

Dear Editor:

The recent release of the NASA budget and the cancellation or delay of many worthy missions have trained a spotlight on funded “Flagship” missions, and the James Webb Space Telescope (Webb) in particular. As members of the Science Assessment Team (SAT) that NASA chartered to look at the science priorities of JWST and its place in observational astrophysics in the 2013 era, we would like to make a few comments with regards to our role and the current state of the Webb mission.

We found that the scientific potential of the Webb telescope was at least as great as that discussed in the 2000 Decadal report. True, the diameter of the primary has been reduced to approximately 6.5 m compared to the 8 m goal in order to reduce mission cost. However, the science capabilities of the US, European, and Canadian supplied instruments are superior to those considered in 2000 and provide for a very broad range of scientific investigations. This is important for a world class observatory. More to the point, we felt that the recent breakthroughs in fields as far ranging as cosmology to extra-solar planets have only increased the value of Webb. Like Hubble and other Great Observatories, it will make major, unique contributions in most if not all of these fields.

The big issue, therefore, is one of cost. Webb’s costs to launch are estimated to be \$3.6B (in real year dollars, with ~ \$1B already spent). NASA’s and the community’s concern is whether there will be future increases against a declining NASA Astrophysics budget (almost 25% lower in purchasing power in 2009-2010 than now). The SAT’s role was to look at the global relevance of the Webb mission and prioritize those science capabilities that would materially affect cost and risk (future growth). We concentrated on instrument capabilities, optical performance, and integration and test. Since the Webb instruments provide for basic imaging and spectroscopy in the near and mid IR, we could not recommend the elimination of a major instrument – and at least 50% of the instrument payload is internationally contributed at no cost to NASA. We did recommend that capabilities for wavelengths below 1.7  $\mu\text{m}$  should be de-emphasized and, in one case, eliminated. This recognizes the power of giant ground-based telescopes that we anticipate being completed in the next decade. In like manner, we recommended the elimination of optical requirements below 1.7 $\mu\text{m}$  while maintaining the requirements at 2  $\mu\text{m}$  and above. This significantly reduces the risk of added costs in the production of the telescope optics. Integration and testing of Webb will be costly. We recommended that the requirements for scattered light due to particulate contamination be relaxed to permit more efficient testing and standard launch vehicle preparation. All these measures were estimated to save hundreds of millions of dollars of future costs. We encouraged NASA to take advantage of the lessons learned from Keck and other large ground-based telescopes with regards to the ability to adjust image performance with JWST’s active optics and further simplify pre-launch ground testing.

NASA will complete demonstrating the readiness of the key JWST technologies by early 2007. Projects that have successfully met this milestone and have had the kind of the intense budget scrutiny that has and will occur throughout this year generally suffer little additional cost growth unless perturbed by outside influences or delays. We continue to

support the community's desire for a balanced science program that includes small and medium-sized missions as well as "Flagship" missions. Under the current plans, the Webb and SIM/Planet Quest will be the only major space observatories in the next decade, when the first generation Great Observatories (Hubble, Chandra, and Spitzer) are no longer operational.

JWST Science Assessment Team

(see <http://www.stsci.edu/jwst> for our reports and membership)