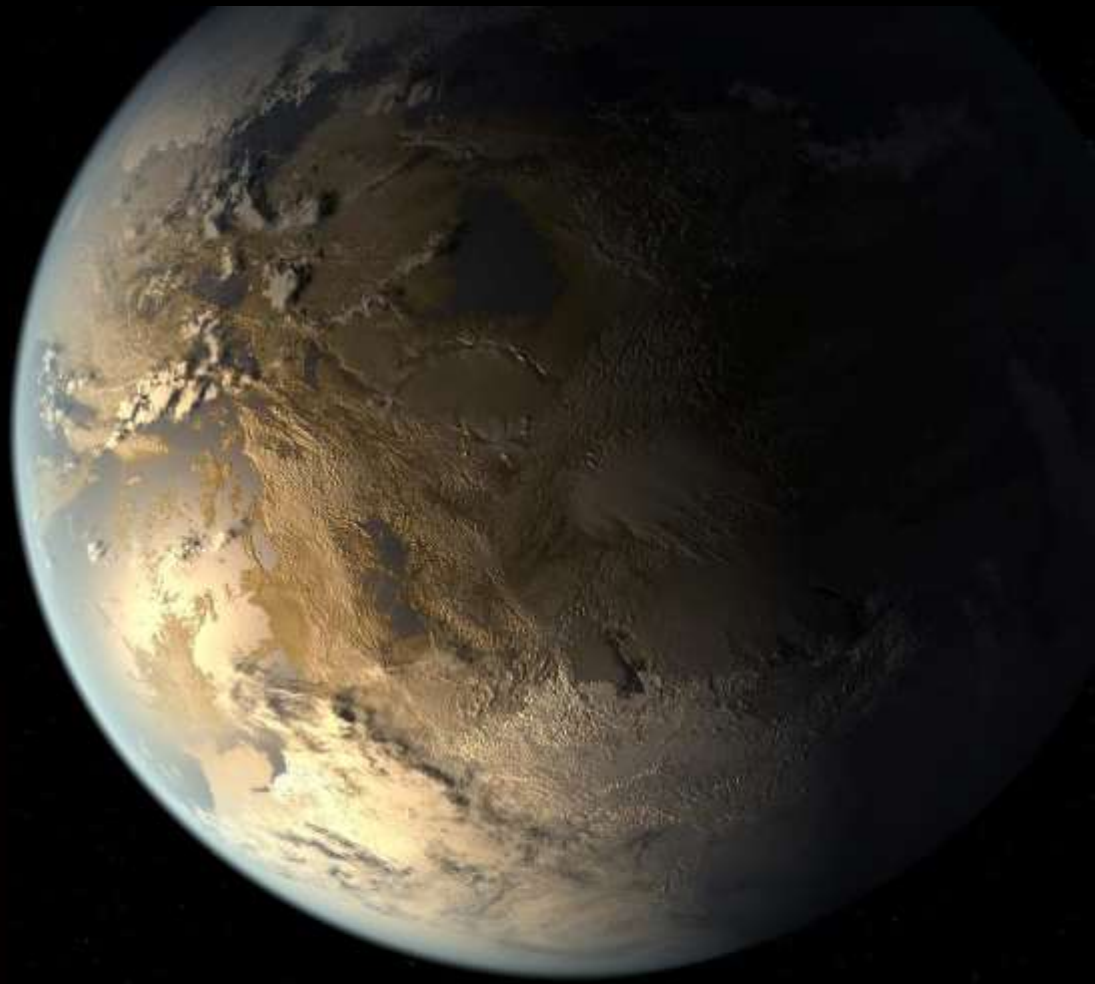
National Aeronautics and Space Administration

Development of a Science Plan for the Study and Exploration of Extrasolar Planets

Initial plans for engaging the National Academies to undertake a study required under the NASA Transition Authorization Act of 2017.

29 March 2017



Astrophysics

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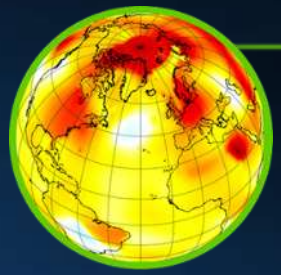
Science Mission Directorate/Astrophysics Division

Key NASA/SMD Science Themes



Safeguarding and
Improving Life on Earth

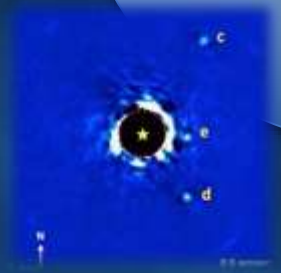
Searching for
Life Elsewhere

Expanding our Knowledge

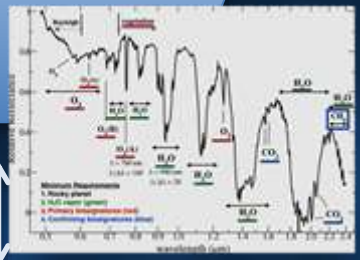
NASA's cross-divisional Search for Life Elsewhere

Astrophysics
- Exoplanet detection and characterization
- Stellar characterization
- Mission data analysis

Hubble, Kepler, TESS, JWST, WFIRST, Etc.

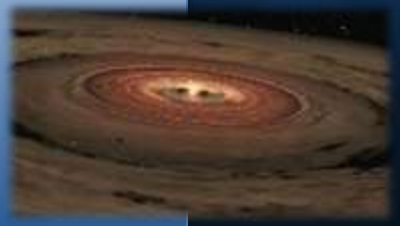


Planetary Science/ Astrobiology
- Comparative planetology
- Planetary atmospheres
- Assessment of observable biosignatures
- Habitability



Earth Sciences
- GCM
- Planets as systems

Planetary Science Research
- Exoplanet characterization
- Protoplanetary Disks
- Planet formation
- Comparative planetology



Heliophysics
- Stellar characterization
- Stellar winds
- Detection of planetary magnetospheres

NASA Transition Authorization Act of 2017

Requirements for National Academy studies:

- Sec. 508 requires NASA to contract with the National Academies to develop a science strategy for the study and exploration of extrasolar planets; this strategy is due 18 months after enactment (~September 2018)
- Sec. 509 requires NASA to contract with the National Academies to develop a science strategy for astrobiology; this strategy is due 18 months after enactment (~September 2018)

NASA Transition Authorization Act of 2017

SEC. 508. EXTRASOLAR PLANET EXPLORATION STRATEGY.

(a) STRATEGY

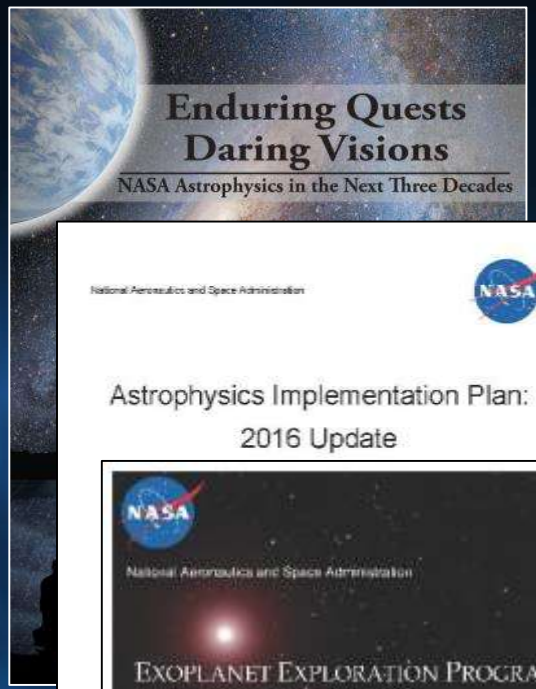
1) IN GENERAL.—The Administrator shall enter into an arrangement with the National Academies to develop a science strategy for the study and exploration of extrasolar planets, including the use of the Transiting Exoplanet Survey Satellite, James Webb Space Telescope, a potential Wide-Field Infrared Survey Telescope mission, or any other telescope, spacecraft, or instrument, as appropriate.
2) REQUIREMENTS.—The strategy shall—
   - (A) outline key scientific questions;
   - (B) identify the most promising research in the field;
   - (C) indicate the extent to which the mission priorities in existing decadal surveys address the key extrasolar planet research and exploration goals;
   - (D) identify opportunities for coordination with international partners, commercial partners, and not-for-profit partners; and
   - (E) make recommendations regarding the activities under subparagraphs (A) through (D), as appropriate.

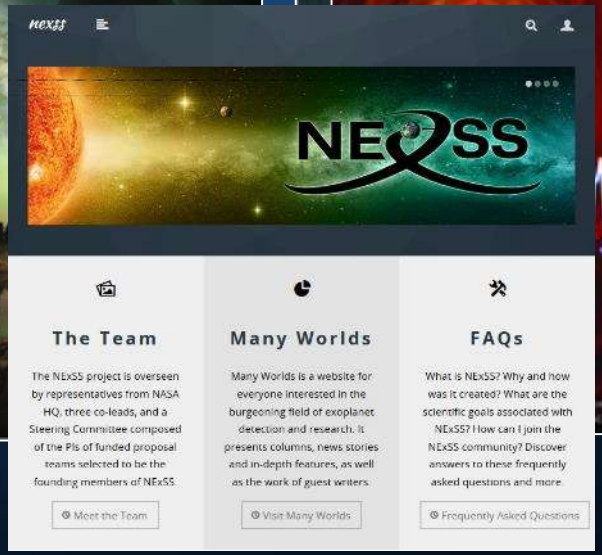
(b) USE OF STRATEGY.—The Administrator shall use the strategy—

1) to inform roadmaps, strategic plans, and other activities of the Administration as they relate to extrasolar planet research and exploration; and
2) to provide a foundation for future activities and initiatives related to extrasolar planet research and exploration.

(c) REPORT TO CONGRESS.—Not later than 18 months after the date of enactment of this Act, the National Academies shall submit to the Administrator and to the appropriate committees of Congress a report containing the strategy developed under subsection (a).

Foundational Documents for the Exoplanet Exploration Strategy Study





Draft Elements of the Exoplanet Exploration Strategy Study

Basic Elements of the Study

- Survey the status of the new field of exoplanet science and research including the use of current and planned facilities such as TESS, Webb, WFIRST, and any other telescope, spacecraft, or instrument, as appropriate
- Outline the key scientific questions for exoplanet science and research
- Outline the near, medium, and far term goals for an exoplanet exploration strategy that includes the search for life in the universe
- Summarize the current state-of-knowledge for exoplanet demographics, especially in areas where they impact the exoplanet exploration strategy
- Identify the most promising research opportunities in the field including cross-discipline opportunities in Earth science, heliophysics, and planetary science
- Summarize the measurements and observations required to advance the field toward the strategic goals including the search for life in the universe
- Make recommendations for advancing the research, obtaining the measurements, and realizing the goals discussed in the exoplanet exploration strategy

Notional Timeline for Exoplanet Exploration Strategy Study

Sec. 508 of the NASA Transition Authorization Act of 2017 specifies that the report from the required Exoplanet Exploration Strategy Study be submitted to Congress within 18 months (i.e., by mid-September 2018).

To meet that deadline, NASA envisions the following timeline:

- **April – June 2017** – Engagement with National Academies, negotiation of study terms, establishment of contract (est. 3 mo.).
- **June 2017 – June 2018** – conduct of Exoplanet Exploration Strategy Study (est. 12 mo.).
- **June – September 2018** – draft study report, peer review as deemed appropriate, submission of report to NASA.
- September 2018 – NASA submits report to Congress.

Questions?

Astrophysics