NASA SUITS FAQs
NASA Spacesuit User Interface Technologies for Students Frequently Asked Questions

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FAQs: General

1. When is the Letter of Intent Due?
    a. The deadline is September 27, 2018
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 the NASA SUITS Challenge,"
        iv. Send via email to NASA-SUITS@mail.nasa.gov
3. Can I submit a design for more than one informatics display?
    a. Each team may only submit one proposal.
4. Can I participate in NASA SUITS if I am a Legal Permanent Resident (LPR)?
    a. Yes. The on-site portions of NASA SUITS test week are currently available to U.S citizens and LPRs enrolled in U.S institutions of higher learning. Non-U.S citizens may still participate with the selected teams, but will not be permitted to enter NASA facilities.
5. How many teams will NASA select to travel to Houston for a test week?
    a. The number of teams is not predetermined but rather based on the quality of submitted proposals.
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 only belong to a single team.
7. Can teams be comprised of students from multiple schools?
    a. Absolutely! We encourage collaboration and interdisciplinary teams.
8. If I am not a full-time undergraduate or graduate student, am I eligible to participate on a team?
    a. Teams may include research and development members that are not considered full-time by their institution, however, only full-time, U.S. Citizen or LPR students will be eligible to represent the team during the on-site portions of test week at NASA JSC.
9. As long as the five students representing the team are full-time students prior to the test week, they can attend?
    a. Yes
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 travel to Houston and cost of building prototype. However, in the event that a development stipend is awarded to the team by NASA SUITS, the program will need each team to identify an institutional financial representative.

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 main interface will be a NASA SUITS coordinator.

12. The outreach portion of my project involves development of K-12 curriculum for classroom use. Are there any suggested components I need to incorporate?
 a. You may consult with a current K-12 educator on this topic. It is suggested that you consider the following:
  i. All curricula are aligned to national standards.
  ii. Each curriculum piece provides the user with a connection between the curricula topic and coding, informatics displays, augmented reality, or your prototype's potential use in space exploration via an introductory paragraph. This adds relevance to the material.
  iii. A curriculum incorporates the 5E model to the extent possible.
  iv. The curricula are written in grade level appropriate language.

13. 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.

14. My project will employ social media. Can we coordinate social media outputs about the project with NASA SUITS?
 a. Absolutely. This can be coordinated with a NASA SUITS coordinator. We will typically retweet a team's posts. We encourage you to use our hashtags #NASASUITS or #NASACodes.

15. If selected, what is the first step?
 a. Email us your acceptance of selection to nasa-suits@mail.nasa.gov.
 b. Your team will be invited to attend a 1 hour orientation session with the NASA SUITS staff. Attendance of this session is required of the faculty advisor and student team. The session is conducted online and a recording link will be available to those unable to attend the live session.

16. 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. Any person participating in JSC on-site portions of test week in Houston must be a U.S. citizen or LPR.
17. What happens if our files are 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 will need to be housed in the cloud and you will simply submit a link to your code files.
18. How much time should I anticipate spending on this project?
    a. Time requirements will vary from team to team. Expect to spend a large portion of your time on design, creation, and outreach. If your team is struggling with time management, please work with your faculty advisor to set a feasible timeline. The workload of this project is comparable to that of a 3 credit hour course.
19. What is considered outreach?
    a. Outreach may consist of a presentation to a school group, a symposium, or other similar event demonstrating the human-in-the-loop testing experience your design provides. It may also include publishing a white paper or technical document. You should also incorporate a social media plan in your outreach activities.
20. How should outreach be documented in the proposal?
    a. Include a description of activities you plan to carry out. The description should include the purpose of the activity, the intended audience, the expected number of participants, and what perceive will be the impact of the activity. It helps to have a letter of support from organizations you plan to work with in your outreach efforts. It is advised that you begin making connections now.
21. When will we hold the outreach component?
    a. Your outreach component can occur prior to test week, but as some outreach components will include testing results, some outreach could occur after your team's test week.
22. 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. You can find the appropriate contact for your Space Grant Consortium here: https://go.nasa.gov/2yE7a7l
23. If a school submits multiple proposals, does each proposal need a different outreach section?
    a. Yes, each proposal will need its own outreach section.
24. May we have multiple Faculty Sponsors?
    a. Yes.
25. Do we need a signature from the Department Head or any other management individual from our School before submitting the Letter of Intent and/or the Project Proposal?
    a. You do not need a letter of endorsement for the Letter of Intent, but it is a requirement for your team's proposal.

26. How many team members are allowed to have on site?
    a. Each team will only have a maximum of the same 5 members that will be badged to test in the HIVE Lab during test week. However, teams are subjected to an unlimited amount of members per team to work on this challenge. Supporting team members are allowed to travel, but will not be cleared to test in the HIVE Lab.
27. 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 that each team have at least one team member with knowledge in software engineering/development since this is a coding challenge.

FAQs: Technical

1. Who would own the intellectual property rights?
    a. NASA hopes to potentially 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?
    a. You will be scored based on how many requirements you meet. So you do not have to meet all of the requirements, but you will lose 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 you to do the research and provide rationale for why you designed it the way you did.
4. Is there a list of design requirements, or are all of the requirements found in the challenge description?
    a. We're limited in what we can "require" due to this being a student challenge rather than a contractual arrangement, but granted, there are minimal details since this is our first year through the project. Also, we do want to enable creativity in the solutions, so we're leaning toward less guidance in the initial phases. We will definitely add more requirements detail as groups begin to work through the challenge and need guidance, and we will of course work with individual groups to verify they are going down the right path if there are any questions as everyone starts.
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 their answers will be continuously posted in this FAQ document. Check this document regularly. Ask as many questions as you'd like, sent to the NASA-SUITS@mail.nasa.gov email, and we'll get to them as soon as we can.
6. Can we adapt technology used in other industries for our design?
    a. Absolutely!

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7. Will we be provided with or the funds to purchase a Hololens or any other equipment to create our deliverables?
    a. No. Your team may download a free Microsoft Hololens Emulator at the following website to test your interface: https://developer.microsoft.com/en-us/windows/mixed-reality/using_the_hololens_emulator.
8. Are any electronics diagrams necessary for our proposal?
    a. Please include as much supporting information as possible.
9. Which programming language should we use to program interfaces?
    a. The Teams will use Unity and C# to program interfaces as this is necessary for compatibility with NASA provided data.
10. Will we receive the data files prior to our arrival to determine compatibility with our interface?
    a. Yes. Data will be provided before the challenge with adequate time to implement it into your design.
11. How has NASA been utilizing the HoloLens? Could you please send us some screen captures or video demonstrations?
    a. NASA has been experimenting 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. We have also been experimenting with the environment tracking feature of the HoloLens for procedure assistance in the internal (pressurized) volume. Over the coming weeks, we will share some of these scenarios on social media and reference technical publications which have been made public.
12. 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 will be
        i. the procedure in a step-by-step form,
        ii. a telemetric data stream compatible with the Unity development environment. Other releases are probable as needs arise, but these two are the critical ones.
13. Can you please provide more specification as to what procedures a user will performing?
    a. Most procedures are task-based, and compatible with being read over a voice loop. Some images will be associated with these procedures, and we will also attempt to provide them in a parse-able form, in order to facilitate any processing of the procedures themselves.
14. Should our teams consist of only coders?
    a. We would encourage you to have diverse teams with varied backgrounds for design perspective. That said, team consistency is up to you.
15. 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. Also,

when you are accepted into the program, an online forum will be available to start discussions between the entire participating community.

16. For this challenge, will we be designing our own prototype display/system or just writing code for a HoloLens display?
    a. The HoloLens will provide 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 will satisfy the challenge.

17. Can we have our own task board?
    a. It is not required, but you may imitate the board design given in the Challenge Description document. NASA will not be providing hardware, but we may be able to provide diagrams of the task board itself.

18. 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.

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

20. Can we make technical adjustments to our interface after the first test while on site?
    a. Yes, the plan is to promote the iterative process.

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

22. Should we be expecting more Meta data besides temperature, pressure, and oxygen levels that will be provided? Is there an anticipated date on when we will receive more information on the task to be completed?
    a. There will be more telemetry data provided to the participants. Participants will have access to this data in Phase Two, after team selections are announced and prior to test week.

23. Will we be using 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.