The Institute Hosts a Workshop

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On November 28–29, 2006, the Institute will host a workshop on astrophysics enabled by NASA's plans to return to the Moon in the next decade. The *stated* issue is whether the exploration initiative poses an opportunity for progress on important problems in astrophysics. The *unstated* question is about the ongoing relationship between space science and human exploration of space: What are the true terms, values, and risks of this relationship? The astronomical community has been challenged to formulate the best possible answers to those underlying questions.

This edition of the Newsletter contains two invited opinion pieces on the issue from Riccardo Giacconi and Bernard Burke. It also reprints an article by Martin Harwit, in which he addresses a relevant question: "How did we get to be so lucky?" The overall goal is to foster reflection on why this workshop is important.

Because of the Institute's unique experience with *Hubble*—an epitome of the scientific benefits of human spaceflight and technologies developed for other purposes—it is both an obligation and a privilege for us to conduct this open, objective discussion about the possibilities for astrophysics enabled by a NASA's commitment to return to the Moon, Mars, and beyond.

In April 1990, the space shuttle *Discovery* blasted off from Kennedy Space Flight Center carrying the *Hubble Space Telescope* to orbit. So began a historic and somewhat controversial ride along a tremendous journey of discovery. Today, *Hubble* is an integral part of the modern scientific landscape, serving a community of roughly 7,000 astronomers worldwide, having produced over 5,000 papers in refereed journals, and, in 16 years, having dispensed over $300 million in grants and fellowships. For the public, *Hubble* has become an icon of modern science. What other telescope in history has its images on postage stamps, U-Haul trucks, rock albums, and the walls of almost every school?

Hubble's long journey from Lyman Spitzer's imagination in 1946 to instrument and icon in 2006 would never have been possible without major technical contributions from national programs that the science budget could never afford, including subsidized space transportation, optical and detector technologies, and servicing by astronauts to repair spherical aberration, replace failed hardware, and upgrade instrumentation.

As we look forward to the next decade, or perhaps more importantly, the next Decadal Survey of Astronomy and Astrophysics, are we confident we can "go it alone" in pursuit of our visions—imaging earths around other stars, watching the detailed plight of matter falling into black holes, and hunting for gravitational waves from the Big Bang? If the space science budget is limited—and it obviously is—then only a few endeavors can afford to develop their own technologies and infrastructures. The remainder must adapt to available opportunities or wait indefinitely in the antechambers of funding. As Martin

Harwit concluded, “We cannot, except in rare cases of uncommon importance, ask for support of missions that require capabilities which significantly outstrip commonly available military or industrial capacities.”

If the return to the Moon is an opportunity for astronomy, and the science sufficiently compelling, perhaps we can influence aspects of NASA’s exploration architecture to help some of our ambitious future science missions become more likely.