Astrophysics Future Flagship Mission Studies

The Strategy

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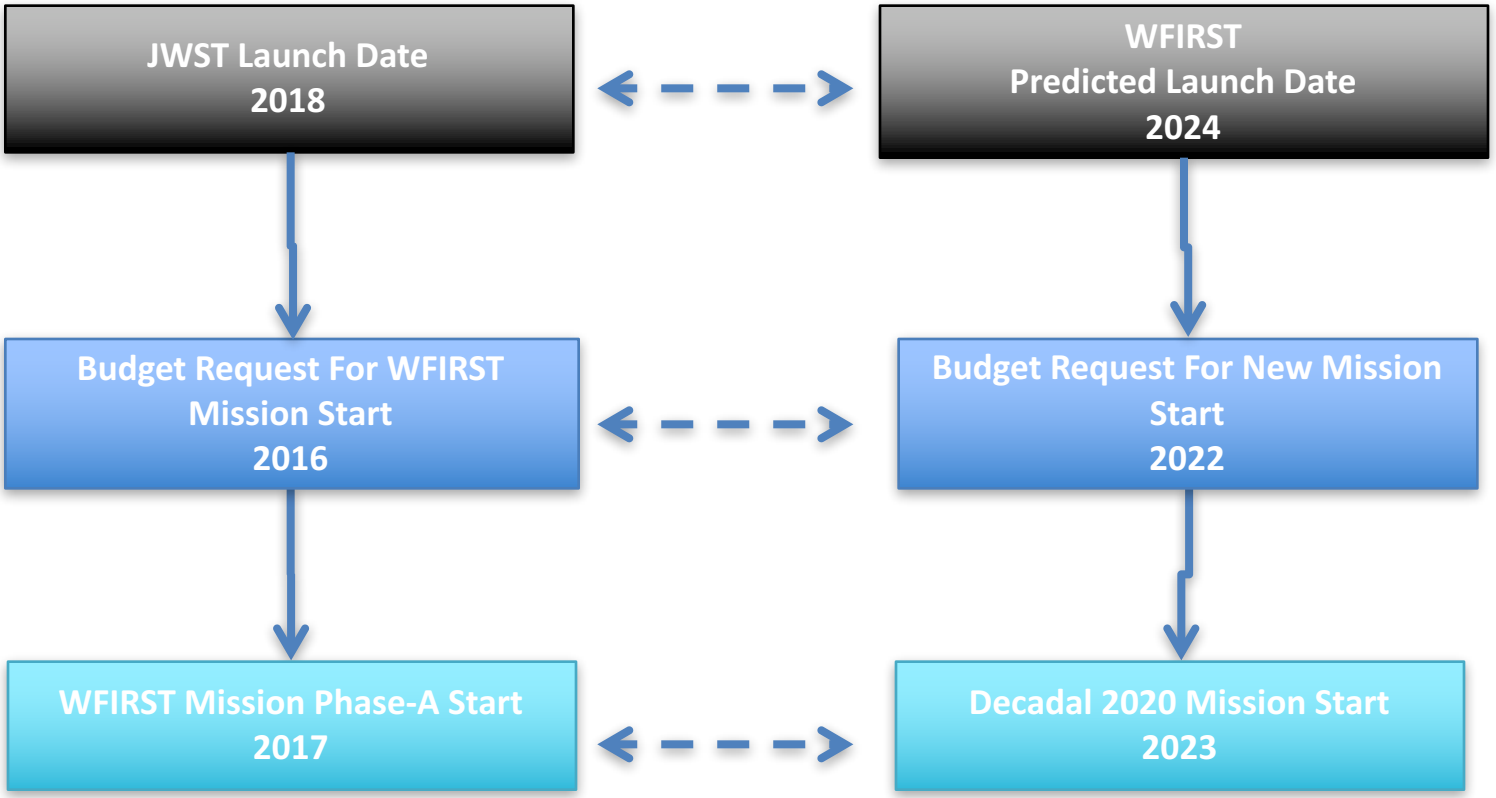
Background

- **Available funds to develop Decadal 2020 mission concepts are considerably less than what was available for 2010 Decadal**
  - *LISA, IXO & JDEM spent several million dollars/year in the years approaching the decadal*
  - *Additional ~$20M were spent for smaller concept studies in the final year*
  - *Heavy emphasis was placed on the engineering point designs in 2010*
- **Decadal 2020 mission start (Phase-A) is tied to WFIRST launch date**
  - *WFIRST planned LRD is 2024*
- **A different strategy is required to achieve a meaningful decadal review in 2020**

Potential Mission Start Date



Gives us minimum 3 years from Decadal 2020 to

- **Conduct focused engineering studies**
- **Mature cost estimates**
- **Mature enabling technologies**

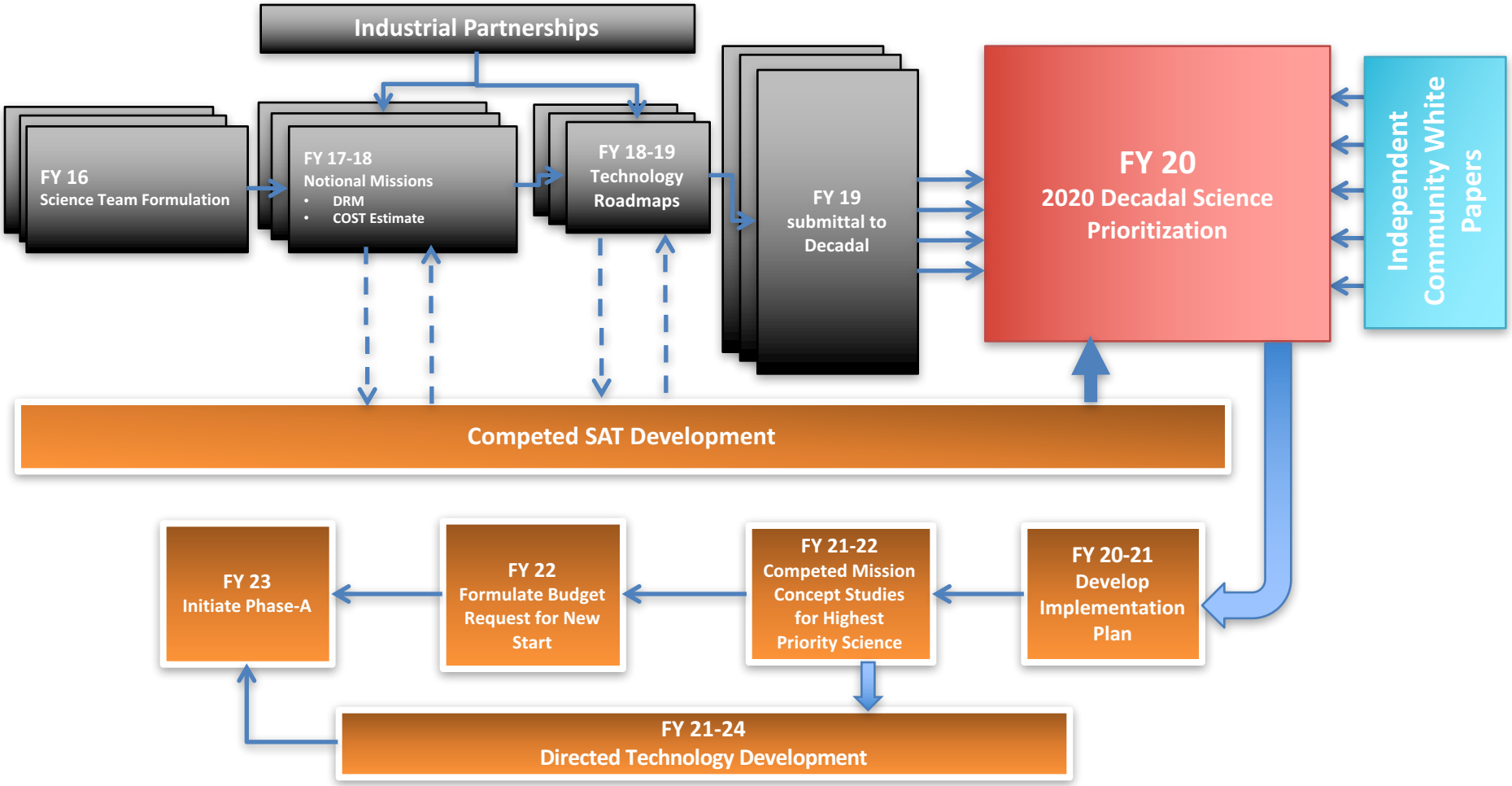
Strategy For 2020 Decadal

- **The adopted strategy proposes that:**
  - *The NRC focuses on prioritizing Astrophysics Science rather than mission concepts*
  - *NASA focuses on implementing the highest priority science **AFTER** the decadal prioritization*
- **The strategy strives to:**
  - *Maximize the focus on science case development and technology maturation*
  - *Minimize premature focus on mission point designs and detailed cost estimates*
  - *Provide the necessary information to the decadal committee for prioritizing science cases that are practically achievable in the next decade*
  - *Make effective use of the period post-decadal to develop mission point designs and cost estimates for viable new mission starts*

Ingredients for 2020 Strategy

- **Strategy for Decadal 2020 strives to:**
  - *Make the most efficient use of the available funds and time in the **Pre-Decadal** years (FY16-FY19)*
    - Balanced investments between technology development and mission concept studies
  - *Make the most efficient use of the available funds and available time in **Post-Decadal** years leading up to the mission start (FY21-24)*
    - Focused investments in highest priorities
  - *Energize the science community to the maximum extent possible*
  - *Engage the international partners as early as practical*
  - *Engage the aerospace industrial base to*
    - Leverage internal R&D funds
    - Extract from "DoD" technologies

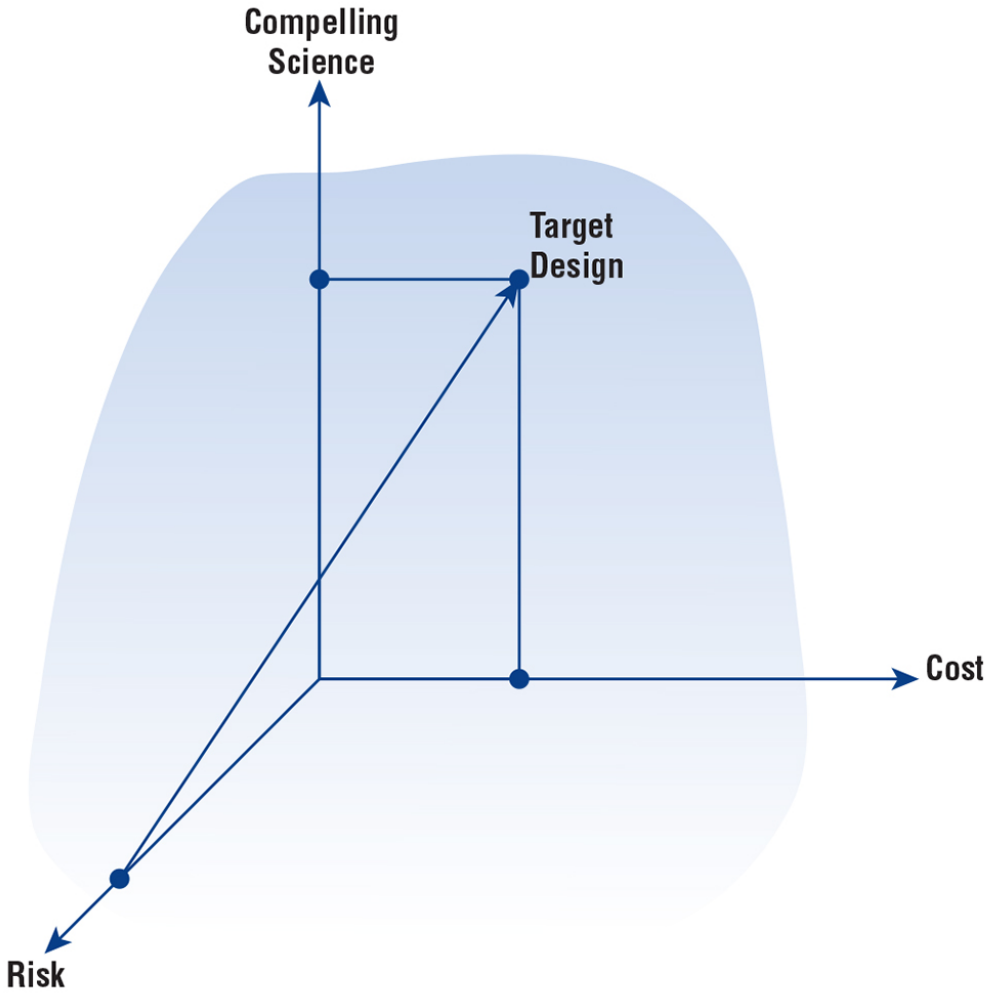
Decadal 2020 Mission Timeline



Study Objectives

- **To answer the following questions:**
  - *Is the science compelling?*
  - *Can a mission be implemented without violating laws of nature or requiring unobtainium?*
  - *Is the pathway to achieving technology maturity well understood, and achievable?*
- **What is NASA Astrophysics Trying to Accomplish?**
  - *Four quality studies with:*
    - Order-of-magnitude increase from the current scientific capabilities
    - Roughly the same degree of product maturity
    - CATE- able parameters
  - *All studies should:*
    - Demonstrate feasibility by analysis
    - Derive the minimum data to perform an independent cost estimate
    - Produce a supporting technology development roadmap
    - Demonstrate a viable risk reduction pathway (*path to green*)
    - Elaborate on the scalability of science vs. risk and cost

Three-Space of Science, Cost and Risk



The "target design" represents a point within the available trade space: specifically a point within the "sweet spot" in that 3-space that is feasible and warrants critical examination.

Summary

- **The adopted strategy makes the most efficient use of the Pre-Decadal budget and Post-Decadal time**
  - *Makes the NRC responsible for prioritizing the Astrophysics Science*
  - *Makes NASA responsible for engineering the mission for achieving the highest fraction of the prioritized science within the budget and political constraints of the decade*
- **The strategy**
  - *Right-sizes Pre-Decadal investments between mission studies and technology development*
  - *Right-sizes the investments between Pre and Post-Decadal time period*
  - *Provides maximum flexibility for reacting to budgetary realities of the next decade*
- **Proposed products from the studies provide sufficient information for science prioritization**

The Program Office is here for you

- **Expertise in several relevant areas**
  - *Mission concept development*
  - *Technology roadmaps*
  - *Risk assessment*
  - *Financial management*
  - *Science advocacy/conference activities*
- **Call on us for**
  - *Consultation*
  - *Sounding board*
  - *Red team reviews*
  - *Budget re-phasing*
- **Negotiations are proceeding with the NRC for us to engage Aerospace to provide guidance on cost and risk assessments**

My Personal Perspective

The predicted budget wedge Post-WFIRST will have external demands on it:

From within the Agency

Other pressing national priorities at that time

The best way to preserve the budget wedge is to build a compelling science case:

Not only for your community,

Not only for the Astrophysics community at large,

But for the entire nation

So that our stakeholders in OMB & Congress have no choice but to leave it alone