AY207: Prioritized Initiatives and Estimated Federal Costs for the Decade 2010-2020

Ground-based	Cost ($M)	Space-based	Cost ($M)
Major initiatives			
Giant Segmented Mirror Telescope (GSMT) [a]	700	Terrestrial Planet Finder (TPF) [a,b]	2,000
Square Kilometer Array (SKA)[a,b] technology development	100	International X-ray Observatory (IXO) [a]	1,000
Large-aperture Synoptic Survey Telescope (LSST) [c]	200	Single Aperture Far Infrared (SAFIR) [b] Observatory	350
Near-IR Deep Spectroscopic Survey (NIRDSS)	200		
Subtotal ground-based	1,200	Subtotal space-based	3,350
Moderate Initiatives			
Optical AO development	100	Moderate Ultraviolet Explorer (MUVE)	350
AO for Current Telescopes	100		
Ground-based BAO Initiative	50	Laser Interferometer Space Antenna (LISA) [a,b]	250
Quality Research Grant Program (Theory)	100	Astrobiology Explorer (ABE)	250
Subtotal ground-based	350	Subtotal space-based	850
Small Initiatives			
Computational Astrophysics Program	20	Theoretical Postdoctoral Grants	20
		Virtual Observatory II	80
Subtotal ground-based	20	Subtotal space-based	100
Total ground-based	1,590	Total space-based	4,300
DECADE TOTAL			5,890

[a] Designated amount represents US contribution only.

[b] To be completed in the next decade; cost reflects funding needed this decade.

[c] LSST has been designated less funding than current cost estimates. The project team should either scale down this project or search for alternative funding sources.

Background information on the Table:

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The graduate class AY207 “Future Directions” is given every two years by Garth Illingworth. Its goal is to acquaint graduate students with the major facilities in our field, with how the astronomy community decides on its strategic goals, how the resulting future projects are identified for federal funding and implemented, and how astronomy and astrophysics overall is supported and funded.

Given the ongoing Decadal survey I asked the 5 graduate students in the Spring 2009 AY207 class to (1) think about the science and report back to the class on their view of the key science issues of the next decade and beyond, and (2) recommend projects that matched those science goals. Thus this mini-process matched the 2010 Decadal in its broad approach (though the working panels were somewhat smaller...).

The class worked as a team of five, discussed and iterated to a set of science goals (which they reported in class), and then went off to think about which projects to support. They iterated with me in class but they took the reigns and their projects and their priorities are reported here. I gave them extensive background on the projects, their readiness, the plausible costs/budgets (though they did tend to try to “undercost” at times), and background on the communities involved.

I also recommended that they not exceed a total of $1.6B in ground nor $4.3B in space. We started out with lower totals, but they complained that it was hard to do a good range of projects, and so I relented and said that higher, more optimistic projections were fine as long as they had clear priorities. Note that they are prioritized from top-to-bottom within each size-grouping.

While it is fair to note that I gave them a lot of information and feedback during the discussions in class, they did the final rankings and choices. I was encouraged by the thoughtfulness and the extent to which they justified their choices, but I was also somewhat surprised by what they chose in a number of cases and/or their rankings. Nonetheless they had good reasons and while I might have ranked some differently, and funded some at different levels, this was a very thoughtful effort.

They laid it out in this format – it is what they submitted to me with a final “presentation” at the end of the class on June 5 2009...

The five UC Santa Cruz graduate students in the class were:

Edmond Cheung, Maria Fernanda Duran Sierra, Michele Fumagalli,

Valery Rashkov, Robert da Silva