



WFIRST Independent External Technical/Management/Cost Review (WIETR)

Reply to Attn of:

Terms of Reference (ToR)

I. Background

NASA is conducting formulation of the Wide Field Infrared Survey Telescope (WFIRST), a major astrophysics facility that responds directly to the recommendations of the 2010 National Academies' Decadal Survey, *New Worlds, New Horizons in Astronomy and Astrophysics* (NWNH). WFIRST incorporates NWNH's highest-priority recommendations in both the large-scale and medium-scale space project categories. Once it becomes operational in the mid-2020's, WFIRST will conduct groundbreaking investigations in dark energy and exoplanet research, in addition to supporting a robust guest observer program. The National Academies endorsed WFIRST, including the 2.4m telescope and the coronagraph, in its 2014 report, *Evaluation of the Implementation of WFIRST/AFTA in the Context of New Worlds, New Horizons in Astronomy and Astrophysics*, and in its 2016 report, *New Worlds, New Horizons: A Midterm Assessment*. Both reports expressed concern that mission cost growth could endanger the balance of NASA's astrophysics program and the alignment of its scientific priorities with those put forward by NWNH. To address this concern, the midterm assessment recommended that NASA charter an independent technical, management, and cost assessment of WFIRST, including a quantitative assessment of the incremental cost of the coronagraph, before the project enters Phase B. WFIRST is currently in the latter stages of Phase A, preparing to conduct a System Requirements Review and Mission Definition Review (SRR/MDR). This is an appropriate time to conduct the independent assessment identified in the midterm assessment.

II. Terms of Reference

NASA therefore establishes the WFIRST Independent External Technical/Management/Cost Review (WIETR) to ensure that NASA's approach to Phase A has yielded a mission that is both (1) well understood in terms of scope and required resources (cost, schedule, etc.) and (2) executable. The WIETR panel will conduct an assessment of the WFIRST project that addresses the following questions:

- A. Are the technical requirements understood and reasonable?
 - a. Are the technical requirements aligned with the mission's science goals?
 - b. Are there any (obvious) science/technical requirements descopes that the project should consider that could result in acceptable science return as well as lower cost, earlier launch, or reduced risk?
- B. Are the scope and cost/schedule understood and aligned?
 - a. What is the likely range of probable cost and schedule, and what are the drivers?
 - b. How do non-optimal funding profiles affect the cost/schedule of the mission?
What is the impact of staying within the funding profile guidelines and KDP-A total cost guidelines?
 - c. Are there any (obvious) design/acquisition/technical trades that the project should conduct that could result in lower cost, earlier launch, reduced cost of science and mission operations, or reduced technical risk?

- C. Are the management processes in place adequate for a project of this scope and complexity?
- D. Are the benefits of the coronagraph to NASA objectives commensurate with the cost and cost risk of development?
 - a. Are the science/technical requirements, resource (budget, schedule) allocation, and risk posture appropriate for a technology demonstration instrument?
 - b. Does the technology demonstration require a space mission?
 - c. What are the cost and schedule savings (if any) of removing the coronagraph from the mission at this stage?

The panel will document its assessment in a presentation and a final report. The panel may develop findings, concerns, and recommendations as part of its assessment.

III. Management

The convening authority for the WIETR is NASA’s Science Mission Directorate (SMD). The review panel shall be comprised of members with considerable experience in program and project management, systems engineering, schedule/cost estimation, and the science and instrument domains relevant to the WFIRST science objectives.

In collaboration with the Chair, NASA will establish a contract with an independent Aerospace Corp. team for cost and schedule analysis. The task will be directed by the review panel through SMD.

The SMD Deputy Director of Astrophysics is the SMD point of contact for the review panel. The Chair and the Executive Secretary for the WIETR will maintain close communications with the SMD point of contact on schedule and assessment status. Additionally, the Executive Secretary will coordinate production and ensure the quality of assessment deliverables. A progress review will be held with representatives of the WFIRST Project and the Exoplanet Exploration Program prior to final presentation to the SMD Sponsor.

IV. Notional Schedule

The review panel will conduct the assessment over a six to eight-week period with email exchange and teleconferences during the first two weeks followed by a meeting at or near Goddard Space Flight Center in Greenbelt MD. The review panel may also travel to the Jet Propulsion Laboratory in Pasadena CA to understand the coronagraph technical approach and status, and to Harris Corporation in Rochester NY to understand the telescope technical approach and status. The review panel will assemble questions in advance to be addressed during the site visit(s).

The final schedule will be determined following discussions between the WIETR review panel, the WFIRST project, and NASA SMD. These discussions will take place after the WIETR review panel’s kickoff telecon.

ASAP	Select and Appoint Panel Members
Week #1	Hold kickoff telecon to review assessment plan; Following discussion with WFIRST Project, determine final schedule

Week #2	Project presents status update to review panel; Review panel sends questions and presentation request to the WFIRST Project
Week #3	Full review panel meeting and site visit in Greenbelt, MD
Week #4	Optional site visits to Jet Propulsion Laboratory (Pasadena, CA) and Harris Corporation (Rochester, NY)
Week #5	Develop draft findings and questions for discussion with WFIRST Project; Develop draft report
Week #6	Complete draft report; Brief WFIRST Project and Exoplanet Exploration Program, and consider comments from project and program
Week #7	Draft semi-final report; Brief GSFC and SMD management
Week #8	Prepare final report; Print & deliver to SMD Associate Administrator.

V. Deliverables

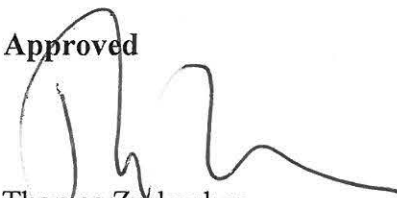
- Presentation to SMD presenting the assessment results.
- Final Report with findings consistent with Section II above.

VI. Personnel

The WIETR panel membership includes:

- Chair: TBD
- Program and Project Management: TBD
- Systems Engineering: TBD
- Science: TBD, TBD
- Instrumentation: TBD
- Cost and Schedule Estimation: TBD
- Executive Secretary: TBD

Approved



Thomas Zurbuchen
Associate Administrator
Science Mission Directorate