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Robotic pre-cursor missions in preparation for manned Mars exploration

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Exobiological research on Mars is a key element of the Aurora Exploration Program. It has been acknowledged that it is essential to have a better understanding of a potential Martian biosphere before sending humans. Reason for that is not so much the fact that humans will contaminate Mars once they have landed, but to understand the presence of a biosphere on Mars as a potential hazard to human exploration. A biological hazard could come from either extinct life in the form of toxins that would only affect the crew, or from extant life in the form of pathogens that could affect the terrestrial biosphere using the human mission as a host. Both threats are very small, but cannot be neglected due to a lack of adequate information.

This paper will take a critical view to what extend past and current missions to Mars have improved our understanding of this critical issue, and propose dedicated robotic mission concepts in preparation for manned Mars exploration.