National Aeronautics and Space Administration

Astrophysics




Briefing to the Astrophysics Science and Technology Definition Teams

May 2016

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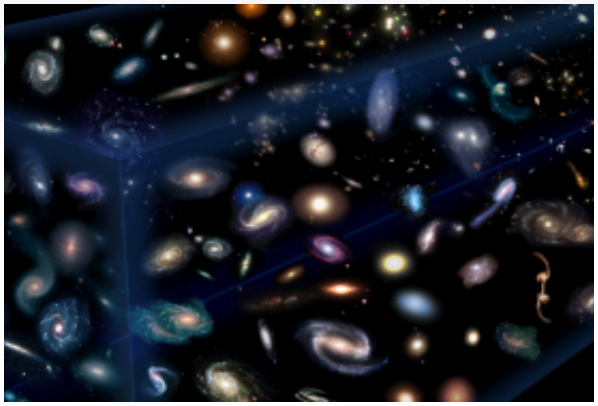
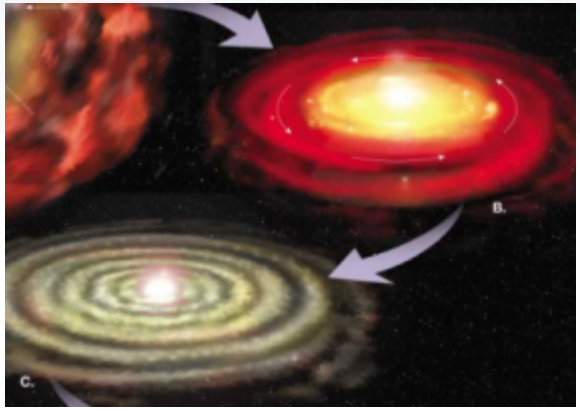
Why Astrophysics?

Astrophysics is humankind's scientific endeavor to understand the universe and our place in it.



1. How did our universe begin and evolve?

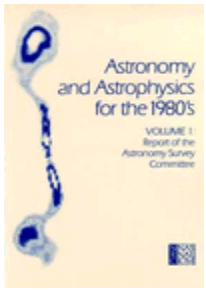


2. How did galaxies, stars, and planets come to be?

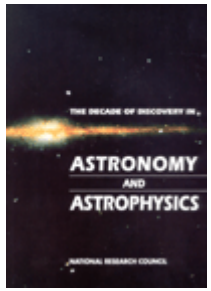
3. Are We Alone?

These national strategic drivers are enduring

1972



1982

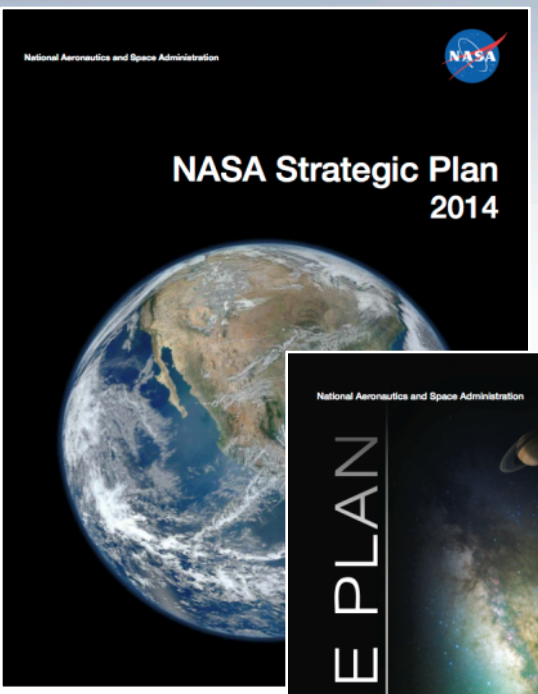


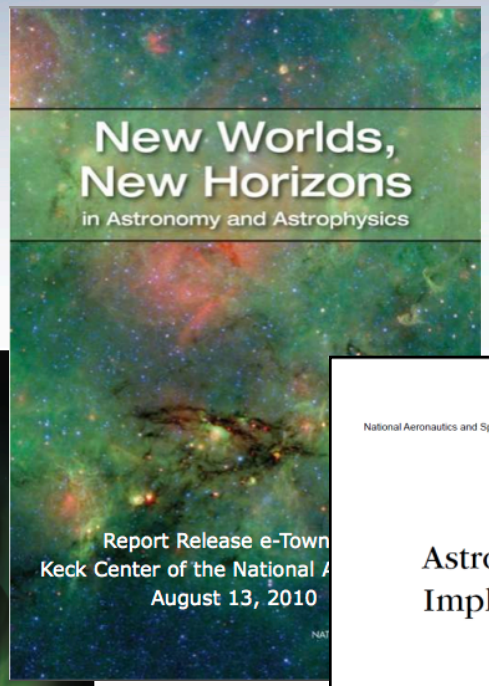
1991

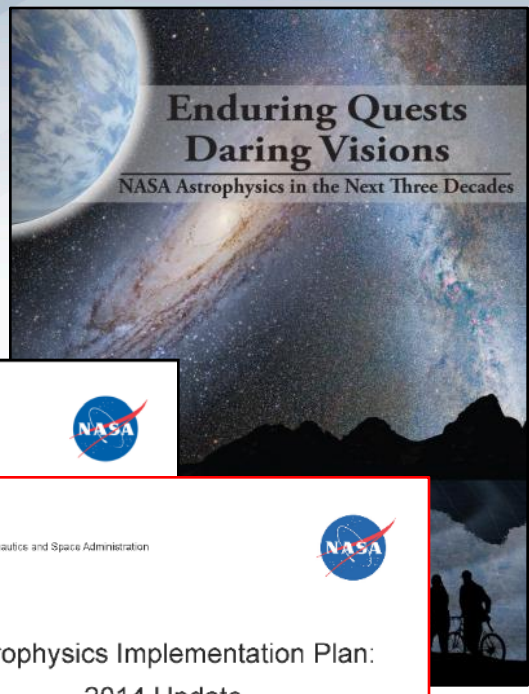
2001

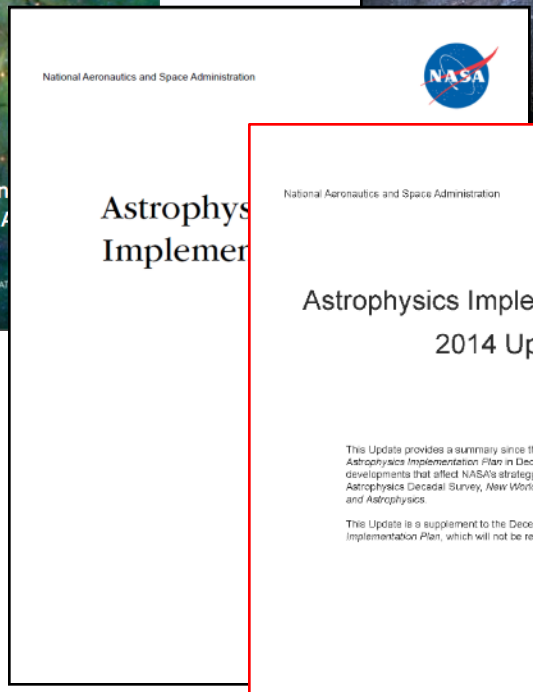
2010

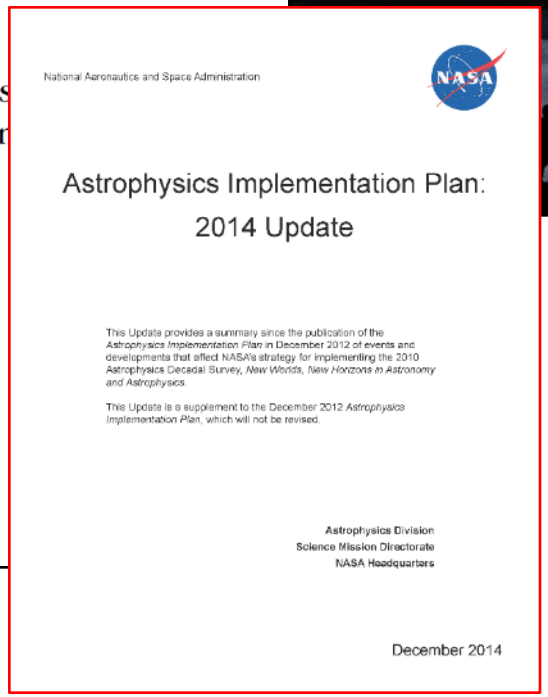
Astrophysics Driving Documents











http://science.nasa.gov/astrophysics/documents

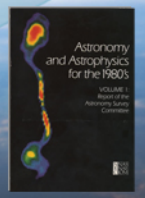
ASTROPHYSICS

Decadal Survey Missions

Launch 1990

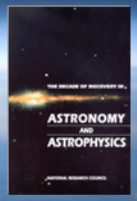
1972
Decadal Survey
Hubble

Launch 1999



1982
Decadal Survey
Chandra

Launch 2003



1991
Decadal Survey
Spitzer, SOFIA

Launch 2018

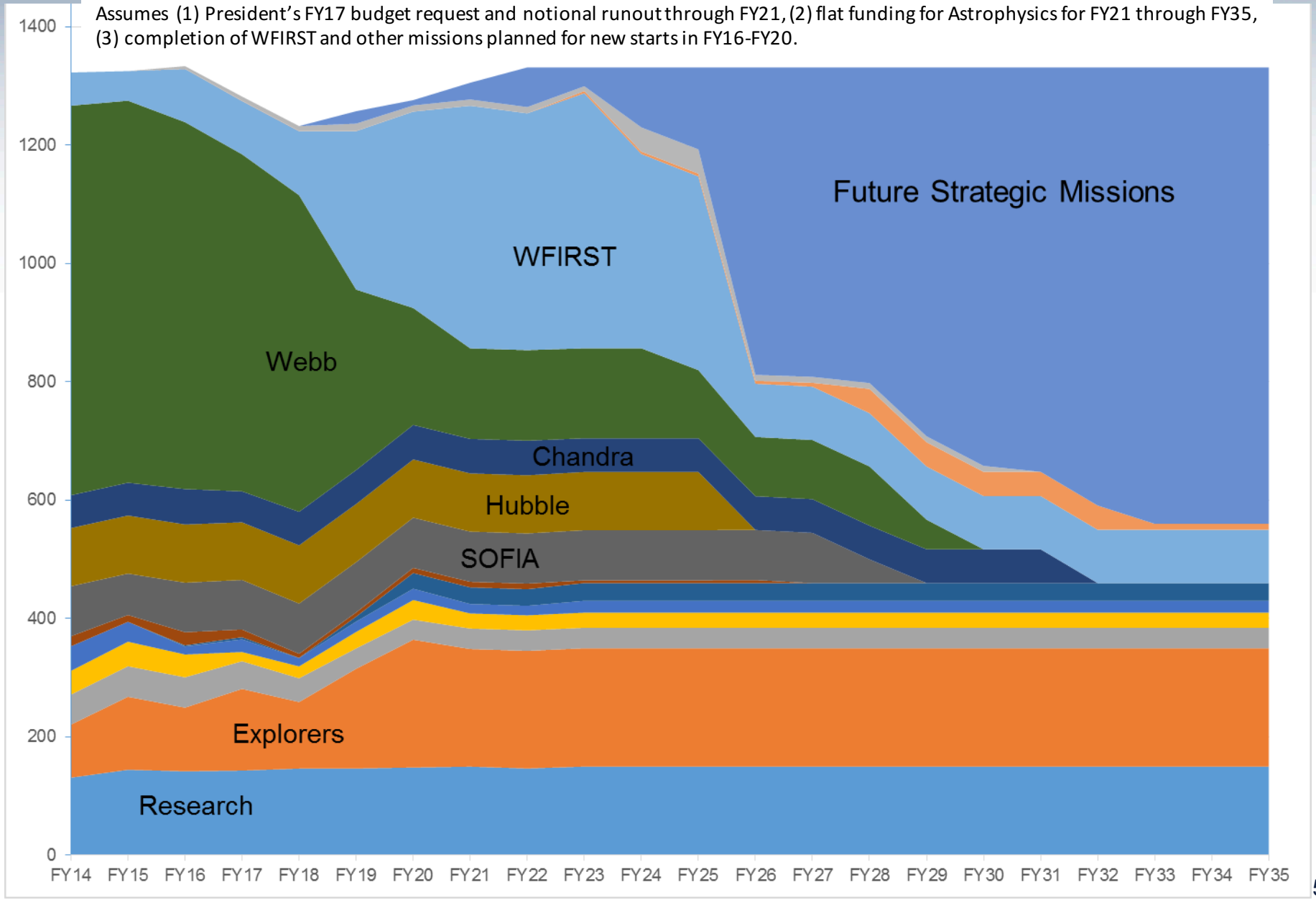
2001
Decadal Survey
JWST

Launch mid-2020s

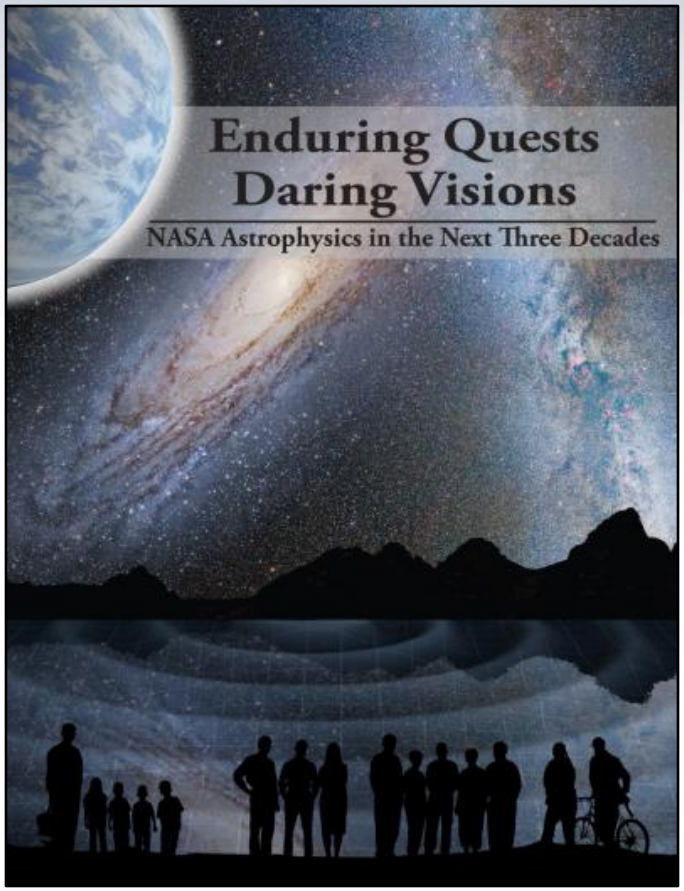
2010
Decadal Survey
WFIRST

The Landscape after WFIRST (notional)

Assumes (1) President's FY17 budget request and notional runout through FY21, (2) flat funding for Astrophysics for FY21 through FY35, (3) completion of WFIRST and other missions planned for new starts in FY16-FY20.



A Community-driven Vision for the 2030s



- Far Infrared Surveyor
- Habitable Exoplanet Imaging Mission
- Large UV/Optical/Infrared Surveyor
- X-ray Surveyor

These four missions were endorsed by the Program Analysis Groups (PAGs) and recommended by the NAC's Astrophysics Subcommittee as the four mission concepts that NASA should study in preparation for the 2020 Decadal Survey.

Preparing for the 2020 Decadal Survey
Large Mission Concepts

NASA has assembled Science and Technology Definition Teams (STDTs) for each of the four large mission candidates to enable Mission Concept Studies as input to the 2020 Decadal Survey.

	Community STDT Chairs	Center Study Team	Study Lead Center	HQ Program Scientists
Far IR Surveyor	Asantha Cooray Margaret Meixner	David Leisawitz Ruth Carter	GSFC	Kartik Sheth Dominic Benford
Habitable Exoplanet Imaging Mission	Scott Gaudi Sara Seager	Bertrand Mennesson Keith Warfield	JPL	Martin Still Doug Hudgins
Large UV/Optical/IR Surveyor	Debra Fischer Bradley Peterson	Aki Roberge Julie Crooke	GSFC	Mario Perez Erin Smith
X-ray Surveyor	Feryal Ozel Alexey Vikhlinin	Jessica Gaskin Gregg Gelmis	MSFC	Dan Evans Lou Kaluzienski

http://science.nasa.gov/astrophysics/2020-decadal-survey-planning/

Correcting Five Myths about the Large Mission Concept Studies

- This is not a competition and HQ will not select among the studies.
- This is not an AO proposal or a Phase A study.
- NASA will not build the design you come up with even if the Decadal Survey recommends your mission.
- A precise cost estimate is neither expected nor achievable.
- The Center and the Program Office are not in charge of the study; the Community Chairs are responsible for the final product.

Success Criteria

NASA defines a successful outcome of these studies to be four compelling and executable mission concepts, which will subsequently be prioritized by the 2020 Decadal Survey.

COMPELLING: Worthy of a Decadal Survey recommendation (i.e., worth spending billions of $$ for the science return)

- Strong science motivation with well articulated objectives
- Groundbreaking science to be performed in the 2030s
- Synergies with existing/planned major ground- and space-based observatories

EXECUTABLE: Technically feasible with a believable path to technology maturation

- Architecture, mission design, + payload in the STDT report is notional.
- NASA has never launched the mission design that was specified in the Decadal Survey.
- Precise costing is neither expected or achievable.

Science comes first

- First objective: A compelling science case for addressing critical science questions in the following decades
- Only then: The technical parameters necessary to achieve these goals, which will include:
  - Design Reference Mission, including notional payload.
  - Technology assessment.
  - Notional time to mature technology and develop mission.
- And at the very end: Cost assessment, major technical issues, and risk reduction plans as a function of science capability.

A Community Driven Process

The Drivers
The Community Chairs

The STDT Members
Design the compelling science / technology case

The Liaison
Center Study Scientist

The Engine
Center Study Team
Center Study Manager manages resources

Interactions with NASA

- The Community Chairs are ultimately responsible for the delivery of a compelling and feasible mission concept. The Community Chairs and the Center Study Scientist interact directly with the HQ Program Scientists.
- The Program Scientists for your study are the Division Director's eyes and ears for this activity.
- The Center Study Manager leads the technical work in support of your study.
- The Program Offices facilitate the implementation of your study.
- The Management Plan is a work in progress. Changes will be made based on feedback from Study Teams and experience of the last few months.


Formulation
Implementation
Primary Ops
Extended Ops
Spitzer
8/25/2003
Kepler
3/7/2009
WFIRST
Mid 2020s
Euclid (ESA)
2020
LISA Pathfinder (ESA)
12/3/2015
JWST
2018
Chandra
7/23/1999
TESS
2017
NuSTAR
6/13/2012
Swift
11/20/2004
Your Mission Here
Hitomi (JAXA)
2/17/2016
Fermi
6/11/2008
Hubble
4/24/1990
CREAM (on ISS)
2017
NICER (on ISS)
2017
SOFIA
Full Ops 5/2014