

IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)  
Interactive Presentations - IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (IP)

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TELECOMMUTE TO THE MOON: A CASE STUDY IN MANAGING UNDERGRADUATE  
ENGINEERING PROJECTS WITHOUT ACCESS TO RESOURCES

**Abstract**

Engineering capstone projects offer undergraduate engineering students a unique opportunity to gain hands-on experience in an end-to-end, industry supported project of their choosing. As of May 2020, universities across the world suspended these in-person activities due to the global pandemic. For undergraduate engineering students hoping to work in the space industry, these restrictions severely limit their ability to gain experience in this field through prototyping and working with hardware.

This paper discusses the management of a team of mechanical engineering students working on a space-themed capstone project, development of an antenna gimbal for a lunar rover, and presents the methods followed to produce a physical prototype during a mandated household-only quarantine. The paper has two main goals:

Show how to effectively communicate with the industry partner remotely, promotion of productivity within the team, and division of engineering labor within the team to ensure equitable experience gained by all members.

Present technical development strategies used to create a working, representative prototype for the industry partner without access to labs or special equipment and recommendations for projecting a low-fidelity prototype's path-to-flight.

The result of this project was the development of a proof-of-concept antenna pointing mechanism for a lunar rover, developed entirely at home during a global pandemic, which succeeded in giving five undergraduate students hands-on experience in the space industry. The lessons learned from this project are applicable to other projects displaced by the COVID-19 pandemic, to schools with permanent online or flexible formats, and more generally, to students without access to substantial resources.