June 7, 2022

ASTROPHYSICS SENIOR REVIEW

SUBCOMMITTEE REPORT

John O'Meara
Chair, 2022 ASR Subcommittee

THE SUBCOMMITTEE

Dr. Marcel Agüeros	Columbia University
Dr. Supriya Chakrabarti	University of Massachusetts, Lowell
Dr. Eric Charles	SLAC National Laboratory
Dr. Kelle Cruz	Hunter College, City University of New York
Dr. Daryl Haggard	McGill University
Dr. Erin Hicks	University of Alaska, Anchorage
Dr. William Jones	Princeton University
Dr. Jeyhan Kartaltepe	Rochester Institute of Technology
Dr. Priyamvada Natarajan	Yale University
Dr. John O'Meara	W. M. Keck Observatory - **Chair**
Dr. Tommaso Treu	University of California, Los Angeles
Dr. David Weinberg	Ohio State University

The brevity of this presentation does not reflect the immense amount of work by the missions, the panels, the subcommittees, and NASA that came before it

THANK YOU

- To this excellent subcommittee and panels for their hard work and advocacy for the astronomical community
- To NASA for entrusting us with this task
- To the support team team for making everything smooth
- To the mission teams for operating the portfolio and providing great proposals and discussion
- To the APAC for your service

THE MISSIONS (WITH LAUNCH DATE)

- Hubble (1990)
- Chandra (1999)
- Swift (2004), TESS (2018), NICER (2017), NuSTAR (2012), Fermi (2008), XMM-Newton (ESA, 1999), New Horizons (2006)

TOP LEVEL FINDINGS

- Bottom line: The Subcommittee finds that NASA should continue to operate and support each of these missions
- The Subcommittee finds that NASA, should budget flexibility be available, fund a number of the requested over-guides
- These missions are all delivering world-class science, and are showing increased amounts of coordination
- The missions are more powerful than the sum of their parts

THE RANKINGS

TIER 1	CHANDRA, HUBBLE
TIER 2	SWIFT, TESS
TIER 3	FERMI, NICER, NUSTAR, XMM-NEWTON
TIER 4	NEW HORIZONS

OVER-GUIDE DECISION RULES

TIER 1	REST OF MISSIONS OVER-GUIDE TIER 1
TIER 2	THE MAJORITY OF THE HUBBLE AND CHANDRA OVER-GUIDE
TIER 3	REST OF MISSIONS OVER-GUIDE TIER 2
TIER 4	REMAINING HUBBLE AND CHANDRA OVER-GUIDE
TIER 5	REST OF MISSIONS OVER-GUIDE TIER 3

Guiding principle: Maximize community impact/science return & minimize mission impact

NEW HORIZONS

- The Subcommittee endorses the New Horizons astrophysics experiments in its proposed second mission extension
- The Subcommittee finds that the data from these experiments be made available broadly, and that analysis be community competed via ADAP or a similar scheme

INFLATION ISN'T JUST FOR THE BIG BANG

- The subcommittee expresses concern that inflation and mandatory salary increases exert significant pressure on already thin missions
- The same forces impact the community, translating into fewer people/$ in the GO program, and eventually lowering the science/$
- Flat-flat is not sustainable
- Many over-guides are requested to maintain current science productivity

CROSS-MISSION ISSUES

- Absent significant technical issues, it is unlikely that these missions will end any time soon
- Communication between missions is impressive and growing
- The subcommittee finds there are many areas where shared resources can bring efficiency to the whole portfolio
- Examples: E/PO, Planning, DEIA

PLANNING FOR THE FUTURE

- Contingency planning is required as many of the facilities age
- Look for creative scientific optimization strategies in extended missions
- Consideration should be given to larger community engagement on how missions might change

ARCHIVES

- Great observatories will need great archives even after the mission ends
- Planning should begin now for resourcing the long-term, including how to retain knowledge of how the data was made (note the age of some of these missions)

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DEIA

- Missions should be given clear and explicit guidance now with measurable outcomes (e.g. PMOs for DEIA) so that future SR can better evaluate and so that the missions can evolve
- The missions should incorporate DEIA across all their PMOs and as a thread that runs through all their mission activities, technical and scientific
- Missions should regularly conduct climate surveys designed with expert input, and enough frequency to inform future reviews. SMD should work with the missions to develop mechanisms for accountability, or the exercise is wasted and counter-productive

DEIA

- NASA, not the missions via their own budgets, should resource the core DEIA initiatives (e.g. the GSFC GOF)
- Most current and proposed initiatives were outward facing. Inward-facing DEIA work is essential, and must be resourced with accountability
- NASA should take its role as a leader seriously to empower every mission in the portfolio

OTHER ITEMS OF NOTE

- Software support
- Cloud computing
- Extended missions are missions