

Landing Site Down-Select at the 3rd Mars 2020 Landing Site Workshop

Overview

Undoubtedly the most consequential remaining decision for the Mars 2020 mission is the choice of landing site. In this workshop we seek the critical insight of community members to identify and evaluate the virtues, uncertainties, strengths, and weaknesses of candidate landing sites as input to the process by which three or four sites will be prioritized for further consideration.

Process

Presentations at the workshop will provide background information relevant to landing site selection, engineering considerations, and detailed geologic data and interpretations regarding the eight candidate sites. We hope these presentations will be thought provoking and will lead to healthy collegial discussion that will educate all of us as we approach the difficult selection process.

At the end of the workshop, attendees will be surveyed using a five-point scale on each of the criteria listed below for each of the landing sites. The survey data will be tallied to generate a red-yellow-green, qualitative “stoplight” chart for each of the criteria at each site. This chart will be displayed and discussed as the final agenda item at the workshop and used as input to a meeting of the Mars Landing Site Steering Committee, the Mars 2020 PSG, and the Mars 2020 Project. These meeting participants will use this community input along with their sense of mission objectives and priorities to prioritize three or four of the eight candidate sites for further scientific and engineering consideration.

Criteria

Landing site prioritization is fraught with differing and deeply held opinions grounded in personal experience, scientific taste, and varying interpretations of existing data. Because Mars 2020 is the first step in a possible Mars sample return effort, this decision has the potential to be among the most influential in the history of planetary exploration. As we continue to engage in this complex and important process together, we ask you to take the long view, carefully consider all of the various stakeholders, and work with us to make the best assessment possible for the science of today and for future generations.

The Criteria listed below were developed by Mars 2020 Project Science and were endorsed by the Mars 2020 Project Science Group. The criteria are designed to be as simple as possible, and to allow differing opinions to be developed, communally explored, and recorded.

Criterion 1:

The site is an astrobiologically-relevant ancient environment and has geologic diversity that has the potential to yield fundamental scientific discoveries when it is a)

characterized for the processes that formed and modified the geologic record; and b) subjected to astrobiologically-relevant investigations (e.g., assessment of habitability and biosignature preservation potential). (scoring: 1=lowest potential, 5=highest potential)

Criterion 2:

A rigorously documented and returnable cache of rock and regolith samples assembled at this site has the potential to yield fundamental scientific discoveries if returned to Earth in the future. (scoring: 1=lowest potential, 5=highest potential)

Criterion 3:

There is high confidence in the assumptions, evidence, and any interpretive models that support the assessments for Criteria 1 and 2 for this site. (scoring: 1=lowest confidence, 5=highest confidence).

Criterion 4:

There is high confidence that the highest-science-value regions of interest at the site can be adequately investigated in pursuit of Criteria 1 and 2 within the prime mission. (scoring: 1=lowest confidence, 5=highest confidence).

Criterion 5.

The site has high potential for significant water resources that may be of use for future exploration—whether in the form of water-rich hydrated minerals, ice/ice regolith or subsurface ice. (scoring: 1=lowest potential, 5=highest potential)