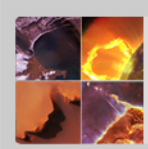


The Explorer Program

Presentation to the Astrophysics Subcommittee

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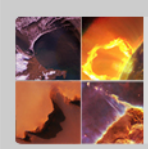
Astrophysics Explorer Program

- The Astro2010 Decadal Survey said “NASA should support the selection of two new astrophysics MIDEX missions, two new astrophysics SMEX missions, and at least four astrophysics MoOs over the coming decade.”
 - The Decadal Survey recommendation implies an AO every 2.5 years
- Astrophysics Division is planning and executing a series of AOs (subject to budget approval):
 1. An AO for an EX and MO in **Nov 2010** with cost caps of \$200M and \$55M (\$FY2011). Launch ~2016-2017
 - Downselect targeted for Spring 2013 (see chart 3)
 2. An AO for an MO in **Sep 2012** with a cost cap of \$60M (\$FY2013). Launch ~ 2017
 - Selection targeted for Summer 2013 (see chart 4)
 3. An AO for a SMEX in late **CY2013/early CY2014** with cost caps and due date TBD by spring 2013. Launch ~ 2020
 - See charts 5-6
 4. An AO for an EX and MO in **2015/2016**. Launch ~ 2022



2011 Explorer (EX) & Mission of Opportunity (MO)

- Two Explorers and Two Mission of Opportunity are in Phase A:
 - **Fast INfrared Exoplanet Spectroscopy Survey Explorer (FINESSE)** - Using a space telescope, FINESSE would survey over 200 planets around other stars to find out what exoplanet atmospheres are made of, what conditions or processes are responsible for their composition
 - **Transiting Exoplanet Survey Satellite (TESS)** – Using an array of telescopes, TESS would perform an all-sky survey to discover transiting exoplanets, ranging from Earth-sized to gas giants, in orbit around the nearest and brightest stars in the sky.
 - **Gal/Xgal U/LDB Spectroscopic/Stratospheric Terahertz Observatory (GUSSTO)** – GUSSTO is a balloon mission. GUSSTO's 1-m telescope would provide a comprehensive understanding of the inner workings of our Milky Way galaxy and one of our galaxy's companion galaxies, the LMC
 - **Neutron star Interior Composition ExploreR (NICER)** – NICER is an instrument to be mounted on the ISS. NICER would use an X ray timing instrument to explore the exotic states of matter within neutron stars and to reveal their interior and surface compositions
- Concept Study Reports received Sep 21, 2012; evaluation in progress
- Final downselect of 1 EX & 1 MO, target Spring 2013
- EX launch targeted for early 2017
- MO launch targeted for 2017



2012 Astrophysics Mission of Opportunity (MO)

- SALMON-2 PEA L released September 14, 2012
 - The selection to be done in one step with no competitive downselect.
- Categories of MO solicited:
 - **PMO** (Partner Mission of Opportunity). ESA's Euclid or JUICE missions excluded
 - **SCM** (Small Complete Missions), including investigations requiring flight on Ultra-Long Duration Balloons (ULDB) or the International Space Station (ISS)
 - **NMES** (New Missions using Existing Spacecraft)
 - **USPI** (U.S. Participating Investigator) solicited through ROSES
- Policies similar to those in most recent Explorer Mission of Opportunity solicitation
- Access to space provided by NASA for ISS & ULDB
- MO flight ~ 2017 or 2018 if SCM
- PI-Managed Mission Cost Cap is \$60M, or \$30M for an ULDB mission, in \$FY2013
 - May select one MO at \$60M, or two MOs if both are ULDB missions or other proposed investigations well below the \$60M PI-managed cost cap.
- 14 proposals received, span all types of MO and all areas of astrophysics
- Final select target Summer 2013

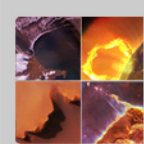


Setting the Cost Cap

Cost cap set by considering:

- Explorer future mission budget
- Desired flight rate
- Desired mission mix: EX, SMEX, MO
- Launch vehicle costs
- Inflation effects on cost cap of previous AO of similar mission
 - The previous SMEX AO cap was set at \$105M (\$FY2008)

Explorer Budget Planning



	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	Sum FY13-22
Available \$M for Future Explorers (FY13 Pres Budget Request)	\$0.600	\$51.374	\$128.860	\$103.073	\$122.792	\$132.850	\$152.285	\$1,300.37

Explorer Program Projected Future Mission Expenditures

	(M \$\$) <u>Base</u>	2% <u>Inflation</u>	<u>AO Year \$\$</u>	+ 12% <u>RY \$\$</u>	
-					-
(AO 2011) EX-1	200	1.000	200.000	\$224.00	
EX-1 Launch	110	1.000	110.000	\$110.00	
(AO 2011) MO-1	55	1.000	55.000	\$61.60	
(AO 2012) MO-2	60	1.000	60.000	\$67.20	
(AO 2013/2014) SMEX-1	118	1.000	118.000	\$132.16	
SMEX-1 Launch	67	1.000	67.000	\$67.00	
(AO 2015) EX-2	200	1.082	216.486	\$242.46	
EX-2 Launch	110	1.082	119.068	\$133.36	
(AO 2015) MO-3	60	1.061	63.672	\$71.31	
(AO 2018) SMEX-2	118	1.104	130.282	\$145.92	
SMEX-2 Launch	67	1.104	73.973	\$82.85	
(AO2018) MO-4	60	1.126	67.570	\$75.68	
				\$1,413.54	

(Assumes
\$152M/year
for FY19-22)

1. Numbers in red are known values, those in black are calculated.
2. The green number is the previous SMEX PI cost cap, \$105M, inflated from \$FY2008 to \$FY2014.
3. This calculation does not include SEOs. A \$50M SEO results in a 6-month delay in the next AO.
4. At a burn rate of \$150M/year, a \$10M cost cap increase results in a one month delay in the next AO.
5. The projected cost of the decadal survey recommended program is < \$150M/year with these assumptions, and > than the \$1,300M available for Future Astrophysics Explorers in the next 10 years.
6. Any SEOs, any increase in LV costs, any decrease in the Explorer budget, or any Explorer overruns will delay future AOs.