

SUITS Frequently Asked Questions 2023-2024

Updated October 10, 2023

General:

1. What should be included in the CONOPS section?
 - a. The Concept of Operations section should specify how your design addresses each of the challenge requirements by detailing how the design evaluator interfaces with your device during each step of the procedure outlined in the mission description. Be as specific as possible about how you display telemetry and other information throughout.
2. Can we attach videos to our proposal via YouTube links?
 - a. Assume the people reviewing your proposal will not watch them. However, you may include a video as an additional way to communicate your proposal. Advice: keep it short.
3. Are international students able to participate in this challenge?
 - a. International students can participate and contribute at their institution. However, they cannot be badged to enter NASA's Johnson Space Center (JSC) in Houston where the test week will take place. International students can attend events that are part of the test week that are not onsite at JSC.
4. Is there a team size limit?
 - a. No, we have had teams range from 2-70 people. Most teams include 8-15 people. Each team member should contribute within a defined role on their team. Teams will be limited to five persons badged for onsite test week, four students and one faculty.
5. Do you want system architecture flowcharts in UML 2.0, SysML, etc.?
 - a. Use whatever your team feels best describes your architecture.
6. Can students under the age of 18 participate?
 - a. No, unfortunately all participants must be 18 to sign the Statement of Rights and attend test week.
7. If we have previously had a proposal for NASA SUITS, can we extend this or should we start from scratch?
 - a. If aspects from your previous design can carry over to this year's challenges, then you can use that. Make sure you are addressing this year's specific requirements first and foremost. We want to see unique ideas.
8. Are international students allowed to be team leads?
 - a. This is a little tricky. STEM Gateway limits team leads to U.S. Citizens. However, we are happy to interact with and help anyone contacting us. So, you could have co-leads, one a citizen, and one that is an international student.
9. Does our faculty advisor have to be from our institution or an active faculty member?

- a. Yes, your faculty advisor is acting on behalf of the university, so they need to be in a position recognized by the university. You can get advice from anyone, so you may have more than one faculty helping you.

Technical/Devices:

10. Does SUITS have a recommendation or requirement on Unreal or Unity?
 - a. It is recommended that Unity be used. There is an existing Unity package which will be available to teams. We do not know if NASA will create an Unreal package or if teams will need to create their own solution.
11. What is in the VISION kit and what does it do?
 - a. Virtual Instrument for Simulating Inertial Objects (VISION) kits are a Raspberry Pi equipped with global positioning system (GPS) tracking unit, inertial measurement unit (IMU), and a magnetometer. GPS position in local and world coordinates, heading, and bearing will be streamed via the telemetry stream server (TSS).
12. Will each team get a rover for testing?
 - a. No, however we will provide more rover specifications as soon as we have them.
13. Are there any simulation tools provided for the rover?
 - a. Not currently. Assume the rover will provide video feeds and location data via the TSS, and that your LMCC will provide move commands.
14. Can our team use additional devices, such as a VR HMD?
 - a. The SUITS team strives to be device agnostic. Some former teams used a design that involved interfacing between a Quest and a HoloLens2. The HMD used in the field during the EVA must be a pass-through AR device.
15. What language is the telemetry stream server (TSS) in?
 - a. Most of the TSS is written in JavaScript and TypeScript
 - b. The NASA SUITS team will provide a Unity Library that you can import to the project to send and receive messages from the server in both the Unity Editor and in a Universal Windows Platform build for the HoloLens. Please contact the NASA SUITS team if you plan to use a development engine other than Unity.
16. How do you receive data from the TSS?
 - a. All TSS data is sent via websockets protocol using ws and is in JSON/GeoJSON format.
 - b. During testing you will change the TSS IP to the IP of the device where you plan to host the TSS
 - c. During test week the TSS will be deployed by NASA on a local network (SUITSNET) at the test site. Teams will need to update the server IP address on their peripheral devices (HMD, VisionKit, etc.) to match the SUITS host server IP. We will then place all appropriate assets in a virtual room with the teams' HMD and LMCC.
17. Can phones be used as peripheral devices?

- a. Teams need to state all peripheral devices their design includes and any requirements they might need from the NASA SUITS team (internet, time outside of the scheduled testing for set-up, etc.) during the design review in the spring. Approval will either be granted for the devices, or the SUITS team may contact teams for additional follow-up before allowing the external devices on-site. Peripheral devices will most likely have to connect directly with the head mounted device, rather than via the TSS.
18. Can you explain the Spectrometer RFID?
- a. We will use a mockup of an X-ray fluorescence (XRF) spectroscopy scanner for geologic study that will utilize Radio Frequency Identification (RFID). Teams will scan rocks tagged with RFID throughout the rock yard. The provided scanner will transmit data from the scan via the telemetry stream.
19. Can we design our own custom hardware interface?
- a. Yes, be sure to include a mock-up of the design and how it interfaces with the augmented reality device in the proposal. If accepted, at the spring design review, teams will be required to present all external devices before receiving approval from the NASA SUITS team to bring them on-site.
20. What does ROVER look like, what does it collect, and how exactly does it function?
- a. ROVER specifications will be released later. It will run on a version of Robot Operating System.
21. For the spectrometer, do we place the point of interest, or are they given when the astronaut returns to the airlock.
- a. Having the ability to tie the geology data to the location of the sample would be a useful feature.
22. How should our proposals be framed around the external devices such as VISION, ROVER, and the spectrometer?
- a. Data from VISION and ROVER will be streamed via the telemetry stream. Explain how your user interface plans to represent data received from the TSS and send messages to the TSS. Additionally, show the system architecture of the communication between your augmented reality head mounted device and the TSS.
23. When will the telemetry stream become available?
- a. The SUITS team's goal is to provide the telemetry stream to selected teams in mid-December. Teams will receive access to the telemetry stream and Unity Package when they receive their VISION kits.