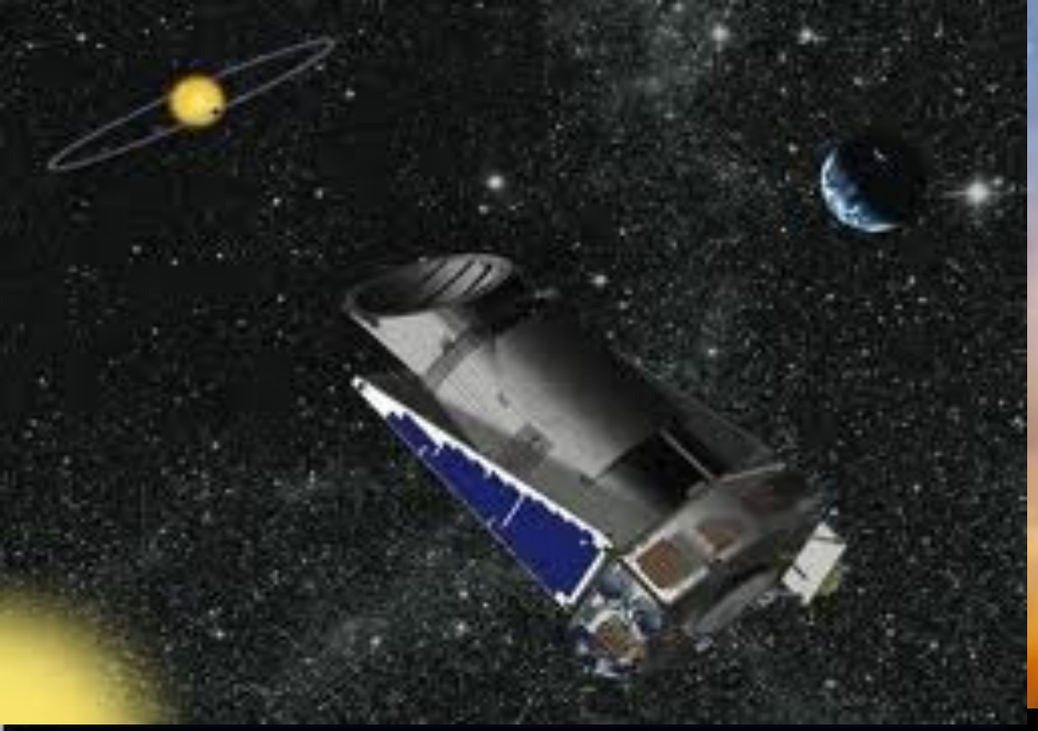
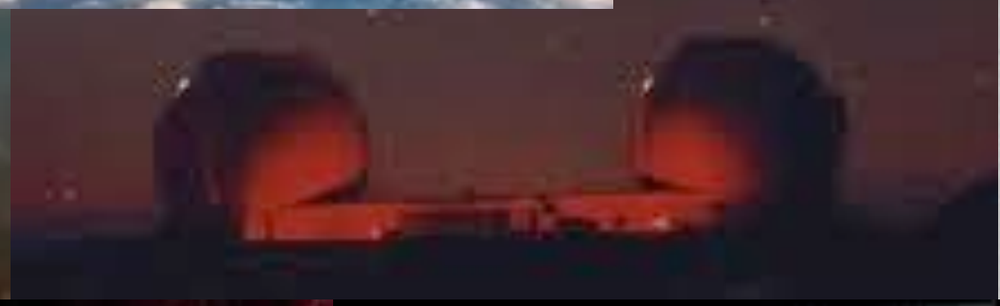
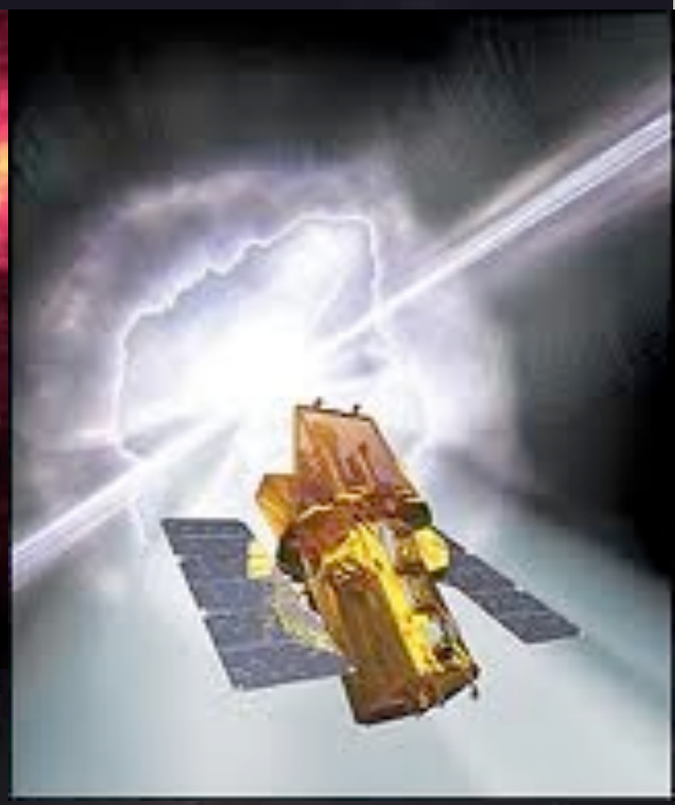
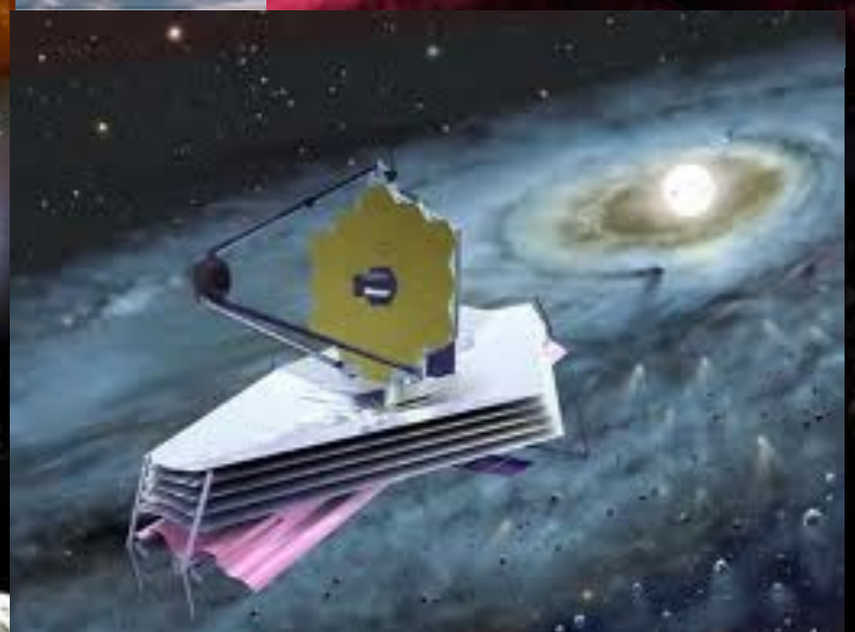



NASA
DLR







The astronomy science centers were "*established by NASA to serve as the interfaces between the missions and the community of scientists who utilize the data*"

(NRC: Portals of the Universe).

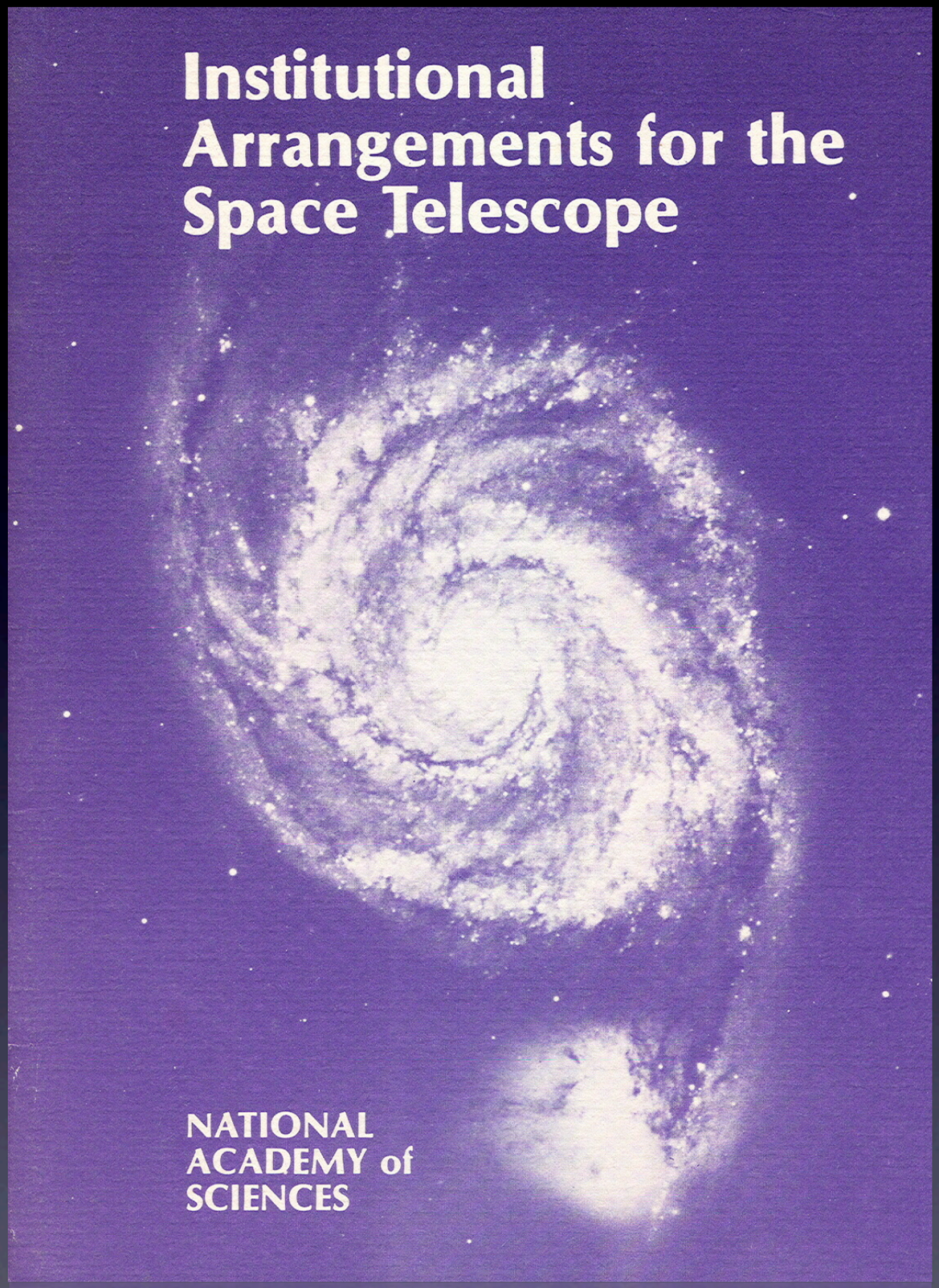
Our mission is to maximize the scientific return of the NASA missions we operate.

Active researchers at each center play a vital role in instrument development and innovative operational support

Crucially the science centers enable close interaction between scientists and engineers in the development and operation of the hardware and software to support the missions.

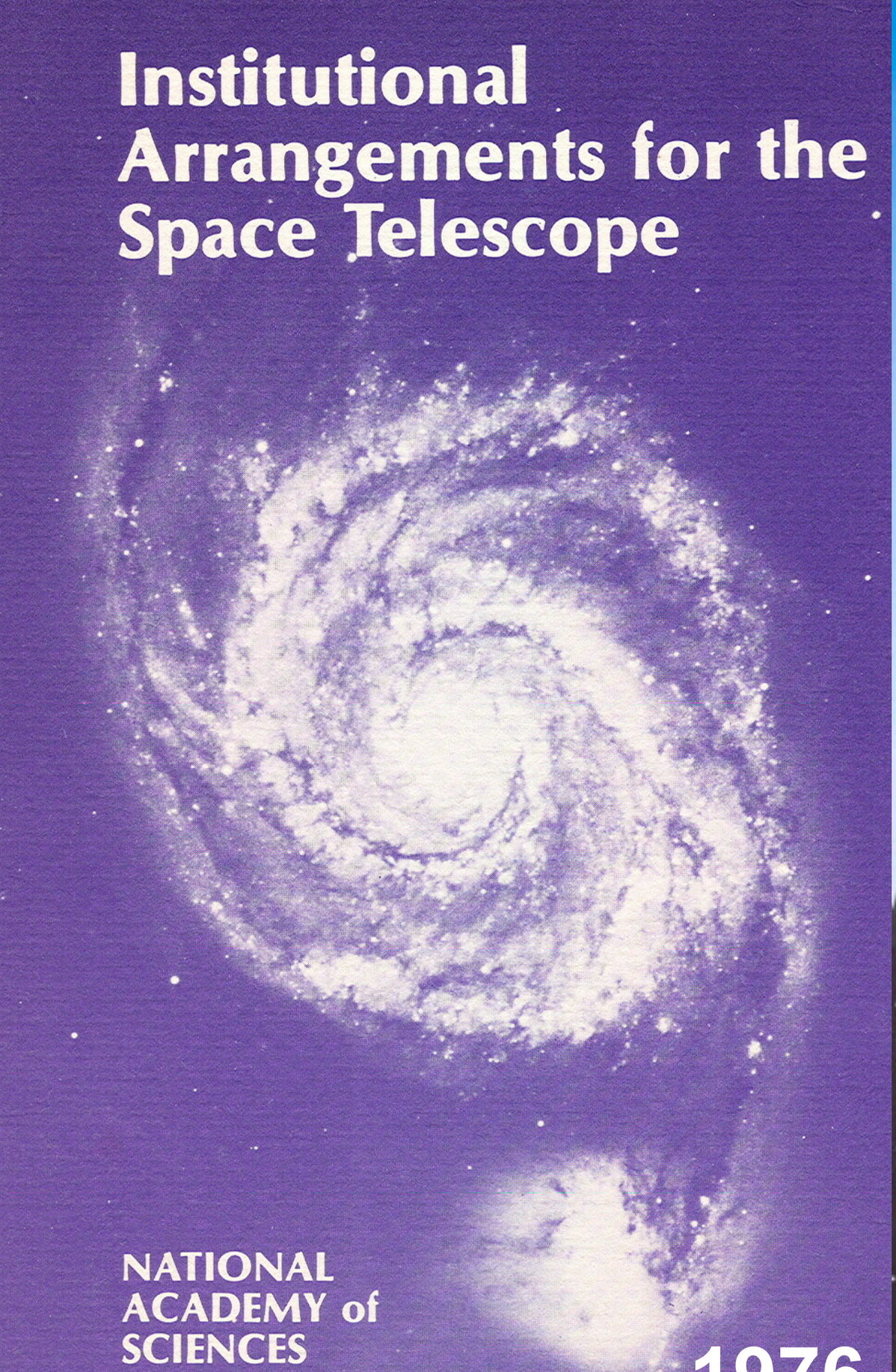
"Whereas the operation of ST…is best carried out by NASA, optimum scientific use… requires the participation of the astronomical community.

An institutional arrangement… is needed to provide the long term guidance and support for the scientific effort, to provide a mechanism for engaging the participation of astronomers throughout the world, and to provide a means for the dissemination and utilization of the data…"



1976

Institutional Arrangements for the Space Telescope

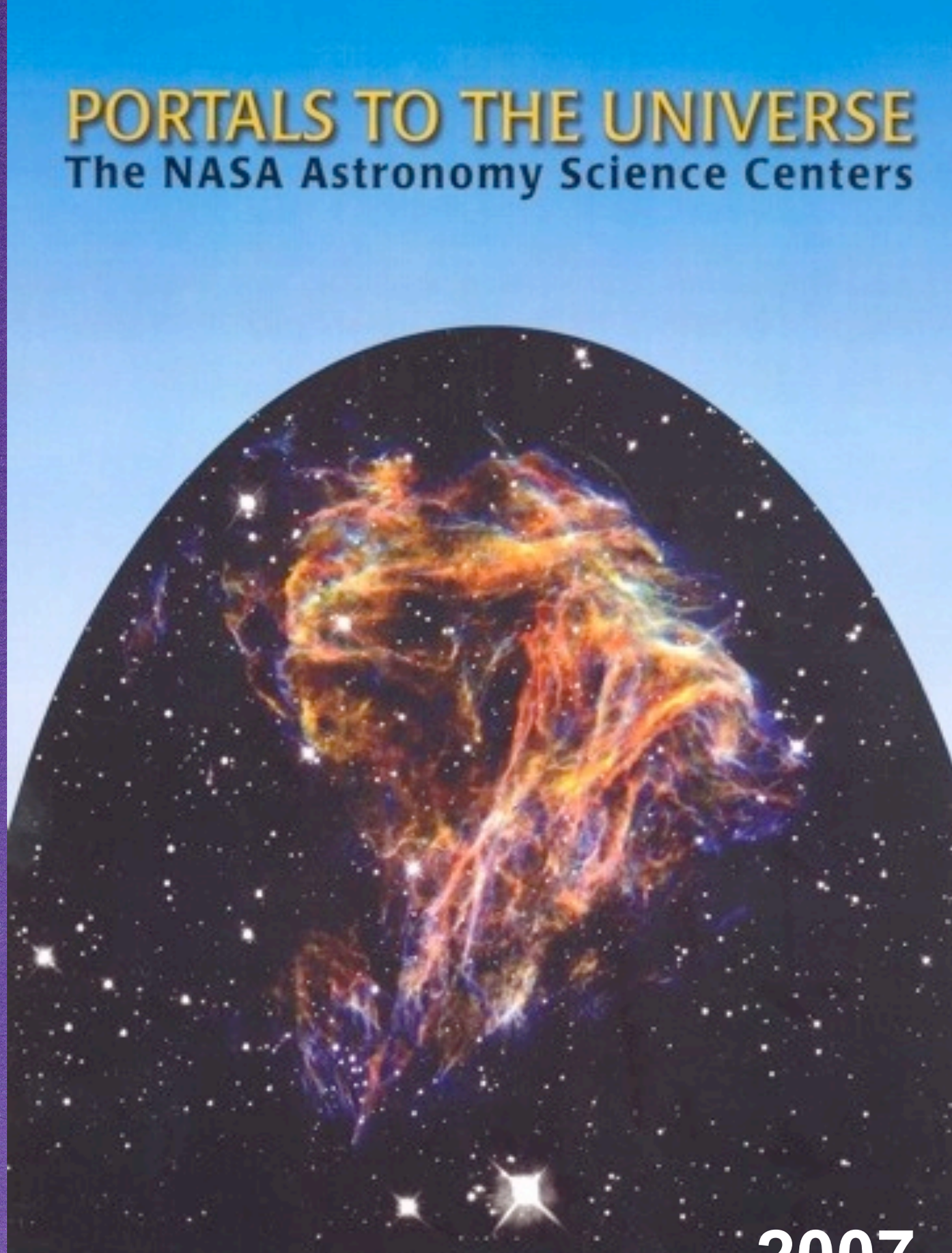


NATIONAL ACADEMY of SCIENCES

1976

PORTALS TO THE UNIVERSE

The NASA Astronomy Science Centers



NATIONAL RESEARCH COUNCIL
OF THE NATIONAL ACADEMIES

2007

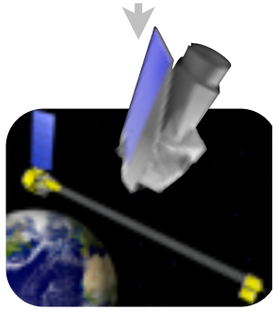
“Big Science” Models

Instrument Team 1

Instrument Team 2

Instrument Team 3

Distinct multi-disciplinary teams



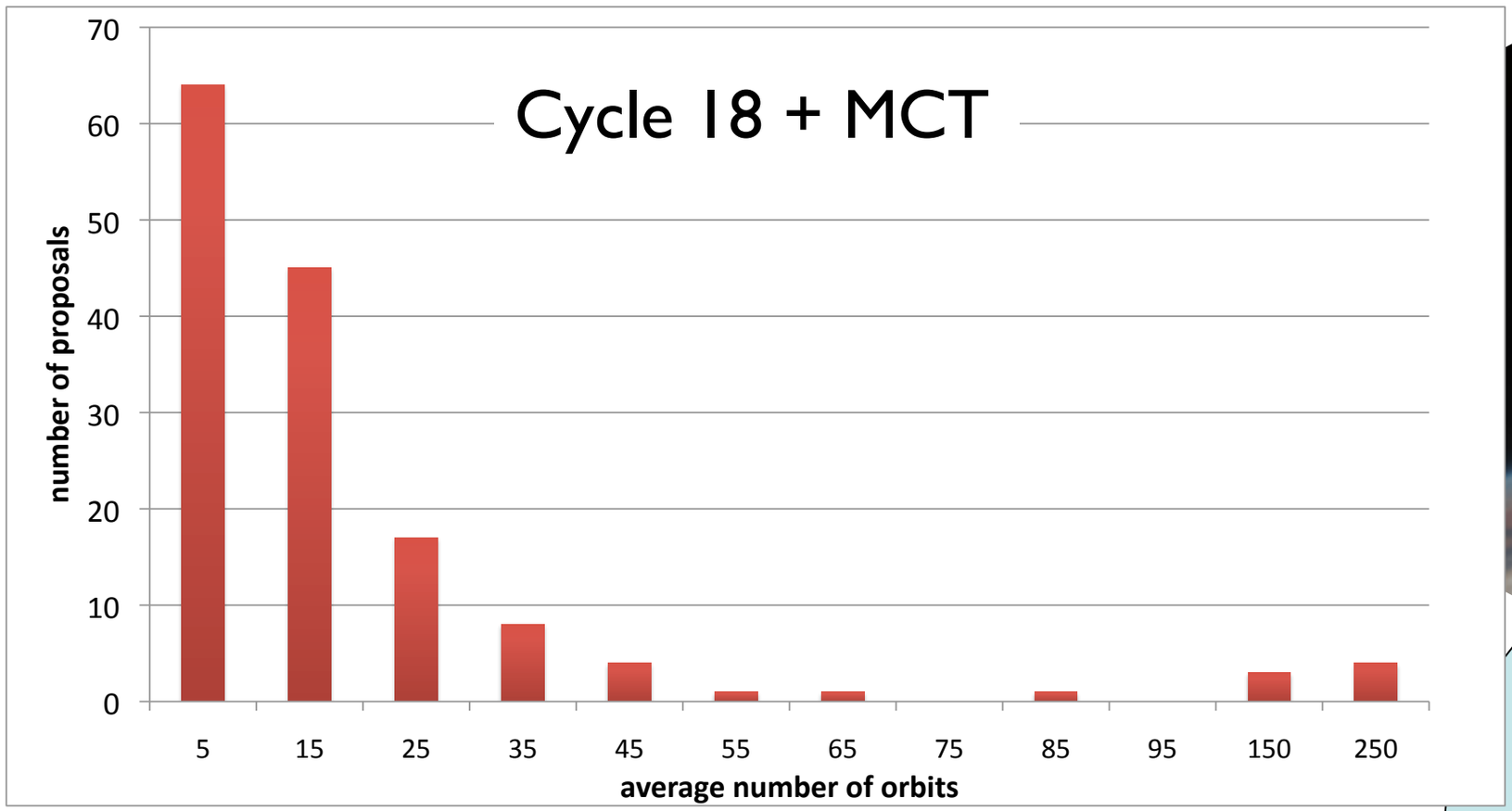
Explorer or M/S class missions

Great Observatories

diverse sustainable communities ~8,000

“Giacconi Model”

“Big Science” Models

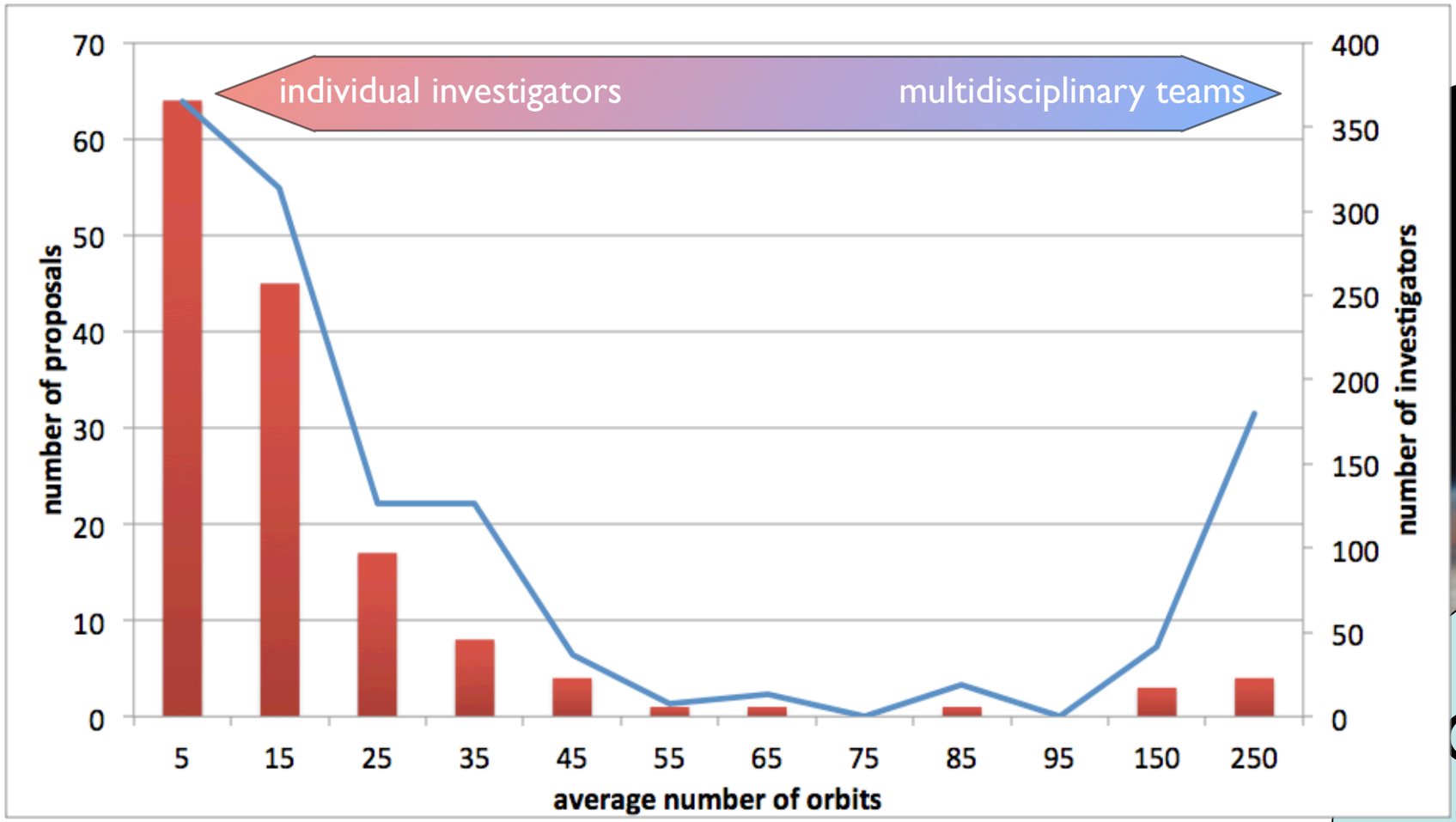


number of programs as a function of size

enables science at all scales

“Giacconi Model”

The Giacconi Model

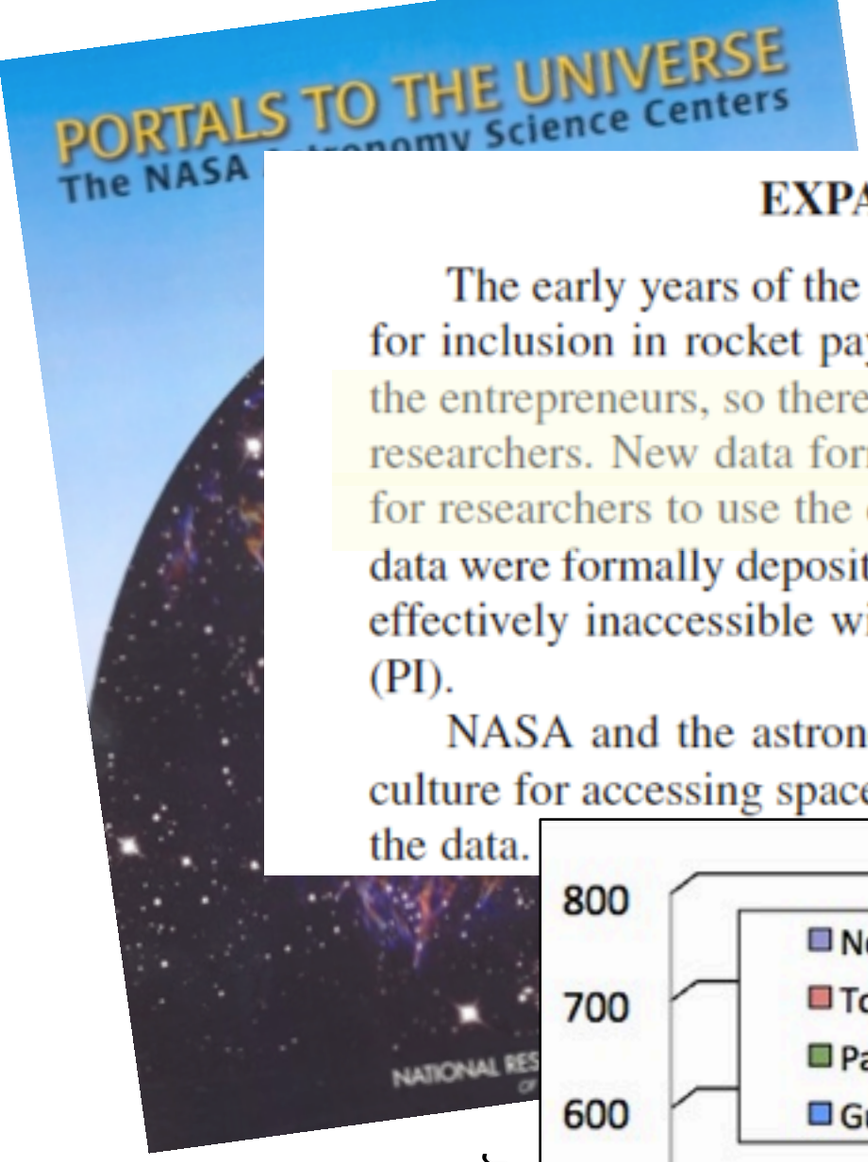


number of programs as a function of size

number of supported investigators

Community science undertake **at all scales** by peer review

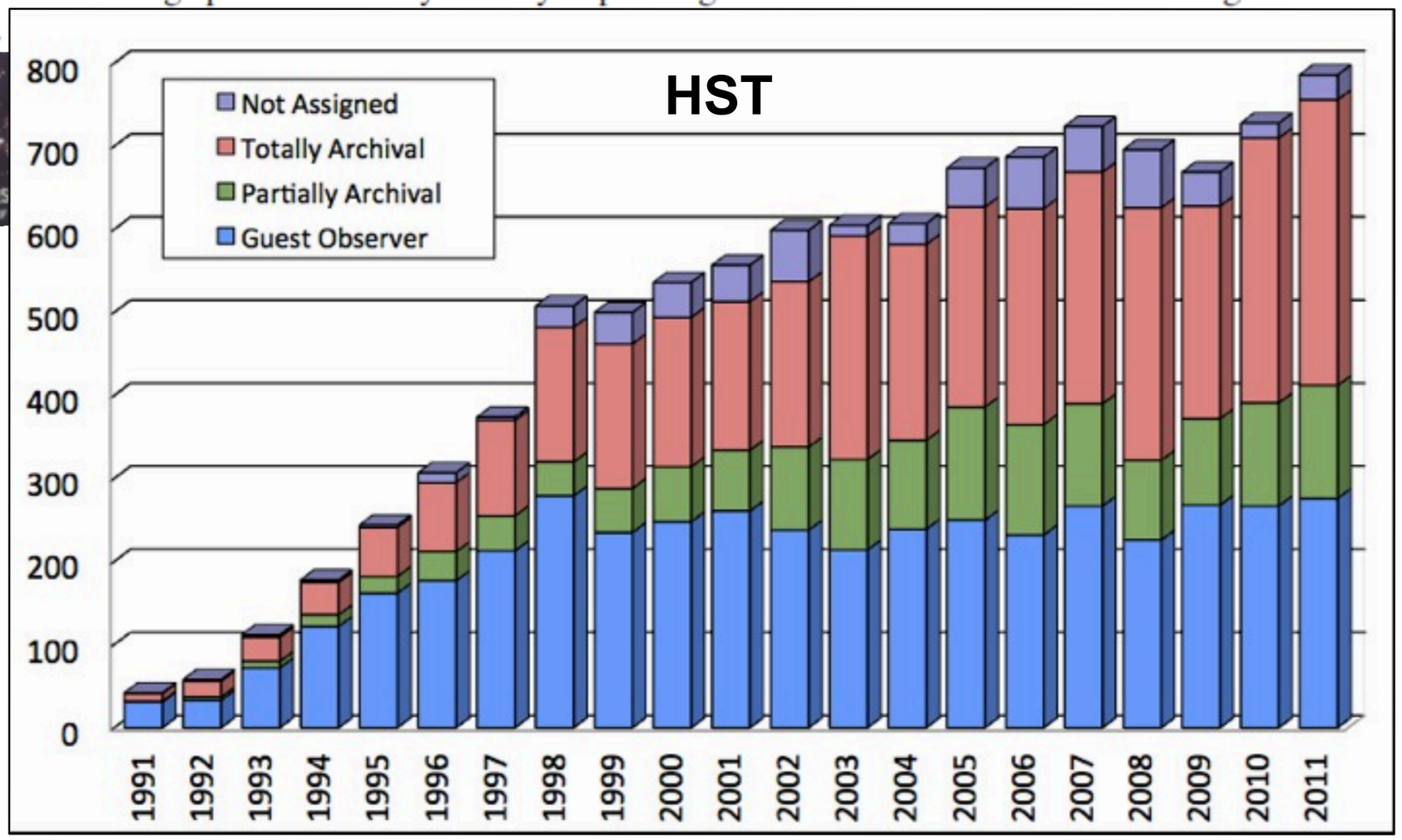
enabled by NASA's Astronomy Science Center model



EXPANDING ACCESS TO SPACE ASTRONOMY DATA

The early years of the space program were dominated by entrepreneurs who developed instruments for inclusion in rocket payloads and then on satellites. The data from those experiments belonged to the entrepreneurs, so there was no requirement to invest resources into making the data usable by other researchers. New data formats were invented for each new set of observations, and it was impossible for researchers to use the data without the expert assistance of the primary investigators. Although the data were formally deposited in NASA's National Space Science Data Center (NSSDC), the archive was effectively inaccessible without an invitation to visit the home institution of the principal investigator (PI).

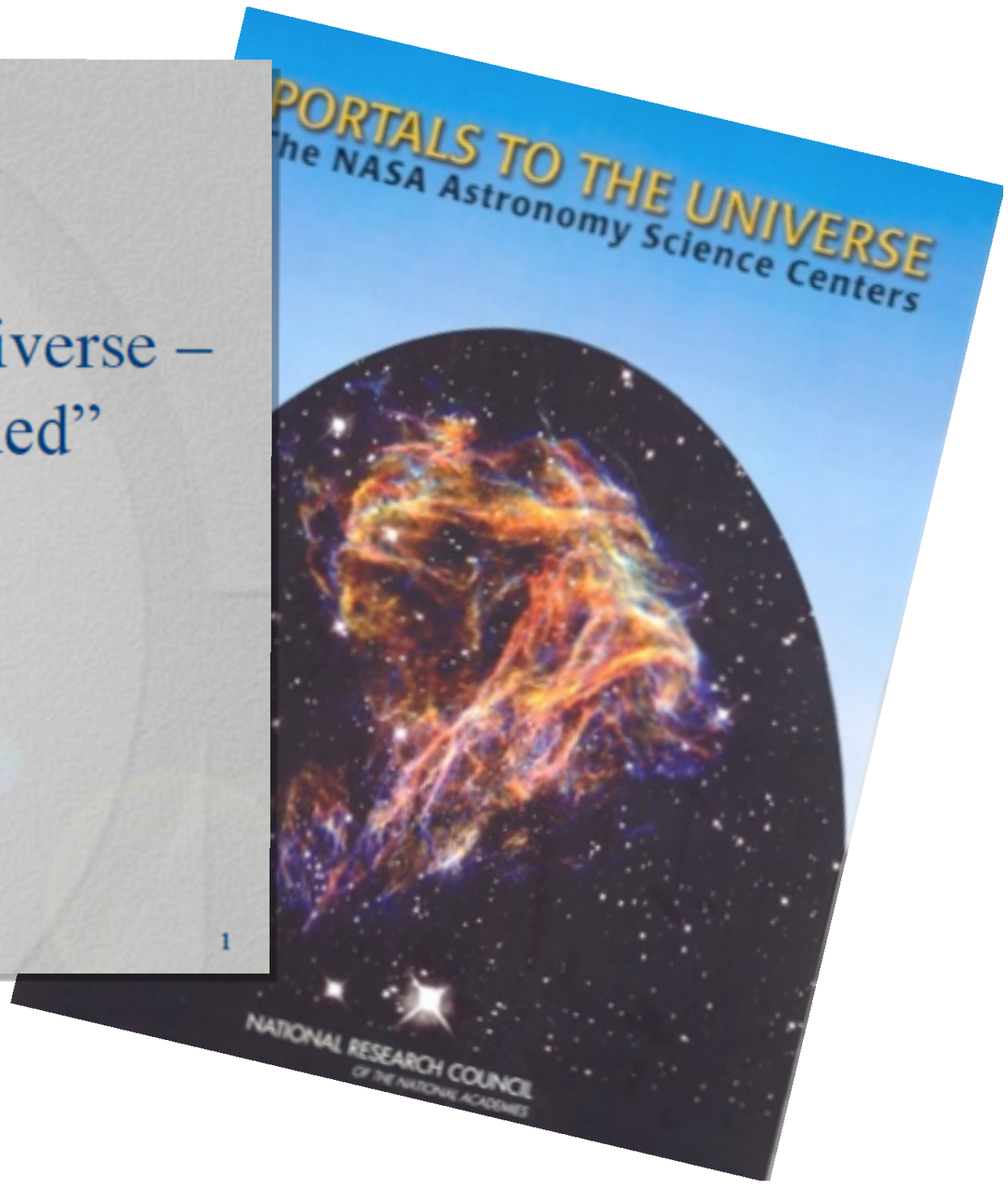
NASA and the astronomy community took several steps to remedy what had become an insular culture for accessing space astronomy data by expanding the number of users and increasing the use of the data.



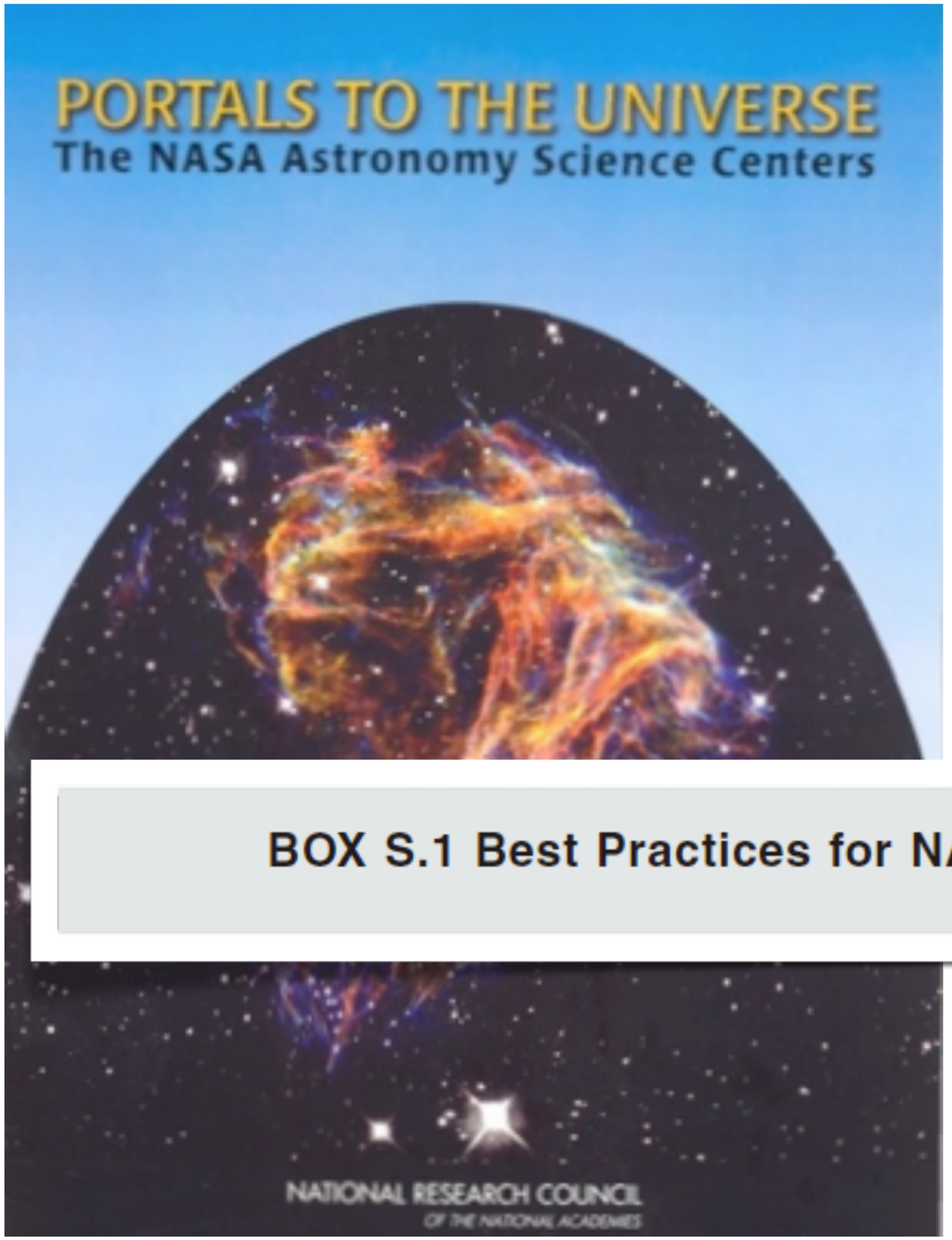
Implementing Portals of the Universe – A Missions "Lessons Learned" Workshop

Neill Reid

Science Mission Office

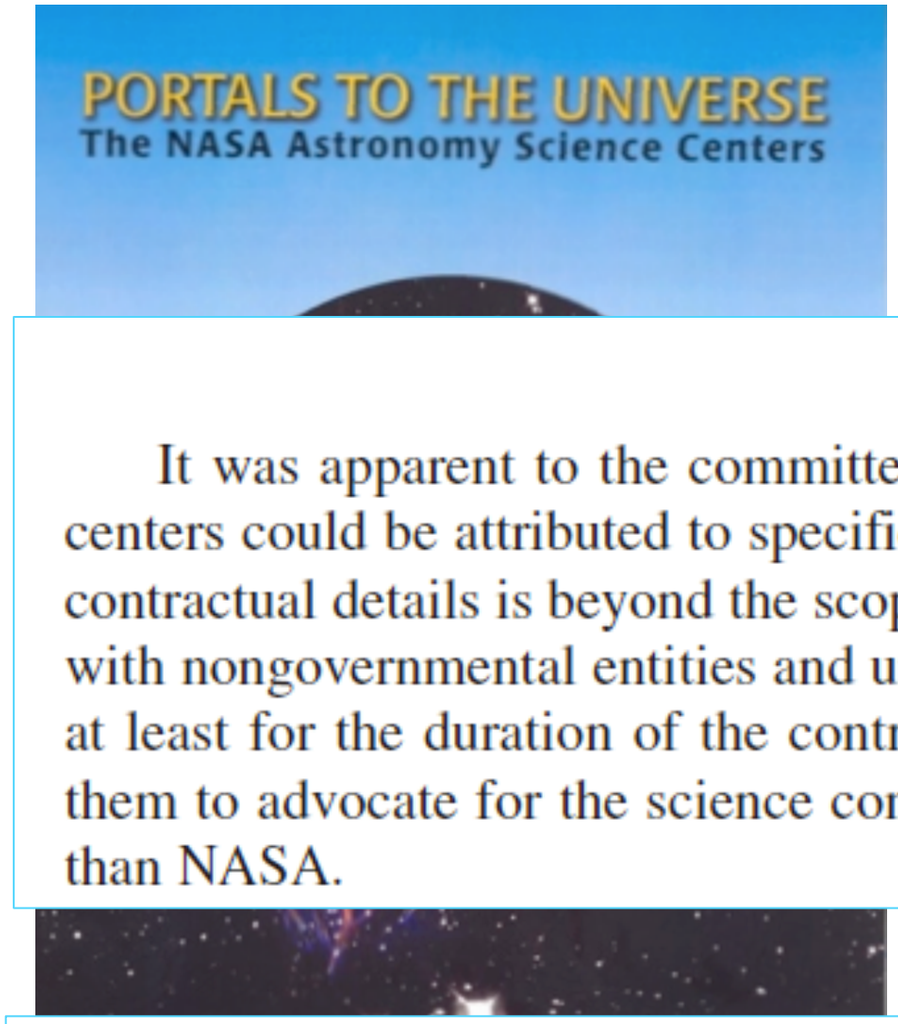


Common themes across all science centers
- utility of science staff
- enhanced data products and archives
- analysis software



BOX S.1 Best Practices for NASA Astronomy Science Centers

see Paul Hertz's presentation



Budgets

It was apparent to the committee that differences between the cost of similar services at various centers could be attributed to specific contractual arrangements with NASA. (An investigation of such contractual details is beyond the scope of this study.) It was also apparent that science centers affiliated with nongovernmental entities and under contract to NASA benefit from a degree of resource stability, at least for the duration of the contract period. Their independence from the government also allows them to advocate for the science community and for their center and to seek sources of funding other than NASA.

ADVOCACY AND STRATEGIC PLANNING

As the largest astronomy science centers evolve to support their user communities, they naturally become focal points, allowing astronomers to develop strategies for the immediate and long-term future of the areas of astronomy they serve. When a center convenes an annual time allocation committee for reviewing proposals, it will already have a strategy for allocating observatory time and center resources to optimize the overall scientific return. Moreover, the centers host forums in which users and center scientists plan the evolution of the observatory and the center and discuss the scientific opportunities at possible future observatories and their design parameters. Naturally these discussions, and the documents resulting from them, become inputs to strategic decisions in the community and NASA regarding the future of the field.