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THE CHALLENGES OF MERCURY AND VENUS

Abstract

We compare the environments on Mercury and Venus to that on the Moon for the purpose of identifying the possibilities regarding advanced robotic and perhaps even human operations on those planets. In the present-day the technology does not exist to transport and safeguard humans on trips to Mars, a benign planet when compared to the two innermost planets of our solar system. But we will get to that capability. And it is likely that as we become more comfortable with human operations on the Moon and Mars over the next – hopefully – half century, we will have set our sights on other targets for robotic/human missions. A number of possibilities have been floated, for example, Titan. Severe environments as well as travel distances are the challenges. It may turn out to be easier to engineer against severe environments rather than long travel times. Of course, a revolution in propulsion technologies may change that optimization. The inner planets offer engineers and doctors tremendous challenges for human survival. Assuming successful lunar and Martian human operations, it may be assumed that some of these challenges will have been met, and will address many but not all of the issues for survival on Mercury and Venus. This paper will briefly compare environments and challenges, and our current understanding of these.