SAMPLE SCIENCE INPUT TO LANDING SITE SELECTION FOR MARS 2020: AN IN-SITU EXPLORATION AND SAMPLE CACHING ROVER D. W. Beaty[1], L. E. Hays[1], K. Williford[1] and K. Farley[2], [1]Mars Program Office, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA 91109. (dwbeaty@jpl.nasa.gov), [2]California Institue of Technology, Pasadena, CA 91125.

Introduction: One of the Mars 2020 Rover mission's main objectives is to collect samples of martian material and seal them in individual tubes for possible return by a later mission[1]. In order for the M2020 rover to have the highest chances of making a significant discovery from the diverse kinds of geological targets that Mars offers, it is crucial to select a landing site that would put the rover in proximity to these features. The M2020 landing site selection process is open to all [2]; however at this meeting we are seeking input from the sample science community into attributes of the landing site that should be prioritized. This paper seeks to foster broader intellectual inputs from the community, and outputs from this discussion will be provided to the M2020 landing site selection committee.

Background: The first workshop in support of the M2020 landing site process was held in Crystal City, VA in May, 2014 and produced a list of candidate sites. The second workshop, to be held in Pasadena, CA in August 2015 will focus on further evaluation of these sites as well as new candidate sites. The presentations at the second workshop will also include the identification of specific regions of interest (ROI) within the landing ellipse as well as any "Go To" regions where science investigations could enable achievement of mission science objectives. The M2020 Rover project would like to understand how far and over what terrain the rover must traverse at a prospective landing site in order to fulfill the science objectives.

Primary Discussion Questions:

Given the instrument payload selected for the M2020 Rover, what geological features on Mars would be of greatest interest for in situ exploration? New instruments such as Mastcam-Z, SuperCam, and PIXL, will allow detailed imaging on a range of scales as well as mineral and chemical composition analyses.

What are the primary investigations that could be explored with returned samples collected by M2020, and what kinds of samples are needed to support those investigations? The M2020 Rover will have the capability to drill and encapsulate samples for potential return and detailed analysis on Earth, thus selecting and exploring a destination where high-priority samples may exist would be an important consideration.

What are the primary features of these locations that could be measured remotely by MRO's HiRISE or CRISM cameras? With the potential for significant science results from both in situ and returned sample investigations, what environments would be the best to identify? As landing site selection of novel locations is primarily informed by measurements made by orbiting spacecraft, what are the features that could be most easily detected remotely?

References: [1] Mustard, J. F. et al. (2013): Report of the Mars 2020 Science Definition Team. http://mepag.jpl.nasa.gov/reports/MEP/Mars_2020_SDT_Report_Final.pdf [2] Grant, J. and Golombek, M. (2015) 2020 Landing Site Selection for Mars Rover Mission. http://marsnext.jpl.nasa.gov/index.cfm