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# POSSIBLE DEEP SPACE GATEWAY SUPPORT FOR HUMAN MARS MISSIONS

**Abstract**

NASA's human lunar exploration plans include the construction and operation of a "Deep Space Gateway" – a human-tended space station in high lunar orbit. The Gateway's preliminary design and capabilities are currently being formulated. While lunar exploration is its initial goal, the Gateway may eventually provide key capabilities in the support of crewed Mars missions. NASA mission studies have resulted in a series of Mars "Reference Architectures" which have been refined over the years to reflect evolving Agency and national priorities. The current Mars architecture has been characterized as a "Basis of Comparison" (BoC) enabling these priorities to be quantified and compared against alternate architectures. Currently, exploration sustainability through the use of a reusable Deep Space Transport (DST) has been a high priority. Such a reusable DST may be particularly well-supported by a (potentially augmented) Gateway and its associated crew and cargo transfer infrastructure, especially in the area of mission "turnaround". We have assessed this turnaround support for the BoC in the categories of a) navigational support, b) returned Mars cargo inspection and assessment, c) logistics storage, resupply and disposal, d) DST maintenance and repair, e) DST refueling and f) DST final checkout prior to the subsequent mission. The intention is to keep the activities and potential Gateway roles functional in description, without specifying technical solutions.