

NASA MarsXR 2 Challenge - Virtual Reality EVA Scenarios and Assets

Here you can propose your own tools, vehicles, drones, robots, add failure modes, suits displays, or any other idea you may have to help us to create the first mission to Mars.

This category does not include any tasks that the crews will perform inside the habitat or spacecraft, but only the tasks that the astronauts will perform while wearing an exploration spacesuit.

What you can work on:

Below is a list of possible scenarios and assets that teams can explore, storyboard, and develop. This list is not all-inclusive, and you can create other potential scenarios and assets not listed here. The scenarios will need to be realistic and solve an actual task the astronauts will need to perform on Mars to support their scientific tasks.

If you are developing a scenario, please consider that this challenge is about developing tasks for what are called Extravehicular Activities (EVA). EVAs are all activities performed outside the habitat and wearing an exploration spacesuit. We will not focus on any activity inside the habitat or spacecraft for this challenge. Scenarios may start from the moment the crew has exited the Habitat Airlock, or they may start anywhere on the surface of Mars (covered by the NASA XOSS MarsXR Engine). Teams will need to define if the scenarios and assets are for use in single or multiplayer modes. All scenarios and assets should be storyboarded/developed with multiple crew members working as a team, and EVAs are never undertaken with a single crew member working by themselves. If you are storyboarding/developing an asset, each asset will need to be used in single and multiplayer modes.

MarsXR Crowdsourcing Challenge: List of Scenarios & Assets

- Tools & Equipment
 - Alternate lenses/modes for the camera
 - Pipe drill/drive tube – for shallow core samples
 - Rotary/Percussion drill – for deep drilling
 - Slide hammer
 - Trenching / shoveling / excavation
 - Tool cart / wagon
 - Notetaking (pen/paper, verbal notes, etc.)
 - Troubleshoot tools & equipment
 - Ex: replace drill bit, replace battery, different modes for drilling
- Payloads* (show Team Overheat example of seismometers)
 - Weather monitoring station
 - Radiation Dosimeter
 - Gravimeter
 - Magnetometer
 - Atmospheric capture device

* mostly looking for something to deploy, then a display to monitor data and control different modes & operations
- Spacesuit interactions
 - Communications (on/off, different channels, signal interference, etc.)
 - Troubleshoot leak(s) in spacesuit

- Dust mitigation of spacesuit
- Basecamp elements
 - Protective elements (dust/heat/radiation shields)
 - Laying power cables or plumbing
 - Realistic connector interfaces (power, fluid/gas)
- Example scenarios:
 - Operate camera to record still and video images of planetary surface/surroundings. Change lenses on cameras and change position frequently to obtain landscape images of the area surrounding the habitat.
 - Use the drive tube to collect a rock core sample. Record descriptions of core sample in field notebook. Label and stow the samples in a protective container for further analysis.
 - Using excavation equipment, dig a trench from the habitat to nearby greenhouse. Lay plumbing and/or power cable to connect each habitat module.
 - Retrieve cosmic radiation dosimeters from storage and deploy them nearby. Measure radiation and record the results. Once completed, return the dosimeters to storage.
 - Unload equipment from a lander/vehicle
 - Replace a damaged wheel on the rover or tool cart.
 - Conduct troubleshooting of electrical systems. Using schematics, visually detect the failure. Then manually repair or replace the failed component using appropriate tools and equipment so that power is restored.
 - Remove weather balloon and portable hydrogen tanks from rover trailer, fill a balloon, attach remote sensors/transponders, and deploy balloon to conduct the survey.