#### **Telerobotics** 2020 SSERVI NESS Site Visit



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# Space Telerobotics

#### Uses

- Exploration (assembly, maintenance, crew/payload positioning, ISRU)
- Science (instrument deployment, measurements, sampling, analysis)
- Technology development and research (NASA and non-NASA)



Fong, Zumbado, Currie, Mishkin, & Akin (2013). **Space telerobotics: unique challenges to human-robot collaboration in space**. Reviews of Human Factors & Ergonomics Society 9(1).



# **Telerobotic Operations**



Robot in Earth orbit Ground control



Robot on surface Ground control



Astronaut in space Robot on surface

#### Volatiles Investigating Polar Exploration Rover (VIPER)



VIPER Rover on Astrobotic Griffin Lander (artist concept)



# VIPER vs. ISS vs. Mars Rovers



### **VIPER** Operations



### **Telerobotics session**

- 3:05p Mixed Reality Interfaces for Lunar Robot Supervision & Teleoperation – Michael Walker (U. Colorado)
- 3:20p Telerobotic Deployment Strategies for Lunar Radio Arrays – Mason Bell & Phaedra Curlin (U. Colorado)
- 3:35p Deployable Optical Receiver Aperture for Lunar Communications and Navigation – Daniel Jacobs (ASU)
- 3:50p Discussion (10 min)
- 4:00p Done

