Space Technology develops critical technologies to enable:

- A sustainable Lunar surface presence,
- The future goal of sending humans to Mars, and
- Critical technologies to enable future science and commercial missions.

We accomplish this mission by:

- Funding critical technology gaps
- Keeping NASA’s space technology pipeline growing with emerging, innovative technologies that promise to drive the future of exploration, science and commercialization.

- Spark Innovation
- Engage The Brightest Minds
- Enable Exploration and Discovery
- Embrace Competition and Public-Private Partnerships
- Invest in America
Early Stage Innovation
- NASA Innovative Advanced Concepts
- Space Tech Research Grants
- Center Innovation Fund/Early Career Initiative

SBIR/STTR

Partnerships & Technology Transfer
- Technology Transfer
- Prizes and Challenges
- iTech

Technology Demonstrations
- Technology Demonstration Missions
- Small Spacecraft Technology
- Flight Opportunities

Technology Maturation
- Game Changing Development

Low TRL
Mid TRL
High TRL

TECHNOLOGY PIPELINE
Virtual Industry Forum - Agenda

• Introduction
  o LK Kubendran, STMD, Program Integration Lead/External Partnerships
  o Bonnie James, STMD, Senior Acquisition Manager
  o Kim Cone, STMD, NRA Manager

• Ground Rules

• Objectives

• Background

• Overview of Changes/Updates

• Questions
  o Review of submitted written Frequently Asked Questions (FAQs)
  o Online questions during the Q&A period of the Forum
• NASA will make every attempt to address questions during this teleconference to clarify the content of the solicitations.

• Questions that require further assessment will be resolved as soon as possible after the Forum, and the answers will be posted to the Frequently Asked Questions (FAQ) page on NSPIRES for the particular solicitation.

• The Q&As outlined in the FAQs on NSPIRES take precedence over all verbal discussions. Please refer to the FAQs for official NASA responses.

• NASA will not provide evaluations, opinions, or recommendations regarding potential space technology development proposals/topic placement.

**NOTE:** Charts presented today will be available on the website listed in the solicitation: [https://www.nasa.gov/feature/TippingPointACO20](https://www.nasa.gov/feature/TippingPointACO20)
Tipping Point Solicitation

• Goal/Intent:
  o NASA continues to embrace public-private partnerships to achieve its strategic goals for expanding capabilities and opportunities in space.
  o A key aspect of NASA’s strategy is to stimulate the commercial space industry while leveraging those same commercial capabilities through public-private partnerships to deliver technologies and capabilities needed for future NASA, other government agency, and commercial missions.

Announcement of Collaboration Opportunity (ACO)

• Goal/Intent:
  o Sister solicitation to Tipping Point
  o The ACO focuses on partnership between NASA and industry through the award of Unfunded Space Act Agreements (SAAs) that will accelerate the availability and reduce costs for the development and infusion of emerging capabilities.
  o Provides technical expertise, test facilities, hardware, and software to accelerate the development and availability of these technologies and reduce costs associated with their implementation and use.
  o STMD anticipates releasing ACO every year, as outreach to U.S. industry space technologies.
• Definition of “Tipping Point”
  o For the purpose of this solicitation, a space technology is at a tipping point if:
    • An investment in a ground demonstration or flight demonstration will result in:
      o a significant advancement of the technology’s maturation, and
      o a significant improvement in the offerors’ ability to successfully bring the technology to market, and,
    • previous investments have been made to mature the proposed technology system (e.g., venture capital, corporate investment, etc.) in preparation for commercialization, demonstrating a pre-existing plan to commercialize the technology, and,
    • the proposed technology system is at a Technology Readiness Level (TRL) of at least 4 at time of submission of the preliminary proposal.

• NASA is interested in advancing these new capabilities to a point that industry would complete and qualify them for market without further government investments.

• These technologies should provide a substantial benefit to both the commercial and government sectors once the project completes.
• Proposed efforts must be led by U.S. industry defined as for-profit businesses that are incorporated in the United States.
  o However, this does not preclude U.S. for-profit companies that are incorporated and operate in the U.S. and also have an affiliation with a foreign firm.

• NASA will not consider proposals that do not include a U.S. industry business as the lead offeror.

• A lead offeror is defined as the proposing organization that will be entering into a contractual relationship with the Government and submits the proposal in NSPIRES.

• Offerors are encouraged to propose teaming arrangements that optimize the potential for rapid development & infusion of the space technology.
  o Teaming partners must also be U.S. domestic entities. However, this does not preclude teaming with U.S. for-profit companies that are incorporated and operate in the U.S. and also have an affiliation with a foreign entity. Also, it does not preclude teaming with non-profit U.S. domestic entities that operate in the U.S. and also have an affiliation with a foreign entity. The System for Award Management (sam.gov) will be reviewed to determine an offeror’s country of incorporation.
• Lead offerors may act as partners on other lead proposals. However, an offeror can only be a lead on two proposals per topic. Individual proposals may NOT cross topics.

• Award Details
  o Firm-Fixed Priced contracts with milestone payments tied to major technical achievement
  o Anticipate multiple awards with a total STMD investment of $250M, including all phases
  o Entry TRL at time of MPP submission: 4

• Two-Step Process
  o Step 1 - Mandatory Preliminary Proposal (MPP)
    • Only those considered the most competitive will be invited to submit a Final Proposal
    • Feedback will be provided on all MPPs
  o Step 2 Final Proposal – only those invited may submit a Final Proposal
    • Final Proposal due date will be provided in the Invitation Letter
    • Feedback provided to all non-selected offerors which acts as your written debrief
Required Industry Contribution

• For this solicitation, all proposals require an industry contribution of at least:
  o 25% of the total offeror cost + NASA civil servant/JPL costs for companies with more than 500 employees
  o 10% of the total offeror cost + NASA civil servant/JPL costs for companies with 500 or less employees

• Contributions may be in the form of direct labor, travel, consumables or other in-kind contributions, reasonable forms of industry contribution including travel directly related to achieving proposed objectives during the period of performance, investments in special facilities or equipment, tooling or other private investment, and internally funded technology maturation such as Corporate Independent Research and Development (IRAD) are deemed acceptable for this effort.

• Contributions coming from government organizations WILL NOT count towards the contribution.
Certified Cost or Pricing Data

- NASA will not require certified cost or pricing data from Offerors at the time of final proposal submission. However, if NASA determines after receipt of proposals that Adequate Price Competition does not exist within any of the Topics, NASA reserves the right to request the offeror submit certified cost or pricing data within 30 days from request.
Tipping Point Solicitation Topics

• Cryogenic Fluid Management Technology Demonstration (active cooling, transfer, and pressure management)

• Lunar Surface Innovation Initiative Technology Demonstration

• Closed-Loop Descent and Landing Capability Demonstration
• Amendment 1 posted on January 30, 2020 to update ONLY the Cover Page

Due Dates

• Key Dates to Remember
  o MPP Questions due: March 12, 2020
  o MPPs due: March 18, 2020 5:00pm Eastern
  o Invitation to Submit Final Proposal: May 18, 2020 (target)
  o Final Proposal Questions due: July 15, 2020
  o Final Proposals due: July 20, 2020 (target)
  o All proposals submitted in response to this solicitation must be submitted by the Authorized Organizational Representative (AOR) at the proposing organization who is authorized to make such a submission.
  o All proposals submitted must be in electronic form. No hardcopies will be accepted.
  o Please start the NSPIRES submittal process as early as possible.
Q: How will STMD accept questions and provide answers after this Virtual Industry Forum?
A: Cut-off date for questions is March 12, 2020. STMD will post Frequently Asked Questions (FAQs) and STMD responses to these questions on the FAQ site associated with this solicitation on NSPIRES (The FAQs will be located under “Other Documents” on the NSPIRES page associated with this Appendix.)

Q: Are you only accepting questions from potential responders or can NASA centers also provide comments?
A: Questions are welcome from anyone.

Q: Can development costs for the vehicle bus and/or payloads that have been incurred prior to the period of performance be counted as a contribution for the purpose of the industry cost share?
A: Section 4.0, subparagraph 3B states: Development costs for an item or a service that were incurred prior to the period of performance start date of the contract cannot be counted as a contribution.
Q: Is IRAD an acceptable industry contribution?

A: Internally funded technology maturation such as Corporate Independent Research and Development (IRAD) is deemed acceptable for this effort. The allowability of cash and non-cash contributions is governed by FAR Parts 30 and 31 and NFS Parts 1830 and 1831. It is an offeror’s business decision on how to meet the industry contribution. An Industry’s contribution should be in accordance with their accounting system.

Q: Is there a mechanism by which an offeror could submit two proposals to address different aspects of a technology area? Is it preferred that a single combined proposal for both efforts be submitted rather than two proposals for segmented activities?

A: The decision on whether or not to submit a proposal and the strongest strategy for submission is left to the offeror. In making these decisions, it should be noted that Tipping Point 2020 states that proposals may include phases. A proposal can only be submitted to one Topic. An offeror can be a lead on up to two proposals per Topic. However, an offeror can act as a team member on multiple proposals.
Q: Our organization is preparing a preliminary proposal for Tipping Point 2020 and would like to discuss the technology development we are considering. Can NASA discuss this technology development with us and provide guidance as to the most appropriate Topic for our proposed effort?

A: In order to ensure that all offerors are treated fairly, all STMD personnel are in a communications blackout regarding this solicitation and are not permitted to engage in technical discussions. The communications blackout is designed so that no offeror gains a competitive advantage. Therefore, STMD cannot advise offerors regarding a particular technology or the Topic for submission.

Q: Regarding the services provided by a foreign affiliate, can we consider "services" to be activity that helps in the development effort (helps raise TRL)? Can the foreign affiliate be funded by the contract?

A: As stated in Section 3.3 of the solicitation, refer to REDDI Section 3.3 and NFS 1835.016-70 for additional information on foreign participation. NASA funding may not be used for subcontracted foreign research efforts. Additionally, refer to solicitation Section 3.4 for export control information.
• Questions from Online Forum?

• You can also submit questions by March 12, 2020 to HQ-STMD-TippingPointAppendix@nasaprs.com
Announcement of Collaboration Opportunity ACO2020
• NASA continues to embrace partnerships to achieve its strategic goals for expanding capabilities and opportunities in space.

• NASA’s STMD is seeking potential partnerships that will focus on advancing commercially-developed technologies that can benefit both the commercial and government use of space.

• NASA is seeking to provide technical expertise, test facilities, hardware, and software to accelerate the development and availability of these technologies and reduce costs associated with their implementation and use. NASA does not intend to provide support that is otherwise reasonably available from U.S. commercial providers.

• NASA plans to use its other transaction authority contained within the National Aeronautics Space Act, 51 U.S.C. § 20113(e), to enter into Unfunded SAAs which primarily benefits the Partner and there is no exchange of funds between NASA and the Lead Industry Participant.

• Future ACO releases are anticipated to be annually instead of every other year.
ACO 2020
Solicitation Overview

• Proposed efforts must be led (and submitted) by U.S. for-profit entity and must include one or more NASA Centers as a team member(s). A “U.S. for-profit entity” is a commercial firm or business incorporated and operating in the United States of America.
  o U.S. for-profit companies that also have an affiliation with a foreign entity are allowed to compete. Final awards are subject to a determination by the NASA selection official that a partnership agreement with such entities would significantly advance one or more NASA mission objectives and would otherwise be in the Agency’s and the Nation’s best interest.

• However, this does not preclude U.S. for-profit companies that are incorporated and operate in the U.S. and also have an affiliation with a foreign firm.

• A Lead Industry Participant is defined as the proposing organization that will be entering into Unfunded SAA with the Government and enters the proposal in NSPIRES.

• Offerors are encouraged to propose teaming arrangements that optimize the potential for rapid development & commercialization of the space technology.
  o Team members may include other U.S. for-profit entities, U.S. non-profit entities (including universities and educational institutions), and/or U.S. Federal, State and local government agencies, as appropriate. NASA will not consider proposals that do not identify a U.S. for-profit entity as the Lead Industry Participant. The System for Award Management (sam.gov) will be reviewed to determine an offeror’s country of incorporation.
• Lead offerors may act as partners on other lead proposals. However, an offeror can only be a lead on two proposals per topic. Individual proposals may NOT cross topics.

• No changes/exceptions/updates permitted on the standard template SAA.

• Award Details
  o Unfunded SAAs
  o Period of performance will be negotiated individually for each SAA. However, typical award durations are 12 – 24 months.
  o Awards typically range up to approximately $1M (FTE and any Center procurement dollars combined) for all participating Centers per award.
  o Entry TRL at time of MPP submission: 3

• Two-Step Process
  o Step 1 - Mandatory Preliminary Proposal (MPP)
    • Only the most competitive MPPs will be invited to submit a Final Proposal.
    • MPP participants not invited to submit Final Proposal will receive a brief explanation of NASA’s decision of their invitation status. Formal feedback will not be provided. Invited participants will not receive feedback.
  o Step 2 Final Proposal – only those invited may submit a Final Proposal
    • Final Proposal due date will be provided in the Invitation Letter
    • Final Proposal participants not selected will receive feedback. Selected participants will not receive feedback.
Topics for this solicitation

- Cryogenic Fluid Management & Propulsion
- Advanced Propulsion
- Operate in Extreme Environments
- Extreme Access
- Sustainable Power
- In-situ Propellant and Consumable Production
- Intelligent/Resilient Systems and Advanced Robotics
- Advanced Materials and Structures
- Entry, Descent and Landing
- Small Spacecraft Technologies
Key Dates to Remember

• MPP Questions due: March 11, 2020
• MPPs due: March 16, 2020  5:00pm Eastern
• Invitation to Submit Final Proposal: May 11, 2020 (target)
• Final Proposal Questions due: June 18, 2020
• Final Proposal due: June 25, 2020 (target) final date will be provided in Invitation Letter

• All proposals submitted in response to this solicitation must be submitted by the Authorized Organizational Representative (AOR) at the proposing organization who is authorized to make such a submission.

• All proposals submitted must be in electronic form. No hardcopies will be accepted.
• Please start the NSPIRES submittal process as early as possible.
Q: I see in section 2.1 of ACO 2020 that the award duration can be up to 24 months. Does the typical cost range of up to $1M listed within section 2.0 mean the value has to be spread over the duration (up to 24 months) or is it possible to propose something for a 2 year duration at that cost of $1M a year - for a total of $2M for the total project?

A: The ACO 2020 guidelines state that typically awards range up to approximately $1M over the total project duration, which can be up to 24 months. The guideline should not be interpreted as $1M per year for up to two years.

Section 2.1 Resource Guidelines The overall amount of funding/Full-Time Equivalents (FTEs) per Center and per award will be negotiated individually. Awards typically range up to approximately $1M (FTE and any Center procurement dollars combined) for all participating Centers per award. However, lower award levels are strongly encouraged. The bulk of the resources should be FTE. As a guideline, procurement dollars should be less than 25% of the resources requested. Procurement dollars should be utilized for Center procurements only, not for industry upgrades/equipment.
Q: Does ACO 2020 have an option to have co-proposers?

A: ACO does allow companies to team with other companies or other organizations. However, ACO does require one U.S. Company to lead the proposal effort. One must lead and then the lead Company should submit the proposal in NSPIRES with the others listed as team members on the proposed effort.

Section 3.0 of ACO 2020: In addition to one or more NASA Centers, team members may include other U.S. for-profit entities, U.S. non-profit entities (including universities and educational institutions), and/or U.S. Federal, State and local government agencies, as appropriate to optimize the potential for rapid development and commercialization of the space technology.

Q: In our ACO MPP, we have multiple organizations partnering with one company who is leading the submit. If this MPP is invited to develop a Final Proposal and that proposal is selected, would multiple SAAs be developed?

A: STMD will enter into a Space Act Agreement with only the lead industry proposer. The other organizations are partnering team members of the lead industry propose
Q: We are a non-profit research and development company and are interested in the ACO 2020. The Eligibility information section suggests that we may not be able to participate. Is this a correct reading of the ACO language?

A: In the Eligibility section of ACO 2020, the language states that proposals submitted under this ACO must be led (and submitted) by U.S. for-profit entity and must include one or more NASA Centers as a team member(s)... In addition to one or more NASA Centers, team members may also include other U.S. for-profit entities, U.S. non-profit entities (including universities and educational institutions), and/or U.S. Federal, State and local government agencies, as appropriate to optimize the potential for rapid development and commercialization of the space technology.
Q: For an ACO 2020 proposal, does NASA only fund the NASA portion of the proposed effort during the duration of the project?

A: Yes. ACO 2020 awards result in Unfunded Space Act Agreements (no-funds-exchanged) with industry. STMD provides the funding (civil servant labor and Center procurement) needed for the NASA participation in the proposed effort while industry provides the funding for their participation in the effort.

Q: In ACO 2020, under “Award Type”, Unfunded Space Act Agreements are specified. Can you provide further explanation about what this means? Specifically, since at least one NASA Center is required as a partner on the proposed effort, how is the Center funded?

A: ACO 2020 awards will result in Unfunded Space Act Agreements (no-funds-exchanged) with industry. STMD provides the funding needed for the NASA participation in the proposed effort directly to the participating NASA Center(s). Industry is responsible for funding their participation in the effort.

Q: If a NASA Center is provided procurement dollars to complete their portion of a selected ACO project, can any portion of those procurement dollars be used by the Lead Industry Partner?

A: As ACO 2020 states in Section 2.2 Availability of Funds for Awards, NASA will not provide any funding to the Lead Industry Participants through SAAs awarded under this ACO. If selected, Lead Industry Participants are expected to secure all of the funding necessary to perform their obligations under the SAAs.
Q: Our company has ideas for preliminary proposals for ACO 2020 and would like to discuss them with NASA before making a decision to write a proposal. Is there someone that we can meet with to discuss our ideas?

A: In order to ensure that all proposers are treated fairly, all STMD personnel are in a communications blackout regarding ACO 2020 and are not permitted to engage in technical discussions. Therefore, STMD personnel cannot provide advice regarding a particular technology. However, ACO 2020 Attachment 10 lists NASA Center Points of Contact that may be contacted for further discussions.

Q: Our company is preparing a preliminary proposal to the ACO 2020, but we are not sure which Topic best suits our technology. Can NASA provide assistance as to the best Topic for our proposed effort?

Q: Our company is interested in responding to ACO 2020. Can NASA provide advice concerning the most appropriate Topic for a particular technology?

A: STMD personnel are in a communications blackout regarding ACO 2020 and are not permitted to engage in technical discussions. However, ACO 2020 Attachment 10 lists NASA Center Points of Contact that may be contacted for further discussions.
Q: Are ACO 2020 Topics focused solely on Moon and Mars exploration? Is there interest in technologies that could apply to other destinations?

A: As stated in ACO 2020, STMD has formulated a strategic framework that represents capabilities needed for Moon/Mars and beyond. This framework enables a trace from high level goals to Topics. For ACO 2020, STMD strategic investments are focusing on both exploration (emphasis on the Moon keeping an eye towards Mars and beyond) and commerce (investing in the growing space economy) goals.
• Questions from Online Forum?

• You can also submit questions by March 11, 2020 to HQ-STMD-ACO@nasaprs.com
Please submit all questions to the email listed in the applicable solicitation:

HQ-STMD-TippingPointAppendix@nasaprs.com
HQ-STMD-ACO@nasaprs.com

Answers to questions will be posted to the FAQ page on NSPIRES for the applicable solicitation.

Charts presented today will be available on:
https://www.nasa.gov/feature/TippingPointACO20

Offerors are responsible for checking this website and/or NSPIRES for any further updates or amendments.

Thank you very much for your participation today.