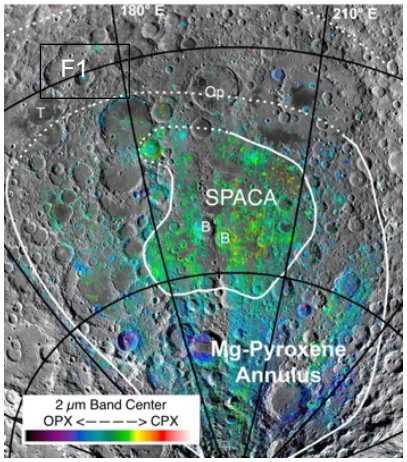
SOUTH POLE-AITKEN (SPA) BASIN AREAS as FUTURE CLPS TARGETS. C. M. Pieters[1,2] and J. W. Head[2], [1]Planetary Science Institute, [2]Brown University, Providence, RI (carle_pieters@brown.edu).

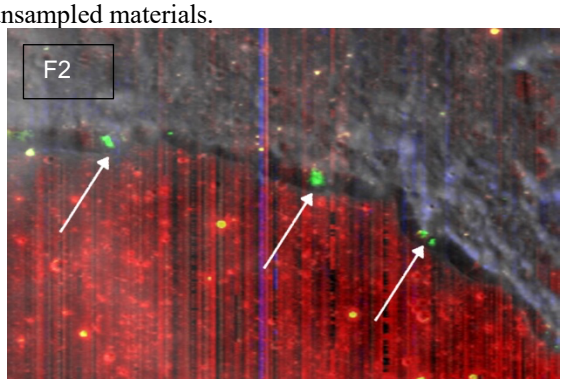
Introduction: The lunar science and exploration environment is evolving rapidly and is quite international in scope. The recently announced anticipated MOU between NASA and ESA in support of the *ESA Pathfinder Mission*, which is designed to implement an important communication network at the Moon, is a necessary long-term investment. Such infrastructure capabilities are essential to explore the half of the Moon that is not visible from Earth – the lunar farside, which is geologically quite different from the more thoroughly explored lunar nearside.

The southern farside of the Moon is dominated by the enormous 2500 km South Pole-Aitken Basin (SPA). A very high priority was assigned to a long-range rover and sample return mission across SPA (*Endurance A)* by the most recent NRC Decadal Report [1]. We identify near-term targets in SPA to consider for evolving CLPS targets and capabilities that would both build a strong foundation for subsequent missions as well as provide excellent interim science. Building on previous SPA science discussions [e.g. 2] we highlight two targets of high scientific interest within SPA identified by remote measurements to have special characteristics. [Note that SPA is huge, of course, and characterizing it with two landers is like trying to characterize the western US from Missouri to California by visiting just two towns.]

Central SPA (SPACA). The starting point for *Endurance A* is in central SPA identified as SPACA terrain [3]. SPACA encompasses a regional topographic low and is an extensive mafic non-mare compositional anomaly that is also associated with an unusual small construct (Mons Marguerite, formerly Mafic Mound). At places SPACA is overlain by SPA mare basalts (which were emplaced during the same general period as nearside basalts [e.g., 4]). The origin of SPACA is unknown but might be related to the SPA basin-forming event. We recommend a CLPS lander be targeted within SPACA, perhaps close to Mons Marguerite. Instruments should be selected to provide an initial compositional assessment of the unusual SPACA materials. Appropriate instruments should also be chosen to assess the site for operations of the later long-distance *Endurance* rover.



Ingenii-Thompson (farside basalt & deep-seated crust). The mare-filled 117 km Thompson Crater occurs within the Ingenii Basin which in turn falls along a SPA basin ring. These three sequential major impacts (SPA, Ingenii, Thomson) have inevitably exposed unusual but yet unsampled material from the lunar deep lunar crust. The north and south rims of Thompson (Fig 2) both expose blocks of an unsampled lunar rock type, Mg-Spinel Anorthosite [5]. By landing in the mare (red) close to one of these exposures (green, shown with arrows) science operations should provide access to both the mare basalt as well as crustal components from the Thompson rim. A well-placed robotic sample return mission could collect both types of highly desirable unsampled materials.



Future CLPS missions could strive to provide robotic sample return to Earth as demonstrated by the Luna missions (16, 20, 24) and the recent Chang'e 5 mission (to young Procellarum mare basalts). The list of landing sites in SPA and elsewhere on the Moon where robotic sample return would provide fundamental new information is extensive, and such a CLPS capability would significantly advance fundamental lunar science.

References: 1] NRC 2023-2032 Planetary Science and Astrobiology Decadal Survey. 2] Pieters and Head 2022 *LPSC53* #1682; Jolliff B et al, 2010 *LPSC41* #2450.
3] Moriarty and Pieters, 2015, *GRL* 42; Moriarty and Pieters, 2018, *JGRP* 123; Moriarty DP et al 2021, *JGRP* 121.
4] Haruyama, J et al. 2009, *Science* 323.
5] Pieters et al. 2014, *Am Min* 99.