
The Hubble Telescope's Biggest Problem: More Distortion Than Meets The Eye

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It doesn't matter that the size of the Hubble Space Telescope's mirror defect is less than 4 percent the diameter of a human hair. For those determined to spot evidence of a debilitating general decline in U.S. scientific leadership and technological know-how, that's more than enough.

Indeed, the distortion troubling the scope has been seized upon by the media, to create another kind of distortion—that of the public's perceptions and attitudes toward NASA in particular and toward Big Science in general.

■ In the *Washington Post* (July 3, 1990): The telescope, "crippled by a mysteriously misshapen mirror, took its place on the list of great technological fiascoes."

■ In the *Wall Street Journal* (July 9, 1990): "The space agency hyped Hubble's promise. . . signed up scientists to act as lobbyists, divvied up jobs among a number of NASA centers that don't work well together, and underestimated the project's costs."

■ And on ABC's *Nightline* (July 10, 1990) the "hobbled Hubble" was called an "epic failure" and a "fiasco."

The reaction in Congress was

similarly unrestrained:

"I am very outraged at what has happened to Hubble," U.S. Sen. Barbara Mikulski (D-Md.) told the *New York Times* (June 29, 1990). Mikulski, who chairs a subcommittee that oversees NASA's budget, added, "I think it has seriously hurt the credibility of NASA when they've had so much time and enough money to get it right." And U.S. Sen. Albert Gore, Jr. (D-Tenn.), whose Senate Commerce Subcommittee on Science, Technology, and Space has held hearings on the telescope flaw, commented in a *Wall Street Journal* piece, "NASA's eyes are bigger than its stomach."

What could this immoderate criticism lead to? The astronomer who conceived the idea of an orbital telescope some 44 years ago, Lyman Spitzer of Princeton University, foresees that the problems with the space telescope could cause a move away from Big Science. "It will strengthen the argument that big, expensive instruments are just a mistake," he told the *Wall Street Journal*.

Already, there is widespread speculation that—partly as a result of the Hubble problem—other major space projects are threatened,

including NASA's proposed \$37 billion space station and the \$50 billion plan for six satellites to monitor the earth's environment. It remains to be seen whether other Big Science projects—such as the Human Genome Project and the superconducting supercollider—will suffer as well.

In my view, wholesale cutbacks on these grandiose, visionary projects could deal a devastating blow to international science. Without question, the telescope's flaw is disappointing—but even more damaging than several years' delay in the Hubble's scientific mission would be drawing the wrong lessons from its problem. The media, our lawmakers, the public, and, above all, the scientific community should avoid the temptation to generalize from an isolated incident, and should put the trouble with the Hubble scope in clear perspective.

The Hubble setback can serve to remind all of us—scientists and public alike—that throughout his-

tory, those who dared greatly have always risked failure, have always had to surmount unforeseen obstacles. And the design, construction, and placement into orbit of the space telescope was as daring a feat as has been attempted in some time.

Perhaps the most beneficial lesson to be learned from the Hubble disappointment is that the need for science to communicate with the public is especially urgent when Big Science projects are involved. The public must be better educated upfront not only on the potential benefits of these ambitious megaprojects but also on their high costs and considerable risks.

In the case of the Hubble mission, most citizens hadn't heard a word about it until a few weeks before the launch. Such aloofness on the part of the science community—such hubris—will inevitably yield a backlash of disappointment and disillusionment when something goes wrong. ■