

Lunar Exploration (3)
Lunar Missions planned (2A)

Author: Mr. Kyle Acierno
Japan, k-acierno@ispace-inc.com

TEAM HAKUTO'S 2017 GOOGLE LUNAR XPRIZE MISSION AND LONG TERM PLANS FOR
LUNAR EXPLORATION

Abstract

This presentation will introduce ispace, a lunar exploration company headquartered in Tokyo, Japan, and Team Hakuto, a front-running team participating in the Google Lunar XPRIZE (GLXP) competition. The presentation will begin by introducing the technology that ispace is developing. Next, the presentation will outline Team Hakuto's 2017 mission plans and rover capabilities. The presentation will conclude by explaining ispace's three-step plan to utilize resources on the lunar surface.

ispace owns and operates Team Hakuto, the only Japanese Team competing for the 30M GLXP competition. During this first mission to Mare Imbrium, the 4kg rover will attempt to survive one lunar day. The rover has a hybrid communication system, with both 900 MHz and 2.4 GHz capabilities, enabling both long distance and high speed communication. The rover will travel at least 500m and downlink high-definition video at 100 kbits/sec to Earth via the lander to achieve the required objectives of the GLXP. In order to further test and demonstrate new technologies, the rover will attempt a total traverse distance of up to 10 km. The traverse will be executed in a flower petal pattern, repeatedly circling back toward the host lander to be photographed. The mission will provide a low cost opportunity to obtain ground truth data for the numerous remote sensing missions. In the future this technology can be further used to investigate promising regions for potential resource deposits. This mission is the first of many missions planned by ispace technologies.

ispace has a three-step plan that will demonstrate its technology, locate, map and measure resources, and finally utilize those resources on the lunar surface. ispace will have its first attempt to demonstrate its rover technology during the GLXP mission. Once proven successful, ispace will develop a tethered dual rover crater exploration vehicle, as well as rover with a drilling mechanism, which will give the company access to the permanently shadowed lunar surface and the resources that lay beneath it. In this phase ispace plans to partner with space agencies and the scientific community for sensor and technology development to better detect and understand water ice deposits. Finally, depending on the location, distribution, quality and quantity of the lunar ice, ispace will develop extraction, processing, and utilization techniques with interested industrial partners. An ultimate goal is to convert the ice to fuel and deliver it to private companies.