Heliophysics Research Program

Arik Posner

Heliophysics R&A Lead

What is the Heliophysics Research Program?

The Heliophysics Research Program contains:

- Mission Operations & Data Analysis of many missions of the Heliophysics System Observatory: ACE, Cluster II, Geotail, RHESSI, SOHO, TIMED, TRACE, Voyager, and Wind; Solar and Space Physics Mission Operations Center.
- The majority of Heliophysics Research & Analysis programs: Geospace and Solar/ Heliospheric Supporting Research & Technology Program (including Supporting Research, Instrument Development, Low-Cost Access to Space), Heliophysics Guest Investigator Program, Heliophysics Theory Program.
- Community Coordinated Modeling Center and the Heliophysics Science Support Office.
- Data Centers and Data Environment Programs: Solar Data Analysis Center, Space Physics Data Facility, Data & Modeling Service, competed Heliophysics Data Environment Enhancements (formerly VxOs).
- Sounding Rockets and the Rocket Range infrastructure on behalf of SMD.

Perception: The Heliophysics Research Program is mainly Competed R&A.

Approximate Heliophysics Research Program Element Funding Levels

HRP: ~$160-180M/yr

- Heliophysics Research and Analysis: 19%
- Sounding Rockets: 31%
- Research Range: 11%
- Other Missions and Data Analysis: 39%

SMD Research Programs in Comparison

NASA R&D programs

	FY 2012 actual	FY 2013 request	FY 2012–13 percent change
	(millions of dollars)*		
Total NASA	17 770	17 711	−0.3
NASA R&D			
R&D programs			
Total Science	5 074	4 911	−3.2
Planetary science			
Discovery	173	190	9.8
New Frontiers	161	175	8.9
Technology	145	133	−8.3
Planetary science research	174	188	8.3
Mars exploration	587	361	−38.5
Outer planets	122	84	−31.2
Lunar quest	140	61	−56.0
Total planetary science	1 501	1 192	−20.6
Astrophysics			
Astrophysics research	164	176	7.4
Cosmic Origins	237	240	1.3
Physics of the Cosmos	108	112	3.2
Exoplanet Exploration	51	56	10.2
Astrophysics Explorer	112	75	−33.1
Total astrophysics	673	659	−1.9
Earth science			
Earth systematic missions	881	886	0.5
Earth system science pathfinder	188	219	16.6
Multimission operations	163	162	−1.0
Earth science research	440	434	−1.5
Applied sciences	36	35	−4.9
Earth science technology	51	49	−3.3
Total Earth science	1 760	1 785	1.4
Heliophysics			
Heliophysics research	175	179	2.1
Living with a star	196	233	18.5
Solar terrestrial probes	189	189	0.4
Heliophysics explorer program	60	46	−23.4
New Millennium	0.1	0	−100.0
Total heliophysics	620	647	4.3
James Webb Space Telescope	519	628	21.0

Example:
Physics Today, American Institute of Physics Periodical, Vol. 65, No. 4, April 2012.

'Heliophysics Research' FY12 Actual Budget Perceived as **28.2%** of Total HPD Budget

i.e., THE LARGEST FRACTION OF THE TOTAL BUDGET OF ALL SMD SCIENCE DIVISIONS

Earth Science:	25%
Astrophysics+JWST:	13.8%
Planetary Science:	11.6%

Heliophysics FY12 Actual Competed R&A is small: 9.4% (k $58,528 incl. LWS TR&T)

Current Issues/Concerns/Trends

- We continue to receive high numbers of proposals to review. Constraints on success rate, proposing/reviewing work loads. Impact on notification dates.
- We discussed this with Management and Operations Working Groups and the HPS, which resulted in implementation of a two-step submission process and combined submission dates for SR&T and HGIP programs.
- This resulted in streamlining and likely slightly reduced number of submissions, which counteract the above trend.
- However, the overall picture does not change.

Trends

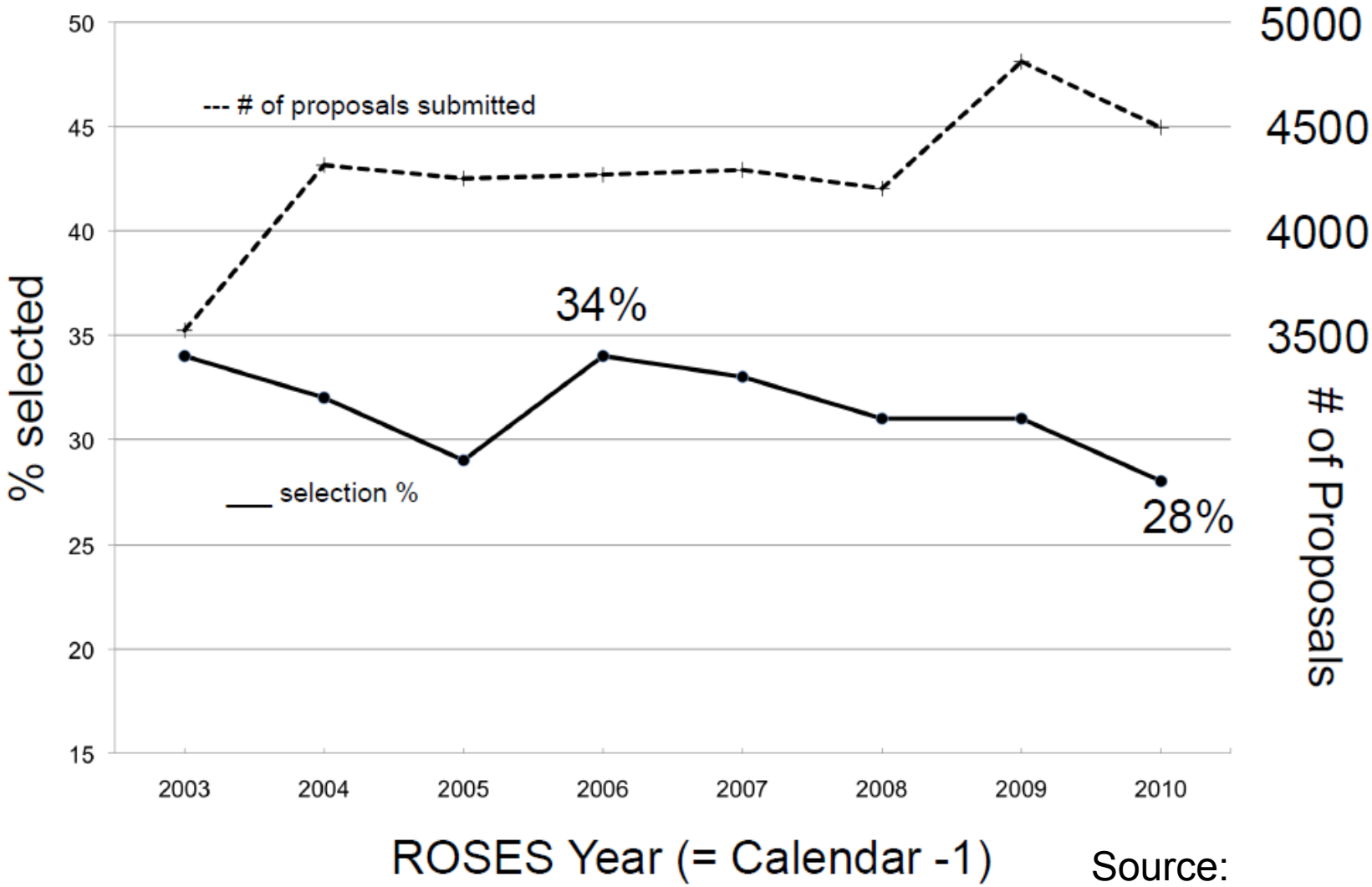
- There is increased emphasis on performance reporting.
- Newly awarded HGIP, SR&T PIs will be asked to promptly report all accepted, peer-reviewed publications to Heliophysics Division:

  HQ-HelioRA@mail.nasa.gov
- Will use information for Public Affairs and Outreach, Statistics, the Government Performance Review Act etc.
- Mission science results will be linked to LCAS, ITD.

Program Trends

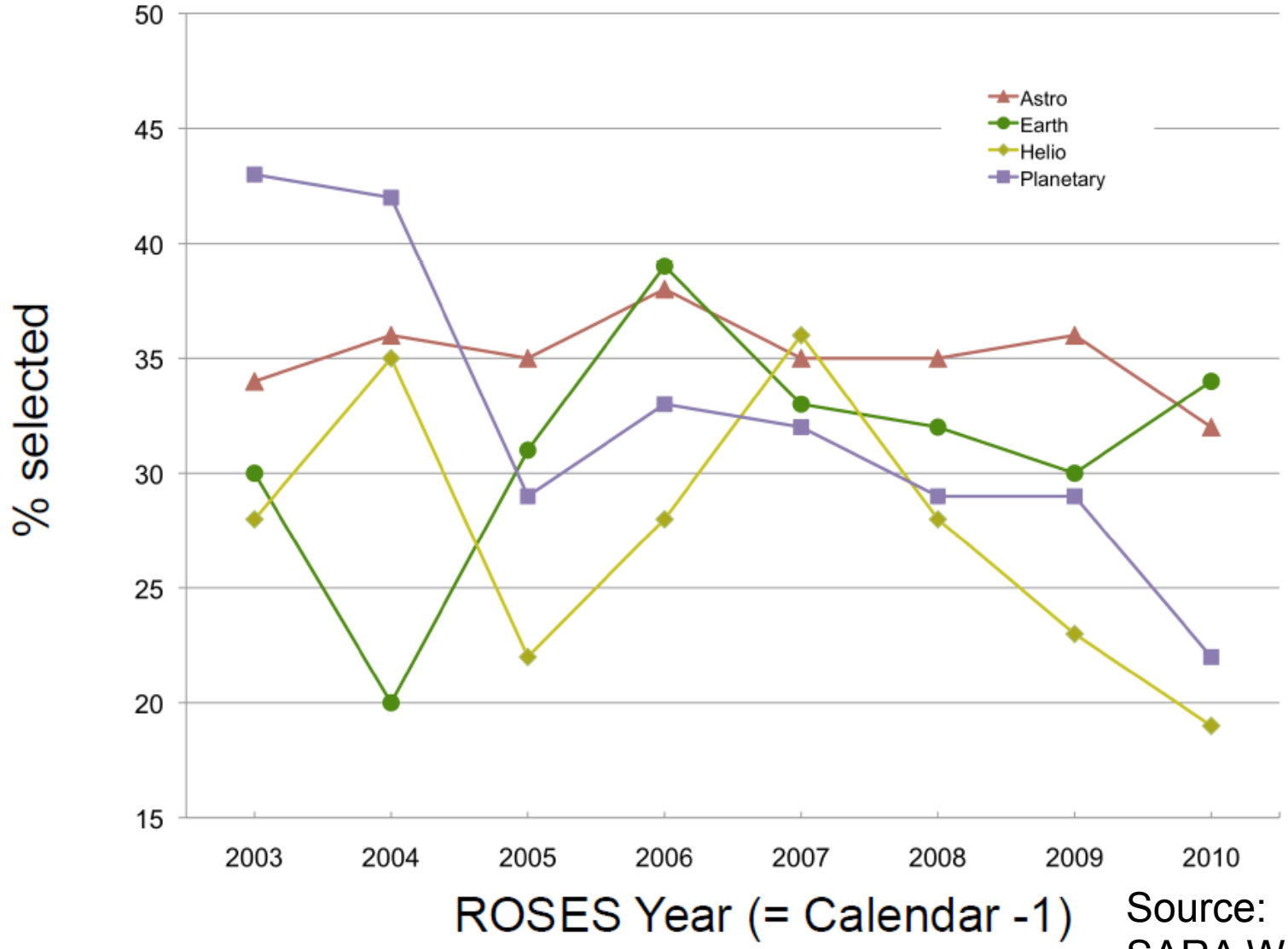
This is a response to the HPS request: Provide information connecting Decadal Survey workforce analysis data with success rates in the competed Research & Analysis programs.

SMD ROSES Selection Rates Over Time



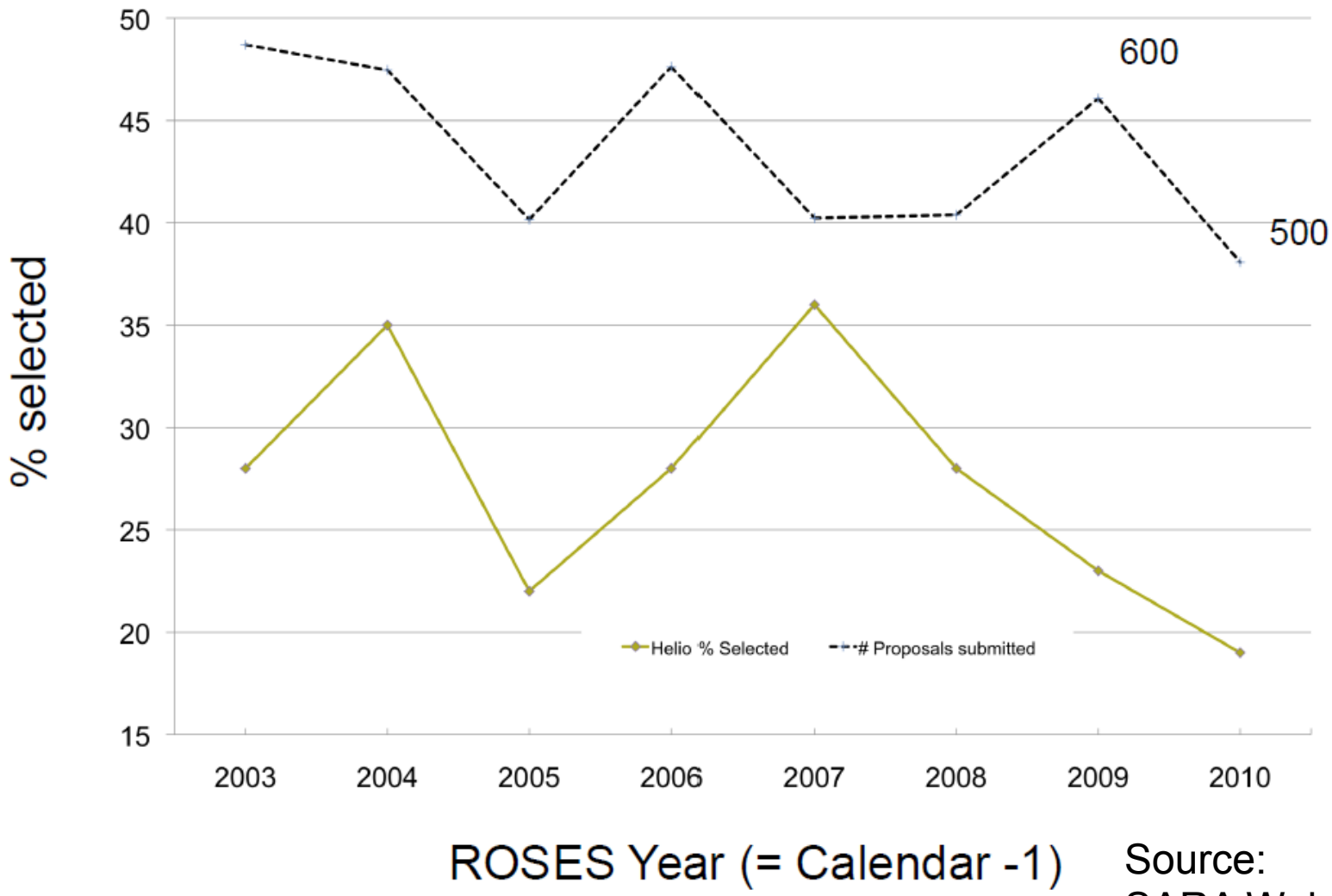
Source:
SARA Web Site

ROSES Selection Rates Over Time

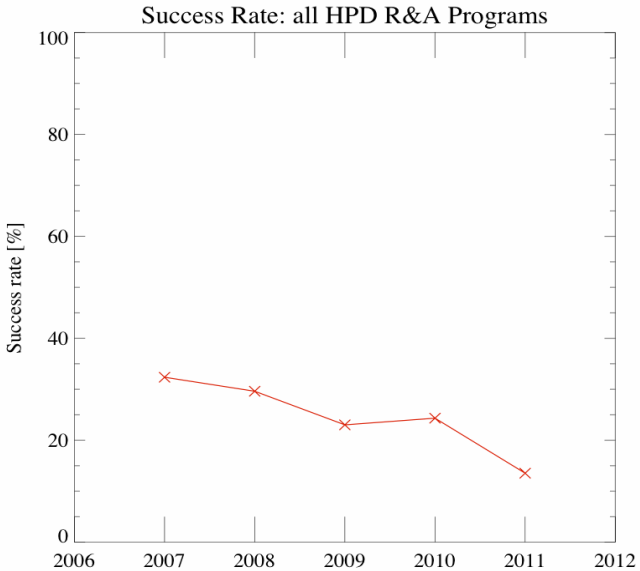


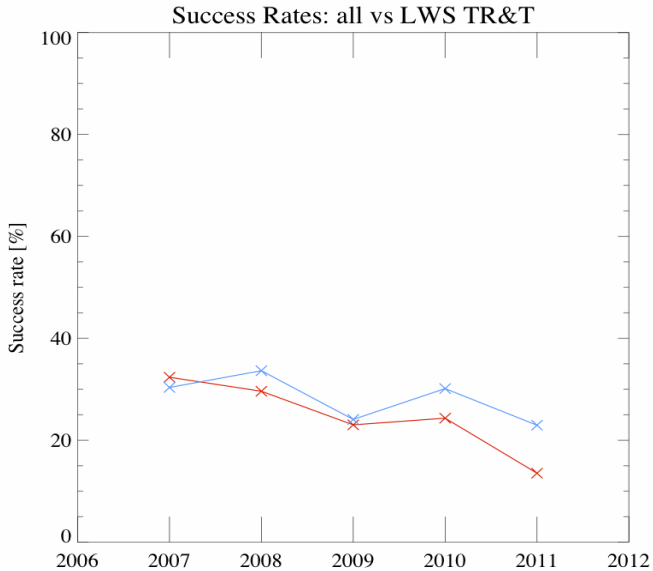
Source:
SARA Web Site

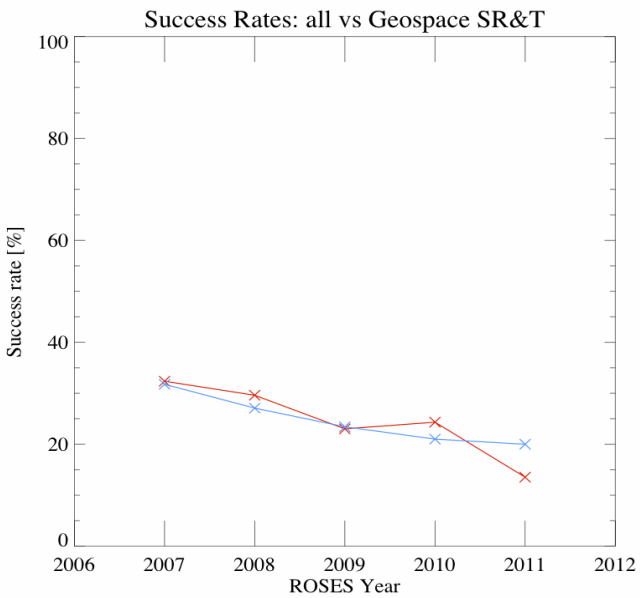
ROSES HPD % vs # over time

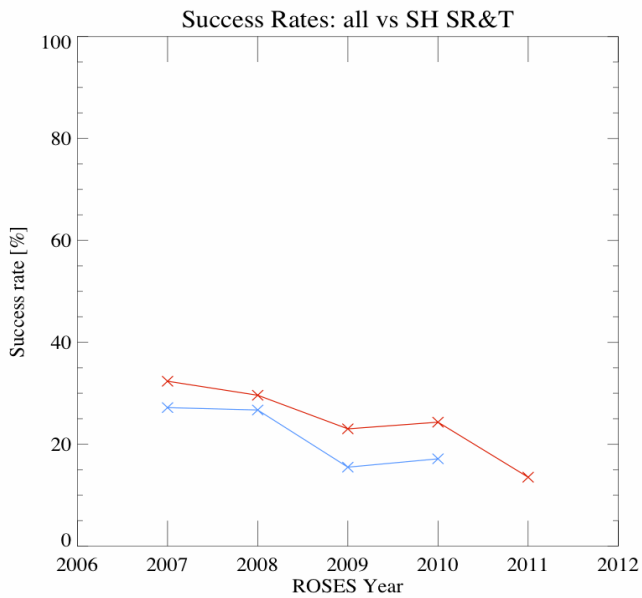


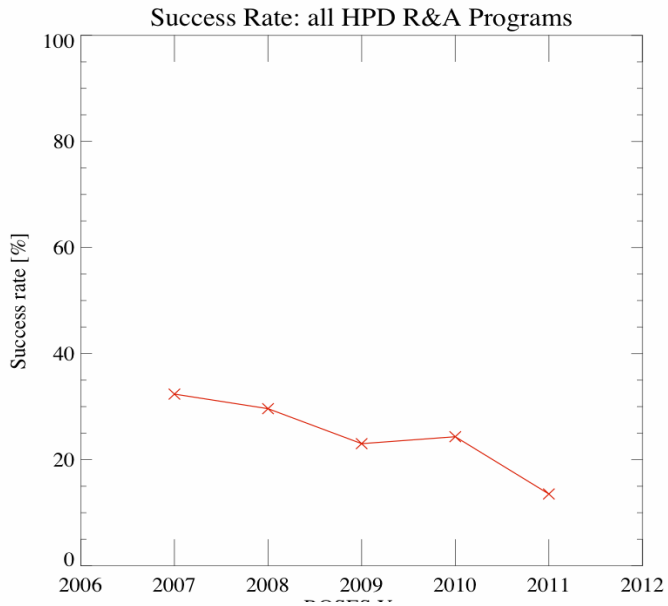
Source:
SARA Web Site

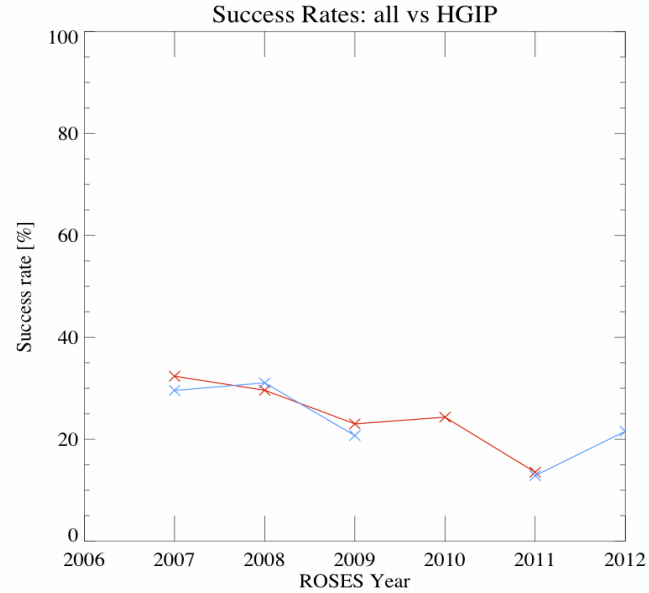

Success Rate: all HPD R&A Programs
Success rate [%]
100
80
60
40
20
0
2006
2007
2008
2009
2010
2011
2012

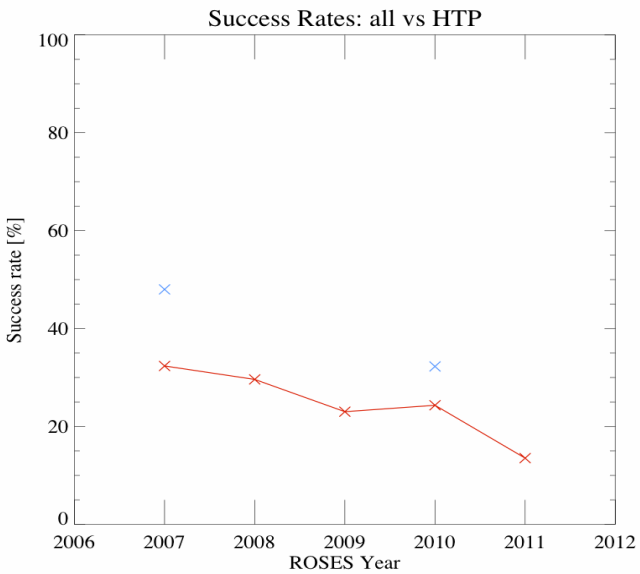

Success Rates: all vs LWS TR&T
Success rate [%]
100
80
60
40
20
0
2006
2007
2008
2009
2010
2011
2012

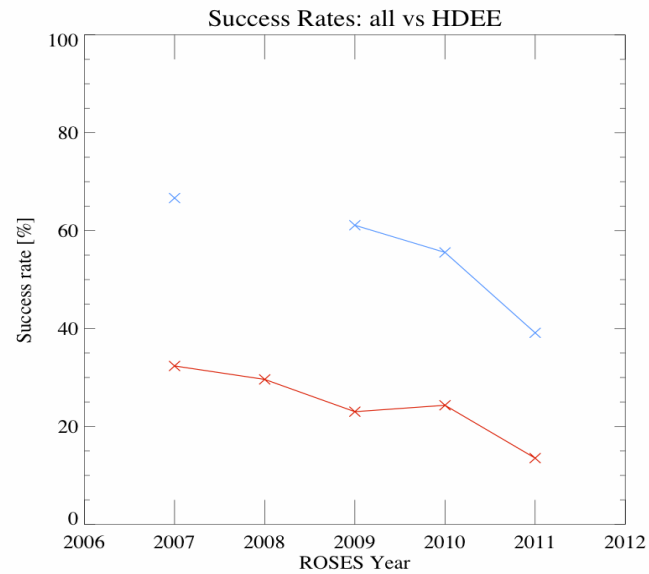

Success Rates: all vs Geospace SR&T
Success rate [%]
100
80
60
40
20
0
2006
2007
2008
2009
2010
2011
2012
ROSES Year

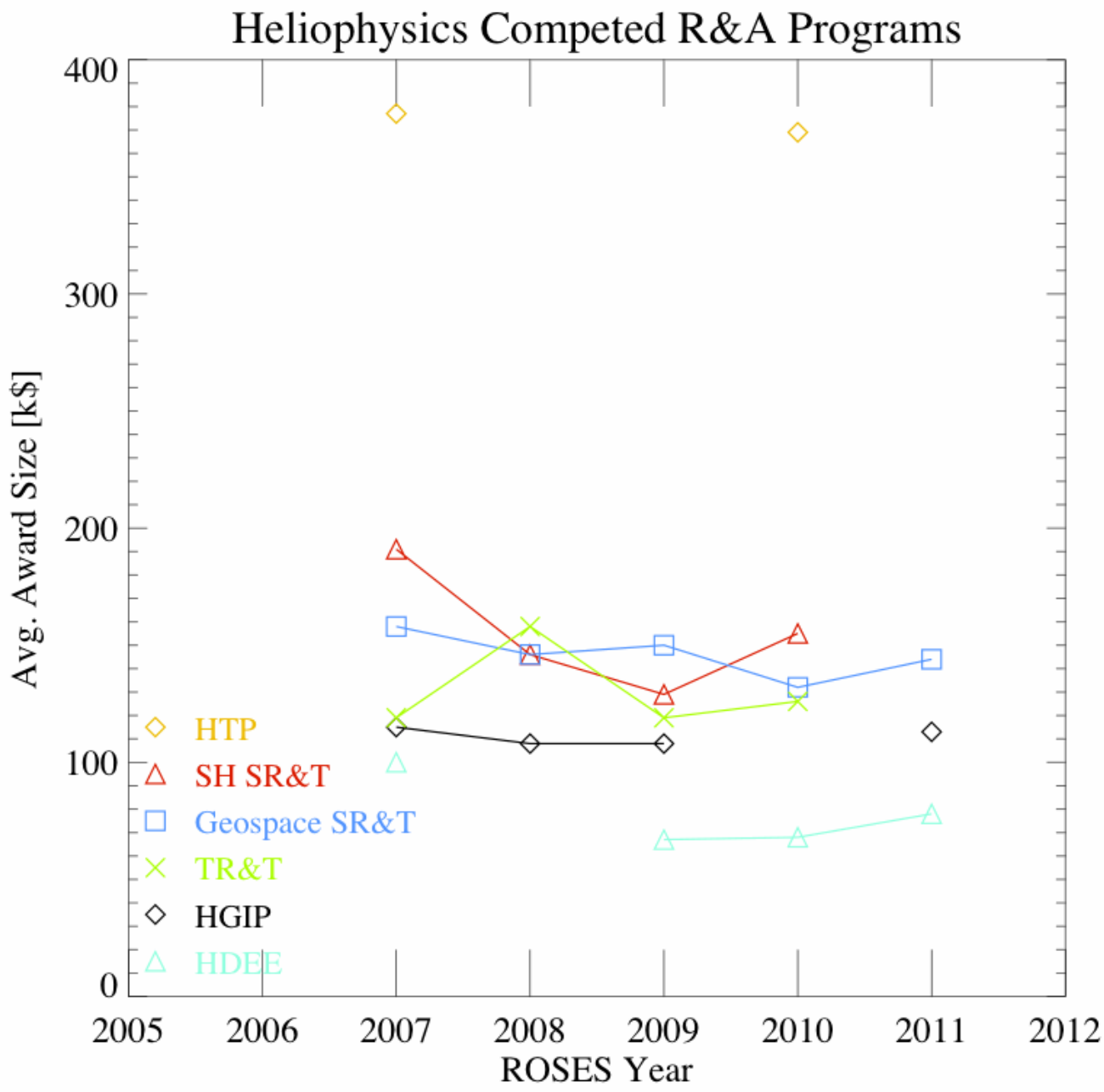

Success Rates: all vs SH SR&T
Success rate [%]
100
80
60
40
20
0
2006
2007
2008
2009
2010
2011
2012
ROSES Year


Success Rate: all HPD R&A Programs
Success rate [%]
100
80
60
40
20
0
2006
2007
2008
2009
2010
2011
2012


Success Rates: all vs HGIP
Success rate [%]
100
80
60
40
20
0
2006
2007
2008
2009
2010
2011
2012
ROSES Year

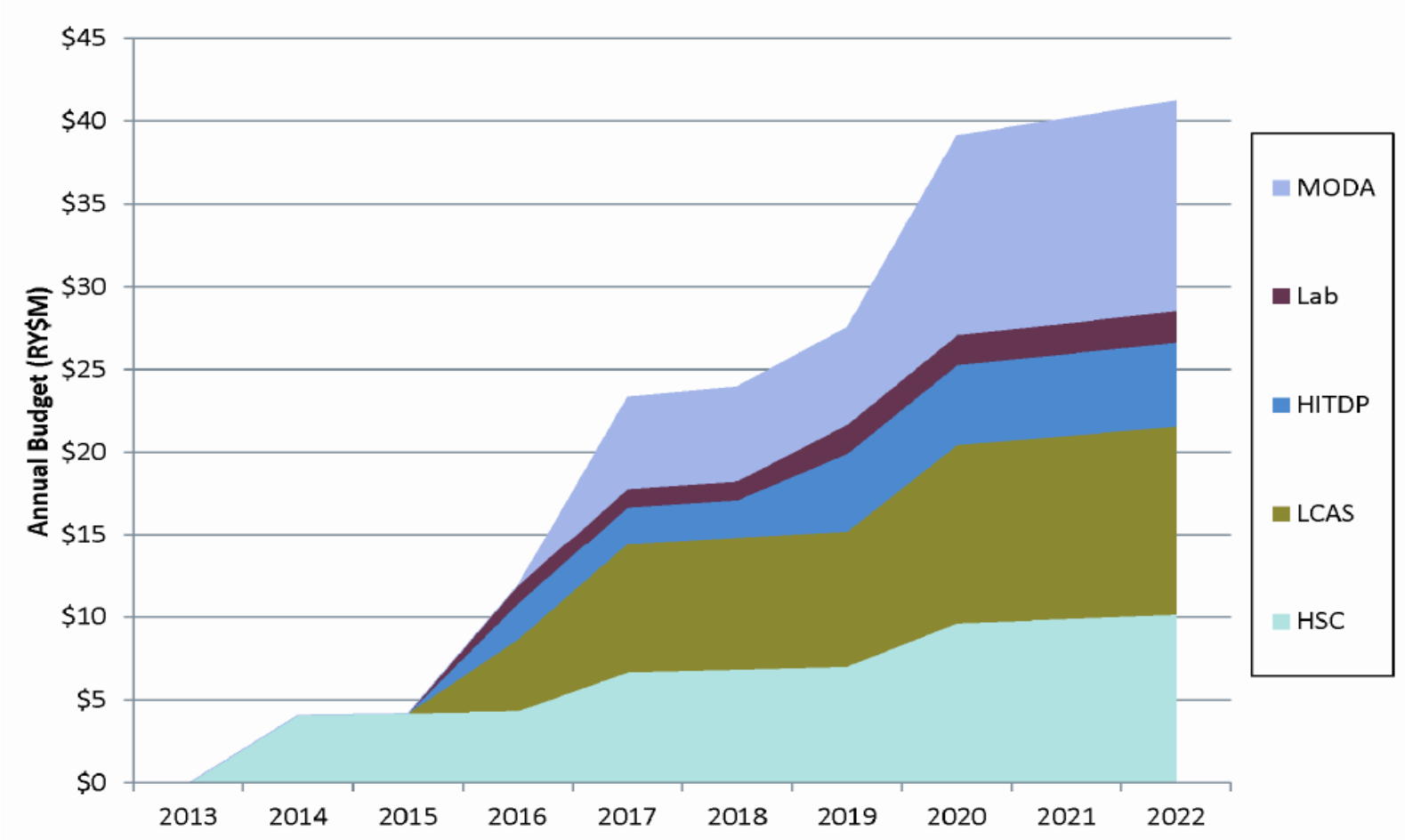

Success Rates: all vs HTP
Success rate [%]
100
80
60
40
20
0
2006
2007
2008
2009
2010
2011
2012
ROSES Year


Success Rates: all vs HDEE
Success rate [%]
100
80
60
40
20
0
2006
2007
2008
2009
2010
2011
2012
ROSES Year

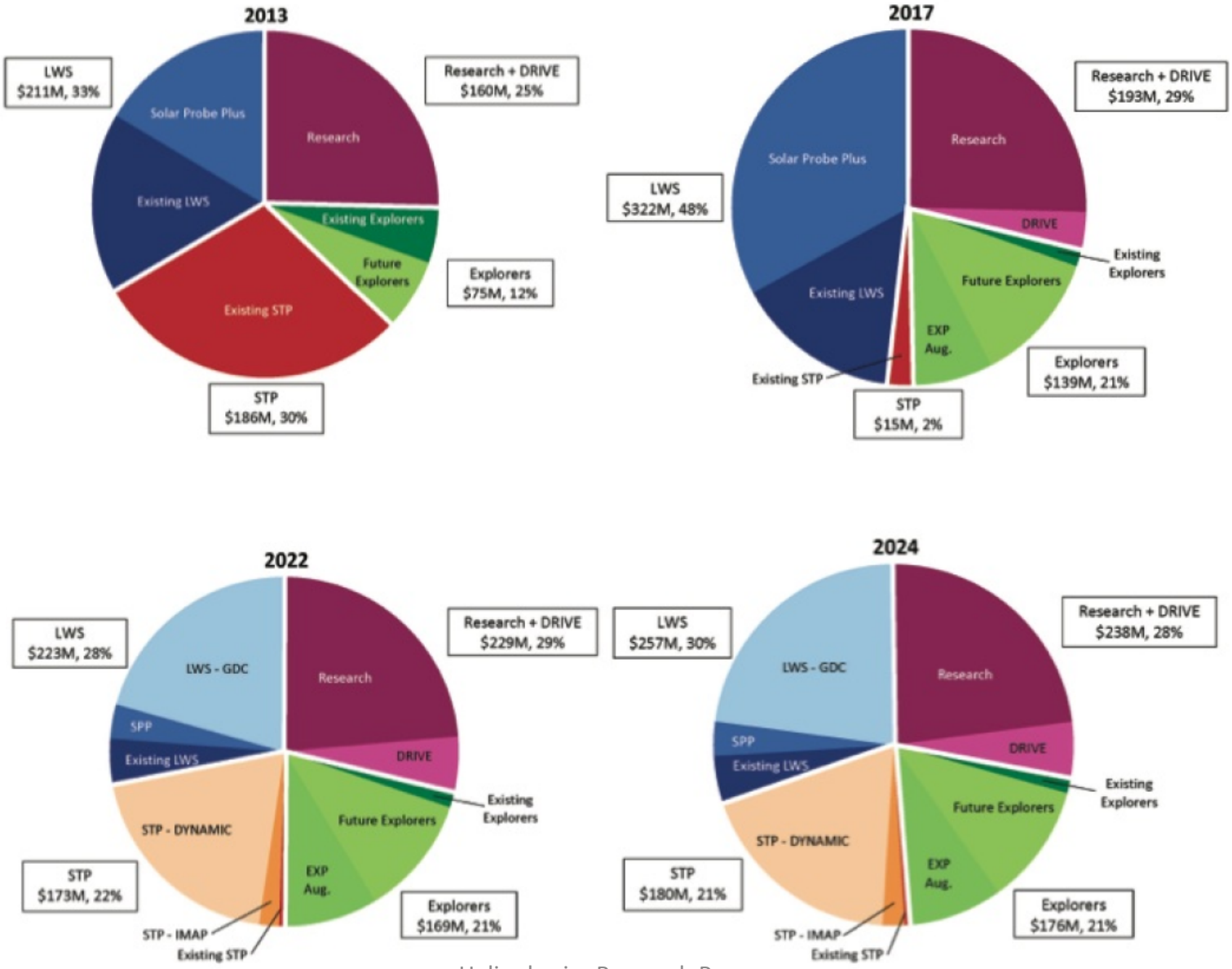

Heliophysics Competed R&A Programs
Avg. Award Size [k$]
400
300
200
100
0
2005
2006
2007
2008
2009
2010
2011
2012
ROSES Year
HTP
SH SR&T
Geospace SR&T
TR&T
HGIP
HDEE

Decadal Survey 2012 Recommendation

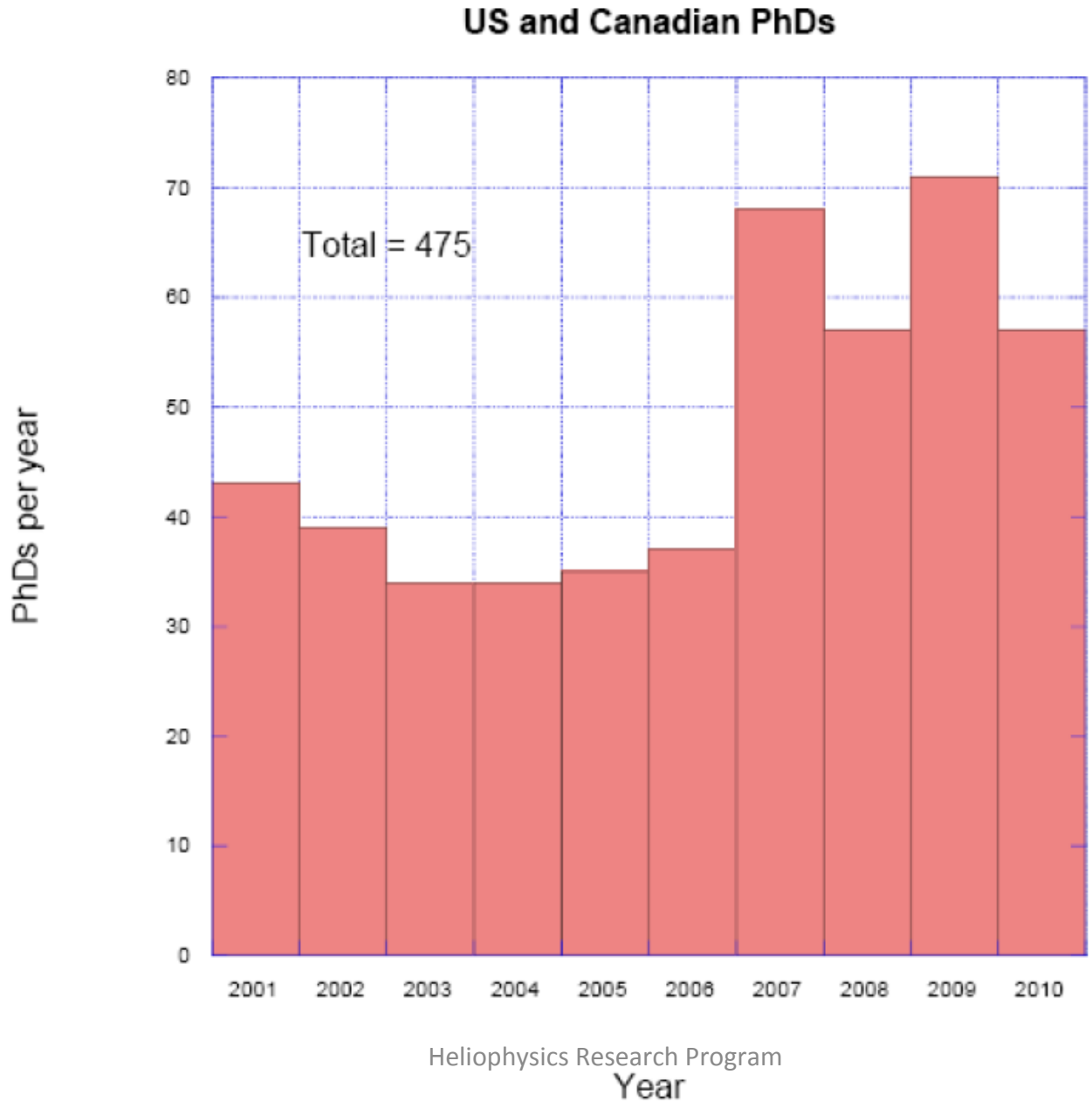
DRIVE (Diversify, Realize, Integrate, Venture, and Educate) Initiative: Augment GIP, MO&DA, Instrument Development, Multiagency Labs; Implement LCAS Microsats, Heliophysics Science Centers



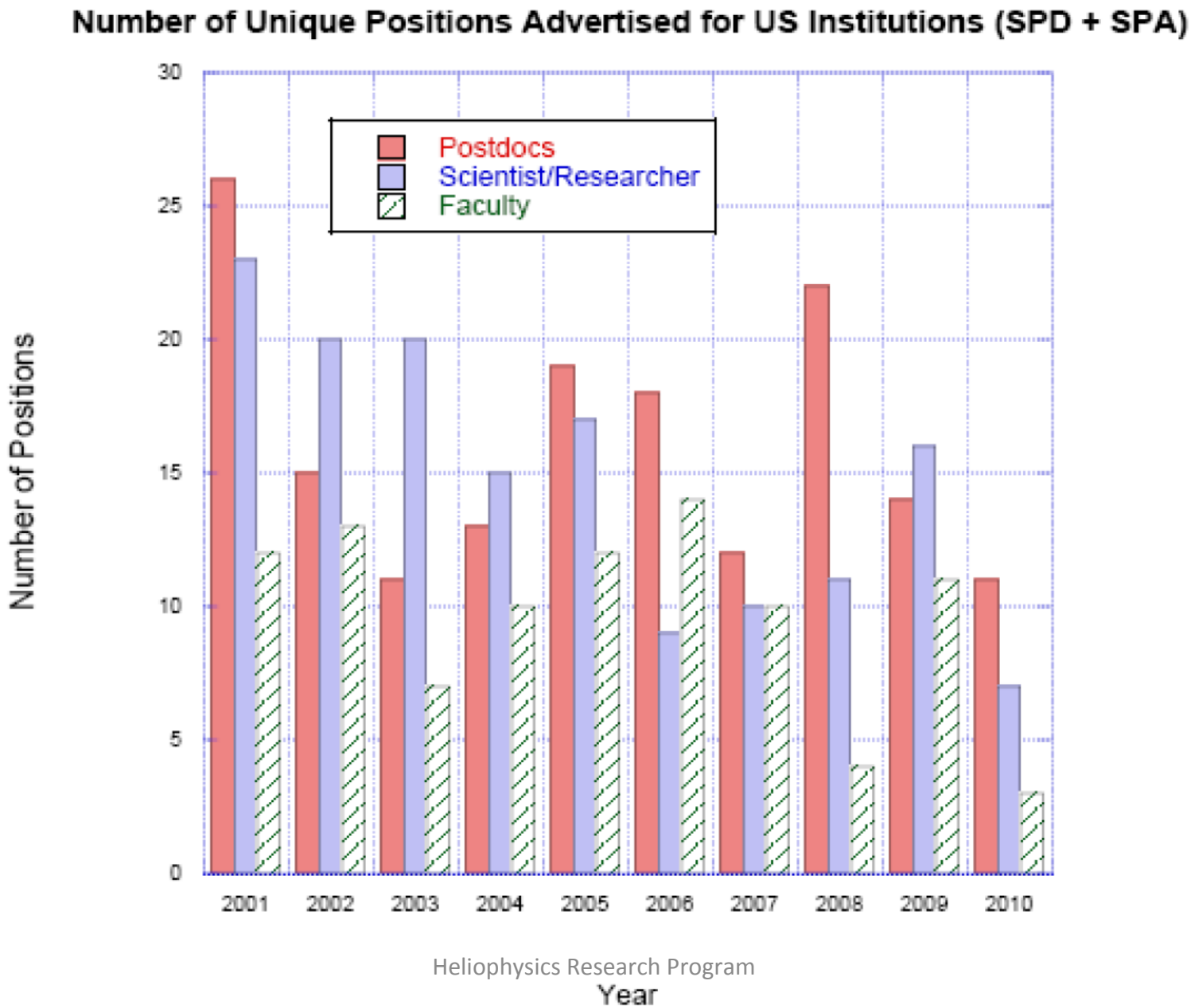
Decadal Survey 2012



Decadal Survey 2012



Decadal Survey 2012



Summary

- Perception Problem: Heliophysics Competed R&A appears larger than it is.
- Challenge: Constant Research $, Increased STEM-Heliophysics Workforce lead to Increased Proposal Pressure, Decrease in Open Positions
- Decadal Survey Recommendations: DRIVE Initiative