NASA Spacesuit User Interface Technologies for Students (SUITS)

Frequently Asked Questions (FAQs)

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FAQs General

1. **When is the Letter of Intent Due?**
   a. The deadline is Wednesday, September 30, 2020.
2. **How do I submit a Letter of Intent for my team?**
   a. Please submit the following:
      i. Team Leader's Name
      ii. Institution Name
      iii. Statement: "We plan to submit a proposal for NASA SUITS Challenge."
      iv. Send via email to NASA-SUITS@mail.nasa.gov
3. **Does our team need a signature from the Department Head or another management personnel from our institution before submitting the Letter of Intent?**
   a. No, but the signature from the Department Head or another management personnel must be submitted with the final proposal submission.
4. **I would like to join a team, but I don't know where to start. What should I do?**
   a. We recommend starting with a faculty member at your institution, but you may also want to reach out to the NASA Space Grant Consortium in your state.
5. **Can I submit a design for more than one informatics display?**
   a. Each team may only submit one proposal.
6. **Can more than one proposal be submitted from the same school?**
   a. Yes, more than one proposal can be submitted from the same school, however, students may belong to only a single team.
7. **Can teams be comprised of students from multiple schools?**
   a. Absolutely! We encourage collaboration and interdisciplinary teams.
8. **Can I participate in NASA SUITS if I am a Legal Permanent Resident (LPR)?**
   a. Yes.
9. **How many teams will NASA select to participate for the virtual testing week?**
   a. The number of teams is not predetermined, but rather based on the quality of submitted proposals.

10. **What expenses does NASA cover?**
    a. The selection of a team for this opportunity does not include a monetary award to your institution. NASA assumes responsibility for all costs involved with prototype testing in the Human Integrated Vehicles and Environments (HIVE). Each team is responsible for all other costs including cost of building prototype.
11. **With whom will my team interface with at NASA?**
    a. Your team will have multiple interfaces at NASA, each of which serve a different function. Your team interfaces most throughout the challenge with the SUITS education coordinator.
12. **The outreach portion of my proposal involves K-12 NASA curriculum for classroom use. Are there any suggested components I need to incorporate?**
    a. Curricula aligned to national standards.
    b. Each curriculum piece provides the user with the connection between the curricula topic: coding, informatics displays, augmented reality or the team's prototype potential use for space exploration.
    c. NASA connection to curriculum. NASA STEM resources can be found [here](#).
    d. Incorporation of the 5E lesson plan model.
13. **What is considered outreach?**
    a. Outreach consist of a presentation to a school group, a symposium or similar event demonstrating the human-in-the-loop testing experience your design provides and a NASA connection. Outreach includes publishing a white paper or technical document. Teams must incorporate a social media and traditional media plan in your outreach activities.
14. **How should outreach be documented in the proposal?**
    a. Include a description of activities you plan to organize. The description includes the purpose of the activity, intended audience, expected number of participants and impact of the activity. Letters of support from organizations you plan to work with during the outreach is recommended.
15. **When will our team host the outreach events?**
    a. Most outreach component occurs after selection, but prior to test week. Some outreach occurs after your team's test week.
16. **My project will employ social media. Can we coordinate social media outputs about the project with NASA SUITS?**
    a. Yes, please contact the SUITS education coordinator for planning. We encourage you to use our hashtags #NASASUITS or #NASACodes.
17. **If my institution submits multiple proposals, does the outreach section have to be different?**
    a. Yes, for each proposal submitted each section needs to be unique.
18. **How does my team's design potentially benefit space exploration?**
    a. During a spacewalk, an astronaut's job involves focus, direction, and communication. Currently, an EVA crewmember communicates details about all tasks by means of a voice connection with mission control, an EVA partner, and an intravehicular (IVA) crewmember (an astronaut inside the pressurized spacecraft). For years, voice has

been the only means of communicating during a spacewalk. However, NASA is developing innovative helmet-based displays which can perform this function much more efficiently, leading to less voice conversation, and a more proficient system. These displays align with the Informatics Subsystem of NASA's Advanced Spacesuit.

19. **What happens if our proposal file is larger than 25 MB?**
    a. Your proposal file must be smaller than 25 MB in order to be submitted to the NASA SUITS website. This is to ensure all proposals can be reviewed properly from the same database. Your deliverable or code needs to be housed in the cloud. Simply submit a link to your code files.

20. **How much time should I anticipate spending on this project?**
    a. Time requirements vary from team to team. Expect to spend a large portion of your time on design, creation and outreach. If your team struggles with time management, please work with your faculty advisor to set a feasible timeline. The workload of this project compares to a 3 credit hour course.

21. **If selected, what is the first step?**
    a. Team lead emails letter of acceptance to nasa-suits@mail.nasa.gov.
    b. Attend a 1 hour orientation session with the NASA SUITS staff to learn more about the unique opportunity. Session link sent through email. Required attendance for the faculty advisor and student team. The session is conducted virtually. Recording sent to all teams after event.

22. **My choice for faculty advisor is not a U.S. citizen. Is he/she still able to work with my team?**
    a. Yes, he/she can still act as your advisor. Only people entering NASA's Johnson Space Center facilities must be a U.S. citizen or LPR.

23. **May our team have multiple faculty advisors?**
    a. Yes.

24. **What is the level of experience required for this challenge? Is it required to have an extensive knowledge in software engineering/development, or can students with little experience make a meaningful impact?**
    a. It is recommended each team must have one team member with knowledge in software engineering/development because coding is required during challenge.

25. **If we have team members from multiple institutions, are we required to submit multiple letters of endorsement?**
    a. No, you only need to submit one letter of endorsement, preferably from the institution with your faculty advisor.

26. **Are we permitted to publish our design as an institution research paper as part of our outreach efforts?**
    a. Yes! A required component for each team's outreach plan is to produce white paper that can be published or utilized at a technical conference. Note that your team must follow the specific author publication guidelines when writing your papers.

27. **Are the conferences we participate in for our outreach activities limited to only NASA-related conferences?**
   a. No, you are encouraged to participate in a variety of different technical conferences for your outreach activities.
28. **Who should our team seek support from for building our design?**
   a. Your state's space grant consortium is an excellent resource to guide and assist you with your project development. Build strong relationships with these organizations as well as industry partners in your area for support.

FAQs Technical

1. **Who would own the intellectual property rights?**
   a. NASA potentially could utilize some of the ideas that your team puts forward in a future space mission. Therefore, we ask that teams complete a "Statement of Rights" document. See the Proposal Guidelines for specifics regarding this topic.

2. **Do I have to meet all of the requirements in the challenge description?**
   a. Teams are scored based on how many requirements you meet. Your team does not have to meet all of the requirements, but loses points depending on how many you do not meet.
3. **Some requirements are vague. What should I do in this case?**
   a. Some requirements are purposely vague. We want the team to do the research and provide rationale for design.
4. **Are all of the requirements found in the challenge description?**
   a. We are limited in what we can "require" due to this being a student challenge rather than a contractual arrangement. We want to enable creativity in the solutions that are open-ended. Once selected teams are given more details for the challenge.
5. **How often can the teams ask for technical clarifications? Will all technical clarifications be posted for all teams to see?**
   a. All questions and answers are updated in this FAQ document. Check this document regularly. Questions are directed to NASA-SUITS@mail.nasa.gov email. The SUITS team answers emails daily.
6. **Can we adapt technology used in other industries for the design?**
   a. Absolutely!
7. **Are funds provided to purchase a Hololens or any other equipment to create our deliverables?**
   a. No. Your team may download a free [Microsoft Hololens Emulator](#).
8. **Are electronic diagrams necessary for our proposal?**
   a. Including supporting information helps increase knowledge of the design concept.
9. **Which programming language interfaces with the NASA provided data?**
   a. Unity and C# programs interface and are compatible with NASA provided data.
10. **May we use other languages beyond C#?**
   a. Yes, other languages may be used but they must be able to communicate effectively within Unity and operate using the HoloLens.
11. **When will data files be sent to teams?**

   a. Data files are provided prior to testing with adequate time to implement into your design.

12. How has NASA been utilizing the HoloLens? Could you please send us some screen captures or video demonstrations?
   a. NASA experiments with different implementations of a heads-up display, in order to measure if EVA tasks are more (or less) efficient than a paper, arm-cuff procedure and verbal instructions. NASA also is interested in the environment tracking feature of the HoloLens for procedure assistance in the internal (pressurized) volume.

13. Can you also provide the data points that will be available to us during the development process that are critical?
   a. The two major data releases:
      i. The procedure in a step-by-step form.
      ii. A telemetric data stream compatible with the Unity development environment.
      iii. Other releases are probable as needs arise, but these two are the critical ones.

14. Can you please provide more specification as to what procedures a user performs?
   a. Most procedures are task-based and compatible with being read over a voice loop. Some images are associated with these procedures. The technical attempts to provide them in a parse-able form, in order to facilitate any processing of the procedures themselves.

15. Should our teams consist of only coders?
   a. We encourage you to have diverse teams with varied backgrounds for design perspective.

16. Do you have a specific individual(s) who would be willing to answer questions and utilize for research while we develop this project?
   a. Please continue to ask questions through the NASA-SUITS@mail.nasa.gov email address. We can use this to route your questions to the appropriate expert. When accepted into NASA SUITS activity, an online forum and Pronto channel is available to start discussions between the virtual members.

17. Should we design our own prototype display/system or just writing code for a HoloLens display?
   a. The HoloLens provides the function of a heads-up display (HUD), mimicking a system that is not attached to the crew member's head, but instead an integral part of the suit/helmet. If there are creative ways to augment this display with modifications or additions that are realistic to a spacesuit environment, that is allowed/encouraged, but at a minimum, writing code for HoloLens satisfies the challenge.

18. Does our design require audio capabilities?
   a. Not necessary, but not limited or excluded.

19. Are teams provided with a more detailed image/schematic/description of the EVA work site in the challenge description?
   a. The goal of the challenge is to create a user interface assist astronauts on EVAs in general. Therefore, the challenge itself will not be made known until test week. However, participants are provided with resources and materials to better understand what takes place during EVA's. Further, participants are encouraged to conduct their own research into the EVA process.

20. **Is there more Meta data besides temperature, pressure, and oxygen levels that is provided? Is there an anticipated date on when we receive more information on the task to be completed?**
    a. Yes, more telemetry data is provided to the participants. Participants access the data after team selections are announced and prior to test week.
21. **Do team use the on-board HoloLens microphone for communication between IVA for the simulation?**
    a. Participants are encouraged to utilize the features of the HoloLens as they see fit. It is each team's responsibility to determine how to implement the onboard features of the HoloLens.
22. **Are we required to ship our personal augmented reality devices to NASA's Johnson Space Center?**
    a. No, you do not need to ship your personal device, however, your team will need to ship pre-loaded, pre-configured university-owned or leased devices to Johnson Space Center for testing.