



# NASA Research Announcement: Technology Development for Exoplanet Missions (TDEM)

## Introduction and Overview

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# Background and Scope



## ExoPlanet Exploration Program

- **Background**

- Exoplanet Exploration Program (ExEP) to advance NASA's efforts to determine whether habitable planets can be found outside of our own Solar System.
- Overarching goal of the program is to develop and execute space flight missions to detect and characterize extrasolar planets.
- Achieving this goal presents numerous significant technological challenges.
- Technology Development for Exoplanet Missions (TDEM) program established to facilitate overcoming these challenges

- **Scope of the TDEM Program**

- focused development of key technologies that feed into exoplanet exploration measurement techniques for future flight hardware.
- Program designed to address maturation of mid-TRL technologies ( $3 < \text{TRL} \leq 6$ )
  - *established as feasible*
  - *insufficiently mature to incorporate into flight hardware without unacceptable risk.*
- Not intended to support 'basic' research into new technologies and initial demonstration of their feasibility (TRL 1-3).
- Not intended to support development of flight hardware (TRL 7-9)



# Scope of Program



- **Measurement techniques upon which future ExEP missions will likely be based include:**
  - Astrometry
  - Coronagraphy
  - Interferometry
  - Photometry
  - Spectroscopy
- **Areas of technology development of particular interest to the TDEM program include (but not limited to):**
  - Starlight suppression
  - Wavefront sensing and control
  - Advanced optics
  - Structures, materials, and mechanisms
  - System performance assessment



# Programmatic Information



- **Proposals must:**

- Demonstrate that candidate technology is at a TRL  $\geq 3$ .
- Establish that candidate technology is specifically targeted at exoplanet-related measurements, i.e. requirements are driven specifically by demands of anticipated exoplanet measurements.
- Must clearly articulate the expected technology advancement
  - *Identify state of technological readiness at beginning*
  - *Identify one or more quantitative milestones that will be achieved over course of proposed development project.*
  - *Identify success criteria for evaluating project performance at end of 2 yr project.*
  - *Must provide a detailed schedule for achieving milestones*

Note: The goal of TDEM program is advancement of key technologies for exoplanet exploration flight missions to TRL 6-7; however, it is neither required nor expected that this process will be completed within the two-year horizon of the current solicitation; the horizon of the proposed work may extend beyond 2 years.



# Reporting Requirements



- Annual Progress Report
  - Both written report and presentation (in person, telecon) to TDEM Program Officer at end of first year.
- Final Report
  - Written report submitted at end of second year detailing project performance against proposed success criteria.
- Formal Documentation of Milestones
  - When work begins, success criteria of a technology demonstration is documented in a whitepaper
    - *Reviewed by independent board appointed by NASA Headquarters, and revised as necessary according to review.*
  - Successful achievement of milestone is documented in a second report that shows success criteria have been met
    - *Also subject to review and verification by independent board.*



# Summary of Key Information



## ExoPlanet Exploration Program

- Total funding available for new awards: ~\$5.2M over 2 yr (~\$2.6M in FY10; ~\$2.6M in FY11)
- Expected number new awards: ~ 5–10
- Expected Period of Performance: 2 years
- Proposal due date: August 28, 2009
- Start Date of new awards: January 1, 2010
- Website for proposal submission (NSPIRES):
  - <http://nspires.nasaprs.com/>
  - NSPIRES Helpdesk [nspires-help@nasaprs.com](mailto:nspires-help@nasaprs.com) or (202) 479-9376
- Detailed instructions for proposal preparation
  - NASA 2009 Guidebook for Proposers, <http://www.hq.nasa.gov/office/procurement/nraguidebook/>
- Submission via Grants.gov not supported



# Milestones and JPL Infrastructure



- The use of JPL infrastructure
  - Not mandatory as part of a proposal
  - The available JPL infrastructure is described in subsequent presentations
  - The use of ExEP infrastructure will be coordinated and managed at JPL by Marie Levine
- Milestone Whitepapers and Reports
  - Mandatory: 1 or more milestones are needed in all proposals
  - More detail on milestones and the milestone process is described in the next presentation
  - Peter Lawson will be responsible for managing the milestone process on your behalf, from Whitepaper through to the final Report; will also advocate on behalf of PIs for use of JPL Infrastructure, as needed
- TDEM funds not to be used to duplicate existing facilities



# NASA Program Officer



ExoPlanet Exploration Program

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