CAA Report

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Tom Greene & Vicky Kalogera, CAA Co-Chairs

CAA reports to the BPA and the SSB

Disclaimer: These slides represent a personal assessment of the issues discussed by the CAA. This document should not be cited or quoted because the views expressed do not necessarily reflect those of CAA, SSB, BPA, or the NRC.

CAA Roles & Responsibilities

- CAA reports to National Academies Board on Physics and Astronomy (BPA) and Space Studies Board (SSB).
- CAA is not the Decadal Survey committee, and it does not set policy for the Survey. It did help the National Academies and the Agencies in preparing for the Survey
- CAA is now focused on implementation of Astro2010, monitoring ongoing agency projects/programs, and waiting for Astro2020
- CAA also writes short reports as needed

- Most recent meeting was March 24 – 25, 2021 (reported here)
- CAA will hold a special ad-hoc meeting after the Astro2020 Decadal Survey is released (expect spring 2021)

https://www.nationalacademies.org/our-work/committee-on-astronomy-and-astrophysics

CAA Membership

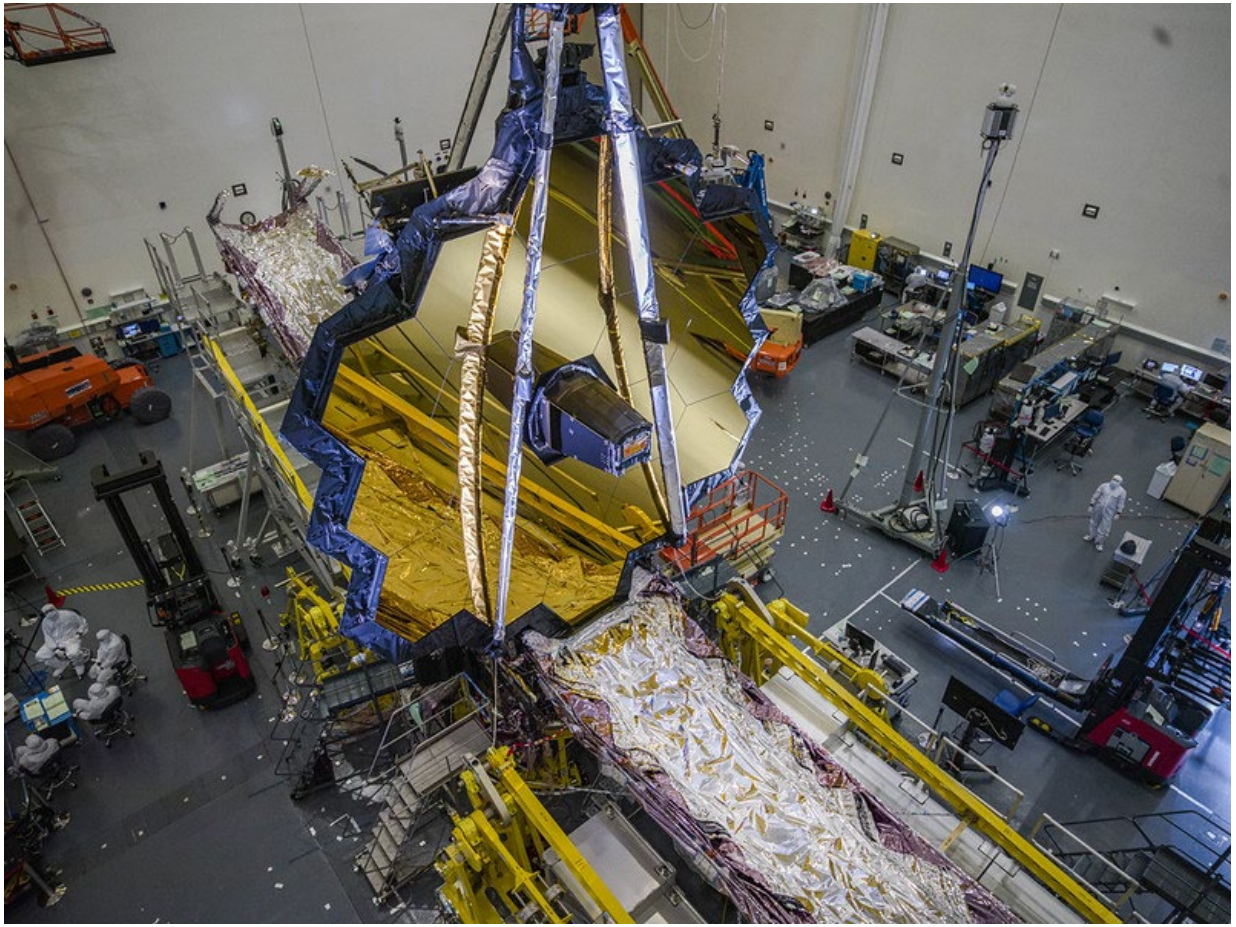
Vassiliki (Vicky) Kalogera (NAS), Co-Chair, Northwestern University
Thomas Greene, Co-Chair, NASA Ames Research Center
* **William (Niel) Brant**, Pennsylvania State University
* **Alyssa Goodman**, Harvard University
Shaul Hanany, University of Minnesota
Elizabeth Hays, NASA Goddard Space Flight Center
Christopher F. McKee (NAS), University of California, Berkeley
Jason Kalirai, Johns Hopkins Applied Physics Laboratory
Jeffrey Kuhn, University of Hawaii
Scott Ransom, National Radio Astronomy Observatory
Kate Scholberg, Duke University
Joseph Silk (NAS), Johns Hopkins University
Alycia Weinberger, Carnegie Department of Terrestrial Magnetism
A. Thomas Young (NAE), Lockheed Martin (Ret.)

* = new members

US Astronomy & Astrophysics Status

- NASA has largely completed the major Astro2010 space elements:
  - Roman / WFIRST approaching CDR; 4 Explorer AOs; exoplanet technology development, new programs
  - JWST on-track for late October 2021 launch (6 mo COVID delay)
- Major COVID-19 impacts: Roman space telescope, DKIST solar telescope and Rubin Observatory operations delayed ~1 year
- Collapse of Arecibo Observatory in Puerto Rico on December 1 was significant loss for several fields of astronomy
- NASA and NSF have started double-blind peer reviews
  - First for observations (NASA + NSF), NASA starting grant proposals
- DOE DESI instrument is starting five-year dark energy survey on NSF 4-m Mayall telescope

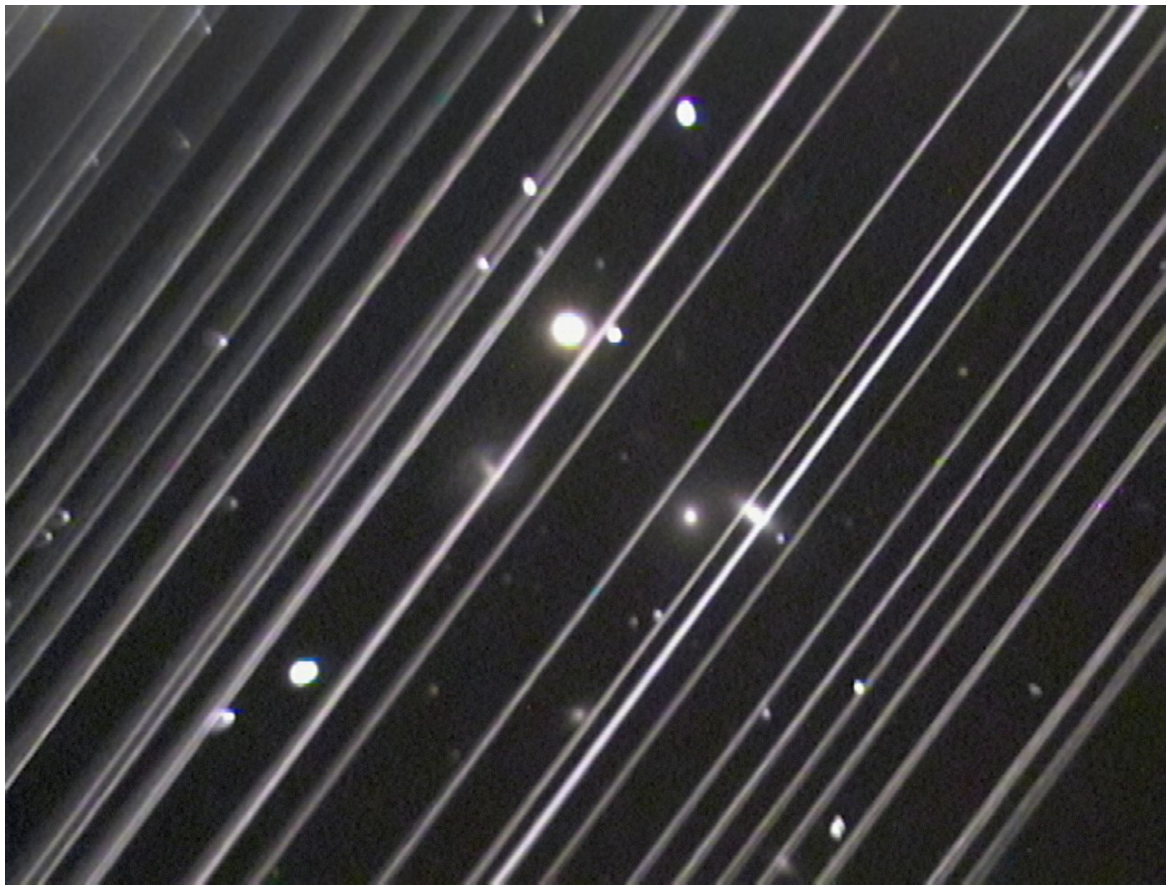
JWST prepares for fall launch



- Sunshade and mirror are being stowed into launch configuration
- Should ship in August
- First year of science programs selected

- 11,000 hours of total observations approved in Cycle 1, including 6031 hours in 266 General Observer / open time programs

Satellite Constellations: Continued Problems



SpaceX Starlink satellites captured in an image of the NGC 5353/4 galaxy group at Lowell Observatory in Arizona, shortly after launch in 2019.

- Satellites become less bright as they are boosted to their operational altitudes (now ~550 km for SpaceX Starlink) but are visible for longer each night and will significantly impair the new Rubin telescope and other facilities

Satellite Constellations: Continued Problems

- High reflectivity and RF leakage of new LEO internet satellite constellations are an increasing problem for visible and radio astronomy
  - Now ~1500+ SpaceX Starlink in orbit, 200+ OneWeb, others coming
  - Increasing 100+ / month, total > 10,000 planned
- One US (NSF-funded) and one international (IAU and UN) workshop in 2020 assessed threat and recommended mitigations
  - Observatories can use software to reduce impact if satellites are not too bright (data not saturated) with significant effort
  - Constellation companies should minimize numbers, altitudes, and brightness (SpaceX cooperating on brightness & maybe altitude)
  - Regulatory agencies should make licensing conditional to impacts
  - Reported to UN Committee on the Peaceful Uses of Outer Space

- Pressing problem: Impacts cannot be avoided and launch rates are increasing

Discussion