

National Aeronautics and
Space Administration

Headquarters
Washington, DC 20546-0001



Reply to Attn of: Science Mission Directorate

TO: Director, Goddard Space Flight Center

FROM: Associate Administrator, Science Mission Directorate

SUBJECT: Next Steps for WFIRST Program

I thank you, the entire WFIRST team, and everyone at GSFC who has worked on this mission. WFIRST is the top priority of the National Academy of Sciences' 2010 Decadal Survey for Astronomy and Astrophysics. It is designed to conduct groundbreaking investigations in dark energy and exoplanet research. NASA initiated the project in 2016 with a mission design that would be as sensitive as the Hubble Space Telescope, but have 100 times its field of view. The National Academy's 2016 Midterm Assessment Report affirmed WFIRST's scientific promise, and cautioned NASA against allowing the cost of the mission to affect the balance of projects and research investigations across NASA's astrophysics portfolio. Accordingly, the Midterm Assessment Report recommended that "NASA should commission an independent technical, management, and cost assessment" of the project.

In response to this recommendation from the National Academies, I established the WFIRST Independent External Technical/Management/Cost Review (WIETR) in April 2017, near the end of WFIRST's Phase A. The motivation behind the independent review was to validate that the requirements for the mission are aligned with the resources available and are executable. I commend the WFIRST team for proactively supporting the independent review and providing them with the information needed to complete their work.

I have been briefed on the results of the independent review. The key findings of the independent review team include that the WFIRST surveys program and system design offer groundbreaking and unprecedented survey capabilities for dark energy, exoplanet, and general astrophysics science. The independent review also found that the WFIRST team is very experienced and has done a considerable amount of work for a project that has yet to enter Phase B, particularly in areas that minimize development risk and cost risk. Key processes for project execution and control are in place, and the science and mission system concepts are mature. They also noted that the WFIRST Project has been methodical, thorough, and inclusive in the analysis and derivation of the science requirements and corresponding technical and data requirements.

The independent review also found that a series of decisions by NASA set boundary conditions for the Project for an approach and mission system design that is more complicated than

originally anticipated in terms of scope, complexity, and the concomitant risks of implementation. For example, they noted that the coronagraph instrument team has made remarkable progress toward advancing technology, but they also concluded that accommodation of the coronagraph instrument has been one of the mission system design and programmatic drivers, and that it is certain to present risks to the primary mission well into the verification and validation program.

The independent review found that the management agreement signed at the beginning of Phase A for the WFIRST life-cycle cost and the budget profile provided as guidance to the Project are inconsistent with the provided funding profile, added scope and requirements, and the appropriate risk classification for the mission. The WFIRST project's latest life cycle cost estimate for the mission of \$3.6B (as compared to the earlier of \$3.2B) was validated by the independent review team.

The independent review team also noted that NASA should consider adding engineering development hardware, spare hardware and additional analysis to provide a more robust program than the standard Class B risk classification for the WFIRST mission. The concern is that a standard Class B mission is not consistent with the uniform application of NASA policy for strategically important missions with comparable levels of investment and risks, most of which are Class A missions. In light of their findings, the independent review team felt that NASA should conduct a top-to-bottom cost-benefit assessment to balance scope, complexity, and the available resources, and that this should be done in advance of the Systems Requirements Review/Mission Design Review (SRR/MDR) which serve as the gateway to Phase B. They suggested that NASA should relook at the Headquarters-to-Program governance structure to establish clarity in roles, accountability, and authority.

I have reviewed the findings of the independent review team and have accepted them. As a result, I believe reductions in scope and complexity are needed.

I am directing the Goddard Space Flight Center to study modifying the current WFIRST design, the design that was reviewed by the WIETR, to reduce cost and complexity sufficient to have a cost estimate consistent with the \$3.2B cost target set at the beginning of Phase A.

The following constraints and changes are directed to begin this design modification study:

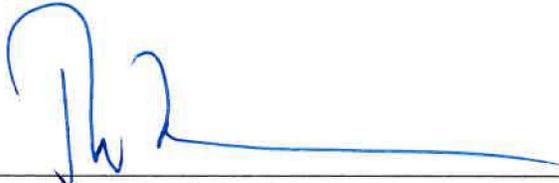
- The basic architecture of the mission, including the use of the existing 2.4m telescope, a widefield instrument, and a coronagraph instrument, shall be retained.
- The implementation of the mission risk classification shall be consistent with the findings of the WIETR report.
- Reductions shall be taken in the widefield instrument.
- The coronagraph instrument shall be treated as a technology demonstration instrument, consistent with the findings of the WIETR report; in addition, reductions shall be taken in the coronagraph instrument.
- The cost of science investigations shall be reduced.
- The additional use of commercial subsystems and components shall be considered for the spacecraft; however, serviceability for both the spacecraft and the payload will be retained.

The modified WFIRST design being studied will still be capable of meeting and exceeding the science priorities set for WFIRST by the 2010 Decadal Survey in Astronomy and Astrophysics. The WFIRST project and GSFC Center management should plan to report the results of this study at the SRR/MDR in February 2018, in time to support a Key Decision Point-B (KDP-B) Directorate Program Management Council in March or April 2018. In advance of KDP-B, an independent cost assessment will be conducted to validate the estimated cost as being consistent with the \$3.2B cost target.

I am directing Dr. Paul Hertz, the Director of the Astrophysics Division, to work with you to establish a WFIRST management process consistent with the findings of the WIETR report, that will result in a more interactive relationship, shortening the time to make decisions and reduce cost. In addition, we will be providing a revised budget profile for the WFIRST Project.

If the result of this study is the conclusion that WFIRST cannot be developed using the current 2.4m telescope architecture within the \$3.2B cost target, I will direct a follow-on study of a WFIRST mission consistent with the architecture described by the Decadal Survey.

WFIRST remains NASA's highest priority for a large astrophysics mission following the James Webb Space Telescope. Making these adjustments to WFIRST in response to the findings in the WIETR report will ensure its success while preserving a balanced Astrophysics program.



Thomas H. Zurbuchen, Ph.D.
Associate Administrator,
Science Mission Directorate

10/19/17

Date

Cc: George Morrow, GSFC
Paul Hertz, SMD