Commercial Space Capabilities Office

Commercial Space Research
Research Request Number: CSCO-2020-01

CSCO-2020-01 is to allow consideration to award funded extension ("Renewal" per GCAM Section 5.3.3) to deserving CSCO EPSCOR R3 work that is ongoing from awards made in Fall 2018/2019 Cyle-1. We would evaluate these along with the regular R2 proposals received for CSCO-2020-02

1) Program: Commercial Space Capabilities Office (CSCO)

2) Research Title: Renewal of Previously Selected Cycle 1 CSCO R3

3) Research Overview:
NASA is requesting proposed renewals for continuation of successful currently supported CSCO R3 efforts and as otherwise adhering to *NASA Grant and Cooperative Agreement Manual* section 5.3.3. as follows;

a. Renewals can only be proposed for CSCO selections from Fall 2018 (RAPID RESPONSE RESEARCH – CYCLE 1) selections: 18-EPSCoR R3-0001, 18-EPSCoR R3-0015, 18-EPSCoR R3-0021, 18-EPSCoR R3-0027, and 18-EPSCoR R3-0035.
    i. Proposer may assume that (as applicable) NASA provided materials will be similar to those in predecessor award.
    ii. Proposer shall assume that all special conditions (e.g ITAR) in predecessor award remain in effect.
b. Proposed renewals shall support the same work of the predecessor award, or work that is a natural extension of and closely related to that work, not new projects unrelated to the predecessor award.
c. In addition to normal Proposal contents, the proposer shall provide the following in their renewal proposal:
    i. Brief statements about:
        1. why the work is still relevant, and
        2. how the work satisfies b. above.
        3. why the work should be renewed rather than recompeted
    ii. Show that costs are reasonable and realistic
    iii. State which Co-I/Sci-I personnel and capabilities/facilities would be used to perform the proposed renewal work, and state which (if any) are new. [NOTE: Changes in research personnel supporting the Co-I/Sci-I do not need to be stated]

4) NASA Contact
Name: Warren Ruemmele
Organization: Commercial Space Capabilities Office (CSCO)/UA3
Work Phone: 281-483-3662
Cell Phone: 832-221-1367
Email: warren.p.ruemmele@nasa.gov

NASA Technical Monitor (TM) will be assigned after award, but is anticipated to be the same TM as for the predecessor award.

5) Proposer-Coordinated Contributions to Proposed Work:

Proposer to indicate any contributions to the proposed work that the Proposer has arranged, in the event of a NASA award, and that would be in addition to NASA EPSCOR awarded funding. This may include funding or other in-kind contributions such as materials or services (Proposal should indicate the estimated value of the latter)

a. From Jurisdiction or Organization that would partner with the Jurisdiction

None are required. Proposer shall indicate if any has been arranged for the proposed renewal work.

6) Other NASA-Coordinated Contributions to Proposed Work

The following contributions will be provided to the proposed work that would be in addition to NASA EPSCOR awarded funding, and in the event of an award.

a. From NASA organization other than EPSCOR

None.

b. From Organization partnering with NASA

None.

7) Intellectual property management:

Proposer to indicate any intellectual property considerations in the Proposal.

8) Additional Agreement Clauses applicable to Cooperative Agreements awarded for this Call Area

None additional.

9) Additional Information:

NASA will support a telecon with the Proposer prior to the submission of Proposals, to answer Proposer's questions and discuss Proposers anticipated approach towards this Research Request. Contact information is provided in section 4).

NASA CSCO will coordinate support from within NASA as needed.

NASA will make the resulting materials data available in its MAPTIS database https://maptis.nasa.gov/ .

NASA welcomes opportunities to co-publish results proposed by EPSCOR awardee. NASA goal is for widest possible eventual dissemination of the results from this work, when other restrictions allow.

Commercial Space Capabilities Office (continued)

Commercial Space Research
Research Request Number: CSCO-2020-02

1) Program: Commercial Space Capabilities Office (CSCO)

2) Research Title: Landed Sensing of Mars Ice

3) Research Overview:

NASA is requesting research proposals in this area to further Mars exploration and commercialization efforts, by investigating landed sensing capabilities to characterize Mars ice deposits with the goal of better understanding the availability of water ice, including:

- Composition of the ice, including possible mixed in salts, dust, pebbles, and rocks
- Heterogeneity of ice deposits: both for mixed in materials as well as any distinct layering
- Spatial distribution within an area of about 10 km^2 (e.g. localized vs uniform)
- Depth, density, and nature of overburden over the area of interest (e.g. loose sand vs large rocks)

NASA has not identified specific tasks in this area but is seeking proposals that consider the following:

a) Sensing capabilities that would be landed on Mars surface or operate near the surface (not in orbit)
b) Sensing capability would be deployed from a single large vehicle that will soft land at specific mid-latitude location(s) on Mars that have been identified from orbit as likely to have accessible water ice in the subsurface.
    i. Sensing capability shall be scientifically/geologically sound, and ideally with the underlying methodology being proven terrestrially in analogous environment. Methods include, but are not limited to: seismic, drill/melt probe, ground penetrating radar, neutron spectrometer.
    ii. Sensing capability elements may remain on, and/or deploy from, the large vehicle. Elements can be centralized or spread among these.
        i. If deployment, a feasible method needs to be included in this proposal. Methods include, but are not limited to: flying, ejecting/shooting (non-explosive preferred), fully autonomous rover, tethered/cabled, combinations, etc.
    iii. The proposed sensing capability can be of much greater mass/volume than current NASA rovers. NASA telecon to discuss.
    iv. Sensing capability electrical power can be provided by direct connection or cable to the large vehicle. NASA telecon to discuss.
    v. Sensing capability commanding/data can be provided by direct connection, cable, or wireless from/to the large vehicle. Direct-To-Earth is allowed but not recommended. Commanding/data would be from Earth.
    vi. Goal of being able to sense an area ~10 km^2 centered on the large vehicle.
    vii. Goal of being able to operate on/in Mars environments between +35º and +50º latitude, for ~one Mars year.
    viii. Sensing capability shall <u>not</u> require <u>any</u> crew interaction on/near Mars.
c) Sensing capability is intended to provide ground truth to build upon the large amount of prior and ongoing data collection by other Mars systems (landers, rovers, remote sensors) and assessments by the Mars science/engineering community. Proposal should indicate relevance to, alignment with, and usage of these. Some references are:
    i. https://swim.psi.edu/

ii. https://astrogeology.usgs.gov/geology/mars-ice
iii. http://www.antarcticglaciers.org/glacial-geology/glaciers-mars/
iv. https://mepag.jpl.nasa.gov/
    i. https://mepag.jpl.nasa.gov/reports/ICESAG_Report_FINAL.pdf

The proposed work shall include performing the following at minimum:

a) Developing an engineering design concept and, as funding permits, fabricating all or part of the design to prototypic level, that would be suitable for testing in suitable terrestrial analog.
b) Producing a final report and delivery of developed design concept and data.

Proposals for this Research Title must include:

a) Describe proposing Institution's and Co-I/Sci-I's relevant capabilities and prior work. (weblinks preferred. Does not count against the 2-3 page limit.)
b) Identify the underlying scientific principles.
c) Compare and contrast proposed work against prior and existing work.
d) If data is needed from NASA to perform the proposed work, identify what it is needed and a contact/source if known

Proposers can assume that technically knowledgeable NASA engineers and scientists will be reviewing the Proposal – so Proposer should focus on technical/scientific specifics.

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NASA Technical Monitor (TM) will be assigned after award

5) Proposer-Coordinated Contributions to Proposed Work:

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a. From Jurisdiction or Organization that would partner with the Jurisdiction

None are required. Proposer shall indicate if any has been arranged for the proposed work.

6) Other NASA-Coordinated Contributions to Proposed Work

The following contributions will be provided to the proposed work that would be in addition to NASA EPSCOR awarded funding, and in the event of an award.

a. From NASA organization other than EPSCOR

None.

b. From Organization partnering with NASA

None.

7) Intellectual property management:

Proposer to indicate any intellectual property considerations in the Proposal.

8) Additional Agreement Clauses applicable to Cooperative Agreements awarded for this Call Area

None additional.

9) Additional Information:

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NASA CSCO will coordinate support from within NASA as needed.

NASA will make the resulting materials data available in its MAPTIS database https://maptis.nasa.gov/ .

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Commercial Space Capabilities Office (continued)

Commercial Space Research
Research Request Number: CSCO-2020-03

1) Program: Commercial Space Capabilities Office (CSCO)

2) Research Title: Improvement of Space Suit State of Art

3) Research Overview:
NASA is requesting research proposals in this area to further future Moon and Mars exploration and commercialization efforts, by investigating improvements to current space suit state of art.

NASA has not identified specific tasks in this area but is seeking proposals that consider the following:

a) Improvement(s) to current space suit design, implementation, and operation. Areas include: soft goods/woven materials and fabrication processes, mobility (spacecraft and surface), ergonomics and crew performance/health/safety, usability (don/doff, pre-breathe), suit life support, suit autonomy aids, availability/maintainability/redundancy (e.g. for repeated surface operations), and produce-ability/cost reduction.
b) Improvement may apply to any space suit flight phase including: launch/landing Intra Vehicular Activity (IVA), surface Extra Vehicular Activity (EVA) operation, and in-space EVA .
c) Improvement should address an identified need and/or shortcoming in current state of art, rather than a "nice to have".
d) Reasonably projected to be applicable to flight designs (so ~TRL7 https://www.nasa.gov/pdf/458490main_TRL_Definitions.pdf) within ~2 years.

The proposed work shall include performing the following at minimum:

a) Developing an engineering design concept and, as funding permits, fabricating all or part of the design to prototypic level, that would be suitable for testing in suitable terrestrial analog. NASA would work with Proposer to identify suitable terrestrial analog facilities and/or sites.
b) Producing a final report and delivery of developed design concept and data.

Proposals for this Research Title must include:

a) Describe proposing Institution's and Co-I/Sci-I's relevant capabilities and prior work. (weblinks preferred. Does not count against the 2-3 page limit.)
b) Provide references/links when presenting need and/or shortcoming in current state of art.
c) Compare and contrast proposed work against prior and existing work.

Proposers can assume that technically knowledgeable NASA engineers and scientists will be reviewing the Proposal – so Proposer should focus on technical/scientific specifics.

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a. From Jurisdiction or Organization that would partner with the Jurisdiction

None are required. Proposer shall indicate if any has been arranged for the proposed work.

6) Other NASA-Coordinated Contributions to Proposed Work

The following contributions will be provided to the proposed work that would be in addition to NASA EPSCOR awarded funding, and in the event of an award.

c. From NASA organization other than EPSCOR

None.

d. From Organization partnering with NASA

None.

7) Intellectual property management:

Proposer to indicate any intellectual property considerations in the Proposal.

8) Additional Agreement Clauses applicable to Cooperative Agreements awarded for this Call Area

None additional.

9) Additional Information:

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