NATIONAL ACADEMY OF SCIENCES

February 25, 2019

To: Interested Responders

Re: Request for Information (RFI)

The National Academy of Sciences ("NAS") is requesting information regarding research support for a study entitled ***Independent Technical, Risk, and Cost Evaluation (TRACE) for the National Academy of Sciences, Engineering, and Medicine's Astronomy and Astrophysics Decadal Survey (Astro2020).*** NAS invites all interested responders to submit a written response to this Request for Information ("RFI").

This RFI is being sought strictly for the purpose of gaining knowledge of responders and capabilities available within a fast-track timeframe and should not be construed as intent, commitment, or promise to acquire services, support, or solutions offered. Submitting to this RFI is neither a disqualifier nor a guarantor of future work. No contract is guaranteed as a result of any response to this RFI.

Information submitted in response to this RFI will become the property of NAS.

NAS will not pay for any information or consultations herein requested nor is it liable for any cost incurred by the responder.

RFI responses must be sent to DYee@nas.edu no later than **March 18, 2019.**

Procedural, administrative, or contractual questions and answers may be directed to the email listed above. Technical or requirement questions may be directed to Abigail Sheffer, (202) 334-3863, ASheffer@nas.edu
We appreciate your attention to this matter.

Sincerely yours,

Kevin Hale
Director, Procurement Services & Subaward Administration

National Academy of Sciences

Request for Information (RFI)

RFI: NAS-RFI-DEPS-19-01

Independent Technical, Risk, and Cost Evaluation (TRACE)[1] for the National Academy of Sciences, Engineering, and Medicine's Astronomy and Astrophysics Decadal Survey (Astro2020) (the "Survey")

1.0 INTRODUCTION

The National Academy of Sciences ("NAS"), under sponsorship of the National Aeronautics and Space Administration ("NASA"), the National Science Foundation ("NSF"), and the Department of Energy ("DoE"), has established the *Committee on Astronomy and Astrophysics Decadal Survey* (the "Survey Committee") to conduct the Astronomy and Astrophysics Decadal Survey (the "Survey") to assess the key scientific questions for the field over the next decade and to identify the priority federal investments that will enable the field to address those questions. To support this goal, NAS intends to contract with an independent organization to assess the budget scope, risk, and technical readiness of space- and ground-based projects. The organization will support the Survey Committee and its subcommittees in gathering the requisite information and providing the necessary analyses to support the prioritization of projects and technical development activities for the upcoming decade.

When developing a portfolio of science missions within a program, a primary goal is to meet critical science objectives in a manner consistent with expected NSF, NASA and DoE budgets. Establishing affordability of a project equates to developing a plan that will meet critical science, technical, and schedule objectives while remaining within the available project budget within a program. These factors must be evaluated for the entire life cycle of the project, including design and technology development, construction, and operation. In addition, the contractor will support the Survey Committee by developing tools to enable the planning of contingency scenarios so that the recommendations can be robust to budget and technical uncertainties.

[1] Formerly known as Cost and Technical Evaluation (CATE), the name is updated to better reflect the risk-based nature of the evaluation.

2.0 PURPOSE

The purpose of this RFI is to solicit interest and receive information on the capabilities from those organizations that have the expertise and desire to support the Survey's activities in the manner described below. The Survey will prioritize both space missions and ground-based facilities, and NAS is seeking a single contractor for both sets of activities. If the contractor does not itself have the necessary expertise, it must describe how it will augment its capabilities to support the full scope of programs to be considered by the Survey.

This RFI provides background information and describes the services desired for the contract. Although this RFI establishes the basis for responder proposals, the detailed obligations and additional measures of performance will be defined in future requests and any resultant contract.

3.0 TASKS

The contractor will support the Survey by carrying out the following tasks:

3.1 Task 1: Support the Gathering of Information

The Survey Committee will request information from teams proposing projects to be considered by Astro2020. This information, along with public documents and other materials, will be provided to the contractor, unless NAS determines that permitted restrictions apply on the distribution of the data. The contractor, in consultation with the Survey Committee, may request additional supplemental information where it is necessary to fully assess the risk, technical readiness, schedule, and cost scope of the activity. In some cases it may be necessary to support the Survey Committee to develop alternative implementations, including the conversion of a project into a technology development program.

3.2 Task 2: Estimate Budget Scope and Schedule for Proposed Space- and Ground-based Activities

The contractor shall select the methodology for assessing the budget scope and schedule for each activity set. The contractor shall assure that methods and tools utilized are appropriate for conceptual level assessments and will cross check model results with analogy-based cost and schedule estimates to provide robust estimates from multiple

independent sources for each activity. In completing the budget and schedule assessments, the contractor's cost estimating methodology and basis of estimate must remain independent from the cost estimates provided by government agencies and project teams. The contractor shall validate its budget estimates through an independent method.

3.3 Task 3: Assess Concept Technology Readiness and Risk

The contractor shall identify programmatic risks associated with (as appropriate) the technology development requirements, telescopes, spacecraft/flight systems, site selection, instrumentation, mission/project/facility design, and operations. The contractor shall assess technology readiness, provide an assessment of the critical technologies needed, and assign low, medium or high-risk ratings based on the technology maturity level of the concept. The contractor shall then associate each of the aforementioned considerations with a cost and schedule impact, and incorporate these into the cost and schedule estimates. This activity will be carried out in collaboration with subject matter experts on the Survey Committee and subcommittees.

3.4 Task 4: Summary and Comparison of Data

The contractor shall develop a series of top level quad-charts for each activity concept using four "quad" panels: a) activity description including technology development requirements, b) cost and schedule estimates, c) funding profile, and d) technology readiness and risk rating. The contractor shall also provide an "S-curve" that is generated by the cost model on a separate chart for the committee's consideration. The quad-charts will provide a top-level snapshot of each concept for summary purposes and an overview of its merits, issues, and expected budgeting requirements. All information provided in the quad-charts is to be backed by independent analysis.

3.5 Task 5: Develop Tools for Budget Analysis

The contractor shall develop tools for analyzing the consistency of the set of recommended activities with the expected U.S. agency, and/or private foundation or organization budgets. The contractor will support the Survey Committee, using these tools, to develop a set of scenarios for phasing and implementation of a set of activities consistent with the available budget profiles.

The description of these tasks may be modified, based on the responses to this RFI or on the needs of the committee, before a contractor is selected.

4.0 RESPONSE

We request that any organization responding to the RFI provide a description of previous experience in independent cost estimating for a set of space science missions and ground-based scientific facilities/projects. The respondent should describe:

1) Expertise and past experience with technical, cost and programmatic evaluation of space- and ground-based scientific projects.
2) Approach to budget and schedule estimation, including relevant data bases and analogy information. This should include a description of the commonalities and differences in approach for ground- and space-based projects.
3) Qualification of staff who will be performing analyses and interfacing with Survey and sub-committee members.
4) Methodology for budget estimation and independent cost validation.
5) Approach to dealing with potential conflicts of interest and processes for handling proprietary, classified, or non-public information, including assurances that any materials provided to the Academies will be unclassified.

The response should be no more than twenty pages.