**EXPLORING THE MOON IN THE 21ST CENTURY: THEMES, GOALS, OBJECTIVES, INVESTIGATIONS, AND PRIORITIES, 2008: THEME 1, GOAL 1C: USE THE MOON AS A PLATFORM FOR ASTROPHYSICAL, HELIOPHYSICAL, AND EARTH-OBSERVING STUDIES.**

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**Introduction:** The Lunar Exploration Analysis Group (LEAG) has been tasked by the NASA Advisory Council to develop a Lunar Exploration Roadmap that encompasses all of the constituencies that LEAG represents. To this end, the LEAG Executive Committee (see http://www.lpi.usra.edu/leag/ for details) has developed a series of Themes and Goals where we have tried to encompass the work that has previously been done on the next steps for lunar exploration.

This abstract addresses Roadmap Theme 1, and focuses on one of its four goals (1c). Theme 1 is: “Pursue scientific activities to address fundamental questions about the solar system, the universe, and our place in them”. Goal 1c is: Use the Moon as a platform for astrophysical, heliophysical, and earth-observing studies.

With its lack of an absorbing atmosphere, the Moon provides a natural and stable observation platform from which to study the cosmos, the Sun, Geospace, and the Earth. Furthermore, the Moon always displays the same side to Earth, and conversely, always displays the same side shadowed from the Earth and its noise sources. In addition, several interesting plasma interactions occur since the Moon is immersed in the solar wind and traverses the Earth’s deep magnetotail enabling the study some fundamental plasma physics processes. These distinctive characteristics provide the motivation for articulating investigations that use the Moon as a scientific platform.

In addressing Goal 1c, the presentation is focused into three areas: Astrophysical, Heliophysical and Earth observing investigations. A brief exposition of the science, method/instruments and requirements for various investigations will be presented. A representative list of instruments includes: instruments to observe our heliospheric boundaries surrounding and protecting our solar system; a low-frequency radio astronomy array and long baseline interferometers for observing the Sun, planets, and astrophysical objects; imaging instruments to observe the global coupling from the Earth’s ionosphere to its magnetosphere; instruments to observe the Earth’s climate, high latitude weather systems and characteristics; a base for a solar observatory; and a surface and orbiting plasma package to study unique plasma physics interactions. Some of these studies are complimentary to studies using Earth orbiting observations or missions at various Lagrangian points.

Sources of input for this presentation are the NAC Tempe Workshop held in February of 2007 [1], and the 2007 Heliophysics Science and the Moon Report [2], and community input via the web.