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A European Perspective on Space

Martin Rees

In most sciences and technologies, Europe's overall effort is comparable to that of the United States. In ground-based astronomy, for instance, near parity is being achieved and the European Southern Observatory's new array of four 8-meter telescopes, when complete, will actually be the world's premier optical facility. But space research is a conspicuous exception. The U.S. space enterprise was ramped up by the superpower confrontation during the Cold War, and science rode along in the slipstream. The European effort—collaborations through the European Space Agency (ESA) plus individual national programs—is of high quality but is far smaller than that in the United States; so, likewise, are space-related activities in Japan and elsewhere.

We in Europe have long been reconciled to a more narrowly focused space program; ESA is generally the minor partner in its collaborations with NASA. For at least the next decade, space scientists in Europe must continue in that secondary role. Europe won't, for instance, have more than a minority share in the Next Generation Space Telescope, intended as a follow-up to the Hubble Telescope. The future of space science and whether the exciting opportunities of the new millennium are optimally exploited depend primarily on what NASA decides. European scientists care greatly about these decisions. Most researchers welcome Daniel Goldin's focus on the theme of the program "Origins" (along with continuing to produce quicker and cheaper missions to monitor Earth's climate, oceans, and terrain). The discovery of other planetary systems, searches for extraterrestrial life, and probes of the early universe will stimulate innovative technology and fascinate a wide public, as well as lead to exciting science. But looming over (and perhaps even jeopardizing) all this is the international space station, to which NASA is unstoppably committed.

The space station will be neither practical nor inspiring.

Without manned spaceflight, we're often told, there would be no sustained public support for a space program. Most people over 35 can remember Neil Armstrong's "one small step." For the middle-aged among us, the film *Apollo 13* (in which Tom Hanks portrayed the astronaut James Lovell) was an evocative reminder of an episode we followed anxiously at the time. But to a younger audience, the gadgetry and the "right stuff" values seemed almost as antiquated as those of a traditional Western film. The Apollo program, a spinoff from superpower rivalry in the Cold War era, wasn't a step toward any longer term goal that could inspire sustained public support. Can the space station recapture the enthusiasm produced by the Apollo program? Will people be excited, 30 years after men walked on the moon, by a new generation of astronauts circling Earth in greater comfort than the Russians in *Mir* but at far greater expense? Even if it is finished—something that seems uncertain, given the ever-rising costs, prolonged delays, and risk of accidents—the space station will be neither practical nor inspiring. A manned station in low orbit is as unsuitable for most high-precision measurements as a ship is for ground-based astronomy.

The practical case for manned spaceflight has weakened as robotic and miniaturization techniques have advanced. It will recover only if costs can be dramatically reduced. Unmanned space probes have yielded a crescendo of discovery. A wide public has followed this exploratory quest through pictures from the Pathfinder lander on Mars, close-ups of Jupiter's moons, and the marvelous images beamed down from the Hubble Telescope. Europe has, so far, wisely eschewed manned spaceflight; a French-led plan for *Hermes*, a mini–space shuttle, has lost momentum. France, Germany, and Italy (though, happily, not the United Kingdom) have nonetheless made a political decision to contribute substantial funds to elements of the space station. Some countries will be rewarded by the launch of astronauts. (But how much did the launch of the Mongolian and Bulgarian cosmonauts by the Soviets benefit those countries?) Along with many European scientists who are enthusiastic about space, I'm saddened that NASA persists with the space station. I regret even more that some European countries should bolster this misdirection of resources rather than supporting their aerospace industries in ways that raise the profile of European space science or lead to distinctive technological advances.

The author is Royal Society Research Professor at Cambridge University.