the Q&A sessions with judges prior to the technical paper due date and will receive all competition updates. NOIs do not need to be comprehensive and are non-binding.

To complete the brief NOI form, visit the [Blue Skies Competition Details website](#).

THE FOLLOWING INFORMATION WILL BE REQUESTED ON THE NOI SUBMISSION FORM:

- Name of College or University
- Partnering universities (if any)
- Project title (if known)
- Contact information for the faculty advisor and student team lead
- Contact information for additional advisors/team members, if applicable
- Synopsis (high-level overview) of the proposed concept (limited to 1,500 characters)
 - NASA anticipates changes to teams' concepts along the way. Concepts can be changed at any point between NOI submission and Proposal submission.

Proposal and 2-Minute Video Submission

Proposal and Video Submission Deadline: 11:59 PM Eastern Time on February 28, 2023

Proposal Guidelines

PROPOSAL EXPECTATIONS

Robust proposals are expected, which demonstrate a strong basis of research analysis. The Gateways to Blue Skies judging panel will be seeking well-developed concepts that have strong potential for development. **Special emphasis is placed on analyzing innovative energy sources.** The proposal should reflect the total scope planned for the final paper. It is imperative that teams address all the criteria listed in the Theme Description and Details section above.

- Proposals should be 5-7 pages in length.
- Proposals should clearly articulate the aviation landscape in which the selected energy source will be implemented, with sound justification of assumptions.
- Proposals should clearly outline the lifecycle, or proposed lifecycle, of the energy source.
- Proposals should include impact analysis to-date (in summary form, if necessary, due to space limitations), leaving placeholders for analysis not yet completed.
- Submissions must be original, the work must be of the Candidates, and must not violate the rights of other parties.
 - Each submitting team represents and warrants that the team is the sole author and owner of the submission, that the submission is wholly original, that it does not infringe on any copyright or any other rights of any third party of which the team is aware, and that the electronic proposal and video submission are free of malware.

THE PROPOSAL SHOULD INCLUDE:

A cover page with the following information:

- University name
- Project title
- Full names of all team members [including faculty advisor(s)], along with major course of study and Academic level of each student (undergraduate or graduate)
- **New This Year:** Faculty advisor signature of review and approval on the Cover Page

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- **Note: Submissions without a valid faculty signature will be deemed non-compliant and will not be reviewed.**

Abstract/Summary

Include a brief summary (no more than 2 paragraphs) of the chosen energy source's source-to-flight lifecycle and impacts on the aviation industry and climate.

The body of the proposal must outline/include (5-7 pages):

- Assessment of the 2050s aviation energy landscape and appropriate landscape-altering factors, in relation to selected energy source.
- Selection and justification of innovative, alternative aviation energy sources** (excluding Jet A and SAF) that could feasibly power most aviation flights longer than 2 hours by the 2050s, with zero or close-to-zero carbon emissions.
- Overview and analysis of the selected energy source's supply chain and its climate impact and safety risks.
 - Make realistic assumptions as you justify the current technology, manufacturing, and supply chain readiness levels for the selected energy source.
 - Create a timeline of necessary technological advances needed for the energy source's entrance into the 2050s aviation market.
 - During your analysis, consider the impact of the potential clean aviation energy source on the aviation industry, from a technical, social, political, and financial perspective.

****Exclusions: Proposals that focus on aviation industry and climate impacts of Jet A and Sustainable Aviation Fuel (SAF) will NOT be considered for selection in the 2023 Blue Skies Competition.**

Appendices, if needed (not included in the page count)

Appendices are to be used for references and calculations ONLY; judges are not obligated to read beyond the stated page limit and therefore all pertinent information should be included in the main body of the paper.

PROPOSAL FORMATTING GUIDELINES

Teams are responsible for the formatting and appearance of their proposal. Figures and tables must be placed in the file and therefore must be in digital format. We recommend teams use image files with a minimum dpi of 150.

- Proposal should be 5-7 pages in length.
 - The Cover Page, Abstract, Table of Contents, and Appendices are excluded as a part of the 7-page total limit. They do not count toward the minimum or the maximum page limitations.
 - References should be included as an appendix and will not count toward the minimum or maximum page limits. Appendices are to be used for references and calculations ONLY.
 - Note: Judges are not obligated to look at anything beyond the listed page limit, including the appendices. Include important details in the body of your proposal to ensure they are reviewed.
 - There is no preference in citation formatting, but references must be formatted uniformly and correctly. Simply listing a link to the source is not acceptable.
 - Papers should be single-spaced and single column.
 - Use of information graphics, tables, and charts are highly encouraged where appropriate (a well-conceived graphic can convey multiple pages worth of text and convey a deeper understanding of the problem and solution).
- Please use fonts common to Macintosh and PC platforms, i.e., Times, Times New Roman, Helvetica, or Arial for text; Symbol for mathematical symbols and Greek letters.
- Font size should be 11 or 12 pt. (including in all tables, charts, and graphs).

TIPS FROM THE JUDGES

- Start with a big picture view of your concept, rationale, and goals. Consider the proposal page limit when determining the appropriate level of analysis details (i.e., higher systems level analysis).
- A picture is worth a thousand words and can convey a lot of information. Images for the proposal are a plus where appropriate. Show us your innovation! (Please do not include illegible hand-drawn sketches).
- If results/details are not available yet, or are still being finalized, it is valuable to indicate that they are forthcoming and how they will be determined. If not mentioned, judges may assume it is not being addressed.
- Look at multiple facets of the issue, providing well-rounded approaches. Multi-disciplinary teams can be particularly successful at this.
- Consider including team members from a variety of disciplines that relate to the competition theme.
 - For the 2023 theme, this may include team members studying aerospace, mechanical, environmental, civil, systems, or chemical engineering, aviation, aeronautics, chemistry, public policy, economics, urban & regional planning, environmental science, energy science, sustainable energy, etc.
- Utilize all the available page space.
- Report quality is considered in the judges' scoring. Poor grammar, typographical errors, etc. do not reflect well on your team and will be penalized.
- Make use of published papers and reports available to you on your chosen theme. AIAA, FAA, DOE, and the [NASA Technical Report Server](#) have a host of available papers on these topics that you may want to reference.

Video Guidelines

VIDEO EXPECTATIONS

As a part of the proposal submission process, teams will be required to include a 2-minute video. The intent is for the video to highlight and enhance each team's proposal by including animation, graphics, or other creative ways of showcasing unique aspects of the proposed concept.

VIDEO FORMATTING GUIDELINES

- Videos are limited to a maximum length of 2 minutes.
- Videos should be uploaded to YouTube, and teams will provide their video's YouTube URL on the online proposal submission form. Other types of video files will not be eligible for consideration.
- Videos need to be publicly viewable via a link. Videos should be "Unlisted" or "Public" on YouTube.
 - Troubleshooting Tip: YouTube accounts sometimes need to be verified prior to being able to fully upload videos. If your video is stuck in the "processing" stage, check to [make sure your YouTube account is verified](#).
- University name and project title should appear in text at the front of the video.
- All team members should appear in the video, if at all possible (still images are OK)
- Do not use music or images which may violate copyright law. You may use images created by NASA.
 - It is the responsibility of the team to follow copyright law. Neither NASA nor NIA can approve the use of copyrighted material.

Submitting the Proposal and Video

To upload your proposal and video (.pdf files and link), please visit the [Blue Skies Competition Details website](#).

No revisions can be accepted after submission, so please proof your proposal and video files very carefully before submission. If there are any technical problems with the content of your proposal or video (for example, your file was corrupted or a URL link was broken), we will try to contact you immediately, so it is very important that you provide us with up-to-date contact information on the submission form.

Late submissions will not be accepted, and the submission form will close promptly at midnight.

THE FOLLOWING INFORMATION WILL BE REQUESTED ON THE PROPOSAL AND VIDEO SUBMISSION FORM:

- College/University name
- University or Industry partners (if any), including contact information
- Project title
- Faculty advisor & student team lead contact information
- Team Member Information (Academic Major and Year in School)
- Survey Questions
 - How did you hear about the Gateways to Blue Skies Competition?
 - List all departments and organizations from your college/university that contributed to your Blue Skies proposal.
 - *E.g., College of Engineering – Chemical, Engineering Policy; College of Architecture – Urban Planning; Department of Art; AIAA Student Chapter*
- File upload for PDF proposal document
 - Use “University Name – 2023 Blue Skies Proposal” as naming convention
- URL link for team’s public or unlisted YouTube video
 - Note: Video MUST be “Unlisted” or “Public.” Private videos are not publicly viewable and may result in disqualification.
- A 2-3 sentence synopsis of the proposed concept (max 600 characters)
- Mailing address and POC contact info for stipend checks (for use only if a team is selected as a finalist in the competition). Use format:
 - Name
 - Attn: POC Name (if applicable)
 - University, Department/Office
 - Mailing Address
 - Mailing Address 2
 - City, State, Zip
- Vendor W9 Form for the primary proposing university (to be completed by the accounting department at the university)
 - Please download, complete, and submit this [Template Vendor W9 Form](#)
 - W9 vendor form must be completed/dated in the same year as the proposal submission
- Acceptance of the [Blue Skies Intellectual Property and Media Release statements](#)

Proposal and Video Evaluation Criteria

The [2023 Blue Skies Scoring Matrix](#) outlines how proposals will be evaluated. The proposal and video together can earn a maximum of 100 points.

PROPOSAL EVALUATION CRITERIA (80 POINTS TOTAL)

Proposals will be judged based on:

- **Technical Merit & Rationale:** Sound justification of assumptions for the selected energy source and its source-to-flight lifecycle (Max 20 points)
- **Impact Assessment:** Sound technical / scientific / engineering analysis, evaluation, and rationale of the climate impacts attributable to the selected energy source and its source-to flight lifecycle, indicating thorough and proper research conducted or to be conducted (Max 20 points)
- **Landscape Assessment:** Understanding of key technical, social, political, financial, and environmental factors (Max 15 points)
- **Innovation:** Of energy source, concept, or technology to the aviation industry (Max 10 points)
- **Theme Adherence:** Adherence to competition thematic components as stated in the Overview and Competition Theme Description (Max 10 points)
- **Composition/Grammar/Cohesion:** Paper utilizes excellence in the English language, grammar, and composition to effectively convey concepts. (Max 5 points)

VIDEO EVALUATION CRITERIA (20 POINTS TOTAL)

- **Relevance to Proposed Concept:** Video enhances/highlights aspects of the team’s concept(s) and/or increases understanding of chosen energy source’s source-to-flight lifecycle. (Max 10 Points)
- **Overall Impression:** Video content is aesthetic, organized, and flows. Viewers can easily follow the material. (Max 10 Points)

Deliverables for Finalist Teams

Teams who are selected to attend the 2023 Blue Skies Forum will be required to:

- Submit an 8-10 page final research paper
- Submit an infographic summarizing research paper concepts, for use in the Forum poster session
- Give a 25-minute presentation, with an additional 20 minutes of Q&A at the Blue Skies Forum
- Print a poster-sized version of their infographic for display (48” x 36”)

Final Research Paper Guidelines

Final Research Paper & Infographic Submission Deadline: 11:59 P.M. Eastern Time on May 14, 2023

FINAL RESEARCH PAPER EXPECTATIONS

The final research paper should be somewhat different than the proposal, although a certain amount of overlap is to be expected. It should be treated as a stand-alone document, being read by someone who has never read the initial proposal. The final research 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 final paper details as listed, evaluation criteria, and judge feedback. It should be robust, creative, well-researched, and well-justified.

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- Final Research Paper should be 8-10 pages in length.
- Proposals should clearly articulate the concept, justifications, and analysis conducted.
- Submissions must be original, the work must be of the Candidates, and must not violate the rights of other parties.

THE FINAL RESEARCH PAPER SHOULD INCLUDE:

Finalist teams will develop an 8-10 page final research paper that includes the following, at a minimum:

A Cover Page (not included in the page count), which must include:

- University name
- Project title
- Full names of all team members, with Academic Level (graduate or undergraduate) and Major
- Faculty advisor's full name(s) and discipline
- A team photo, wall of faces, or collage showing the members of your team
- OPTIONAL, but encouraged: A graphical depiction of your concept

Abstract (not included in the page count)

Include a brief summary (no more than 2 paragraphs) of the chosen energy source, its lifecycle, and source-to-flight impacts on the aviation industry and climate.

Body of paper (8-10 pages)

- Assessment of the 2050s aviation energy landscape and appropriate landscape-altering factors, in relation to selected energy source.
- Overview, analysis, and justification of the selected energy source, the energy source's supply chain, and their climate impacts and safety risks.
 - **Note any changes made since the proposal; provide detailed information about the work conducted in concept development.**
 - Realistic assumptions, assessments, and justifications for technology, manufacturing, and supply chain readiness levels.
 - Timeline of necessary technological advances needed for the energy source's entrance into the 2050s aviation market.
 - During your analysis, consider the impact of the potential clean aviation energy source on the aviation industry, from a technical, social, political, and financial perspective.
- Conclusions and key findings.

Appendices, if needed (not included in the page count)

Appendices are to be used for references and calculations ONLY; judges are not obligated to read beyond the stated page limit and therefore all pertinent information should be included in the main body of the paper.

FINAL RESEARCH PAPER FORMATTING GUIDELINES:

- Papers should be single-spaced and formatted as a single column.
- Margins should be a standard 1" (2.54 cm) all the way around (top, bottom, left, and right).
- 8 pages minimum, 10 pages maximum.
 - The Cover Page, Abstract, Table of Contents, and Appendices will not count toward the minimum or maximum page limits.
 - References should be included as an appendix and will not count toward the minimum or maximum page limits. **Appendices are to be used for references and calculations ONLY.**

- Note: Judges are not obligated to look at anything beyond the listed page limit, including the appendices. Include important details in the body of your paper to ensure they are reviewed.
- There is no preference in citation formatting, but references must be formatted uniformly and correctly. Simply listing a link to the source is not acceptable.
- Please use fonts common to Macintosh and PC platforms, i.e., Times, Times New Roman, Helvetica, or Arial for text, Symbol for mathematical symbols and Greek letters.
- Use of information graphics, tables, and charts are highly encouraged where appropriate (a well-conceived graphic can convey multiple pages worth of text and convey a deeper understanding of the problem and solution).
- Font size should be either 11 or 12 pt (including in all tables, charts, and graphs).
- Final research papers must be submitted as PDF files.

Infographic Guidelines

INFOGRAPHIC EXPECTATIONS

During the Forum, finalist teams will showcase their concept in a poster session featuring their infographic. Teams must also submit an exact digital copy of their poster (to be displayed on the Blue Skies website). The poster session provides teams with an opportunity to expound upon important concepts in their presentations. It also allows judges to follow up on presentations by asking additional questions for further clarification.

An infographic is a graphic visual representation of information, data, or knowledge intended to present information quickly and clearly – see for example: [The Crude Journey of Petrol](#), by GE.

Teams with the most successful infographic are often those that include a team member who excels in graphic design.

THE INFOGRAPHIC SHOULD INCLUDE:

The purpose of the infographic is to visually depict the **selected energy/fuel path's supply chain from source-to-consumption, incorporating the lifecycle of the energy source and the potential climate impacts at each stage of implementation.**

- Utilizing visual elements, the infographic should be easily understood by audiences from non-technical backgrounds.
- The infographic should incorporate a blend of both visual and textual information (with more emphasis on the visual aspect).
- The infographic should reflect only the information discussed in the final research paper (i.e., it should NOT be used to add additional information that didn't fit within the 8-10 page final research paper page limit).
- The infographic should convey research study elements in a visually compelling manner, demonstrating that attention was given to the use of color and artistic creativity, as well as the organizational flow of information.

NOTES:

- A simple flow chart is not an acceptable infographic.
- An infographic is different than a [conference poster](#).
 - View [infographic samples](#).
 - View [2022 competition infographics](#).

DIGITAL INFOGRAPHIC FILE GUIDELINES

Each team is required to submit the digital file of their infographic. Digital infographic files will be displayed on the Gateways to Blue Skies Website, and as such, will need to follow some standard guidelines:

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- Infographic file should be 9600 pixels x 7200 pixels (48” x 36”).
- Infographic must be **formatted horizontally (landscape)**.
- Infographic should be sized to print as 48” x 36” and mounted to a cardboard display backing of the same size, for the poster session during the Forum.
- Images and graphs embedded should be “print-ready,” with a minimum PPI of 300 whenever possible.
- Images and graphs should be clear, legible, and appropriately sized.
- Links or redirects in the body of the infographic are not permitted, with the exception of references. The infographic should stand alone.
- File size limit is 100MB.
- Infographic should be submitted as a .PDF file.
- Infographic should include a small team identifier in bottom left-hand corner (i.e., University and/or team name; logo; etc.).

Submitting Final Research Paper and Infographic Files

To upload your final research paper (.pdf) and infographic (.pdf), please visit the [Blue Skies Competition Details website](#).

No revisions can be accepted after submission, so please proof your final research paper and infographic files very carefully before submission. If there are any technical problems with the content of your final research paper or infographic (for example, your file was corrupted or a URL link was broken), we will try to contact you immediately, so it is very important that you provide us with up-to-date contact information on the submission form.

Late submissions will not be accepted, and the submission form will close promptly at midnight.

THE FOLLOWING INFORMATION WILL BE REQUESTED ON THE FINAL RESEARCH PAPER AND INFOGRAPHIC SUBMISSION FORM:

- College/University name
- Project title
- Infographic Title
- Faculty advisor & team lead contact information
- Additional Faculty Advisor information, if applicable
- A 2-3 sentence synopsis of the concept (max 600 characters)
- File upload for PDF final research paper document
 - Use “University Name – 2023 Blue Skies Final Research Paper” as file naming convention
- File upload for PDF infographic document
 - Use “University Name – 2023 Blue Skies Infographic” as file naming convention
- **New this year:** PDF file upload for Faculty Advisor Approval Attestation [using the provided template](#)
 - **Note: Submissions without a valid Faculty Advisor Approval Attestation will be deemed non-compliant and will not be reviewed.**
 - Use “University Name – 2023 Blue Skies Faculty Attestation” as file naming convention
- Acceptance of the [Blue Skies Intellectual Property and Media Release statements](#)

Presentation Guidelines

Presentation Files Submissions Deadline: Noon Eastern Time on May 29, 2023

Presentations are limited to 25 minutes, followed by a 20-minute Q & A session with the judges. Presentations will be supported by a PowerPoint slideshow. Teams may choose who speaks and who doesn't speak during the presentation. However, all team members are encouraged to stand together at the front of the room during the presentation to be available to answer questions, even if they are not presenting. **Teams should be prepared to answer questions about their concept through a sound understanding of the technologies and capabilities introduced in their final technical paper.**

EACH PRESENTATION FILE (.PPTX) MUST INCLUDE A COVER SLIDE THAT CONTAINS:

- Project title
- University name
- Faculty advisor's name(s)

SLIDE READABILITY

The presentation room may be very large. Please ensure the font on your power point is large enough for those to see from the back of the room. Take advantage of high contrast options and avoid black screen backgrounds. Emphasize slide readability, especially for significant figures/calculations. Dark videos/animations and black backgrounds do NOT show well in the presentation room and should be avoided.

Special Notes about the Presentations

Presentations should reflect the final research papers. If errors were discovered after the paper was submitted, teams should take this time to address them. **Significant information discussed during the presentation that was not included in the final research paper will be penalized in scoring.**

Submitting The Presentation

To upload your team's presentation, please visit the [Blue Skies Competition Details website](#).

Presentations must be submitted in PowerPoint format by the deadline using the online upload tool, prior to team check-in at the Forum (i.e., presentations on flash drives will not be accepted). **Revisions to these files will not be accepted after the noon deadline – no exceptions.** Teams that do not submit a presentation by the deadline will be barred from presenting, and their stipends may be subject to return to NIA. Teams are encouraged to submit their final presentation files prior to travel.

Late submissions will not be accepted, and the submission form will close promptly at Noon EST.

THE FOLLOWING INFORMATION WILL BE REQUESTED ON THE PRESENTATION SUBMISSION FORM:

- College or University Name
- Project Title

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- Faculty Advisor and Team Lead information
- Additional Faculty Advisor Information, if applicable
- File Upload for Presentation Chart Deck Files
 - Submit a .pptx or .ppt file
 - Use “University Name – 2023 Blue Skies Chart Deck” as file naming convention

Final Evaluation Criteria

The [2023 Blue Skies Scoring Matrix](#) outlines how the final research paper, infographic, and presentation will be evaluated.

A panel of NASA and industry experts will evaluate and score the final competition components anew; the points from the proposal review process are used only for finalist selection purposes and have no bearing on teams’ final scores. Final deliverables will be evaluated and judged based on adherence to the following, with a maximum of 100 points earned:

FINAL RESEARCH PAPER EVALUATION CRITERIA (40 POINTS TOTAL)

- **Technical Merit and Rationale:** Sound technical / scientific / engineering analysis, evaluation, and rationale of the selected energy source, its source-to-flight lifecycle, and its climate impacts and safety risks throughout its lifecycle (Max 20 points)
- **Technology, Manufacturing, and Supply Chain Assessment:** Realistic assumptions, assessments, and justifications for current technology, manufacturing, and supply chain readiness levels of the selected energy source and its source-to-flight lifecycle. This should include a timeline of necessary technological advances needed for the energy source’s entrance into the 2050s aviation market. (Max 15 points)
- **Theme Adherence:** Adherence to competition thematic components as stated in the Overview and Competition Theme Description (Max 5 points)

PRESENTATION EVALUATION CRITERIA (35 POINTS TOTAL)

- **Visual Presentation:** Quality of presentation slides (i.e., visuals, structure, appropriate use of slides for information, easy to follow) (Max 10 points)
- **Presentation Delivery:** Communication delivery and presence of integration and teamwork (Max 10 points)
- **Q&A Response:** Quality of responses to questions from the judges (Max 10 points)
- **Consistency with Final Research Paper:** Representative of the findings and work written in the Technical Paper (Max 5 points)

INFOGRAPHIC EVALUATION CRITERIA (25 POINTS TOTAL)

- **Aesthetics, Creativity, & Organization:** Visually compelling; creative use of color, graphics, images, and/or photos; well laid out components that clearly demonstrate the energy source’s source-to-flight lifecycle and its positive impact on aviation’s sustainability (Max 10 Points)
- **Technical Simplification:** Language and information are easily understood by people from both different technical fields and non-technical fields (Max 10 Points)
- **Consistency with Final Research Paper and Adherence to Infographic Requirements:** Representative of the findings and work written in the Technical Paper (Max 5 Points)

Participation Stipends

Teams selected to present at the Forum will receive a \$6,000 monetary award to facilitate full participation in the Blue Skies Forum, held at a TBD NASA Center in June 2023.

Prizes and Awards

OVERALL COMPETITION WINNER

NASA ARMD is setting aside up to 6 internships for students on teams that advance to the Blue Skies Forum, with first opportunities being presented to members of the winning team. **Internships must be taken within the academic year following the Forum.** Selections will be made first to students on the winning team(s) and will be based on the cumulative merit of each student's individual internship application and availability for fall, spring, or summer internships.

- Fall 2023: Late August/early September to mid-December (16 weeks)
- Spring 2024: Mid-January to early May (16 weeks)
- Summer 2024: Late-May/early June to August (10 weeks)

Note: NASA internships have additional eligibility requirements:

- U.S.-citizenship.
- Cumulative 3.0 GPA (on a 4.0 scale).
- Undergrad and graduate students must be enrolled full-time in a degree-granting program at an accredited college or university.
 - Applicants transitioning between undergraduate and graduate pursuits are eligible **IF** they have graduated within 6 months and can demonstrate enrollment in the next-level academic pursuit.

OTHER RECOGNITION AWARDS MAY INCLUDE

At the judging panel's discretion, the following awards *may* be awarded at the Blue Skies Forum. The following list is not exhaustive:

- First Place Overall
- Second Place Overall
- Best Research Paper
- Best Infographic
- Best Presentation
- Most Creative/Innovative Aviation Power Source

Intellectual Property (IP) and Media Release

Proposers must acknowledge that they have read and agree to abide by the [full Intellectual Property and Media Release Statements](#). An excerpt is included below.

Intellectual Property - Summary

In addition to any rights granted to NIA Recipients, as applicable, recipients of monetary awards under the Gateways to Blue Skies (Blue Skies) Competition agree to grant to NASA and the Federal Government, as the source of awards funding, the Rights in Data and Patent Rights set forth in detail below. In summary, awardees agree to grant to NASA and the Federal Government (i) a license to use, distribute, reproduce, perform, display, and prepare derivative works, any data first produced by recipient in carrying out recipient's responsibilities under this award in which the recipient asserts copyright, or data for which copyright ownership was acquired under the grant for Federal purposes and to have or permit others to do so for Federal

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purposes only, and (ii) a license to practice or have practiced for or on behalf of the United States any invention of the recipient conceived or first actually reduced to practice in the performance of work under this award if recipient chooses to retain title to such invention, and NASA may elect to obtain title or patent such invention if recipient chooses not to do so, all as set forth more particularly in the below Rights in Data and Patent Rights provisions.

All deliverables provided to NASA under the Challenge, in NASA’s sole discretion, may be publicly released in conjunction with any announcements concerning the Challenge.

Media Release

The recipients of monetary awards under the Blue Skies Competition (“Teams”) agree to give permission to be recorded, photographed and/or videotaped by or for NIA, NASA or their representatives or designees for the purpose of announcements and other outreach or informational purposes, including public announcements, concerning the Challenge.

The Teams further give permission to NIA, NASA or their representatives or designees to use, reproduce, prepare derivative works, publish, distribute to the public, perform publicly, and/or publicly display all deliverables, including excerpts and any ancillary material, which may include each team participants’ names, affiliations (schools), images, voice, and/or likenesses. NIA or NASA may distribute the materials, including excerpts therefrom, and any ancillary material through a variety of media in existence now or in the future, including but not limited to print, television, websites, radio, or any other means. NASA may also permit a third party to exercise NASA’s rights, including but not limited to the right to display or distribute the recording, including excerpts therefrom, and any ancillary material, in any manner NASA deems appropriate.

The teams also understand that this permission to use each participant’s name, image, voice and/ or likeness in such materials is not limited in time and team participant will not receive compensation for granting this permission.

Teams acknowledge that NASA has no obligation to use any participant’s name, affiliation, image, voice, and/or likeness in any materials produced by NASA, but if NASA so decides to use them, each participant waives the right to inspect or approve any such use.

Teams hereby unconditionally release NASA and its representatives from any and all claims and demands arising out of the activities authorized under this Media Release.

Contact Information

For Gateways to Blue Skies inquiries, please contact the Blue Skies Program Team at BlueSkies@nianet.org:

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