

THE COMPETITION

On-Site Mining – (MANDATORY) requires the teams to design and build a mining robot that can traverse the simulated Martian chaotic terrain. The robot must then excavate the basaltic regolith simulant (called Black Point-1 / BP-1) and the ice simulant (gravel) and return the excavated mass for deposit into the Collector Bin to simulate an off-world mining mission. The teams will have two, 10 minute competition runs on different days to mine the regolith. The abrasive characteristics of the basaltic regolith simulant, the weight and size limitations of the mining robot and the ability to tele-operate it from a remote Mission Control Center are additional factors in the competition.

Systems Engineering Paper – (MANDATORY) requires the team to discuss the design philosophy from inception in the context of systems engineering, optimization, major reviews, schedules from inception to competition, concept of operations, systems hierarchy, technical budgets, trade-offs, reliability and verifications.

Outreach Project Report – (MANDATORY) requires team to detail the type of STEM outreach in their communities, activities provided, numbers reached and are encouraged to reach out to the underserved / underrepresented K-12 students.

Slide Presentation & Demonstration – (OPTIONAL) provides the teams with the opportunity to talk and present the spirit, intent and the technical outcome of their design project. This is another opportunity for the students to develop their presenting and public speaking skills that will serve them in thesis and / or doctorate dissertations, job interviews, grant requests, etc.

Social Media and Public Engagement – (OPTIONAL) requires the teams to creatively engages the public in robotics and STEM related topics, showcases their universities progress in the design and build of their robot, motivates and encourages K-12 robotic groups to showcase their robots and educates the public about robotics and the current NASA missions.