

Terms of Reference
Large Mission Concept Independent Assessment Team (LCIT)

Introduction

NASA is sponsoring four large-scale mission concept studies as part of its preparations for the 2020 Astrophysics Decadal Survey. The four large-scale mission concept studies, led by community-driven Science and Technology Definition Teams (STDTs), are:

Large-scale Mission Concept Study	STDT Chairs	Study Manager Study Scientist NASA Center
Habitable Exoplanet Imager (HabEx)	S. Gaudi, OSU S. Seager, MIT	K. Warfield B. Mennesson JPL
Large Ultraviolet Optical Infrared Surveyor (LUVOIR)	D. Fischer, Yale B. Peterson, STScI/OSU	J. Crooke A. Roberge GSFC
Lynx X-ray Observatory (Lynx)	F. Ozel, ASU A. Vikhlinin, SAO	K. Gelmis J. Gaskin MSFC
Origins Space Telescope (OST)	A. Cooray, UC Irvine M. Meixner, STScI	R. Carter D. Leisawitz GSFC

The four STDTs worked closely with engineering teams at the NASA Centers assigned to each study (see Table above). Each STDT developed a publicly available Interim STDT Report. Each STDT is developing a Final STDT Report for submission to the 2020 Decadal Survey. Documents supporting the STDT process, including the Interim STDT Reports and the Management Plan for Large Mission Concept Studies, are available at <https://science.nasa.gov/astrophysics/2020-decadal-survey-planning>.

In advance of that submission, NASA HQ will assemble a Large Mission Concept Independent Assessment Team (LCIT) to conduct a technical, risk, and cost assessment of the four large-scale mission concept studies. The LCIT will include experienced technical and cost reviewers with expertise in large space missions and in science, instrumentation, and technology.

Charge and Review Criteria

The LCIT will conduct a “cost and technical credibility analysis” of the STDT-led large-scale mission concepts. A cost and technical credibility analysis is not a Cost and Technical Estimate (CATE); rather it is an independent assessment of the technical, cost, and schedule requirements that are described in the large mission concept draft final reports.

The purpose of conducting a cost and technical credibility analysis of the STDT-led large-scale mission concept studies is two-fold:

1. Provide feedback to the STDTs that can be used to improve the Final STDT Reports that will be presented to the Decadal Survey.
2. Provide NASA Headquarters confidence in the science, technical, cost, and risk conclusions of the Final STDT Reports that will be presented to the Decadal Survey.

Specifically, the LCIT will:

- Assess whether the proposed observatory and instrumentation can achieve the stated science goals and objectives with the proposed architecture.
- Review and assess the current TRL of enabling technologies and the plans (including cost, risk, and schedule) for maturing these technologies to TRL 6 before PDR.
- Review and assess engineering challenges beyond maturation of requirements and beyond maturation of technology.
- Develop a process to assess the credibility of the cost and schedule, including assumptions to support the assessment.
- Assess the credibility of the proposed mission cost and development schedule.
- Evaluate any proposed alternatives (e.g., second option architectures and any descopes) and their cost savings, additional cost, realism, and reasonableness.

Content and Format Requirements for Submission to the LCIT

To enable the independent assessment by the LCIT, each STDT will submit to NASA HQ the following material according to the schedule below.

- A draft of the Final STDT Report (hereafter called the Draft STDT Report). The Draft STDT Report will comply with the constraints set by the joint discussion in August/September 2018.
- The high-level mission design products generated by the Center design labs during the development of the mission concept, including the Master Equipment List (MEL).
- The heritage, if applicable, of each enabling technology item identified as less than TRL6, as well as any required new facilities or major test equipment needed to demonstrate TRL6 by PDR.
- The independent cost estimate (ICE) developed by the Center through its cost assessment office, as well as the supporting documentation developed during the generation of the ICE.
- The mission level risks and their recommended mitigation including risks associated with the individual instrument development schedules.

The LCIT will use the Draft STDT Reports, the high-level design products made available from the Center design lab runs, and the Center ICEs including supporting documentation as the basis for their assessment.

LCIT Report and Deliverable

The LCIT deliverable to NASA HQ is a written report covering:

- Overall Summary;

- Brief description of LCIT Methodology and Process;
- Technical and Risk Assessment for each Study including Strengths and Weaknesses of the Mission Concept draft final report;
- Viability of Mission Cost and Confidence Level;
- Suggestions for improving each Study Report / Comments to the Study Teams; and
- Comments to NASA.

The LCIT final written report will be in the form of a short narrative summary and a set of PowerPoint slides with explanatory notes.

LCIT Schedule

The LCIT will have an initial discussion with each STDT early in this process to discuss the cost data and products to be provided to the LCIT and the status and content of the draft Final Reports.

The LCIT will meet with each STDT at the beginning of the assessment phase (after delivery of the cost data, products, and the draft Final Report) to ensure that the LCIT understands the STDT's mission concept as well as to discuss with each STDT the issues and concerns regarding their mission concept.

The LCIT will meet with each STDT after the LCIT has developed its draft report to reconcile differences between the LCIT's assessment and the Draft STDT Report, and to avoid misunderstandings and preventable errors. This feedback from the LCIT's draft report provides an opportunity for the STDTs to improve their Final STDT Reports before submitting them to NASA HQ for transmission to the Decadal Survey.

Milestones	Date (as of November 2018)
LCIT formed	September 2018
LCIT kickoff meeting	November 9, 2018
Finalize input requirements and schedule with STDTs	November 2018
LCIT initial discussion with each STDT	December 2018
STDTs submit required input to LCIT via NASA HQ (including draft final report)	February 28, 2019
Second meeting of LCIT with STDTs	March 2019
Third meeting of LCIT with STDTs	May 2019
LCIT submit final report to HQ	June 2019
STDTs submit final report to HQ	June 30, 2019
HQ review and submit to 2020 Decadal	August 2019

After the reconciliation process with each of the four STDTs and after the delivery of the LCIT final written report to NASA, NASA will disband the LCIT.

LCIT Membership

The LCIT will consist of 10-15 members with expertise in the science, technologies, instrumentation, management, and cost analysis relevant to the four large-scale mission concept studies. Rick Howard (Cornell Technical Services (CTS) and ex-NASA) will chair the LCIT.

NASA HQ Point of Contact

Rita Sambruna, Decadal Studies Program Scientist
LCIT Executive Secretary / Review Manager

Rita.m.sambruna@nasa.gov

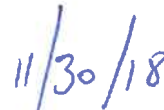
202-358-2166 office

240-381-8085 cell

Concurrence:



Paul Hertz, APD Director



Date