

Condensed Phase 1 Winners Feedback for use in Phase 2

MarsXR 2

Habitat Plumbing and Electrical - Scenario 1 - Ethan Briscoe

- Could have benefited from greater description of the assets required for the scenario and how they would be operated, but the assets mentioned are novel and relevant to the scenario which is good.
- Tasks are very relevant to operational concepts. Only piece that's likely not relevant/feasible is having 3 astronaut operators in the scenario.
- Could elaborate more on potential failure points or alternate "branches" to the main storyboard, should anything unplanned happen
- Metrics are listed, easily quantifiable/adjustable. Could potentially add some metrics related to trenches (e.g. appropriate depth, width) or order of operations on procedures.

Geological sampling with accompanying vehicle - Frederic Kreutzer

- All of the relevant assets are not clearly listed, but the submission has a lot of new assets and designs suggested which is good. Other potential scenarios are also addressed like vehicle inspection.
- The submission did not list metrics clearly but it has 7 timed sections, 2-3 based on focus with eye tracking, 1 metric related to safety, 2 stress/performance, and checklist based metrics. There might be more concrete metrics as well, but it would be wise to think further about the metrics that could be tracked in this scenario overall.

EVA Suit Emergency - Sofia Coloma - SpaceLux's team

- Scenario is quite thorough, including cases for contingency or post-event operations. Assumptions are listed and defined well.
- Storyboard is highly relevant for the most part; it is doubtful that there would ever be a case when fixes to the life support system/O2 supply would happen in the middle of the giant, dusty surface of Mars (as the participant notes). But the concepts are relevant to other potential tasks/procedures.
- The new assets in this scenario are unique but built upon other existing assets, so hopefully Phase 2 users can start there. The concept also mentions cases to add pressure/stress to the scenario, which could be interesting.
- There are a lot of metrics listed, though very few are explicitly called out as being relevant to the EVA scenario/tasks. For example, "heart rate" or "user comfort in VR" are nice, but aren't specific to the task. It's a good list overall, but there should be a bit more

direct application metrics as was done in some cases (e.g. "oxygen lost during scenario" is an easily quantifiable number).

Rover Unbogging and Medical Response - Lauren Fell

- This was a well thought out scenario. However, one thing is a little unclear: Is Astronaut 2 an actual person or is it a VR EV2?
- This submission introduces a good failure point. All phase 2 submissions should consider potential and probably failure points.
- Some misconceptions about decompression sickness and if/when/how it might present after the noted activity, but the overarching theme and relevance is great. Simulated DCS checklist and protocol are good.
- Scenario is very novel; a high stress contingency scenario. The assets and functionalities are not novel, though; seems like these use mostly existing assets. Would be great to see some sort of human/suit monitoring piece mentioned as it pertains to the scenario (e.g. suit pressure gauge).
(NOTE: Relying on existing assets to create a highly novel scenario is not an issue, but it would be even more valuable if a Phase 2 submission is able to improve upon existing assets or develop new ones as part of the Phase 2 submission.)
- The performance measures listed are good and quantifiable. Would like to see a little more detail on what defines correctness, but overall they are good.
- Well defined measurable performance metrics.

Medical Operations Management during EVA on Mars - Roger Daglius Dias - Xtory Team

- This submission seems to cover all bases, thematically.
- The addition of new assets, ML/AI and AR elements is valuable.
- However, the metrics are not well defined. A Phase 2 submission could improve upon this by analyzing which metrics could potentially be monitored and tracked during the scenario.

3 ways to collect a rock core sample - Nataliia Savchenko

- The geological sampling scenario is not as novel but the procedure for instruction here is unique and thorough.
- There is a nice comic format for the storyboard and new assets to be used in this version of the scenario.
- Well defined training to execution measures.
- Lists 4 metrics, which is a good starting point. More could likely be found by Phase 2 competitors.

Maintenance - Omar Gil Sturlese - Overheat

- Clearly followed the challenge guidelines and provided detailed scenarios with possible malfunctions to make the tasks harder. Metrics also identified for task performance. However, the final asset designs and their physical operations could be upgraded visually to look more realistic.
- The ability to test a user's performance and the completeness of the original task is a good feature.
- Clear description of multiple metrics a developer could include to measure the operator's performance during the EVA. These are a strong starting point for Phase 2 competitors.

Finding biosignatures on Mars with an AI glider - Anne Spalding - Trillium Technologies

- Using an AI glider/drone to scout terrain is relevant towards exploration and scientific discovery.
- New assets, scenarios, and failure points successfully addressed.
- Clearly identifiable metrics. 14 are technically listed, but not all are clear on how performance is measured outside of a fail. It would be good to have some metrics tracked on a scale, slider, percentage bar, etc.
- This submission also mentions damage & battery use, which could be used as metrics too.

Dusty Rescue - Richard Milton - Team ROGUE

- This submission is unique in rover operations and measures. However, it is still unclear how a rover towing task would actually work in situ. Careful consideration of what this scenario should entail to achieve the proposed goal will be important for Phase 2 competitors.
- There are clearly identifiable performance measures here, which should help Phase 2 competitors, though these competitors can always add more.