

NASA LUNAR DEEP FREEZE CHALLENGE

AUGUST 2020-FEBRUARY 2021

PROBLEM STATEMENT

NASA needed novel small-footprint, lightweight, low-/no-power cryogenic containment solutions that could enable long-term storage and transportation of lunar material samples back to Earth. A universal single-system cryogenic solution that could be used continuously from Human Landing System (HLS) to NASA facilities on Earth would be ideal; however all innovative combinations of approaches, processes and systems that can deliver an actionable solutions to this challenge were of interest.

OUTCOME & RESULTS

By approaching this Challenge creatively, TechConnect attracted 76 submissions, despite its very technical nature. We divided the response forms into two categories: a complete system in category one and a component solution in category two. This encouraged a broader set of solvers to engage and share ideas for how NASA could solve its challenge. It made sense because NASA did not have a prescriptive idea of how a solution would fit its existing architecture, exactly. We even played with this ambiguity through a tongue-in-cheek graphics campaign which centered around nearly a dozen different images of potential containers - lunchboxes, Igloo coolers and more - because its actual style, size, and material were variables to solve. With a low prize purse, NASA wanted serious solutions but faced the challenge that anyone with command of the space may have IP concerns. Fortunately, we captured additional interest through an informational webinar and contact forms provided additional leads for NASA. In the end, NASA awarded \$5,000 to Isaac Blankenau, an individual contributor who works at Vanderbilt University. We enjoyed a deeply technical challenge with flavors of ideation and, although defining those parameters with the client was a lengthy exercise, it provided critical value in arriving at scope and, ultimately, a solution.

30%
TEAM ENTRIES

21
COUNTRIES

63%
SUBMITTED
COMPLETE SYSTEMS

76
ENTRIES

WINNING
SOLUTION: **TRL 4**