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COMMERCIAL LAUNCH VEHICLES

NASA Taking Measures to Manage Delays and Risks

GAO Highlights

Highlights of GAO-11-692T, a report to the Subcommittee on Space and Aeronautics, Committee on Science, Space, and Technology, House of Representatives

Why GAO Did This Study

Since the National Aeronautics and Space Administration (NASA) created the strategy for the Commercial Orbital Transportation Services (COTS) project in 2005, the space landscape has changed significantly—the Space Shuttle program is retiring and the Ares I will not be available—increasing the importance of the timely development of COTS vehicles. The lack of alternatives for supplying the International Space Station and launching science missions have all contributed to an increased need for the COTS vehicles. The two COTS project partners, Orbital and SpaceX, have made progress in the development of their respective vehicles; however, both providers are behind schedule. As a result, the project recently received an additional $300 million to augment development efforts with risk reduction milestones.

This testimony focuses on: (1) COTS development activities, including the recent funding increase; (2) the extent to which any COTS demonstration delays have affected commercial resupply services (CRS) missions and NASA's plans for meeting the space station's cargo resupply needs; and (3) lessons learned from NASA's acquisition approach for COTS.

To prepare this statement, GAO used its prior relevant work and conducted additional audit work, such as analyzing each partner's agreement with NASA and interviewing NASA officials. New data in this statement was discussed with agency and company officials who provided technical comments, which we included as appropriate.

View GAO-11-692T or key components. For more information, contact Cristina Chaplain at (202) 512-4841 or chaplainc@gao.gov.

What GAO Found

SpaceX and Orbital continue to make progress completing milestones under their COTS agreements with NASA, but both partners are working under aggressive schedules and have experienced delays in completing demonstration missions. SpaceX successfully flew its first demonstration mission in December 2010, but the mission was 18 months late and the company's second and third demonstration missions have been delayed by almost 2 years due to design, development, and production challenges with the Dragon spacecraft and Falcon 9 launch vehicle. Orbital faced technical challenges developing the Taurus II launch vehicle and the Cygnus spacecraft and in constructing launch facilities, leading to multiple delays in completing program milestones, including its demonstration mission. NASA has amended its agreements with the partners to include a number of new milestones, such as additional ground and flight tests, to reduce remaining developmental and schedule risks; most of the new milestones completed thus far were finished on time, but many milestones remain.

Based on the current launch dates for SpaceX's and Orbital's upcoming COTS demonstration missions, it is likely that neither will launch its initial CRS mission on time, but NASA has taken steps to mitigate the short-term impact to the space station. The launch windows for SpaceX's first and second CRS flights are scheduled to occur either before or during its upcoming COTS demonstration flights and will need to be rescheduled. Orbital's first CRS flight will also likely shift due to a Taurus II test flight. NASA officials said that the agency will have to renegotiate the number of flights needed from each partner and re-baseline the launch windows for future CRS missions once COTS demonstration flights are completed. NASA has taken steps to mitigate the short-term impact of CRS delays through prepositioning of cargo, some of which will be delivered on the last space shuttle flight. Despite these efforts, NASA officials said they would still need one flight in 2012 from SpaceX's and Orbital's vehicles to meet science-related cargo needs.

In considering the use of a Space Act agreement for COTS, NASA identified several advantages. These advantages include sharing costs with agreement partners and promoting innovation in the private sector. A disadvantage, however, is that NASA is limited in its ability to influence agreement partners in their approach. At the time the agreements were awarded, NASA was willing to accept the risks of using a Space Act agreement given the goals of the project and alternative vehicles that were available to deliver goods to the space station. As the project has progressed, however, and these alternatives are no longer viable or available, NASA has become less willing to accept the risk involved and has taken steps aimed at risk mitigation. Given a critical need, the risk is present that the government will be required to make additional investments to meet mission needs. The amount of investment can be lessened by ensuring that accurate knowledge about requirements, cost, schedule, and risks is achieved early on. GAO has made recommendations to NASA and NASA is taking steps to help ensure that these fundamentals are present in its major development efforts to increase the likelihood of success.