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Waste and duplication in NASA programs: The need to enhance U.S. space program efficiency

Bert Chapman*

Government Information, Political Science, & Economics, HSSE Library, Purdue University, 504 West State Street, West Lafayette, IN 47907-2058, USA

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ABSTRACT

The U.S. Government faces acute budgetary deficits and national debt problems in the Obama Administration's second term. These problems have been brought about by decades of unsustainable government spending affecting all federal agencies including the National Aeronautics and Space Administration (NASA). An outgrowth of this fiscal profligacy is the presence of wasteful and duplicative programs within NASA that prevent this agency from achieving its space science and human spaceflight objectives. These programs occur due to mismanagement of these programs by NASA and from the creation of these programs by the U.S. Congress and congressional committees. This occurs because congressional appropriators tend to be more concerned with economically enhancing their states and districts and promoting their reelections instead of providing effectively targeted funding and oversight of their programs to ensure they meet national space policy goals and provide tangible value for taxpayers. This work will examine recent examples of wasteful and duplicative NASA programs and suggest ways to improve their utility.

1. Introduction

The U.S. Government faces acute budgetary and national debt pressures during early 2014. The federal budget deficit is $301 billion representing 1.75% of a $17,649.6 trillion Gross Domestic Product (GDP) as of April 30, 2014 [1] and the national debt exceeded $17.472 trillion as of May 12, 2014 having risen from to this level from $10.626 trillion since the beginning of the Obama Administration [2]. This situation requires federal agencies and congressional appropriators to carefully scrutinize federal programs for duplication and waste and determining whether they are critical enough to spend taxpayer dollars on during this period of protracted fiscal restraint. All federal agencies, to varying degrees, are being forced to reduce the growth of their expenditures, if not their actual expenditures, by political and economic constraints such as 2012 federal budget sequestration legislation. In March 2013, the National Aeronautics and Space Administration (NASA) reported that the 5% of its Fiscal Year (FY) budget of $17.896 billion which it was required to sequester was $918 million [3].

NASA is one agency being forced to cope with heightened scrutiny of its programs. While it has had significant scientific and political successes during its more than half century history, NASA has not been immune to programmatic waste, duplication, inefficiency, and uncertain institutional purpose during this time period. This article will examine recent and ongoing problems NASA has with waste and duplication which, if allowed to persist, will jeopardize its ability to meet national space policy objectives and maintain political support for continued funding of its programs which can be seen by Americans irrelevant to their daily needs. NASA's ambivalent popular standing is reflected in recent public opinion polling. A March 2012 General Social Survey Poll asking U.S. Government space exploration spending found 40% of respondents saying the U.S. was spending the right amount while 29% said it was spending too much. A May 2013 Gallup Poll seeking public opinion on NASA's performance found that 32% of respondents had a good opinion of NASA; 32% had a fair opinion of NASA; and 10% had a poor opinion of NASA. Finally, an October 2013 Pew Research Center poll on overall opinion of NASA revealed 22% held a very favorable opinion; 51% a mostly favorable opinion; 3% a very unfavorable opinion; and 12% a mostly unfavorable opinion of this agency [4].

Duplication and waste is common to NASA and other federal agencies. Documentation on such duplication and waste can be

* Tel.: +1 (765) 494 2837; fax: +1 (765) 494 9007.
E-mail address: chapmanb@purdue.edu.

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found in many sources including U.S. Government Accountability Office (GAO) reports, agency inspector general (IG) reports, and congressional committee publications. An important factor to remember is that responsibility for much of this duplication and waste occurs through congressional earmarking as part of annual federal appropriations as members of Congress seek to enhance economic development in their states and districts and their own reelection prospects by placing NASA facilities in their constituencies (particularly in southern and western states) and maintaining government spending for these facilities even if they no longer meet national space policy needs [5].

2. Multifaceted waste and duplication

GAO is responsible for issuing numerous reports on the management performance of government programs. A particularly important category of reports GAO issues are its High Risk reports. This series of reports are issued approximately every two years at the beginning of each two year congressional session. Their purpose is documenting "high risk" government operations and focusing on government agencies and program areas which achieve the high risk category due to their vulnerabilities to fraud, waste, abuse, and mismanagement or are in acute need of broad reform. The "high risk" reports have been issued from 1990 until 2013 and various NASA programs have been included on this list every time [6].

NASA acquisition management programs were targeted as high risk in the February 2013 edition of these GAO reports. These programs were targeted as high risk due to NASA's continuing history of persistent cost growth and scheduling delays in the majority of its major programs. GAO asserts that various causal factors including obsolescent financial management systems, poor cost estimating, and underestimating risks associated with developing major systems keep NASA acquisition management programs in the high risk category [7].

GAO credited NASA for meeting cost and schedule baselines in 2011 for the Juno and the Gravity Recovery and Interior Laboratory spacecraft projects. However, GAO also determined that same year that NASA increased lifecycle costs of the James Webb Space Telescope (JWST) by $3.7 billion and a 52 month launch delay. In December 2012, GAO reported that JWST costing and scheduling confidence developing and scheduling levels could impact the program's overall reliability. GAO also mentioned that in 2011 NASA lacked common measurable and proven criteria such as engineering drawings employed at a key point in the development lifecycle to give decision-makers requisite knowledge, insight, and evidence to allow individual projects to proceed [8].

Since 2011 GAO has also issued annual reports on government agency program duplication and included recommendations for eliminating this duplication. In its April 2013 report on this topic, GAO focused on the possibility of reducing government satellite program costs. Besides NASA, federal agencies involved in using satellite assets and technologies for various programs include the Department of Defense (DOD), National Oceanic and Atmospheric Administration (NOAA), Federal Aviation Administration (FAA), and the U.S. Coast Guard. In recent years, over $25 billion annually as been appropriated to agencies for developing space systems. These systems are launched and put into orbit by rockets which can cost from $80–$200 million per launch [9].

Recommendations from GAO to reduce such duplication and costs include launching government payloads on commercial space industry satellites; increased launch ride-sharing by federal agencies, and resolving agency cultural challenges such as DOD being reluctant to adopt technologies from unfamiliar commercial providers. Additional complicating factors include government agencies being concerned that commercial agencies may not be flexible about changing launch dates if instruments or satellites experience delays and existing federal legal and policy challenges such as the 2004 U.S. Space Transportation Policy mandating that government payloads be launched on U.S. manufactured space launch vehicles unless otherwise exempted [10].

GAO noted that while the U.S. Space Transportation Policy was intended to support the U.S. space industry, it limits the government's ability to utilize available foreign commercial launch options which commercial satellite providers take advantage of. GAO recommends that Congress and the President should consider revisiting U.S. space transportation law and policy to give federal agencies additional flexibility to use foreign space transportation and launch vehicles to encourage cost savings. GAO believes hosted payloads and ride sharing could reduce government launch costs and produce savings in the hundreds of millions of dollars over project lifespans but is unable to quantify the potential for further financial benefits due to a limited pool of available data [11].

Political figures like to target what they consider as wasteful government spending and NASA was heavily criticized by Senator Tom Coburn (R-OK) in the October 2012 edition of the *Waste Book* compiled by his staff. One example of questionable NASA spending cited in this presentation included $947,000 to researchers at Cornell University and the University of Hawaii as part of NASA's Advanced Food and Technology Project to develop recipes for pizza and other foods that could be served on Mars even though human expeditions to Mars are not likely until the 2030s. Other characteristics of this program included six volunteers heading to a barren area of Hawaii to simulate a 120-day Mars mission, wearing space suits, and consuming only instant foods and foods prepared from shelf stable ingredients in order to determine the best food options for long-term travel to Mars and eating on this planet [12].

This report also revealed NASA had spent $1.5 million developing a massive multiplayer online game simulating a journey to Mars and astronauts life on that planet; developed the online rock radio station Third Rock with a Houston company targeting 18–34 year olds which is accessible on mobile phone apps; the NASA website, and iTunes, and spent $94,000 developing a Mars Rover video game for Xbox [13]. It also spends $771,000 annually for an obsolete and poorly used "Lessons Learned" database allowing NASA managers to document best practices and other information gained from completed projects. NASA's IG, however reports that these managers rarely contribute to or access this database and that agency employees found it to be user unfriendly and unhelpful [14].

NASA has also spent $12.4 million funding a cutting edge visitor center to replace an existing facility five miles away from the Stennis Space Center in Mississippi. Despite receiving approximately 100 visitors per day in 2007, NASA and other federal, Mississippi state agencies, and private organizations collaborated to build a new 72,000 square foot science center which opened in 2012. The new facility is five times larger than the previous visitors center and aspires to attract over 300,000 visitors annually [15].

3. Unused and ineffectively used facilities

NASA's real estate holdings encompass eighteen facilities in Washington, DC and the following twelve states: Alabama, California, Florida, Louisiana, Maryland, Mississippi, Ohio, New Mexico, New York, Texas, Virginia, and West Virginia [16]. These make NASA the U.S. Government's ninth largest real property holder with over 124,000 acres and 4900 buildings and other structures whose replacement value exceeds $30 billion [17]. Over 80% of these facilities are forty or more years old and NASA faces a deferred maintenance backlog of $2.5 billion. The 2010 NASA Authorization Act required the agency to reduce its real property to fit current and