



Memo To: Astronomy Colleagues

May 13 2020

*Re: The risk to Roman/WFIRST<sup>1</sup> from the lack of support in the astronomy community*

From: Garth Illingworth

Over the last couple of years I have become increasingly concerned about the lack of interest in Roman/WFIRST in the astronomy community. My concern about the narrow science model has grown in the last 6 months. The contrast with the development of the mission is marked. The WFIRST Independent External Technical/Management/Cost Review<sup>2</sup> (WIETR) review process, the clarity of the recent transition to implementation (Phase C), and the excellent development efforts by the Roman/WFIRST Project team at GSFC have contributed to putting the Roman/WFIRST Program onto a sound programmatic and technical footing. The Project is progressing well (though Covid impacts are TBD). Nonetheless, the yearly cancellations do hang over the Program, and not having much astronomy community support adds greatly to the risk for Roman/WFIRST.

I have written three letters to Director Paul Hertz, Astrophysics Division NASA SMD, discussing various aspects of these concerns. These letters are attached (in one set). This memo also includes a summary below of the concerns and thoughts raised in the letters to Paul.

The first letter, from November 17 2019, is short and makes it obvious just how different Roman/WFIRST is from JWST in terms of community interest. This has been reinforced by numerous discussions. These discussions led me to give a broader analysis in my second letter of January 24 2020 about the lack of interest, along with some thoughts for consideration by Paul and his Roman/WFIRST team towards gaining community support for Roman/WFIRST. I realized in subsequent discussions that the second letter was misinterpreted (my fault for not being sufficiently clear), and so I wrote a more focused third letter re the science model that was sent to Paul and the Roman/WFIRST team in late April.

I should note that I do not have a “horse in this race”. My concerns here arise from my decades of effort helping to make the Great Observatories, and NASA Flagship missions in general, hugely successful scientific enterprises that are worthy of the support by policy-makers for the billions of dollars that the US, and our partners, spend on them on behalf of taxpayers.

The letters are long and so I have included here the summary that is in the third letter that I sent to Paul recently to give you an overview of my concerns (and those of many others):

***Summary:*** *Roman/WFIRST has the potential to be an exciting Flagship mission doing cutting-edge science by bringing the imagination of the community to bear. Roman/WFIRST can be a powerful Hubble-Class Flagship Observatory with a remarkable wide-field camera. Yet Roman/WFIRST is failing to be seen as a project worth spending \$4B on by the science community. Why? Because the 2.4-m Roman/WFIRST/AFTA is being set up as a pre-planned limited-science survey mission that will serve a tiny fraction of the science interests of the astronomy community. Furthermore, it is a mission that is seen to have been captured by just a few percent of the community -- who are seen as the “haves” and “insiders”. This clearly is not what we should be doing for a powerful \$4B Flagship.*

<sup>1</sup> Occurrences of “WFIRST” have been replaced by “Roman/WFIRST” for alignment with the mid-2020 name change to Nancy Grace Roman Space Telescope, widely abbreviated to “Roman” by NASA, while retaining consistency with the original document’s use of WFIRST.

<sup>2</sup> [https://www.nasa.gov/sites/default/files/atoms/files/wietr\\_final\\_report\\_101917.pdf](https://www.nasa.gov/sites/default/files/atoms/files/wietr_final_report_101917.pdf)

How did we get into this situation? Roman/WFIRST/AFTA had its genesis in the mid-2000 timeframe when a number of probe-class missions were rolled up into a sub-\$1B JDEM. JDEM was conceived to be a 1.5-m dark energy survey instrument, responsive to the Beyond Einstein process. This grew slightly in science scope in the Decadal survey, but still with a similar size mirror. When the AFTA opportunity arose, and WFIRST grew from the then 1.3-m to 2.4-m, its path was set to become a Flagship. The science opportunities should have expanded greatly beyond those for just a small-scale survey telescope. **Yet the science opportunities remained like that for sub-\$1B Probe or Fermi-like missions.** The Roman/WFIRST science program is of direct interest to just a tiny fraction of the science community (~5%) and is seen to have been given to just a few percent (~2-3%) of the science community, as represented in the SITs and FSWG. While this group has done valuable service by defining detailed science approaches that have provided the technical requirements on Roman/WFIRST, the FSWG and SIT teams are seen as controlling the science program for Roman/WFIRST. Failing to take the AFTA opportunity to expand the science scope was a mistake that has led to the community seeing the now \$4B Roman/WFIRST as a telescope for the “haves” and “insiders” and not as an Observatory that would provide access for the full-community by enabling cutting-edge contemporary science in the 2026-2031+ timeframe across all of astrophysics. The science model for Roman/WFIRST/AFTA should be Hubble/Chandra/Spitzer, not JDEM, or the similar probe-like capability of the WFIRST/Decadal, or of other sub-\$1B scale missions like Fermi. We need to change Roman/WFIRST to a model of contemporaneous peer-review in the 2026+ timeframe, openly-competed across all astronomy, since that is the **gold standard** for doing the best science.

Key projects, covering a small fraction of the time, could be used to deal with any science areas that might, as we get closer, be seen as needing special treatment. But the justification would need to be exceptional to do so. For JWST, as recommended by the JSTAC, it was felt that the science goals that have long been used to justify and “market” JWST did not need special treatment. If they are of overwhelming contemporary science interest they surely will be selected through a well-designed TAC process.”

The bottom line is that the current pre-planned survey science model focuses just on a small (albeit important) area of astrophysics, and diverges from our well-established *broad, contemporaneous science peer review process to define the science program*. The current narrowly-focused survey science model is a mistake in a \$4B Flagship Observatory that has Hubble-like power for doing cutting-edge science. For enabling our future Flagship missions (cf., HabEx, Lynx, Origins, LUVOIR), as well as for justifying the cost of Roman/WFIRST, Roman/WFIRST has to be seen as one of our ensemble of Great Observatories that have opened up new scientific frontiers and also provided new opportunities for the whole astronomy community – and particularly, offers such scientific opportunities through contemporary peer review for our upcoming young scientists, who, with the enhanced numbers of woman and minorities, are finally leading to more diversity in our community.

As my concluding sentence noted in my most recent letter: **“The current narrow pre-planned survey science approach for Roman/WFIRST will not achieve these goals, and leaves Roman/WFIRST at significant risk of cancellation.”**

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Short summary CV here: [http://www.ucolick.org/~gdi/docs/GarthIllingworth\\_SummaryCV2020.pdf](http://www.ucolick.org/~gdi/docs/GarthIllingworth_SummaryCV2020.pdf)

Attached letters (as a combined set) for Paul dated 11/17/2019, 01/24/2020 and 04/28/2020:

*Roman/WFIRST Community Support*

*Making Roman/WFIRST into a Great Observatory*

*Roman/WFIRST Contemporaneous Science Peer Review*