Augmenting ATLAST

Sustaining Goddard Leadership on the Road to the 2020 Decadal Survey

March 2015

The will to win means nothing without the will to prepare!

NASA's Exoplanet & Astrophysics Facilities

JWST

AFTA

TESS

Kepler

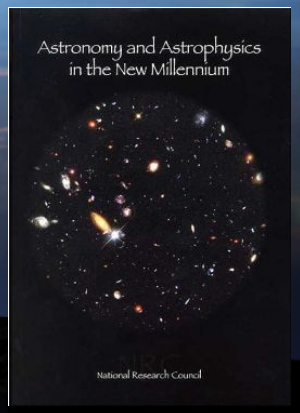
New Worlds Telescope

Spitzer

Hubble

Ground-based Observatories

2001 Decadal Survey



2010 Decadal Survey

Adapted from invited Goddard Symposium talk by J. Grunsfeld (Mar 11, 2015)

Led by GSFC and including JPL, STScI, and MSFC, our overarching goal is to win the Astrophysics NRC 2020 Decadal Survey

- FY2015 is a "watershed year," with major opportunities for ATLAST and its competitors
- The priority science goals and 10 m-class reference design is very well-regarded
  - AURA's *Beyond JWST* report has recommended that a mission nearly identical to ATLAST follow WFIRST/AFTA
  - Our team has been approached by candidate international and industry partners
- Priority challenge for an ATLAST win is perceived technology readiness by early 2020s
  - The Exoplanet Program Office is prepared to augment relevant tech funding in FY16 and SMD astrophysics is putting in an "over guide" augmentation to FY17
  - We are seeking an FY15 funding augmentation to accelerate technology development in two (of three) key areas
    - Assessment and design work of starlight suppression (partially matched by JPL)
    - Advanced design of optical wavefront sensing and control

Facing the 2020 NRC Decadal Survey Committee

In 2010: twenty-three professionals from twenty institutions supported by 120 colleagues in ten panels

Our technology must be ready and our design sufficiently detailed.

We must be seen more often, be better prepared, and in more places than our competitors.

We must be prepared to meet with candidate industrial and international partners.

GSFC's priorities, as well as our partners, must be unambiguous.

Our visualizations must impress and our media presence widely accessed (via STScI).

Are we preparing to face the NRC?

Augmented Funding to Accelerate GSFC-led ATLAST Technology Readiness and Mitigate Risk

- ATLAST's scientific "killer app" is the detection of biosignatures in the spectra of exoplanets around stars in the solar neighborhood: *Are we alone?*
  - This requires major progress in two key technologies: starlight suppression and overall systems stability
- *Starlight suppression:* Matched by JPL funding, we are requesting **$200 K** in CY15 to jointly support [four] coronagraph teams to assess feasibility of their designs to suppress starlight in a large-aperture segmented observatory
  - Results will be submitted to Stuart Shaklan (JPL) for apples-to-apples comparison
  - We are requesting **$100 K** in CY15 to fund JPL assessment of star shade option for starlight suppression
- *Systems stability:* ATLAST requires mechanical and thermal stability beyond that which has ever been achieved, requiring exploration via sophisticated integrated modeling
  - As the small number of GSFC integrated modelers are fully occupied, we are requesting **$75 K** for Carl Blaurock (Night Sky Systems, Inc.), one of the world experts, to expand his work on this activity.
- Although our JPL, STScI, and MSFC partners in ATLAST have been excellent, it is essential that GSFC maintain leadership by being the "face" of the mission to the professional communities.
  - We request continued senior Center support for professional engagement and outreach