Astrobiology Science Strategy for the Search for Life in the Universe Committee *and* Exoplanet Science Strategy Committee

Mandated under the National Aeronautics and Space Administration Transition Authorization Act of 2017 (Public Law 115-10-March 21, 2017)

Victoria Meadows (Committee member)

APAC Briefing, 4.12.18.

The NASA Authorization Act 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, the 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 inter- national 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 sub-section (a).

The NASA Authorization Act 2017

SEC. 509. ASTROBIOLOGY STRATEGY.

(a) STRATEGY.—

(1) IN GENERAL.—The Administrator shall enter into an arrangement with the National Academies to develop a science strategy for astrobiology that would outline key scientific questions, identify the most promising research in the field, and indicate the extent to which the mission priorities in existing decadal surveys address the search for life's origin, evolution, distribution, and future in the Universe.

(2) RECOMMENDATIONS.—The strategy shall include recommendations for coordination with international partners.

(b) USE OF STRATEGY.—The Administrator shall use the strategy developed under subsection (a) in planning and funding research and other activities and initiatives in the field of astrobiology.

(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 sub- section (a).

SEC. 510. ASTROBIOLOGY PUBLIC-PRIVATE PARTNERSHIPS.

Not later than 180 days after the date of enactment of this Act, the Administrator shall submit to the appropriate committees of Congress a report describing how the Administration can expand collaborative partnerships to study life's origin, evolution, distribu- tion, and future in the universe.

Astrobiology Science Strategy for the Search for Life in the Universe

Statement of Task

In preparation for and as an input to the upcoming decadal surveys in astronomy and astrophysics and planetary science, the National Academies of Sciences, Engineering, and Medicine will appoint an ad hoc committee to carry out a study of the state of the science of astrobiology as it relates to the search for life in the solar system and extrasolar planetary systems. The study will have the following objectives:

- Take account of and build on NASA's current Astrobiology Strategy 2015;
- Outline key scientific questions and technology challenges in astrobiology, particularly as they pertain to the search for life in the solar system and extrasolar planetary systems;
- Identify the most promising key research goals in the field of the search for signs of life in which progress is likely in the next 20 years;
- Discuss which of the key goals could be addressed by U.S. and international space missions and ground telescopes in operation or in development;
- Discuss how to expand partnerships (interagency, international and public/private) in furthering the study of life's origin, evolution, distribution, and future in the universe;
- Make recommendations for advancing the research, obtaining the measurements, and realizing NASA's goal to search for signs of life in the universe

In the course of conducting this study, the committee will consider and regularly consult with the concurrent study "Exoplanet Science Strategy," in the area of assessing habitability, searching for signs of life, and other relevant areas of scientific overlap. Also the committee will not revisit or redefine the scientific priorities or mission recommendations from previous decadal surveys.

Astrobiology Science Strategy Committee Roster

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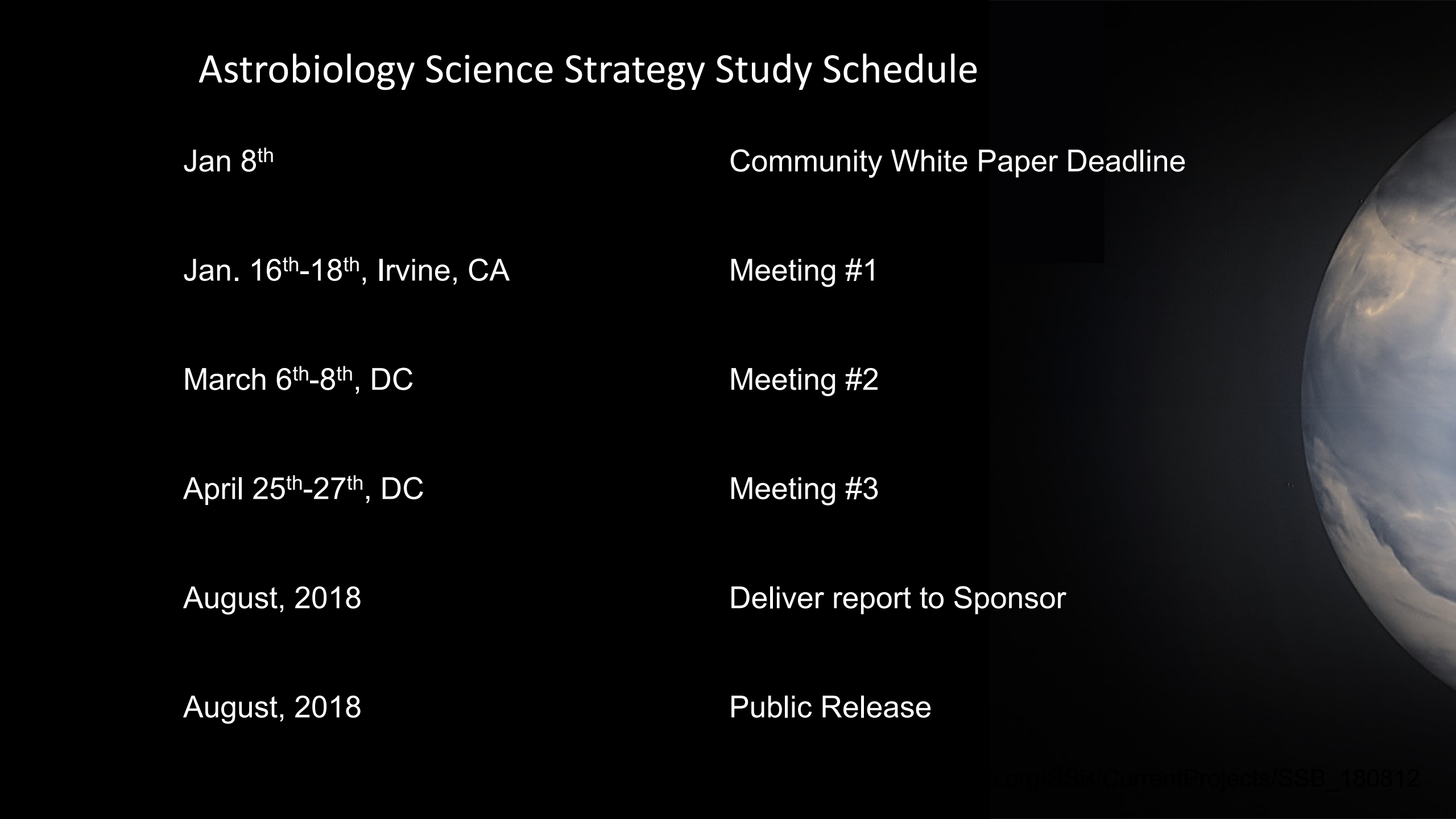
Astrobiology Science Strategy Study Schedule

Jan 8th	Community White Paper Deadline
Jan. 16th-18th, Irvine, CA	Meeting #1
March 6th-8th, DC	Meeting #2
April 25th-27th, DC	Meeting #3
August, 2018	Deliver report to Sponsor
August, 2018	Public Release



Exoplanet Science Strategy

Statement of Task

In preparation for and as an input to the upcoming decadal surveys in astronomy and astrophysics and planetary science, the National Academies of Sciences, Engineering and Medicine will appoint an ad hoc committee to perform a study with the following objectives:

•Survey the status of the field of exoplanet science, including the use of current and planned facilities such as Transiting Exoplanet Survey Satellite, the James Webb Space Telescope, the Wide Field InfraRed Survey Telescope, and any other telescope, spacecraft, or instrument, as appropriate;

•Recommend an Exoplanet Science Strategy that outlines the key scientific questions for exoplanet science and research and related near-, medium-, and far-term measurement and technology goals. The Strategy will include the search for life in the universe as well as cross-discipline opportunities in Earth science, astrophysics, heliophysics, and planetary science.

•Discuss which of the key goals of the committee's Strategy could be addressed via current decadal survey recommended priority activities and also identify opportunities for coordination with international partners, commercial partners, and not-for-profit partners;

In the course of conducting this study, the committee will consider and regularly consult with the concurrent study “State of the Science of Astrobiology,” in the area of assessing habitability, searching for signs of life, and other relevant areas of scientific overlap . Also the committee will not revisit or redefine the scientific priorities or mission recommendations from previous decadal surveys.

Exoplanet Science Strategy Committee Roster

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Exoplanet Science Strategy Study Schedule

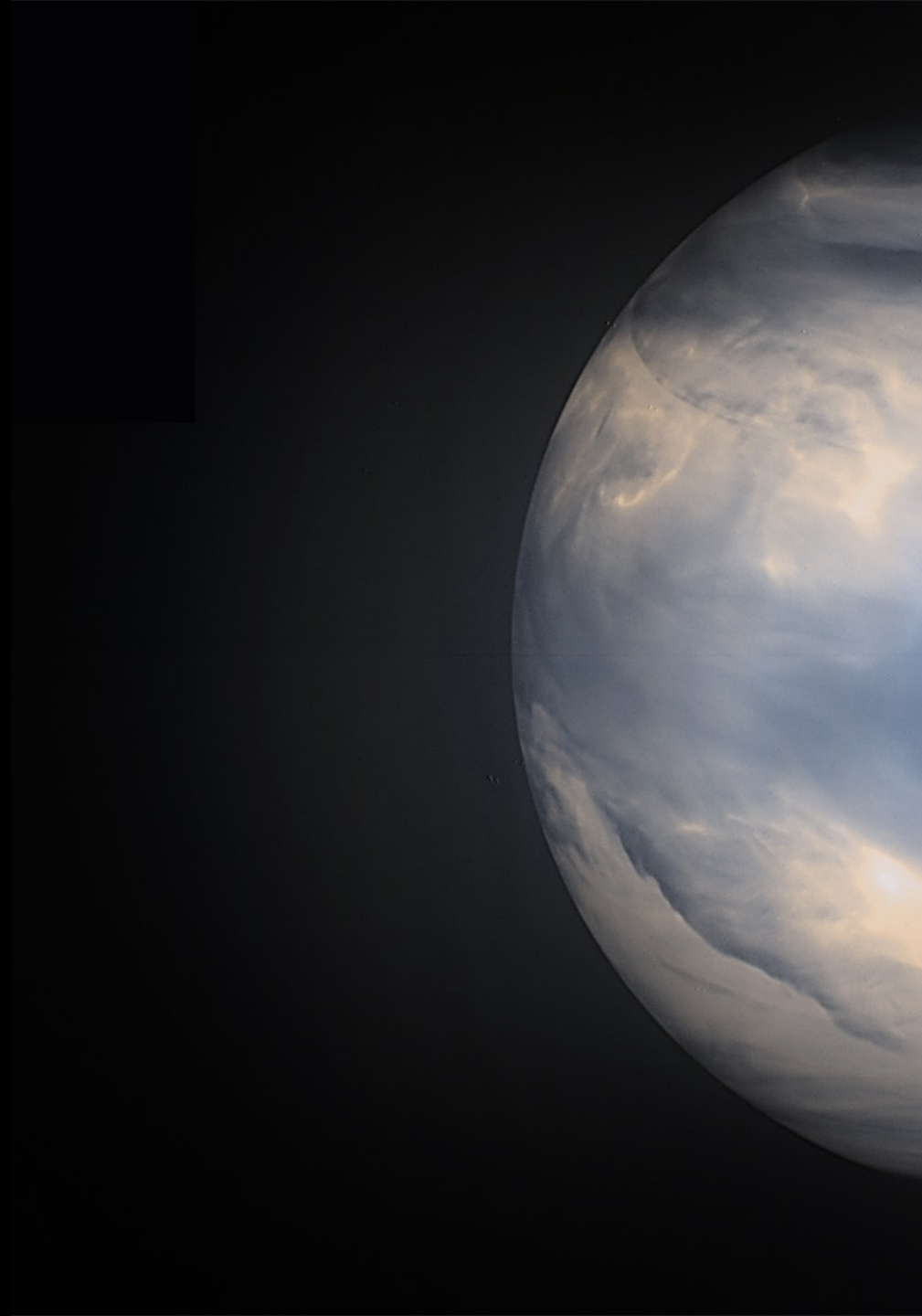
March 6th-7th, DC	Meeting #1
March 9th	Community White Paper Deadline
April 19th-20th, Irvine, CA	Meeting #2
June 5th-6th, DC	Meeting #3
August, 2018	Deliver report to Sponsor
August, 2018	Public Release

For further information, please visit the Space Studies Board Current Projects webpage or contact:

astrobiology@nas.edu (Astrobiology Science Strategy)

exoplanets@nas.edu (Exoplanet Science Strategy)

Backup Slides



Presentations to the First Astrobiology Strategy Committee Meeting.

- NASA Briefing: Planetary Science & Astrobiology, Mary Voytek, NASA HQ
- NASA Briefing: NASA Astrobiology Strategy 2015, NASA HQ
- NASA and the Search for Life beyond the Solar System, Douglas Hudgins, NASA H
- Center for Life Detection , Tori Hoehler, Ames Research Center, *remote.*
- NASA NExSS, Natalie Batalha, Ames Research Center, *remote.*
- Habitability & Issues with the Term, Elizabeth Tasker, Japan Aerospace Exploration Agency, *remote.*
- Mars Astrobiology: Recent Findings and Future Approaches, Bethany Ehlmann, California Institute of Technology
- Ocean Worlds Roadmap, Jonathan Lunine, Cornell UniversitEuropa Exploration: Europa Lander Mission Concept, Kevin Hand, NASA JPL
- Water, Habitability, and Detectability, Steven Desch, Arizona State University, *remote.*
- Recent Advances and Near-Future Opportunities in the Study of Planets Orbiting Other Stars, David Charbonneau, Harvard University
- False Positives, Andrew Steel, Carnegie Institution for Science, *via* Zoom
- Agnostic Approaches to Life Detection, Sarah Johnson, Georgetown University, *remote.*
- Technosignatures & SETI, Jill Tarter, SETI.
- The Co-evolution of Life and Biosignatures: A Geochemical Perspective on an Ecological Problem, Hilairy Hartnett, Arizona State University

Presentations to the Second Astrobiology Strategy Committee Meeting.

- Systems Biosignatures, Sara Walker, Arizona State University, *remote.*
- Planetary Protection & The Search for Life in the Universe, Lisa Pratt, NASA HQ
- From Habitability to Life: An Ecosystem Approach to the Search for Biosignatures Beyond Earth, Nathalie Cabrol, SETI Institute
- Biosignature Preservation, Jochen Brocks, Australian National University, *remote*
- ExoMars Rover and the Search for Life, Jorge Vago, ESA, *remote*
- Future Space and Ground Astronomical Capabilities for Searching for Life on Exoplanets, Alycia Weinberger, Carnegie Institution for Science
- Comparative Planetology and the Inner Solar System as a Gateway to the Exoplanets, Noam Izenberg, Applied Physics Laboratory
- Life Detection Instrumentation in a Golden Age of Astrobiology, Stephanie Getty, Goddard Space Flight Center

Presentations to the First Exoplanet Strategy Committee Meeting.

- NASA and the Search for Life on Planets Around Other Stars, Paul Hertz, NASA HQ.
- Planetary Science Division Overview, Mary Voytek, NASA HQ
- Transiting Exoplanet Science With JWST, Kevin Stevenson, STScI.
- Direct Imaging of Exoplanets Webb, Laurent Pueyo, STScI
- The Origins Space Telescope: From First Stars to Life, Margaret Meixner STScI/JHU/GSFC and Jonathan Fortney, UCSC.
- Lynx and Exoplanet Science, Rachel Osten, STScI/JHU.
- Big Bang to Biosignatures: The LUVOIR Mission Concept, Courtney Dressing, UC-Berkeley.
- HabEx: The Habitable Exoplanet Observatory (A Concept Study), Leslie Rogers, U. Chicago.
- Radial Velocities for Exoplanet Discovery and Characterization, Debra Fisher, Yale University.
- Direct Imaging with Ground-Based Telescopes, Olivier, Guyon, U. Arizona.
- Atmospheric Biosignatures, Shawn Domagal-Goldman, NASA-GSFC.
- Microlensing Surveys for Planets with WFIRST, Jennifer Yee, Harvard – CfA.
- The Nexus for Exoplanet System Science - Anthony Del Genio, NASA-GISS.