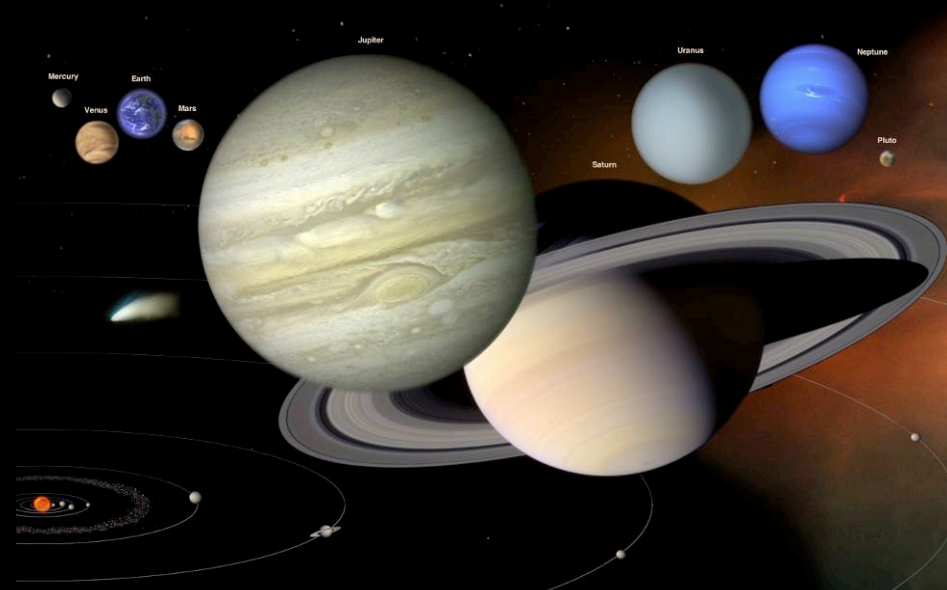
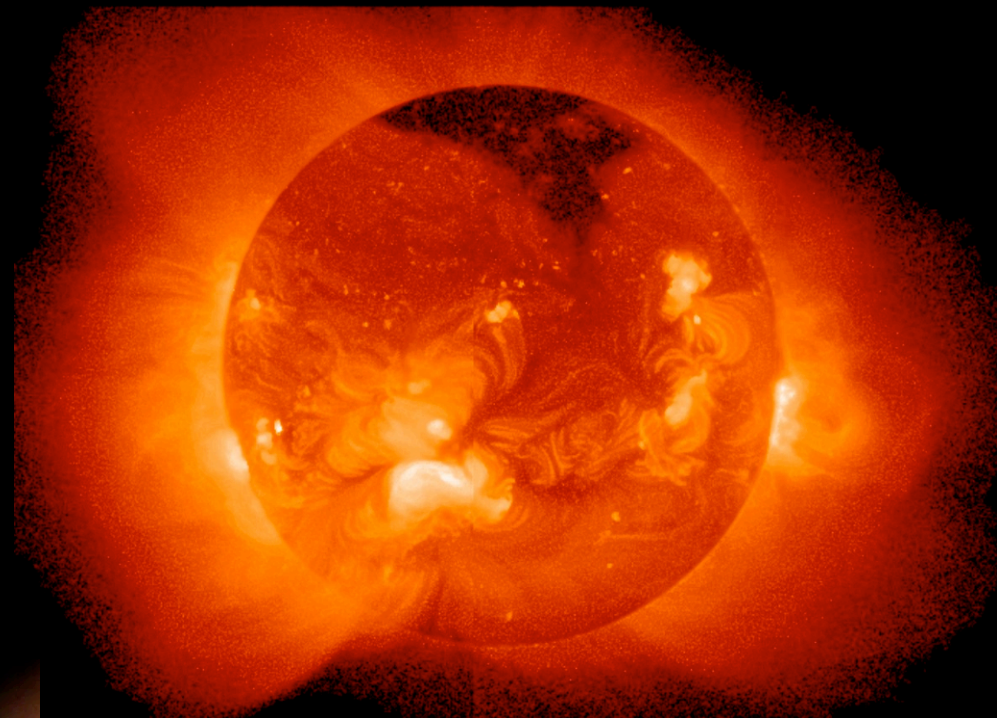


# NASA NIGHT @ AGU



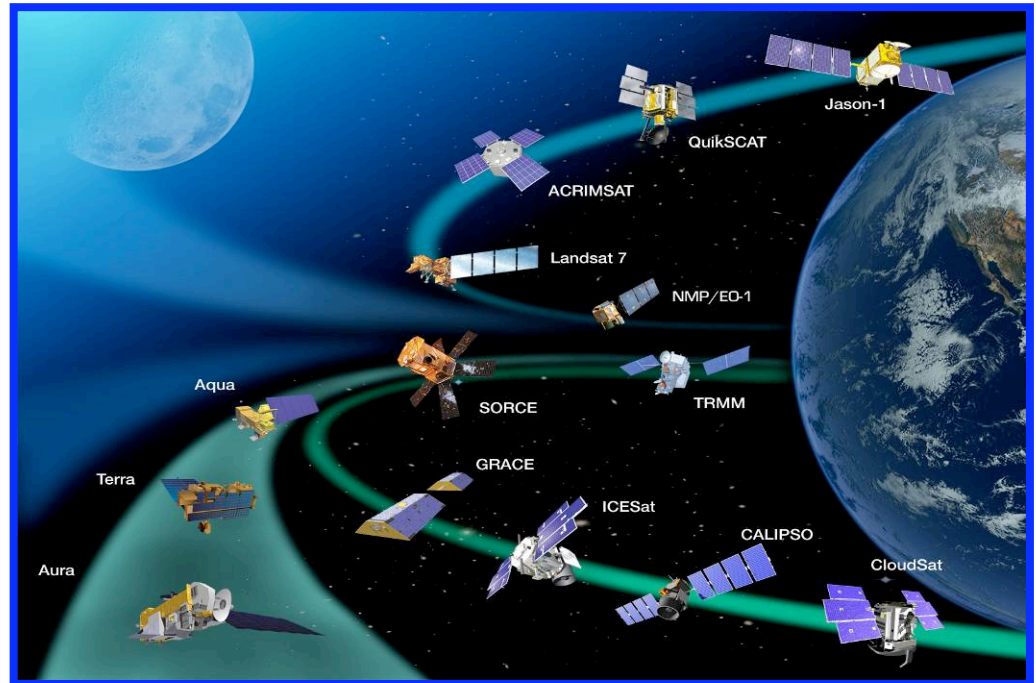
**Alan Stern**  
**Associate Administrator**  
**Science Mission Directorate**  
**(SMD)**

**10 Dec 2007**

# SMD PROGRAM SUMMARY



- ❑ **\$5.4B/YEAR BUDGET.**
- ❑ **LARGE EARTH SCIENCE, HELIOPHYSICS, PLANETARY SCIENCE, & ASTROPHYSICS PROGRAMS.**
- ❑ **53 FLIGHT MISSIONS IN OPERATION.**
- ❑ **41 FLIGHT MISSIONS IN DEVELOPMENT.**
- ❑ **3000+ OPERATING R&A GRANTS.**
  
- ❑ **THESE NUMBERS EXCEED THE COMBINED EFFORTS OF ALL OTHER EARTH & SPACE SCIENCE PROGRAMS OF THE WORLD.**





# SMD Missions Next 12 Months

## Astrophysics



GLAST  
Launch-5/29



Planck  
Launch-7/31

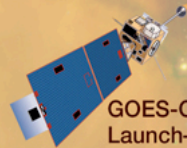


Herschel  
Launch-7/31



HST SM4  
Launch-8/7

## Earth Science



GOES-O  
Launch-4/1

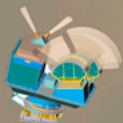


OSTM  
Launch-6/15



OCO  
Launch-12/15

## Heliophysics



TWINS-B Launch



CINDI  
Launch

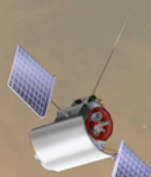


IBEX  
Launch-6/15

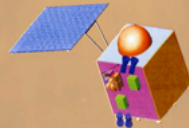


SDO  
Launch-12/15

## Planetary Science



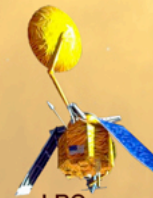
MESSENGER  
Mercury Flyby-1/14



M3 on Chandrayaan-1  
Launch-4/8



Phoenix  
Landing-5/25



LRO  
Launch-10/28

Jan 2008

Feb

Mar

Apr

May

June

July

Aug

Sept

Oct

Nov

Dec 2008

# **BUT THERE ARE EXPRESSED COMMUNITY CONCERNS**

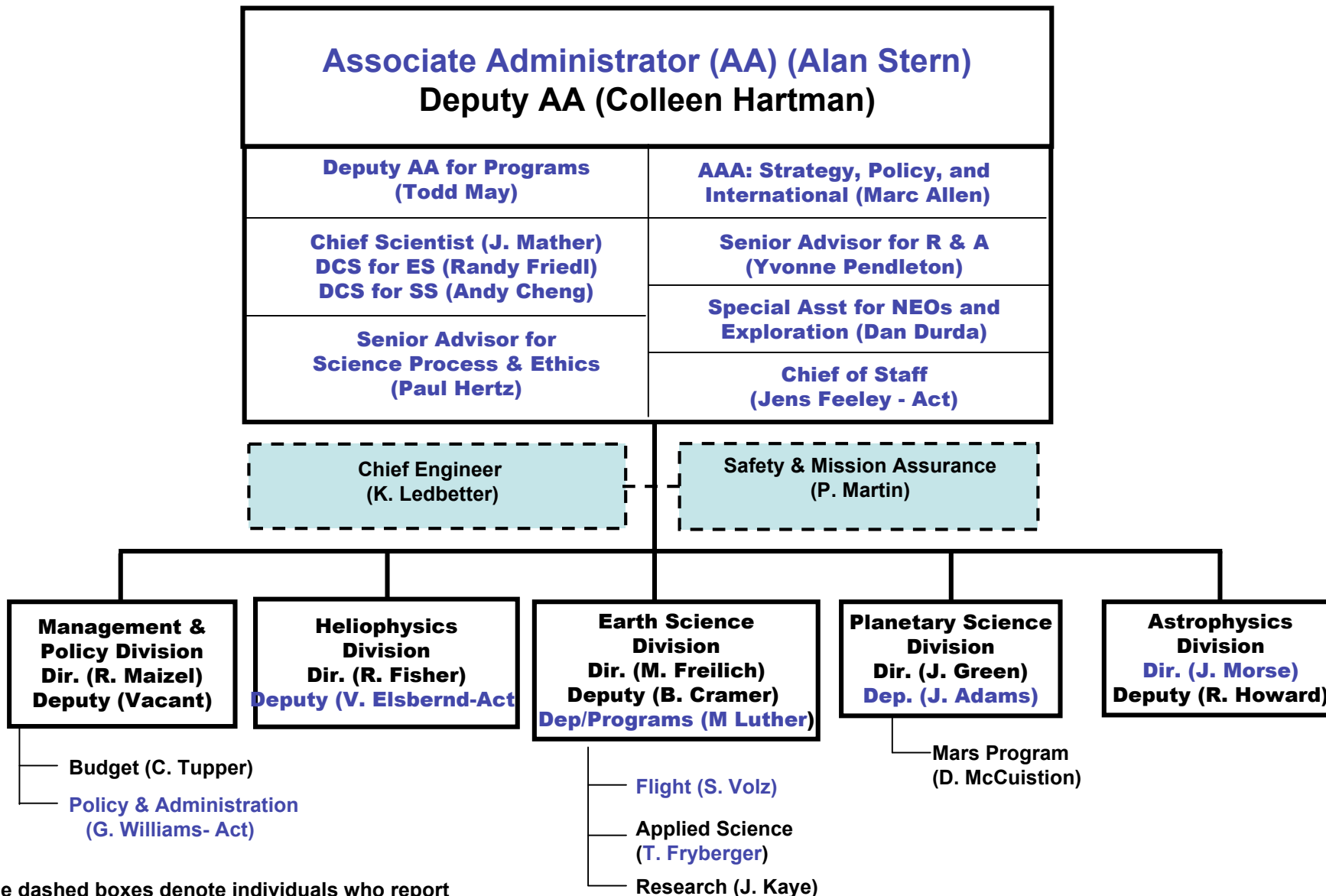


- ❑ NASA AND SMD'S BUDGETS ARE NOT GROWING.**
- ❑ SMD FLIGHT RATES WILL SOON BE DECLINING.**
- ❑ RESEARCH FUNDS HAVE BEEN CUT.**
- ❑ PROGRESS ON DECADAL SURVEY OBJECTIVES HAS BEEN SLOW.**
- ❑ SMD HAS BEEN SLOW OR SIMPLY UNRESPONSIVE TO THESE ISSUES.**





# WELL SMD'S GOT A NEW EXECUTIVE TEAM



Blue dashed boxes denote individuals who report to other organizations, but support SMD



# AND WE INTEND TO FULLY MEET THESE ISSUES HEAD ON.



- ❑ **By Controlling Costs to Increase Flight Rates.**
- ❑ **By Rebalancing Queues to Increase Flight Rates.**
- ❑ **By Expanding Foreign Collaborations.**
- ❑ **By Repairing R&A Processes & Budgets.**
- ❑ **By Ensuring Missions Fully Fund Their Science.**
- ❑ **By Valuing Responsiveness to Community Concerns.**



# **SOME ACTIONS WE HAVE TAKEN SINCE APRIL**



- ❑ AVOIDED >\$150M IN OVERRUNS.**
- ❑ INSTITUTED 4 NEW EXPLORER MISSIONS REPLACING 1.**
- ❑ EXPANDED SUBORBITAL ROCKET AND BALLOON PROGRAMS.**
- ❑ ENTERED INTO PARTNERSHIPS FOR OUTER PLANET FLAGSHIP AND SOLAR ORBITER MISSIONS.**
- ❑ TAKEN R&A OFF THE TABLE FOR CUTS.**
- ❑ AND INITIATED AN EFFORT TO SIMPLIFY AOs.**





# HELIOPHYSICS CHANGES ARE AFOOT



- ❑ **We've reinvigorated the Explorer Program by moving from one planned MDEX selection, to three SMEX selections, and by also making \$70M available in Mission of Opportunity funding.**
- ❑ **We've worked to find an affordable, non-nuclear Solar Probe mission capable of being funded.**
- ❑ **We've initiated an annual Mission of Opportunity AO beginning in 2008, to foster more international collaboration opportunities.**
- ❑ **And we selected the BARREL Geospace MoO to augment the RBSP mission.**



# Geospace MoO: BARREL



- **BARREL: Balloon Array for RBSP Relativistic Electron Losses.**
- **PI: Robyn Millan/Dartmouth; with UC Berkeley, UCLA, and the Aerospace Corp.**
- **Polar Launch Campaigns: Summers of 2012 and 2013.**
- **Objective: Differentiate competing processes affecting precipitation/loss of radiation by directly measuring precipitation during the RBSP mission.**



# PLANETARY CHANGES ARE AFOOT



- ❑ **We've focused on bringing Mars Sample Return and the Outer Planets Flagship to reality.**
- ❑ **We've funded four new Missions of Opportunity: two in Discovery and two in Mars Scout.**
- ❑ **We extended the MER Mars rovers through FY09.**
- ❑ **And today we announced we've selected the next Discovery mission for new start: **GRAIL**.**

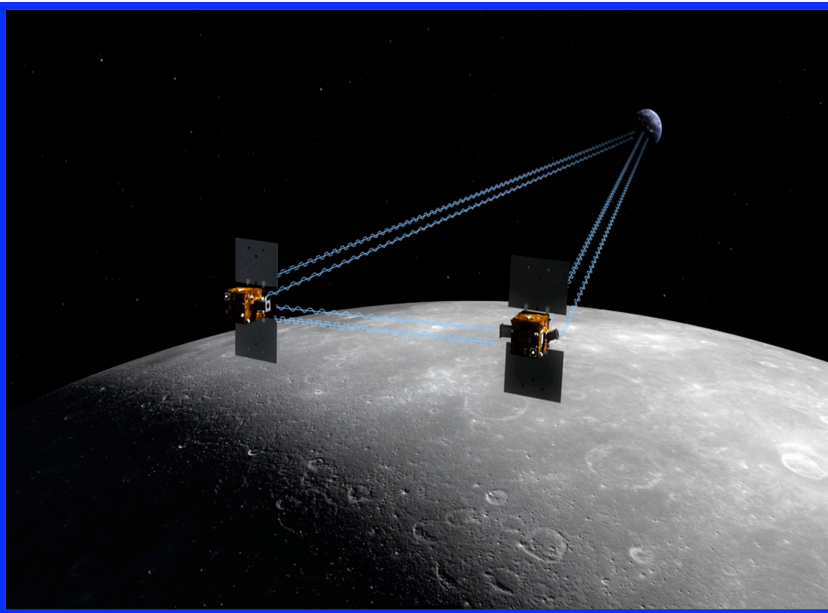
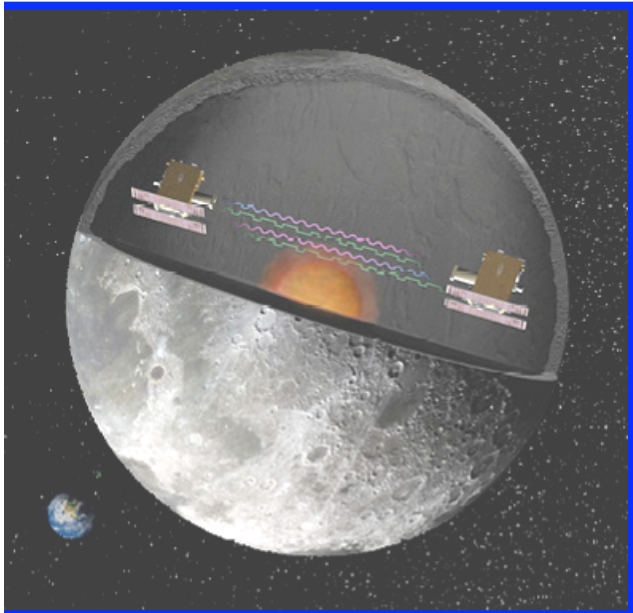




# DISCOVERY 2011: GRAIL



- **GRAIL: Gravity Recovery And Interior Laboratory.**
- **PI: Maria Zuber/MIT; with JPL & Lockheed-Martin.**
- **Target: Moon; Launch: Mid-2011.**
- **Objective: GRACE-Like 2-Spacecraft Global Gravity Mapping to Study Internal Structure and Constrain Lunar Thermal History at unprecedented accuracy (<10 mGal) and resolution (30 km).**



# EARTH SCIENCE CHANGES ARE AFOOT



- ❑ **We've worked with NOAA to find affordable means to re-manifest the OMPS-Limb, CERES, and TSIS NPP climate sensors.**
- ❑ **We initiated concept studies that will lead to starting the first 4 top-priority Earth Science Decadal Survey missions: SMAP, ICESat-II, CLARREO, and DESDynI.**
- ❑ **And we funded all 13 operating Earth Science missions through 2009—with no terminations after senior review.**



# SO TOO, R&A CHANGES ARE AFOOT



- We established the SARA position within SMD.**
- We provided a mailbox for complaints and feedback about R&A programs ([sara@nasa.gov](mailto:sara@nasa.gov)).**
- We eliminated a backlog of hundreds of no-cost extension requests.**
- We adopted widespread funding of 4-yr grants.**
- We ceased redacting budgets from review panels in ROSES-08.**
- We accelerated grant win notifications after panel reviews from months to weeks.**

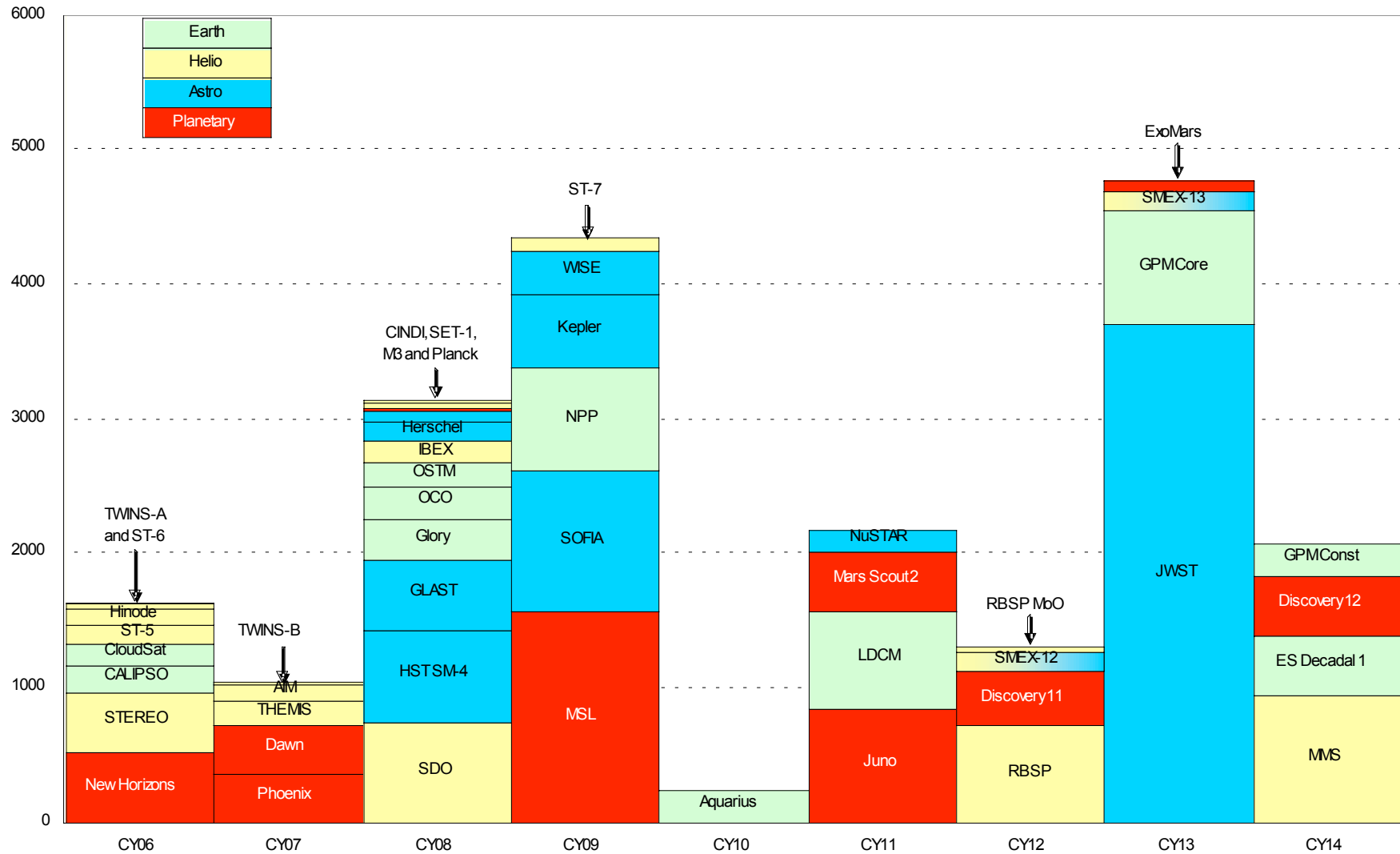




# WHY HAVE LAUNCH RATES DECLINED?



## A RECENT IMBALANCE TOWARD LARGE MISSIONS



# WHY ELSE HAVE LAUNCH RATES DECLINED?



## COST OVERRUNS HAVE BEEN RAMPANT

	Pror	FY03	FY04	FY05	FY06	FY07	FY08	FY09	BTC	Totl
<b>Changes</b>										
AM			-21.6	10.5	21.1	10.3	0.5	0.2		21.0
Aquarius			5.3	-0.6	0.9	11.6	15.6	19.3	54.2	106.3
Aura		16.5	37.1	3.0	0.5					57.1
CALPSO			20.8	10.3	10.0	0.9	3.4	1.9		47.3
CNDI			0.5	0.5	1.3	0.8	2.8	0.6		6.5
Cloudsat			18.7	8.1	9.2	2.0	1.0			39.0
Dawn		1.4	1.5	3.1	15.8	63.4	1.5	1.0	7.9	95.6
Deep Impact			31.0	7.6	-2.6					36.0
GLAST			-12.3	-8.2	12.6	43.7	-2.4	4.0	48.9	86.3
Gbrv		1.6	2.5	-0.8	51.5	86.3	58.5	31.7	23.1	254.4
GP-B			30.5	3.2	-0.6	6.0	1.6			40.7
GPM		-0.5	1.2	-0.3	-2.1	-17.9	-15.1	-8.4	744.7	701.6
Hayabusa			-0.2	0.5	0.5			0.7	2.3	3.8
Herschel			6.6	4.3	-0.6	-2.4	-9.8	1.1	18.1	17.3
BEX						3.2	6.0	3.6	1.6	14.4
Juno					-8.5	-24.5	-7.2	55.9	181.7	197.4
JWST			-9.9	-43.0	-29.7	108.3	241.7	207.3	868.1	1342.8
Kepler		1.4		-32.6	25.5	72.0	81.2	22.0	9.8	179.3
MB					1.2	-0.2	1.1		1.9	4.0
Mars Express			0.4	1.0	1.2	3.7	4.6			10.9
MESSENGER			18.4	1.6	7.8	4.1	12.5	7.9	19.2	71.5
MRO			12.8	33.8	3.1	-9.1	3.8	3.8	1.1	49.3
MSL						3.1	44.8	3.3	0.2	51.4
New Horizons			23.3	86.8	-19.1	-9.7	6.1	7.3	0.7	95.4
NPP		2.0	-1.5	-9.0	-40.4	50.2	75.1	115.2	107.2	298.8
OCO		0.2	1.3	4.1	-14.0	32.7	45.3	24.6	11.1	105.3
OSTIM		0.4	-16.0	0.2	1.4	37.0	25.4	4.4	33.0	85.8
Phoenix		-4.1	-3.4	13.5	39.3	14.2	-15.8	-5.1		38.6
Planck			1.0	2.0	0.2	0.3		1.7	11.7	16.9
Rosetta			-1.7	1.1	-0.4	0.4	1.3	0.3	23.9	24.9
SDO			22.3	-21.5	54.5	61.1	87.5	10.6	25.9	240.4
SOFA				20.6	42.5	-10.1	17.7	28.7	106.5	1105.9
Sdr-B			3.4	3.2	-0.7	3.7	2.4	3.5	1.9	17.4
Spitzer			-5.7	-9.8	-9.4	-3.8	3.2	3.8	65.8	44.1
STEREO			24.5	16.5	32.0	9.1	10.4	11.5	3.0	107.0
Swift		-0.3	26.0	-0.5	1.9	3.8				30.9
THEMS		0.5	-4.6	-1.2	-1.0	10.8	-0.5	-3.7	24.4	24.7
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<b>Total Growth:</b>		<b>19.1</b>	<b>20.9</b>	<b>81.2</b>	<b>187.8</b>	<b>572.5</b>	<b>750.2</b>	<b>635.7</b>	<b>3325.3</b>	<b>5781.7</b>



# ACHIEVING HIGHER FLIGHT RATES DEPENDS ON YOU TOO



- ❑ **WE NEED YOUR HELP TO ACHIEVE BETTER COST CONTROL AND HIGHER FLIGHT RATES LEADING TO ACCELERATED PROGRESS IN THE DECADAL SURVEYS. YOU HAVE TO BE PART OF THE SOLUTION.**



SPACEREF





# THINGS TO LOOK FOR GOING FORWARD



- ❑ A CONTINUING COMMITMENT TO REJUVENATE R&A.**
- ❑ A NEW COMMITMENT TO REINVIGORATE EPO.**
- ❑ A STRONG & CONSISTENT EMPHASIS ON COST CONTROL.**
- ❑ A NEW PARTNERSHIP WITH NASA'S HUMAN EXPLORATION PROGRAM.**
- ❑ AND A STRONG EMPHASIS ON COMMUNICATING WHAT THE EARTH AND SPACE SCIENCES DO FOR SOCIETY.**





**Earth Science**



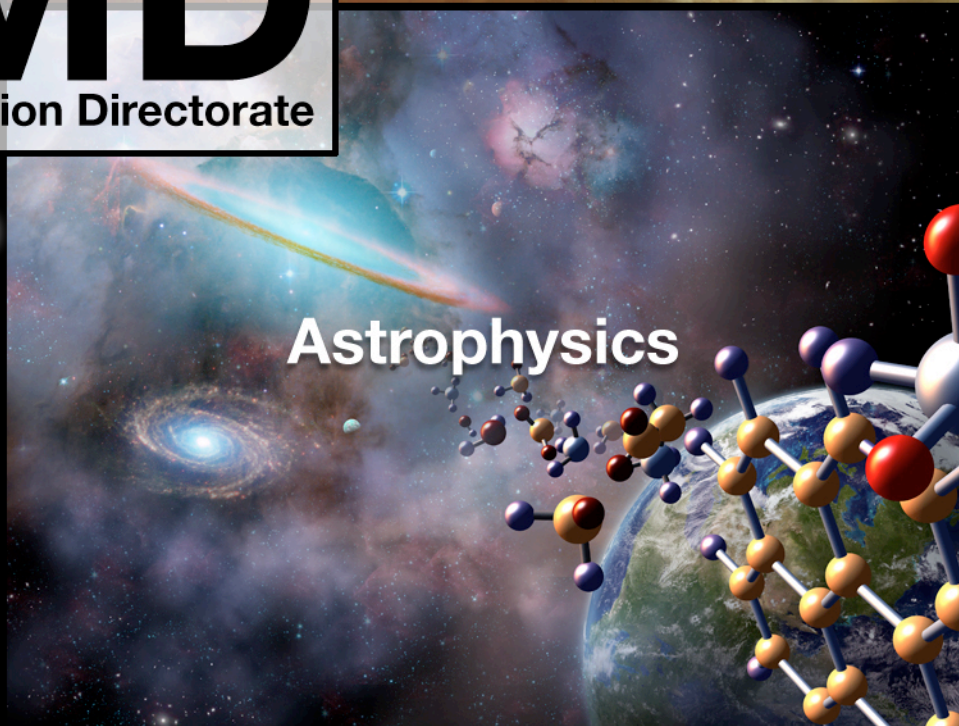
**Planetary Science**

**SMD**  
Science Mission Directorate



**Alan Stern**  
**Associate Administrator/SMD**

**Heliophysics**



**Astrophysics**



# BACKUP CHARTS



# SMD LAUNCH CALENDAR



As of Dec 2007

- NASA Mission on US ELV
- DoD Mission with Substantial NASA Contribution
- Reimbursable for NOAA
- Joint NASA - International Partner Mission
- International Mission with Substantial NASA Contribution
- NASA Mission on STS

√ = Successfully launched to date

\* = Shared risk science flight

