



An Analysis of NASA's Plans for Continuing Human Spaceflight After Retiring the Space Shuttle

Dr. Kevin M. Eveker
Senior Analyst
National Security Division
Congressional Budget Office

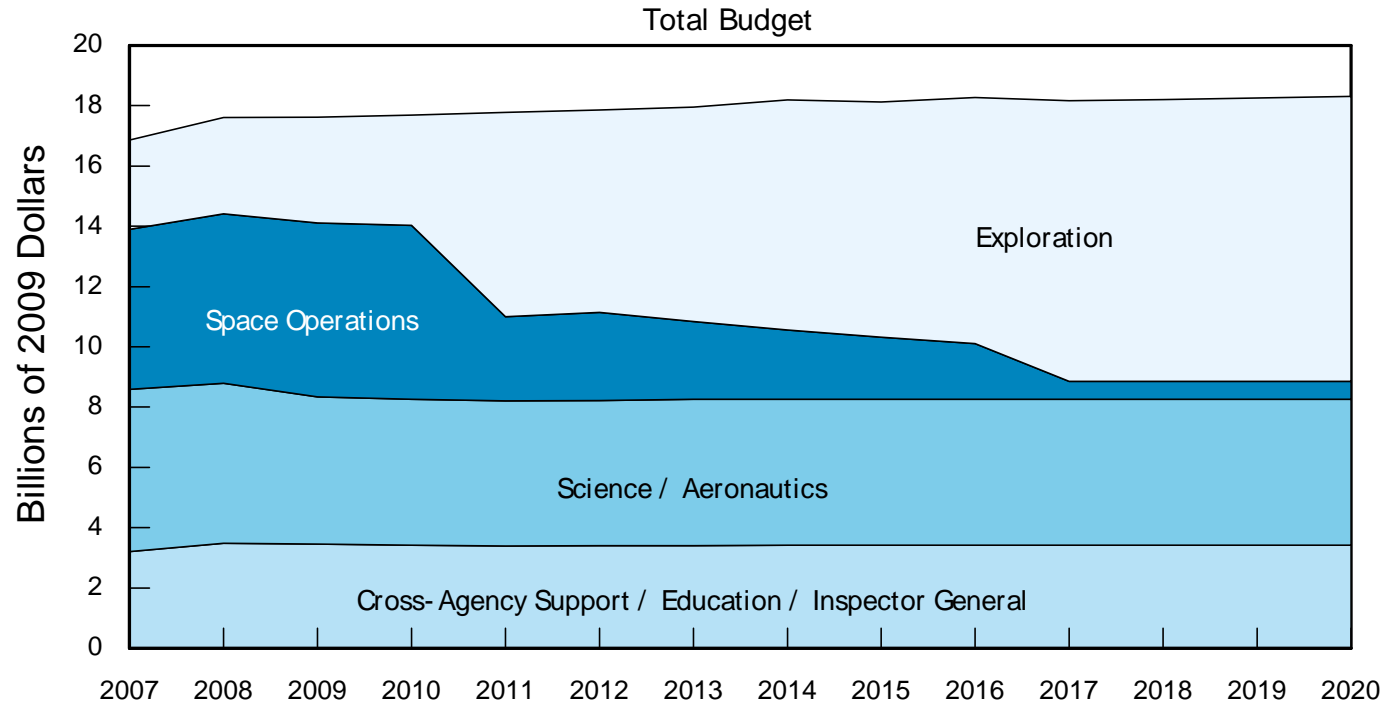


Agenda

- NASA's Budget and the Constellation Program
- Risks to Timely Completion of Ares 1 and Orion with Potential for Cost Growth
- Potential Delays in Completing the Space Station and Retiring the Space Shuttle



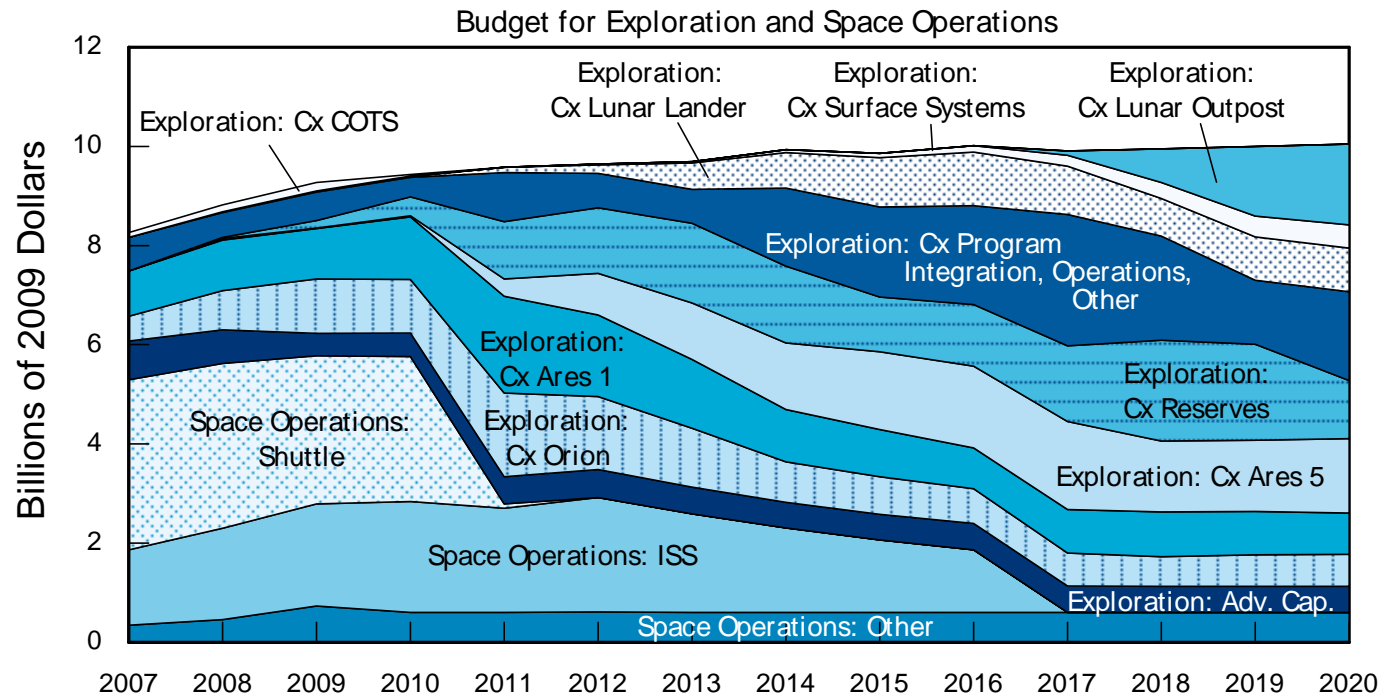
NASA's Planned Budget Through 2020



- Data for 2007 to 2013 from President's Budget for Fiscal Year 2009
- Data for 2014 to 2020 based on NASA supplied data for Exploration and Space Operations; Remaining Accounts Assumed Constant out to 2020



NASA's Planned Budget for Exploration and Space Operations



- Funding Shifted to Constellation Program from Space Shuttle in 2011 after Shuttle Retirement
- Funding Shifted to Constellation Program from ISS; no ISS funding after 2016
- Approximately \$28 Billion in Total Funding for Ares 1, Orion, Program Integration, and Operations through 2015 IOC
- Approximately \$7 Billion in Total Reserves through 2015



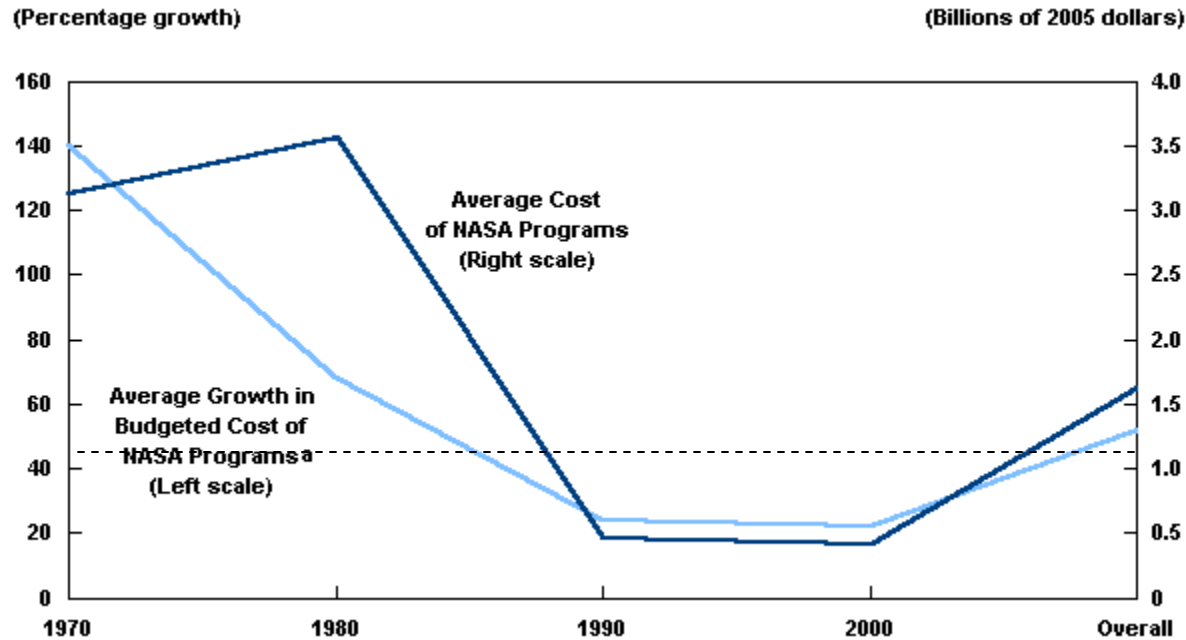
Examples of Identified Risks to Timely Completion of Ares 1 and Orion

- Mass Growth for Orion
- Thrust Oscillations on Ares 1
- Performance of Ares 1
- J-2X Engine Development Timeline
- Orion Heat Shields

Risk Mitigation Typically Requires Additional Time and Money



Trends in the Costs of 72 NASA Programs¹ and Potential for Cost Growth for Ares 1 and Orion

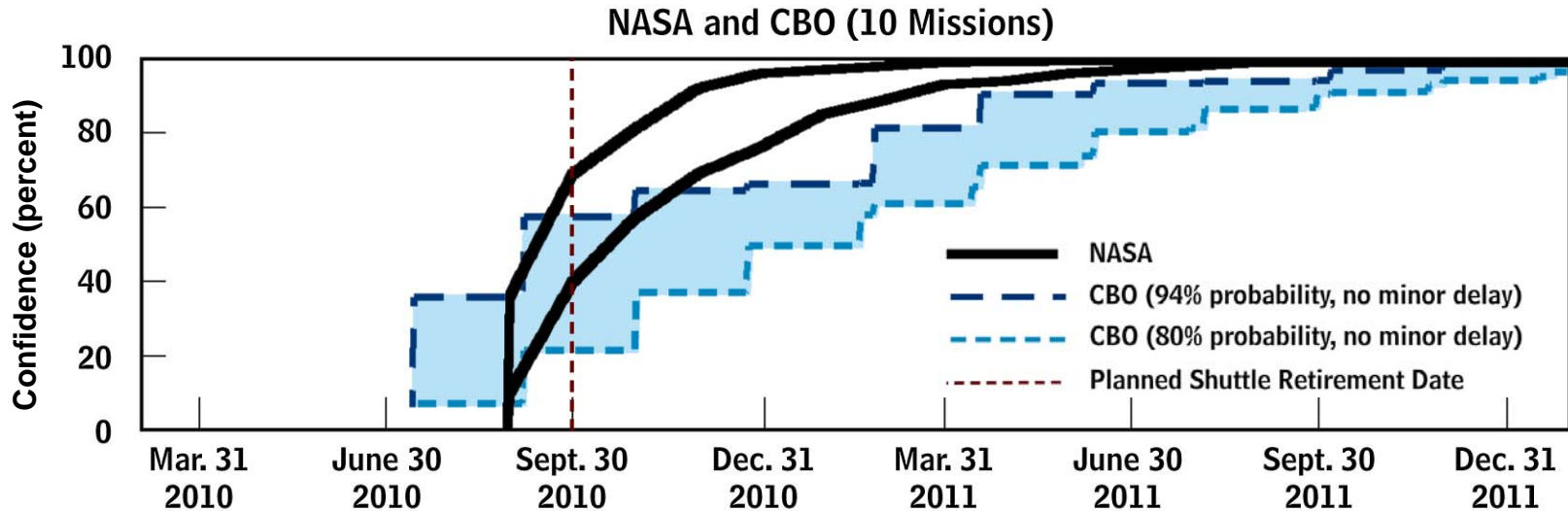


- Overall Average Percentage Cost Growth from Past NASA Programs of Approximately 50 Percent Estimated for Ares 1 and Orion
- For Ares 1 and Orion Planned Costs of \$28 Billion this Implies Cost Growth of Approximately \$14 Billion
- With \$7 Billion of Planned Reserves, Additional \$7 Billion would be Required
- Under Fixed Top Line Funding, NASA would Require Additional 18 Months before Ares 1 and Orion IOC including Some Cuts to Ongoing Lunar Programs

¹See Congressional Budget Office, *A Budgetary Analysis of NASA's New Vision for Space Exploration* (September 2004)



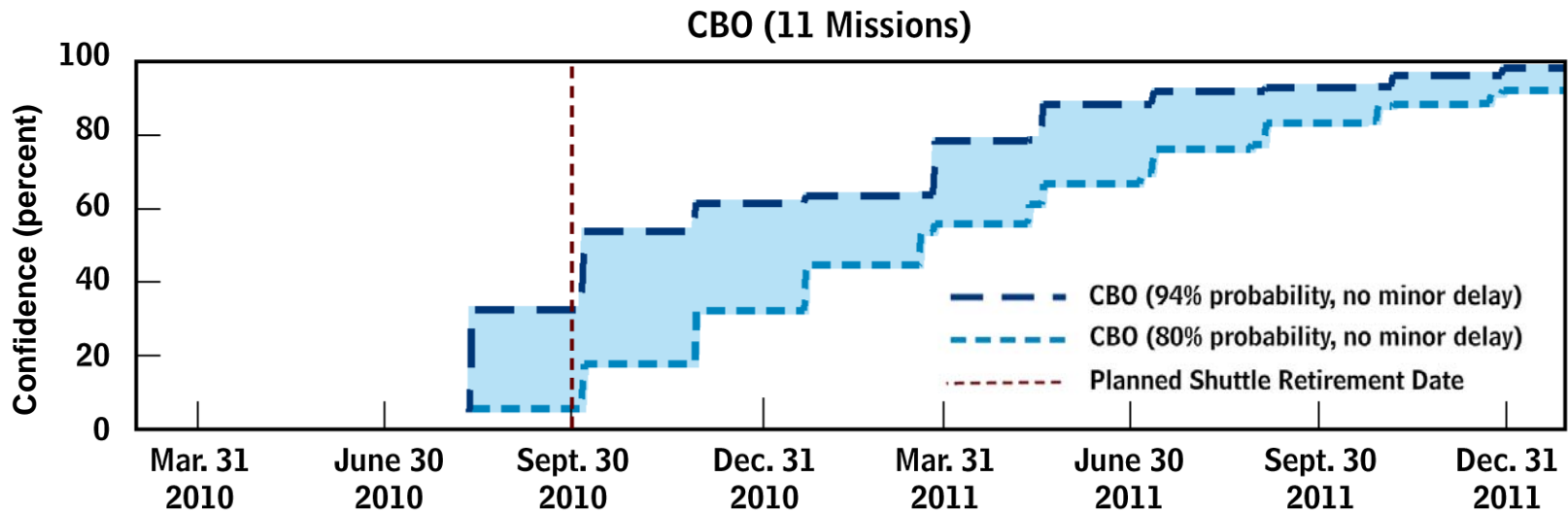
Confidence Estimates for Space Station Completion and Shuttle Fleet Retirement (10 Mission Manifest)



- 10-Mission Manifest includes 2 “Contingency” Missions
- NASA MAST data top line for likely-case assumptions, lower line for conservative assumptions
- Next Mission on Manifest Planned for Nov 14, 2008 and Final Mission Planned for July 15, 2010



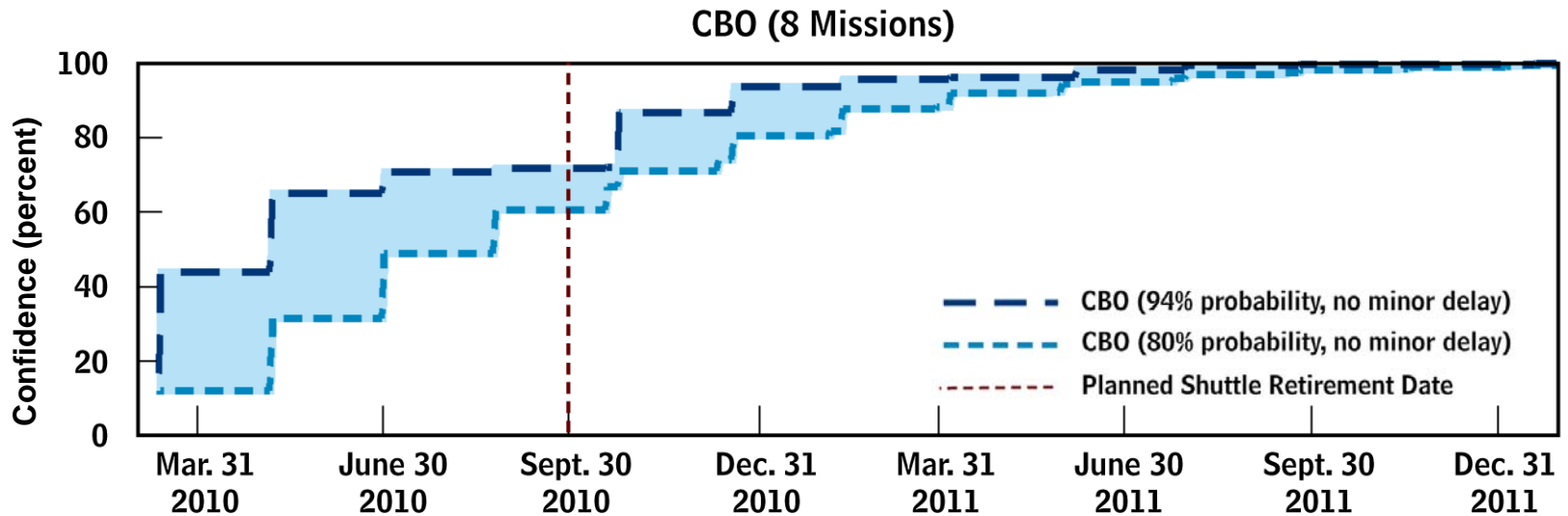
Confidence Estimates for Space Station Completion and Shuttle Fleet Retirement (11 Mission Manifest)



- 11-Mission Manifest includes 2 “Contingency” Missions Plus Mission to Transport Alpha Magnetic Spectrometer to ISS
- Next Mission on Manifest Planned for Nov 14, 2008 and Final Mission Planned for August 15, 2010



Confidence Estimates for Space Station Completion and Shuttle Fleet Retirement (8 Mission Manifest)



- 8-Mission Manifest does not include final 2 “Contingency” Missions
- Next Mission on Manifest Planned for Nov 14, 2008 and Final Mission Planned for March 15, 2010