Cost Management Issues in NASA's Acquisitions and Programs

House Committee on Science and Technology
Subcommittee on Space and Aeronautics
March 5, 2009

Chair: Gabrielle Giffords (D-AZ) (opening statement)
Ranking Member: Pete Olson (R-TX) (opening statement)

Witnesses:

- Christopher Scolese, Acting Administrator, NASA (prepared statement)
- Christina T. Chaplain, Director, Acquisition and Sourcing Management, Government Accountability Office (prepared statement)
- Gary P. Pulliam, Vice President, Civil and Commercial Operations, The Aerospace Corporation (prepared statement)

Background

For more than a decade, the Government Accountability Office (GAO) has identified the National Aeronautics and Space Administration's (NASA's) acquisition management as a "high risk" area due to the agency's difficulty in meeting cost, schedule, and performance objectives for some of its projects. In January 2009, the GAO updated its high risk list and reported that NASA had taken significant steps – which included a corrective action plan to address weaknesses identified by the 2007 GAO high risk list – to improve its acquisition management. The purpose of this hearing was to discuss the GAO's findings in its review of several NASA large-scale projects, the causes of cost growth and schedule delays in NASA acquisitions, and the agency's progress in addressing these issues. Relevant GAO reports on NASA management are available on the hearing website. For more information, see the charter and webcast for the hearing.

Nuggets

"It is clear that good cost and schedule management will be critical to the success of NASA's planned robotic and human space flight activities."

Chairwoman Giffords

"…we should and could, and can and will, do better in the future."

Mr. Scolese

"Irrational optimism can be costly."

Rep. Rohrabacher

By Laura M. Delgado

Hearing Highlights

This first hearing of the House Committee on Science and Technology's Subcommittee on Space and Aeronautics in the 111th Congress was meant to be, according to Chairwoman Giffords, "a first step in this Subcommittee's oversight of NASA's acquisition and program management". In her opening statement, she expressed the subcommittee's commitment to exploring potential solutions to prevalent cost and schedule growth in NASA programs, a concern that has been present since the 1980s. Congressman Olson, ranking member of the subcommittee, said in his opening remarks that information on NASA's ability to maintain cost-effectiveness will be important to support initiatives to increase the agency's budget.

NASA Acting Administrator Scolese began his comments by describing the two kinds of factors that contribute to cost overruns within NASA programs: internal growth, which can result from poor management or overestimation, and the impact of external elements, such as industrial base issues or changes in mission profile. Other external factors that have increased cost in specific missions were a "backed up" flight manifest – which has prompted close coordination with the Department of Defense to decide on space launch priorities – and also partner performance. "There is no perfect formula for projecting cost," he added and explained that NASA's challenge is exacerbated by the fact that cost estimation improves only as the project advances.

An example of this phenomenon is the Mars Science Laboratory. Initially given a price tag of $600 million, the MSL was later estimated by NASA to cost about $1.6 billion, a number that later proved to be insufficient by at least $400 million. Mr. Scolese explained that the first estimate came from a National Academy of Sciences (NAS) Decadal Survey, the purpose of which is to outline the science priorities that should guide NASA's future programs. The second estimate came from NASA after the program was further studied and developed, and "we still underestimated the complexity of it," he added. Mr. Scolese said that NASA is working with the NAS to improve cost estimates that are done "at the earliest phase" of concept development when it is particularly challenging to have an accurate understanding of future program costs. He expressed confidence that by the continued application of multiple integrated techniques within NASA, the agency will be able to improve its estimates and performance.

Representing the Government Accountability Office, Ms. Chaplain described the reasons why NASA was first put on GAO's "high risk list" and why it remains there. "Fourteen years later…acquisition problems still existed" and further reviews found "significant cost overruns" in 27 programs. Ms. Chaplain commented that one reason for this continuing challenge is that NASA programs are sometimes created with too many expectations, increasing the level of risk. While there have been some improvements as evidenced in GAO's most recent reviews, problems still exist. "Ten of thirteen projects experienced an average of 13% cost growth" as well as an average launch delay of 11 months. Ms. Chaplain also stated that these reports were not meant to create debate over the distinctiveness of NASA, "rather to serve as an oversight and management

tool." The criteria GAO used to evaluate NASA programs have been time-tested in several distinct communities, including the defense space sector.

In his remarks, Mr. Pulliam, of the Aerospace Corporation, offered four main explanations of NASA's cost overruns. He described these as:

(1) NASA being too optimistic in its initial designs, producing" artificially low cost estimates and "optimistic schedules";
(2) Scope changes as designs evolve, a condition he also called "desirable from a science perspective" but adding complexity and therefore, cost;
(3) Inherent difficulty in developing world-class technology, particularly when the issue of technology maturation increases risk; and
(4) External influences that cause "chain reactions" across the agency.

Mr. Pulliam noted NASA's efforts at a strategic and tactical level to reduce uncertainty in the cost-management process.

Uncertainty was repeatedly cited as the most significant contributing factor to negative changes in cost and schedule. Uncertainty in budget and requirements reduce program stability, and stability is "probably the most important thing" for mission success according to Mr. Scolese. When asked whether human spaceflight missions are more likely to encounter delays and overruns than robotic missions, Mr. Scolese said that while not necessarily leading to overruns, a difference does come up when developing early cost estimates. The fact that human missions are usually long term and less frequent, "presents a challenge for us…we don't have a historical database to allow us to make predictions as we do with robotic missions," a situation that he said added "greater uncertainties in our initial estimates." More human spaceflight missions would reduce uncertainty as technical and resource requirements are better known and can be assessed earlier in development.

A related issue and an important point of debate during the hearing was whether cost-overruns are an inherent characteristic of space exploration missions. While acknowledging the high risk and high probability of failure associated with these kinds of missions, Mr. Scolese acknowledged there are still actions that can be taken to address this problem. Congressman Griffith (D-AL), on the other hand, expressed the opposite view and said "I do expect there to be cost-overruns" as a result of NASA's innovation, level of excellence and efforts to remain competitive. He said he appreciated the attention given to "the detail of cost," but that when the polio vaccine was being developed this issue was not brought up and space activities should be viewed similarly.

The state of the space industrial base was also cited as contribution to cost growth. In discussing this impact, Mr. Scolese said that because it "has shrunk and consolidated" there is "less opportunity for competition." He also noted a "loss of expertise" in the technological workforce and export regulations (ITAR) as contributing to a less competitive U.S. space sector. The combined result of all of these factors is that NASA often has to acquire many of its components from overseas, which "hurts American

industry.” He added that another element that NASA has had to deal with due to a lack of parts is an increase in the number of counterfeit parts it ends up acquiring. He described this as a worldwide problem. “In dealing with that you find out late…you find out about it when you're in tests, or you find out about it when you're sitting on top of the rocket, or worse, you find about it when you're in space. And all of those have cost implications."

Mr. Scolese reiterated that schedule, cost, technological challenges, safety, and mission success are all interrelated elements that NASA has to balance continually. The effects of the processes the agency has put in place to deal with the cost management challenge should begin to become visible in the next few years. “We should be seeing some of the results soon…as we start delivering on those missions,” Mr. Scolese said.