



ASCE
BLUE SKY
INNOVATION
CONTEST

“Infrastructure Reimagined”

2021 Rules



ASCE
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CONTEST

Table of Contents

Section 1: Mission and Summary1
Section 2: Problem Statement.2
Section 3: Ethics4
Section 4: Eligibility5
 4.1. Levels of Competition5
 4.2. Required Conduct and Advancement to Finals Competition5
Section 5: Safety6
Section 6: Judging6
Section 7: Scoring.....7
 7.1. Recording Data and Submitting Scores8
 7.2. Elements of the Competition8
 7.3. Overall Submission for the Competition8
 7.4. Written Contest Submission.....10
Section 8: Awards and Recognition13
Section 9: Student Conference Host Requirements14



Section 1: Mission and Summary

In 2020 the ASCE Regional Student Innovation Contest and the Blue Sky Competition merged into the Blue Sky Innovation Contest, an ASCE student competition. The 2021 theme is connected to the [Future World Vision Project](#), “Infrastructure Reimagined.” Participating teams will select one of the two cities debuted in ASCE’s Future World Vision and apply their innovation to the broad topics of High-Tech Construction, Advanced Materials, and Sustainable Methodologies for that city. The competition will identify visionary innovations to address infrastructure challenges such as: automation, integration of technology, prefabrication, large-scale 3D printing and more. Visionary innovations have the potential to reshape our infrastructure, the construction process, and to create a dramatic improvement in how quickly infrastructure can be built, rebuilt, and reused.

Blue Sky Innovations are intended to seek out visionary ideas that can be used to stimulate communities and fields of study, pursue new infrastructure directions, or address “wicked” Civil and Environmental Engineering (CEE) problems. Those who participate in this competition are unconstrained in their efforts and encouraged to submit revolutionary thoughts that are developed, presented, and used to stimulate new activities and directions to help solve the problems associated with the built environment.

Teams are expected to be a student-led effort and may include interdisciplinary collaborations. The competition will be judged by a panel of industry and education experts. Solutions that can be described as “radical”, “out-of-the-box”, “transformational”, “unconventional”, or “breakthrough” are encouraged. The proposed solutions should be carefully thought out, researched, and carried out as a student team effort with a feasible work plan and should be presented through the various types of required deliverables. The use of advanced technologies, including those from disciplines outside of engineering such as digital tools, technologies and virtual representations are welcome to illustrate the proposed ideas via these deliverables. Prototypes of solutions are also welcomed.

Your challenge, should you choose to accept it, is to reimagine infrastructure in 2021 and beyond.



ASCE BLUE SKY INNOVATION CONTEST

Section 2: Problem Statement

Reimagine Infrastructure from 2021 and beyond with solutions using High Tech Construction, Advanced Materials, and/or Sustainable Methodologies

We are looking for innovations that offer big improvements in the built environment and infrastructure. These improvements can be immediate or may range over a period of no more than thirty years. Recently, there have been huge advances in materials and technology. CEE needs to incorporate these advancements to meet, for example, the Grand Challenge of 50% reduction in lifecycle costs. Innovations in the use of materials, use of new materials, development of new construction methods because of new materials or automation, artificial intelligence (AI), or robotics, etc., and sustainable methodologies are all included as possible focus points for an innovation in this competition.

For 2021, teams will use either the Floating City or the Mega City environment from the Future World Vision as the backdrop and technical point of reference for their innovation. Information about these cities may be found at www.futureworldvision.org. Teams will consider the issues connected to (1) building in harsh environments (underwater, floating, and affected by coastal flooding), or (2) in the environment of Mega Cities with over 50 million residents that accommodates an immense and accessible green space and supports a diverse array of lifestyles and economies while preserving the city's historic character.

The Future World Vision project illustrates how CEE is changing at an extraordinary rate. This is due to several large-scale and impactful disruptors, including rapid advances in technology and major social injustice, health, and economic stressors facing the world and, subsequently, the built environment. All contestants are expected to conduct themselves using the highest ethical standard (see Section 3) and address safety criteria throughout the development of their innovation (see Section 5).

Visionary thinking is necessary to develop ideas and solutions that are timely, engaging, innovative, exciting, and beneficial to society. Students can play an important role in the development of these solutions through their education and involvement with ASCE student competitions such as the Blue Sky Innovation Contest.

The ASCE student chapters are the source of our industry's future innovation. The goal of the Blue Sky Innovation Contest is to connect the best students in our ASCE communities with our best industry thinkers and futurists.



ASCE BLUE SKY INNOVATION CONTEST

The path to this goal has several components.

1. To educate students about the thought process and elements needed to bring an idea to market.
 - a. Having a great idea is not enough to solve future engineering challenges. Developing an idea into a usable and marketable solution requires innovative engineering as well as collaboration and communication.
 - b. The benefits of this program include identifying and developing a CEE community that has skills in innovative and entrepreneurial thinking. This contest also provides students the opportunity to meet with and be coached by forward thinkers who are developing today's innovative solutions.
2. To provide students an opportunity to explore and collaborate with experts to develop an idea.
 - a. Before any student member or student chapter decides to participate in a Blue Sky Innovation Contest, the most important assets needed are faculty, industry, and student advisors who are willing to talk with the team and challenge the team as it develops an innovative idea into a viable innovative solution.
3. To provide students a competitive space that includes feedback for improvement and opportunity to take their idea to the next level of competition.
 - a. 1st place winning teams at the student conference level will be invited to participate in a virtual cohort experience that will take place during the summer of 2021. This virtual cohort experience will provide more in-depth coaching and education about how to develop their innovation into a viable market concept. Winning Teams will continue to develop their presentations in preparation for the Finals during the ASCE Convention, Fall 2021.
 - b. The cohort of student teams will participate in the public-facing practice video portion of the Blue Sky Innovation Contest. A public-facing document or video is one that is created for the public. It describes your innovation without revealing proprietary information.
 - c. The student teams will compete in the virtual Semi-Final competition process of the Blue Sky Innovation Contest where finalists will be selected for the 1st, 2nd, and 3rd place awards.
 - d. Student conference finalists will participate in the live event at the ASCE Convention.
 - e. Winners will be announced at the Convention Awards Ceremony and Closing Awards event.



ASCE BLUE SKY INNOVATION CONTEST

You are the inventors, innovators, and imaginers - what will YOUR infrastructure solution be, how will YOU make it happen, how will YOU ensure it adheres to appropriate societal and engineering ethics, and how will it change the way we live?

Section 3: Ethics

This competition is to be conducted in the highest ethical standard. Students are referred to ASCE's Code of Ethics (<https://www.asce.org/ethics/>), which sets the standards of professional practice by all members of the Society. According to the ASCE Code of Ethics, Canon 5, "Engineers shall build their professional reputation on the merit of their services and shall not compete unfairly with others."

In the context of this contest, "unfair competition" may include conduct such as the following:

- Failure to provide proper credit for past teams, plagiarism, or any other false statements concerning the source of material used in the contest.
- Taking other people's ideas, artwork, or other creative content without permission (for an overview of Intellectual Property Laws, including Trademark and Copyright, visit <https://fairuse.stanford.edu/overview/introduction/intellectual-property-laws/>); and
- Any false or malicious statements about other teams, members, or others involved in the contest.

The rules are intended to stimulate creative infrastructure solutions using the ASCE Future World Vision cities, The Floating City and the Mega City, as a backdrop and point of reference. Students and teams should read these rules thoroughly and seek clarifications, as necessary.

This document, also available on the ASCE Student Conferences page of the ASCE Website, defines the 2021 Blue Sky Innovation Contest and the rules for both the conference and Society-wide levels. Requests for Information (RFI) should be sent to student@asce.org.

Clarifications will be posted to the Blue Sky Innovation Contest Collaborate site (<https://collaborate.asce.org/communities/community-home?CommunityKey=c874e311-52af-4e00-bdd1-024b2448d196&GUID=a8bf5789-961d-4ed9-8aeb-ef165fcaebbb>) on every other Friday, starting September 25, 2020 until February 12, 2021. Each post will address the questions received from the previous two weeks through the Wednesday before (11:59 pm EST).



ASCE BLUE SKY INNOVATION CONTEST

Section 4: Eligibility

Only one entry per college or university may compete in the ASCE Blue Sky Innovation Contest. A college or university may compete in only one ASCE student conference. The teams, representing an ASCE student chapter in good standing, shall be led by undergraduate CEE students, and may be advised by faculty and/or graduate students. Multi-disciplinary teams are encouraged and preferred; however, the innovation must focus on an improvement, solution, cost savings etc. related to the CEE industry and the built environment. All student team members, regardless of academic major, must be in good standing with their ASCE student chapter and be Society-level ASCE student members during all or part of the fall through spring of the current competition academic year. Teams are encouraged to engage experts on and off campus in other engineering fields, such as architecture, social sciences, and the humanities, to develop ideas and solutions that are timely, engaging, innovative, exciting, and beneficial to society. ASCE student chapters that are not part of that student conference may make a request to participate to a student conference host conducting the Blue Sky Innovation Contest. Student conference hosts for the Blue Sky Innovation Contest will be or are listed at www.asce.org/studentconferences.

4.1. Levels of Competition

There are two levels of competition: First, at the ASCE student conferences level, and a Finals level. The Final competition for the Blue Sky Innovation Contest will take place in conjunction with the ASCE Convention – a global platform where student conference winners will be given the opportunity to share their innovation with an international audience.

4.2. Required Conduct and Advancement to Finals Competition

All participants shall act professionally and respectfully at all times. Failure to act appropriately can result in sanctions, disqualification, and loss of invitations to future student conference competitions or finals competitions. The inappropriate use of language, alcohol, or materials, uncooperativeness, or general unprofessional or unethical behavior will not be tolerated.

Winning teams from the student conferences may be invited to a finals event to present their solutions and compete at the ASCE Convention.

To advance to a finals competition, teams must meet ASCE eligibility standards:
<https://www.asce.org/eligibility-for-society-wide-competitions/>



ASCE BLUE SKY INNOVATION CONTEST

The student conference host student chapter shall promptly submit the completed official scoring spreadsheet for a conference competition to student@asce.org. Teams will not be invited to finals event until this spreadsheet is received and eligibility is confirmed.

Section 5: Safety

Safety is our highest priority and risk of personal injury will not be tolerated. Students should use safe practices in any competition test procedures, proof of concept exercises, or any activities associated with ideas and exercises related to their competition entries and should seek appropriate instruction and supervision as necessary to maintain health and safety.

Safety criteria and considerations related to submitted innovations and their connection to the built environment, if applicable, are expected to be included in the written submission. For information about Safety in the built environment, please refer to the ASCE website for more information. Possible links include:

<https://www.asce.org/issues-and-advocacy/public-policy/policy-statement-424---crane-safety-on-construction-sites/>

<https://www.asce.org/issues-and-advocacy/public-policy/policy-statement-350---construction-site-safety/>

<https://www.asce.org/issues-and-advocacy/public-policy/policy-statement-367---highway-safety/>

Section 6: Judging

The student conference host will recruit judges. Three to five are recommended. Judges should have experience in innovation and incubating new ideas if possible and do not necessarily need to be a civil engineer. Local support for the Blue Sky Innovation Contest is an essential element for the ongoing development of the contest and the development of an innovative community within CEE. Contact ASCE if you need additional clarification or help with recruiting judges.

The judging panel should include educators and professionals, and individuals with knowledge of High-Tech Construction, Advanced Materials, Artificial Intelligence (AI), or Sustainable Methodology including but not limited to automation, prefabrication, and



ASCE BLUE SKY INNOVATION CONTEST

large-scale 3D printing. Judging will be conducted in a virtual environment. Judges will have access to the submission site at least five days prior to the virtual presentation. Judges will be expected to conduct an initial review of the submitted content and be prepared to complete all scoring within the time provided during the virtual portion of this contest.

The ASCE Blue Sky Innovation Contest will be 100% virtual and the deadlines will work within each student conference host's timeline. The ASCE Industry Leaders Council will provide on-line learning modules, question and answer sessions, and the Cadmium Abstract Scorecard virtual platform that students will use to load their submissions and judges will use to score submissions.

All submission materials must be loaded into the online contest platform (<https://www.abstractscorecard.com/cfp/submit/login.asp?EventKey=SQKFJDRF>) no later than posted deadlines determined by each student conference host. These deadlines will be approximately one week prior to the particular student conference. The contest portal will open to accept team accounts no later than October 15, 2020.

Judges will have access to a written submission through the Cadmium platform. The contest submission document, which is not public-facing, will be held confidential throughout the judging process. Complete submissions also include a poster in jpeg format which is a public-facing document and they have the option to include a 2-3-minute video.

The students are encouraged to use innovative and broad-based ideas in the development and portrayal of the proposed solution. Judging should consider the innovative nature and completeness of the presentation of the ideas.

Section 7: Scoring

This competition relies heavily on your ability to present an original, innovative infrastructure solution in a professional, engaging, and persuasive manner. Scoring will be based not only on the proposed solution, but also on your approach to presenting your solution to the panel. As with any professional proposal, you control the message you want to convey.

The four areas of scoring and overall weighting are as follows:
Scored primarily in the written submission:

1. Innovation and Creativity (30%)
2. Value Proposition and Relevance (20%)
3. Efficiency and Feasibility (20%)



ASCE BLUE SKY INNOVATION CONTEST

Scored during the virtual presentation by the judging panel and includes the poster image:

4. Communication (30%)

7.1. Recording Data and Submitting Scores

Scoring data shall be recorded for each team that competes. Examples of the Official judging form will be provided by February 1, 2021, to student conference host schools. These forms will be available as a PDF and may be used by judges to take notes during the competition; however, judges are required to enter their final scores into the Cadmium virtual scoring system which tabulates the official results of the competition. Each judge will be given private access to the scoring system and will only have access to the specific entries for which they are scoring. An official judging summary report will be provided to each conference host representative for their records and distribution to the student conferences. ASCE will verify if teams and student chapters have complied with all student conference requirements

7.2 Elements of the Competition

There are two parts of the competition: the overall submission including the written proposal and the jpeg image of the marketing post, and the virtual presentation when scoring will focus on the written and verbal elements of communication incorporated throughout all elements of the contest submission and related activities.

7.3. Overall Submission for the Competition

The overall submission (written proposal, oral presentation, and poster) will be judged on the following elements on a scale of 1=bad to 10=excellent in four areas: the level of innovation and creativity, value to society/customer, feasibility, and team communication of the unique and creative properties of their solution. Expectations and descriptions of those judging criteria are as follows:

7.3.1. Innovation and Creativity (30%)

Lower scoring will be given to entries with next generation, incremental, or iteration of existing solutions. Higher scoring will be given to entries that skip a generation of existing solutions and those that use out-of-the-box new approaches to solve a problem.



ASCE BLUE SKY INNOVATION CONTEST

7.3.2. How is the innovation valuable to society/customer? (20%)

We are trying to solve big problems, not just make life incrementally easier for the customer. By way of an analogy, think of the value of painkillers vs. multi-vitamins. One is addressing a big issue/pain point and the other is routine maintenance. We are looking for painkiller solutions that provide substantial problem-solving, not just a couple of improvements. Is the innovator building a daily supplement or a cure for cancer? Is the innovator addressing one of the things that keeps customers/society up at night or just a nice-to-have solution? The submission will receive higher scores if it addresses big problems with large beneficiaries or cost and/or time savings in methodology and receive lower scores for just nice-to-have solutions.

7.3.3. Is the innovation technically feasible? (20%)

We want to showcase, promote, and reward not just for an innovative solution but also entries that have thought through the technical feasibility of their innovation. Please provide information to support your innovation, including test result summaries and/or prototypes proving the veracity of the solution. Low scoring will be given to an innovation that does not appear to have realistic technical success. Higher scoring will be given to innovations that demonstrate the success of the technological solution (through tests, pilot products, sales, etc.).

Does the innovation have a scalable business plan? We want to showcase, promote, and reward forward-thinkers who do more than just come up with a great idea, and reward those who thought about the challenges of commercialization and have a plan for market adoption. Even if the commercialization plan is long, expensive, or difficult, a well-thought-out plan is important for this category. Low scores will be given to plans that only consider potential market size. High scores will be given to plans that determine a real market, price sensitivity, distribution models, have a broad societal impact, and have considered the innovation's life cycle.



ASCE BLUE SKY INNOVATION CONTEST

7.3.4. Communication makes up the remaining 30% of the final score

Has the team communicated the unique and creative properties of their infrastructure solution?

A good submission will include and articulate these issues:

1. Critical thinking, including the ability to integrate different perspectives and “connect the dots” between disparate data points.
2. An ability to communicate and articulate an idea.
3. Demonstration of industry-specific knowledge, but there is no penalty for making assumptions when necessary (e.g., unknown facts, future trends, demands).
4. It is appropriate to question underlying assumptions presented by others who may have examined the problem, if you are convinced a different perspective is appropriate.
5. All things being equal, innovations with broad application will generally be scored higher.
6. In summary, we are interested in how well you communicated the ability to think through the problem, collaborate with team members and outside resources to develop options, identify competitors, and provide and defend your infrastructure solution and its unique characteristics.

7.4 Written Contest Submission

This document must be loaded into the Cadmium [online contest platform](#) by the deadline posted by each student conference Host.

(<https://www.abstractscorecard.com/cfp/submit/login.asp?EventKey=SQKFJDRF>)

This platform will open for student teams to create accounts and upload documents on October 15, 2020. Teams will have access to their account until the deadline for each particular student conference. Once the deadline for submissions have passed, all accounts for the particular student conference will be locked.

In addition to the elements outlined in the Overall Submission (7.3), the written proposal of the infrastructure solution will be judged for its ability to communicate the innovation clearly and concisely. This includes thoroughness and completeness as it describes and explains the identified infrastructure issue and the proposed, “reimagined infrastructure” solution to address the issue. The proposal must contain the following elements:

- Executive Summary (1-page max)
- Table of Contents
- 5-page submission includes:
 - Background and problem statement for the identified issue.



ASCE BLUE SKY INNOVATION CONTEST

5-page submission includes (continued):

- Explanation of how the proposed infrastructure solution could address the identified issue as well as any applicable additional societal challenges or needs related to using High-Tech Construction, Advanced Materials and Sustainable Methodology
- Discussion of how this proposed infrastructure solution takes advantage of modern technology.
- Discussion of how it will appeal to the affected group including all stakeholders. Recognizing that multiple socioeconomic groups should be engaged—share results of any testing, surveying, public surveys, demonstrations, proof of concept, research etc. that was done or found to address this item. The timeframe over which your innovation will be implemented will determine the number of assumptions needed. You may make assumptions when necessary, based on future trends, and projected demands. Make sure to provide your basis and foundation of information from which you have developed your assumptions.
- Discussion of resources required to enact this solution (this can be general in nature, or more specific and include cost estimates).
- Anticipated engineering and societal value of the proposed solution, and references.
- Appendix – optional and not included in the 5-page submission requirement.

This written entry is an opportunity for the team to demonstrate the thought process used for the development of their infrastructure solution. Teams are encouraged to use the written proposal to completely discuss any aspects of their proposed infrastructure solution that addressed the problem statement and goals of the competition.

The body of the written entry shall be no more than 5 pages on white 8 ½ in. by 11 in. pages in portrait orientation, with a minimum font size of 11pt. Appendix (if used) and cover sheets are permitted but are not required and will not be included in the 5-page limit. All pages of the written entry and appendices shall maintain a minimum of ½ in. margins on all sides.

The header and footer may be located within the margin itself (i.e., outside of the body text limits). Public sources of information in support of the proposed solution should be referenced appropriately in the body text. Consistent with ASCE publication guidelines, the author-date method will be used for in-text references, whereby the source reads as the last names of the authors, then the year (e.g., Smith 2004 or Smith and Jones 2004). A references section must be included that lists all references alphabetically by last name of the first author. Exceptions to this rule are theses, dissertations, and “in press” articles, all of which are allowed in the references list. A references section is not included as part of the 5-page limit for the contest entry.



ASCE BLUE SKY INNOVATION CONTEST

7.4.1 Virtual Presentation and Interview with Judging Panel

Each team or individual will be scheduled to participate in the required virtual presentation part of the competition with the judging panel. You will have 4-6 minutes to present your innovation and the judges will have 5-7 minutes for questions. The content you present shall communicate the approach and team effort on identifying and developing the innovation solution. This will be followed by questions from the panel. Teams are encouraged to use technology as part of this presentation. Each presentation will be judged on how well it communicated the unique characteristics and creativity of the innovation, its value proposition and relevance to society, and its efficiency and feasibility.

Exact dates for the virtual presentation will be announced by the student conference host and may happen up to 1 week before the student conference. Appointments will be organized by the host and ASCE will provide the virtual platform (Zoom). A minimal requirement for each participating team is a room with an Internet connection, a web camera, access to the Internet and a microphone.

All presentations shall be conducted in a professional manner (defined as a presentation which a professional engineer would give to a prospective client). Teams are encouraged to be entrepreneurial in conveyance of their proposed solution. Oral presentations shall be presented in English. Teams may use PowerPoint or other appropriate tools in the development of their presentation. The presentation order shall be randomly selected before the competition begins and subject to scheduling and time availability of teams, judges, and host conference representatives. The oral presentations, including the question and answer period, shall be open to the public for viewing. Following the oral presentation, questions by members of the audience may be allowed if the online venue and time permits.

7.4.2. **Poster Image.** The poster image must be loaded into the online contest platform by each deadline announced by each student conference host.

Each team will create an innovative image to market their proposed solution. The marketing item shall clearly convey the intent, excitement, and innovation of the solution, as well as plans for its implementation. The target audience is your fellow students and the public! You want to get them to support your solution.



ASCE BLUE SKY INNOVATION CONTEST

You are required to upload a forward-facing poster image of your innovation for viewing by the public on a website. We are asking for a title and a caption for your image which may be provided in a jpeg or PDF format.

If printed by request of student conference host, the marketing material shall be limited to fit the following dimensions:

- Flat with dimensions of 24" x 36" (If a physical poster is required)
- Single-sided
- Written in English
- Team sponsors may be recognized.

Section 8: Awards and Recognition

The winners of the Blue Sky Innovation Contest shall be determined by compiling a team's total number of points.

First place winning teams at the student conference level will be invited to participate in a virtual cohort experience that will take place during the summer of 2021. This virtual cohort experience will provide more in-depth coaching and education about how to develop their innovation into a viable market concept. They will also be provided coaching to help them prepare their presentations for the final competitions at the ASCE Annual Convention. Note: 2nd place teams may also be invited to participate in the virtual cohort experience depending on judge's recommendations and space availability.

ASCE shall award \$3,000 in cash prizes to the finals winning teams' ASCE Student Chapter. To be eligible to receive a prize, the entrant school must be a recognized ASCE Student in good standing.

Total prizes shall be distributed as follows:

- 1st place overall winner: \$1,500 and trophy
- 2nd place overall winner: \$1,000 and trophy
- 3rd place overall winner: \$500 and trophy



ASCE BLUE SKY INNOVATION CONTEST

Section 9 Student Conference Host Requirements

9.1 Marketing and Encouragement.

The student conference host is expected to promote this new contest and encourage schools to participate.

9.2 Local judging support is needed.

Local support for the Blue Sky Innovation Contest is an essential element for the ongoing development of the contest and the development of an innovative community within CEE. ASCE has access to qualified judges and the virtual venue of this competition allows more flexibility of participation from this existing group; however, the student conference hosts are expected to provide volunteer judges to participate in the virtual judging event.

9.3 Competition venue/space requirements.

If the student conference host elects to host the virtual competitions during their conference, then they will need a room with an Internet hook up, a web camera, access to the Internet and a microphone. ASCE will provide the virtual judging platform using Zoom Video Conferencing. If the judging does not take place during the exact conference dates, the host will need to provide the dates to ASCE contest staff no later than December 1, 2020 so that the final submission dates may be posted.

If the student conference hosts elect to host the contest prior to the dates for their conference, then the individual teams will need to secure a space from which to present their innovation, an Internet connection, a web camera, access to the Internet and a microphone. The student conference host is expected to have a representative participate in each of the virtual competitions as an online observer and help the ASCE staff host the event with introductions and announcements as appropriate.