

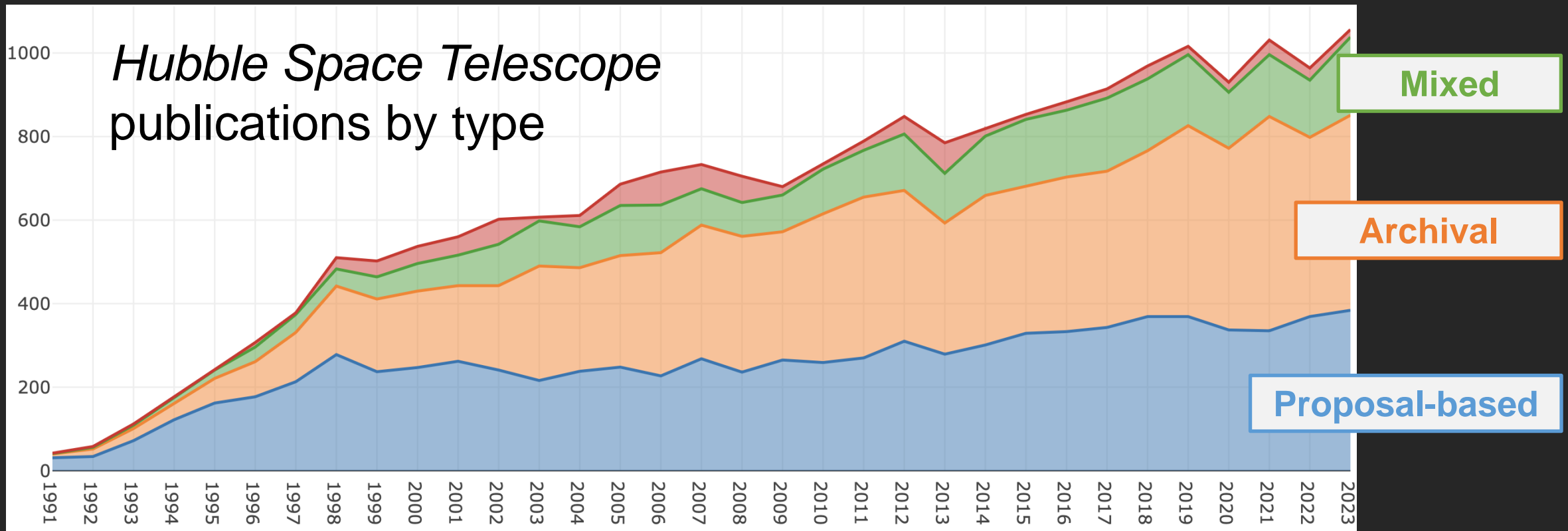
# Astronomical data archiving in 2024 (A ground-based optical-IR perspective)

Adam S. Bolton, NSF's NOIRLab

26 Mar 2024

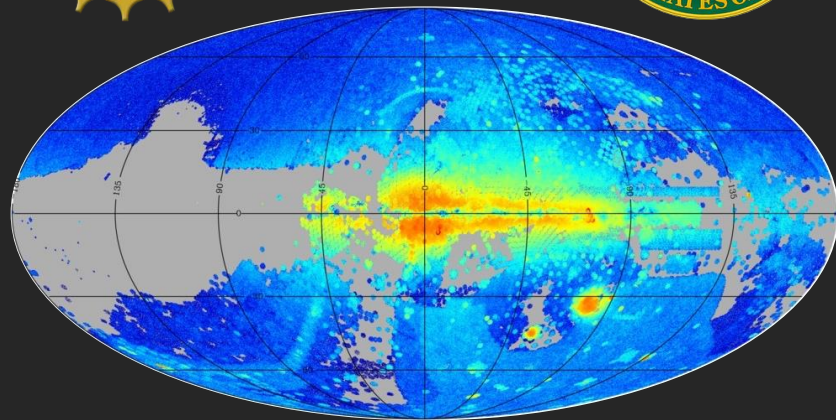
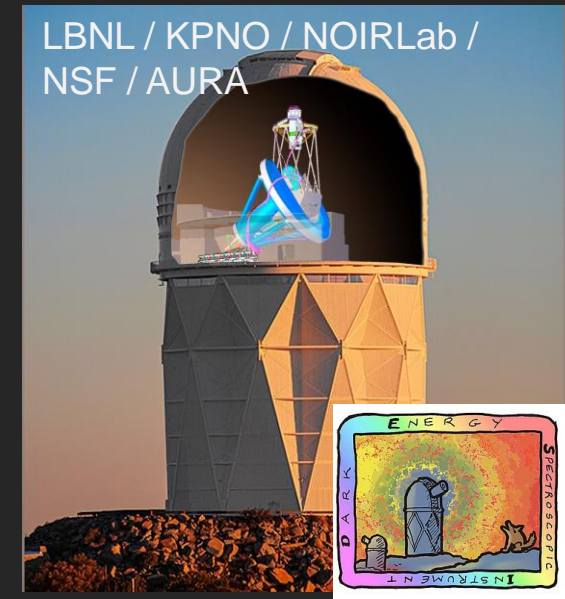
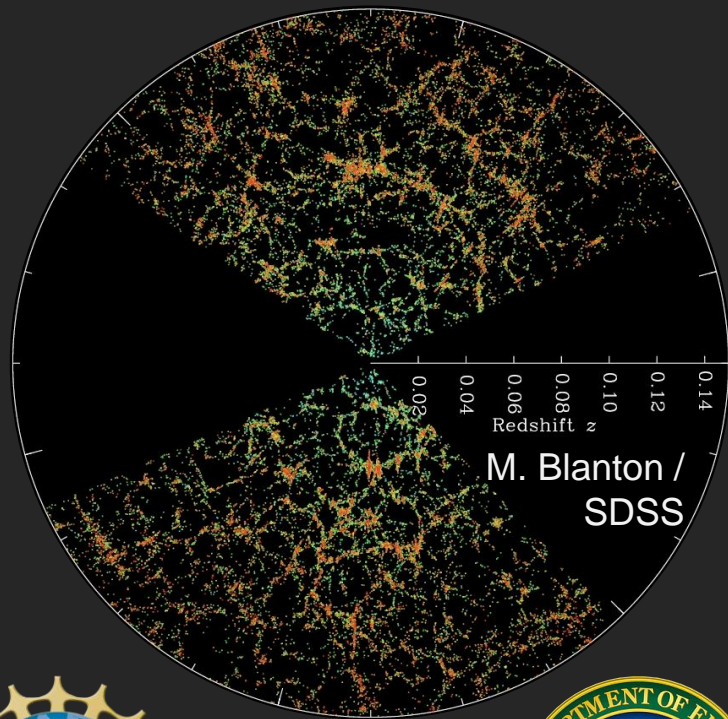


# Hubble Space Telescope publications by type

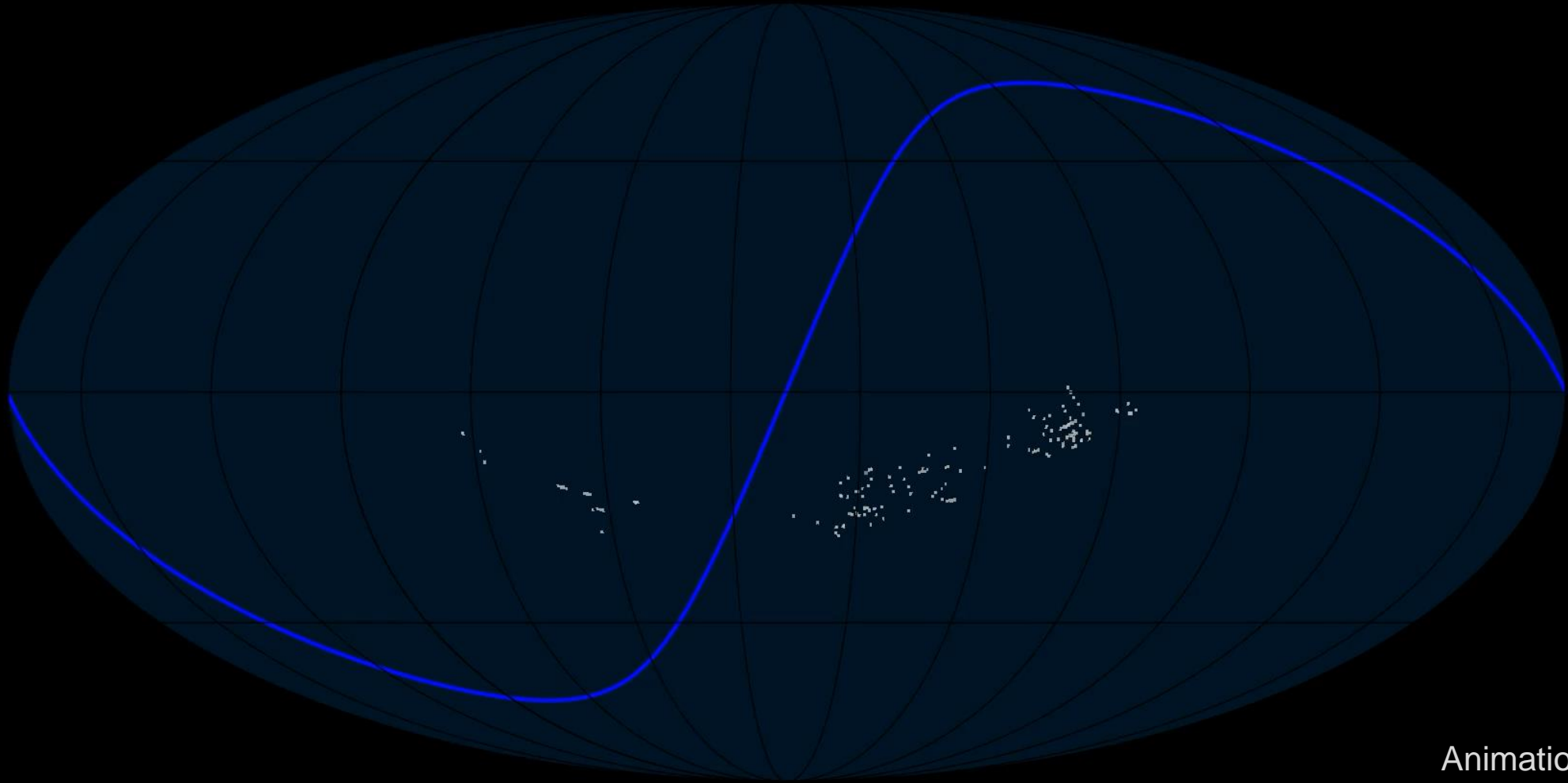


Credit: NASA / AURA / STScI

Source: <https://archive.stsci.edu/hst/bibliography/pubstat.html>



2004.6



Animation credit:  
R. Nikutta

Total exposure time on NOIRLab 4-m class telescopes

# Data-driven astrophysics

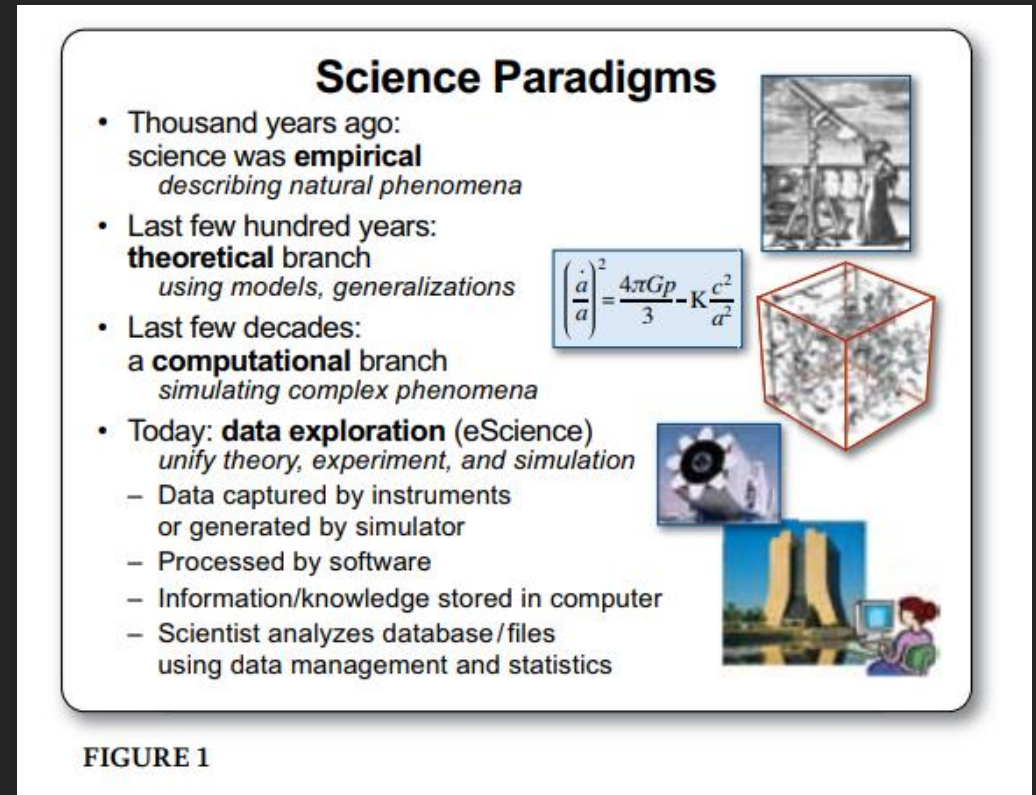
New astrophysical exploration, discovery, analysis, and/or measurement driven by the availability of existing data

Experimental

Theoretical

Computational

**Data-driven**



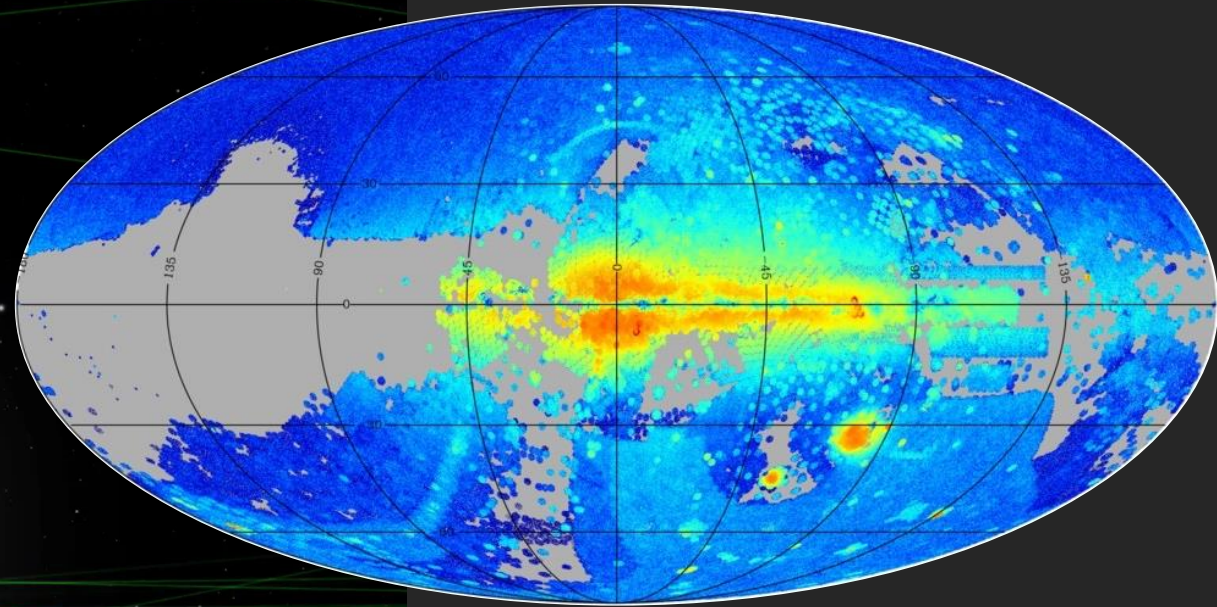
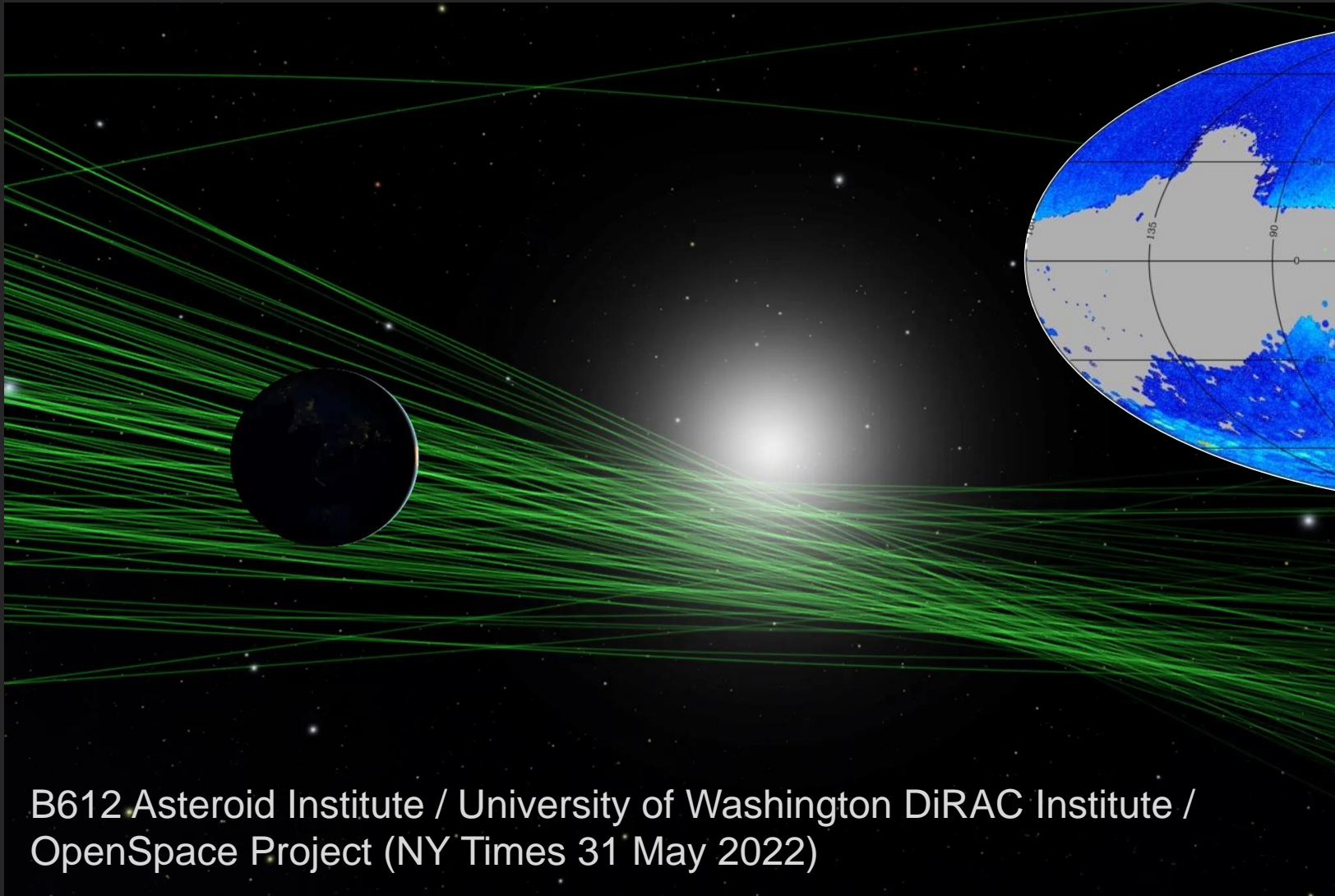
J. Gray & A. Szalay, eScience talk at NRC-CSTB meeting, Mountain View, CA, 11 Jan 2007

# Software powers data-intensive science



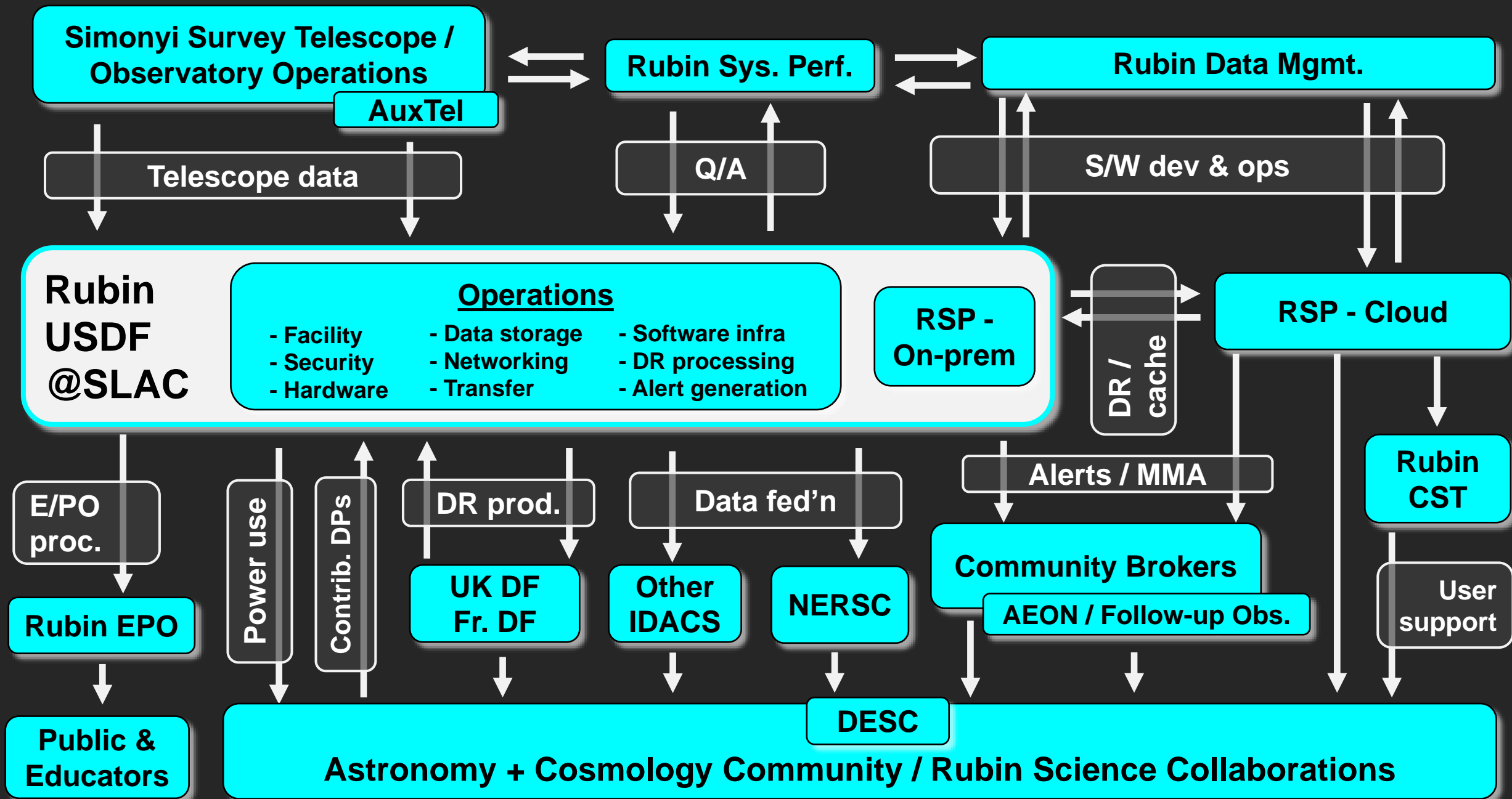
Data Set	# of Records Total	# of Records Ingested	# of Records per File	% Records Ingested	Current Size (GB)	Predicted Size for All Records (GB)	Last Updated
BOSS-DR16	3,946,000	3,946,000	1000	100%	440	440	8/21/22 15:28
SDSS-DR16	1,843,200	1,842,560	640	100%	170	171	8/31/22 20:23
<b>TOTALS</b>	<b>5,789,200</b>	<b>5,788,560</b>		<b>100%</b>	<b>610</b>	<b>611</b>	<b>8/31/22 20:23</b>

# Killer asteroids hiding in large catalogs



Nidever et al. 2021

B612 Asteroid Institute / University of Washington DiRAC Institute /  
OpenSpace Project (NY Times 31 May 2022)

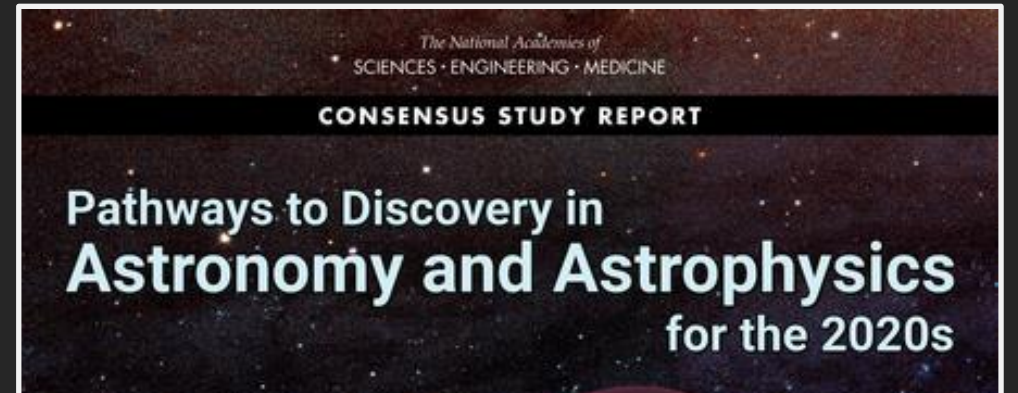




# Key themes: challenges, opportunities, and progress

- Color-of-money and color-of-effort
  - Funding and priorities flow primarily to individual projects
- Multiple roles of data archives:
  - Support for experimental operations
  - Platform to enable science analysis
  - Long-term data stewardship
- Cyberinfrastructure at scale
- “Old economy” mindsets

# The trend is positive



*“Recommendation: NASA and the National Science Foundation should explore mechanisms to improve coordination among U.S. archive centers and to create a centralized nexus for interacting with the international archive communities...”*

arXiv > astro-ph > arXiv:2311.04272

Astrophysics > Instrumentation and Methods for Astrophysics

[Submitted on 7 Nov 2023]

**The Future of Astronomical Data Infrastructure: Meeting Report**