

# US Contributions + NASA Mission of Opportunity

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# NASA Landscape

- 2010 Decadal Report: technology funding for potential mission in the 2020 decade, depending on results from sub-orbital experiments.
  - Hints for a signal from sub-orbital experiments are perceived critical
  - Ancillary science alone did not rise to the level justifying a space mission
- ➔ Funding for any collaborative space mission must come from existing programs ➔ Mission of Opportunity (MO)

# MO

- MO solicitations are part of 'Explorer + MO' solicitations
  - Every ~2 years
  - SMEX/Explorer + MO package
  - Subject to Phase-A study and final down select
  - Require significant management costs and cost margin
  - Stiff competition
- EXP2014: Small Explorer, \$65M orbital MO, \$35M sub-orbital MO.
  - 5 Selections: 3 SMEX, **LiteBIRD**, sub-orbital MO
  - CORE+: contribution not sufficiently well defined
- EXP2016 (12/2016): Explorer, **~\$70M orbital MO**, **~\$35M sub-orbital MO**
  - Target Contributions: **detectors**, cooler, optical elements
  - Other submission: **PIXIE**, +?
- Selections: Does there have to be a MO? Can there be two? No; yes.

## MO

- Is LiteBIRD a `competition`?
  - No: not from a NASA point of view
  - Yes: is this the right mission to do the science
  - Yes: if LiteBIRD/US is down selected before CORE+/US is.

## Timeline

- October, 2016: submit to ESA-M5
- December 2016: submit US-MO
- June/July 2017: selections for Phase-A (Europe/USA)
- Early-mid 2017: down-selections of 2014
  
- July 2018: submit US Phase-A Study
  - Converge on final technology and scope of contribution
- Early-mid 2019: final US EXP2016 selection of missions
- 11/2019: ESA M5 selections

## Presentations Today + MO

- Several candidate focal plane technologies
  - JPL (O'Brien): phased array PSBs – single color
  - NIST (Ullom):
    - horn-coupled PSBs – potentially multi-colored
    - KIDS
  - Argonne (Chang/Carlstrom): sinuous-antenna PSBs – potentially multi-colored
- Later: choose baseline for 12/2016 proposal
- Leave final down-select of technology to Phase-A

## Presentations Today + MO

- High Performance Computing (Borrill)
- Regrets: Peter Shirron (CADR)

## US Participation

- Strong support (and enthusiasm) for participation in a space mission
- Field tested technologies with high TRL (at a subset of the frequencies)
- Field (Planck)-tested capabilities in computing/simulations/analysis/interpretation



BACK UP

## To Do

- What are the management costs?