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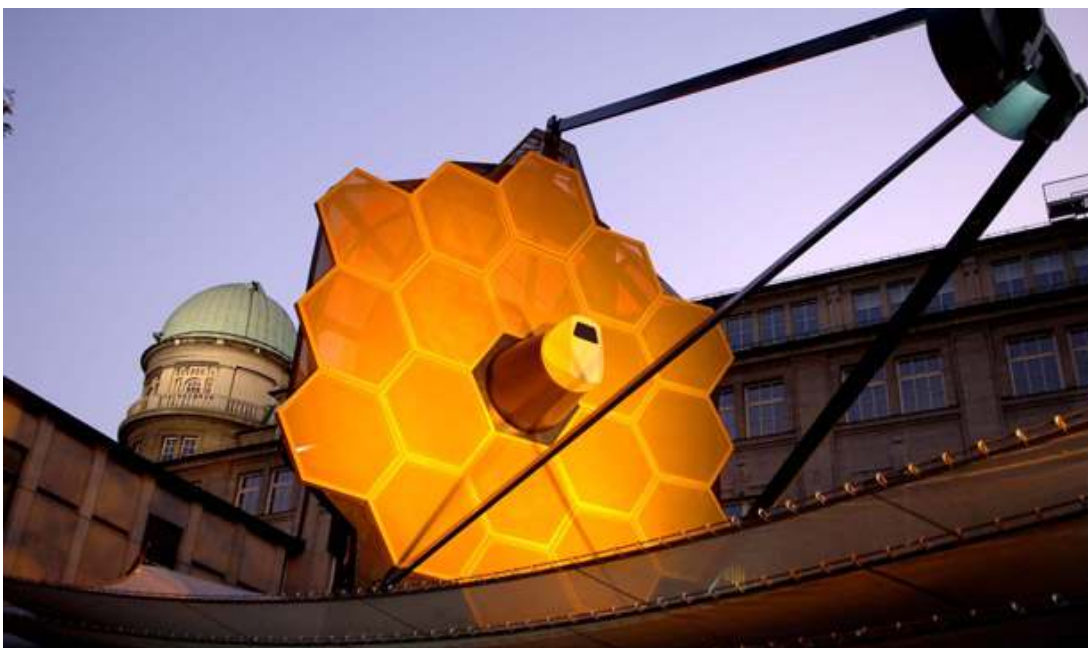


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The Webb Telescope: Late and Over Budget, but Still Worthwhile

By Edward Tenner

Early cost estimates of government projects tend to be optimistic, but does that mean an ambitious project should be scrapped when its price increases?



NASA

The [Washington Post](#) reports on the political storm surrounding continued funding of the Webb Space Telescope, our planned next-generation instrument:

In 2006, NASA estimated that Webb would cost \$2.4 billion and could launch in 2014. In 2008, the price tag rose to \$5.1 billion. A congressionally mandated report released last year found that NASA had underestimated costs and mismanaged the project. This summer, NASA said it had already spent \$3.5 billion on the project and needed a total of \$8.7 billion to launch in 2018.

Against critics who say the gap has been growing and the project should be shut down,

[Edward J.] Weiler [retired head of NASA space sciences] said estimating costs on a project that's never been built before is difficult. "You bid optimistically. That's not just a problem with the James Webb Space Telescope. We see it at NASA all the time; you see it at defense contractors. I would argue -- and I'm not making excuses here -- that [the budget overrun] is a product of the way we do business in America."

Top astronomers said early estimates were never realistic.

"People were used to lowballing," said Garth Illingworth, an astronomer at the University of California at Santa Cruz. "Congress has been part of the game."

The much-acclaimed Hubble Space Telescope, Weiler reminded critics, was also way over budget. And that very point is reflected in the new book by the Nobel Laureate psychologist Daniel Kahneman, *Thinking, Fast and Slow*, in the chapter dealing with what he and his colleague Amos Tversky called the Planning Fallacy: using best-case scenarios and not reflecting actual costs of similar projects. Poster child: the Scottish Parliament building in Edinburgh, originally budgeted in 1997 at £40 million and finished only in 2004 at a cost of £431 million.

But would we always be better off by following Dr. Kahneman's wise counsel? Shouldn't we look the future squarely in the eye and not fool ourselves about costs? Mark Twain, who virtually bankrupted himself backing an ultimately unworkable [typesetter](#), might have agreed. (Or maybe not; he kept backing esoteric projects like a Polish-Austrian inventor's carpet-pattern machine.) But Dr. Illingworth's remarks suggest there's something else at work, a tacit agreement to keep original estimates deliberately low. Regarding the Scottish Parliament and other architectural megaprojects, the Danish-born program management guru [Bent Flyvbjerg](#) believes such enterprises are more often than not [Machiavellian charades](#). Of course that leaves open the question of whether some notorious cases like the Sydney Opera House may turn out to have been worth the deception or self-deception, while others like New Jersey's [Xanadu](#) have at least so far been mere money pits.

Scientific instruments are different from monuments; even ardent Scottish nationalists might not claim that the new building will give their country better laws, while the Webb instrument, like the Hubble, might change our view of the universe and our place in it, and yield the surprising economic benefits that expensive pure science (and some military cost overruns) often do. The question is whether the benefit of greater realism in the majority of cases would be offset by the loss of benefits if legislators ruled out all projects that by Kahneman's criteria were likely to produce substantial cost overruns. Sometimes coping with unexpected difficulties produces surprising new solutions, a phenomenon that the economist Albert O. Hirschman has called the [Hiding Hand](#).

Fiscal realism can also have unintended consequences. Cancellation of the [Superconducting Super Collider](#) in 1993, it has often been [observed](#), helped drive legions of physicists from big science to even bigger finance, where they developed the computer infrastructure behind the trading that is now the target of Occupy Wall Street. The NASA executive Dr. Charles Beichman wrote tongue-in-cheek to the [Financial Times](#) two years ago that it's cheaper to pay scientists and engineers to work on accelerators and telescopes than to turn them loose writing derivatives.

So, on balance I would suggest implementing Dr. Kahneman's procedure, but (in the case of potentially productive investments) looking not just at all the potential additional costs but at the kinds of benefits, including spinoffs, that previous big projects have created. I find it hard to believe that in the context of the whole Federal budget, the Web Space Telescope would not survive that kind of realism.

Image: NASA

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