



## NASA Lunar Rover Virtual Industry Forum | Question and Answer Log 12 February 2020

**1. Q: Can the vehicle be a UAV?**

A: NASA is looking at lunar surface mobility systems (rovers) for the LTV. The LSSMS mobility capability is not constrained to rover systems (i.e., systems that roll) and encourages any viable innovative approach to lunar surface mobility. NASA envisions both the LTV and LSSMS including vehicle autonomy in its suite of operating modes.

**2. Q: How much funding can we get?**

A: NASA is releasing these two Requests for Information (RFIs) to help define both the technical and programmatic trade space for NASA's future lunar surface mobility systems. These RFIs are for the purposes of market research, are not solicitation documents, and are not funded. The RFIs are not a procurement action and serve to inform the strategies for lunar mobility. The development of these mobility strategies would drive future plans, which may include procurements. Any potential funding levels would be dependent upon the mobility strategies and available resources.

**3. Q: Will a recording of this web presentation be made available with audio?**

A: The presentation charts from yesterday's Industry Forum are available online on NASA's Artemis web features page, accessible through the NASA homepage. The charts, as well as all program updates, are available on the LTV and LSSMS pages on the [beta.sam.gov](https://beta.sam.gov) website at <https://beta.sam.gov/opp/46cd587dcb34a8e96792f26d3c7a8d8/view>. NASA intends to also post and maintain a Q&A log on the beta.sam.gov site. Audio files will not be provided.

**4. Q: Are non-US organizations eligible/encouraged to submit responses to the LSSMS RFI?**

A: The RFIs are targeted primarily toward existing or future domestic commercial entities, but that does not preclude non-US responses. NASA will accept RFI responses from any interested parties. Any potential future solicitation(s) would require that proposals be led by U.S. entities in compliance with domestic sourcing regulations, however this does not preclude a foreign entity from participating as a member of a team or partnership that is led by a U.S. entity. To foster the development of teams and partnerships, NASA is posting an Attendee List from the industry forum on the LTV and LSSMS pages on [beta.sam.gov](https://beta.sam.gov).

**5. Q: How would you recommend small businesses to team up with contractors for component development and R&D?**

A: NASA strongly encourages participation in these RFIs from traditional and non-traditional sources, regardless of size. NASA recognizes that the breadth of expertise required for these systems might not reside within one organization. To foster the development of teams



and partnerships, NASA is posting an Attendee List from the industry forum on the LTV and LSSMS pages on [beta.sam.gov](https://beta.sam.gov).

**6. Q: Do you foresee the possibility of returning all or part of one of the vehicles so they can be studied after use?**

A: If a respondent believes that the return to Earth of a lunar vehicle is of value and can describe how it might be accomplished, then that topic could be addressed in their response to the RFI.

**7. Q: What is the anticipated timeline for the acquisition?**

A: NASA has not announced a procurement action for either the LTV or LSSMS programs. However, NASA envisions an LTV mission potentially as early as 2024. The LTV RFI asks for information regarding notional development schedules. Given that a 2024 mission would require development to begin in the near future, one could reasonably expect an LTV procurement to commence shortly. LSSMS has a much broader mandate and more flexible schedule trade space. The LSSMS RFI is asking for schedule information from interested parties and NASA expects the responses to vary, depending upon the technologies and concepts described.

**8. Q: What is the communication media and coverage for teleoperation? And the speed of connection?**

A: NASA is currently studying architectures and approaches that increase communications capacity in cislunar space. As these capabilities are evolving, NASA looks to commercial industry to help define communications requirements to support the concept of operations for their surface systems. NASA encourages respondents to identify what communications capability would be needed to teleoperate their described system. Comparison of that communication capability against existing NASA resources, such as DSN, and planned capabilities, such as the cislunar Gateway, could be a valuable input as well.

**9. Q: Will NASA provide access to the DSN for these rovers**

A: NASA is currently studying architectures and approaches that increase communications capacity in cislunar space. As these capabilities are evolving, NASA looks to commercial industry to help define communications requirements to support the concept of operations for their surface systems. The RFI responses will help inform the development of the communication strategies as well which may or may not include DSN.

**10. Q: Will the LTV be subject to the full crew certification process? What is the anticipated fault tolerance posture?**

A: Yes, as a crewed vehicle, the LTV would be subject to human-rated certifications. However, NASA is quite interested in hearing about alternate standards and commercial approaches to certification. Along that line of thought, NASA is also very open to hearing Industry's opinions on fault tolerance.



**11. Q: For LTV, is there an interface document associated with CLPS? Specifically the area/volume of what can be landed. The size constraints could vary the problem drastically.**

A: Responses should adhere to the area, volume, and mass limits are defined in the LTV RFI, beyond that, responses should describe the interfaces that the LTV would expect. CLPS is a competitive contract which seeks to accommodate the needs of the payloads.

**12. Q: Do you believe there is a role for academic, non-commercial responses at this stage of the inquiry?**

A: The RFIs are targeted primarily toward existing or future domestic commercial entities, but that does not preclude academic community responses. NASA will accept RFI responses from any interested parties. Any potential future solicitation(s) would, however, seek commercially available concepts. To foster the development of teams and partnerships, including academic institutions, NASA is posting an Attendee List from the industry forum on the LTV and LSSMS pages on [beta.sam.gov](http://beta.sam.gov).

**13. Q: What is the drivable surface grade?**

A: Table 1.2.1 of the LTV RFI identifies general capability descriptions, including surface grade. The LSSMS requirement is much broader and NASA hopes to learn what capabilities exist within Industry.

**14. Q: Since Space Act Agreements are already a type of OTA, can you provide examples of what non-SAA OTAs might be considered?**

A: NASA's acquisition authority includes "Other Transactional Authority," an example of which is a Space Act Agreement. NASA is interested in hearing about other viable procurement mechanisms.

**15. Q: Do you plan to have multiple providers for the LTV?**

A: NASA has not yet determined how many LTV providers it will employ. This aspect of the LTV acquisition strategy will be informed, in part, by the RFI responses..

**16. Q: Is the RFI response date flexible?**

A: The response dates for both the LTV and LSSMS RFIs are stated within the RFI. Since this is not a procurement activity, it is not a matter of penalties associated with submission of a late response. However, in order to be fully considered in the formulation of NASA's lunar surface mobility architecture, NASA encourages interested parties to respond in accordance with the RFI instructions. RFI responses that arrive after the due date may not be considered.

**17. Q: What is the anticipated number of units to be procured in future out-years?**

A: NASA has not determined the number of LTV units to be procured at this time. The number of LTV's will be subject to trade studies that look at cost and capability, as well as



mission concepts. Interested parties are welcome to address this topic in the response. The LSSMS RFI is not a procurement action and informs the strategy for uncrewed lunar mobility. The development of this strategy would drive future plans, which may include procurements.

**18. Q: What type of in-situ navigation support will NASA provide for lunar traverse? High-resolution maps? GPS-like satellite navigation?**

A: RFI responses should identify what surface navigational aids they require for their concept.

**19. Q: Will NASA make EVA suit capability descriptions available to respondents?**

A: NASA has posted the Human Integration Design Handbook (HIDH), rev 1, to the LTV page on the beta.sam.gov website at <https://beta.sam.gov/opp/46cd587dcba34a8e96792f26d3c7a8d8/view>. At this time, NASA does not wish to constrain RFI responses by specifying interfaces and interaction between an EVA suit and the rover. Additional EVA suit contextual information can be found at <https://www.nasa.gov/feature/spacewalk-spacesuit-basics>. Note this is general information and not specific to any suit configuration or to surface suits in particular.

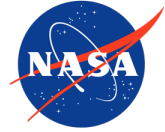
**20. Q: Is NASA willing to entertain a program that delivers minimal 2024 LTV technology, but is evolvable to a more robust capability?**

A: NASA would be very interested in learning more about ideas for an evolvable LTV. The initial LTV capability is focused on a potential 2024 mission, but NASA is also very interested in more robust and capable surface mobility systems for future missions.

**21. Q: If a new company is still in the process of acquiring a DUNS & and CAGE code, will NASA still consider its RFI response? If NASA will do so, what evidence would the agency require the business to submit, as proof that the company is actively pursuing these registration requirements?**

A: NASA's outreach to Industry and Academia for the Lunar Terrain Vehicle is a market research activity, and is not a formal solicitation or procurement activity. The purpose of this RFI is inform NASA of Industry's interest and capability with regard to lunar surface mobility systems and technologies. NASA is interested in all responses that will assist in defining the potential solution space, including those from small companies and other "non-traditional" sources. Any eventual procurement activity resulting from a formal solicitation would require registration within the SAM.gov environment with the attendant DUNS number and CAGE code, with the additional condition that all LTV development activities be led by a U.S. entity. Similarly the LSSMS RFI is not a procurement action and informs the strategy for uncrewed lunar mobility. Should any future procurements occur in this area, they would adhere to applicable Federal acquisition regulations and be in compliance with domestic sourcing regulations.

**22. Q: The RFI, item 1b in "Partnerships," on page 7 asks "What is the current or potential commercialization value of the required mobility capabilities development (e.g., electric vehicle systems, autonomous driving, and extreme environment tires)?"**



**Is it accurate to interpret that a response should include the current or planned potential of the required mobility components and systems to be used in commercial or industrial applications and markets?**

A: Yes. One of the foundational elements of NASA's human space exploration strategy is an integral partnership with private industry. NASA envisions a lunar economy that is not dissimilar from what is evolving today in low-Earth orbit. NASA believes that there are viable business cases to be made for lunar surface mobility systems, component subsystems and enabling technologies. Eventually, NASA would like to become a marginal buyer of services that enable space exploration and utilization, rather than a proprietary owner and operator of these exquisite capabilities.