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# ExoMars 2018: the four final candidate Landing Sites

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The ExoMars 2018 mission will land a rover on Mars, its scientific objectives are to search for signs of past and present life on Mars and to investigate the water/geochemical environment as a function of depth in the shallow subsurface. The rover will be able to travel several kilometres, analyzing surface and subsurface samples, down to a 2 meter depth. The very powerful combination of mobility with the ability to access in-depth locations, where organic molecules can be well preserved, is unique to this mission [1].

An invitation has been sent to the community to propose scientifically compelling sites for the mission [2], which comply to the main engineering constraints for landing and operation safety.
Scientifically interesting sites include locations with evidence for long duration or frequently recurring aqueous activity, low energy transport and deposition, fined-grained, recently exposed sediments, and/or hydrated minerals such as clays or evaporites. The outcrops of interest must be distributed over the landing ellipse to ensure that the rover can access some of them over a short distance [2].

The received proposals have been reviewed by the Landing Site Selection Working Group (LSSWG) and at first eight sites were found to be compliant with the science, engineering, and planetary protection requirements [3]. These sites were presented by their proposers and discussed at the first landing site workshop that took place in ESAC, Spain, 26-28 March 2014.
Following that workshop, four sites were selected for further investigation, on the base of their higher potential for long lived water activity, the presence of fine grained sediments, and also importantly on the high concentration of potential targets of interest over the whole landing ellipse [3].
The analysis of these sites, both in term of scientific relevance and engineering safety, is still on-going. Latest findings were presented during a second workshop that took place in ALTEC, Torino, Italy, 11 December 2014.

The Aram Dorsum site comprises Noachian layered sedimentary rocks with a prominent inverted channel system (>80 km long). Potential targets include the inverted channel, the channel margins, a channel transition unit, and pits present within the floodplain.
The Hypanis Vallis site lies near two fluvial fan/deltaic systems at the termination of Hypanis and Sabrina Valles. Potential targets include mainly outcrops of expected fine-grained sediments on the smooth transition unit that surrounds the delta/fan, and units around the rim of Magong crater.
The Mawrth Vallis site contains one of the largest exposures of phyllosilicates detected on the Martian surface, in Noachian terrain [8]. Potential targets include the mineralogically diverse clay-rich outcrops and ancient channels.
The Oxia Planum site lies on Fe/Mg phyllosilicates-rich exposures associated to layered rocks that may be related to the Mawrth Vallis sequence. Potential targets include the clay-rich outcrops as well as channels and inverted channels and delta-fan deposits.

New data are being actively acquired by the HiRISE, CRISM and HRSC teams to support the ExoMars 2018 landing site selection process. The ellipses are large and new data are important for characterizing the potential targets and evaluating the safety of the sites. The proposing teams, the ExoMars project team and the LSSWG will continue their analysis and comparison of the sites, aiming to complete the certification of at least one site by September 2016 —in time for the start of the mission's Critical Design Review (CDR). The final selection of the landing site is expected within 2017.

References: [1] http://exploration.esa.int/mars/48088-mission-overview/ [2] http://exploration.esa.int/mars/53462-call-for-exo mars-2018-landing-site-selection/ [3] ExoMars 2018 LSSWG recommendation: http://exploration.esa.int/mars/54707-recommendation-for-the-narrowing-of-exomars-2018-landing-sites/