4. The new 2010 U.S. space policy

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4.1. Introduction

The Obama Administration released the new US Space Policy on 28 June 2010. This was slightly unusual because Presidents normally review space policy during their second term, not the first, because of the low political salience of space policy, though Presidents Reagan and George H W Bush did so in their first term, during a period when space policy was highly controversial. The document is divided into three sections, on principles, goals and guidelines, as the Bush document was. These sections are important because they indicate where the priorities of US space policy lie. As Garnett has noted, "in retrospect at least, policy is revealed by a *series* of decisions, and in prospect it is revealed by general statements of purpose."[697] This is why the space policy document is important, not only in terms of the principles and goals outlined, which reflect core values repeated in virtually every presidential space policy since the start of the space age, but also because the guidelines suggest the areas where the government is determined to act. The long-term aspirations outlined in a policy document need to be distinguished from the objectives that the government is actually going to seek to achieve during its term of office. The question therefore is not so much what aspirations are outlined in the policy, but rather what is the administration actually intending to do?

The Obama policy covers the broad sweep of all aspects of US space policy and some observers have described it as the first substantial updating of the 1996 Clinton policy.[698] This is misleading however, since the Bush administration chose to cover the same ground in two policy statements, one civilian and one military oriented, as well as documents dealing with specific policies, such as the GPS satellite system, rather than a single document as the Clinton and Obama administrations did. It is also worth noting that a great deal of the 2010 document repeats almost verbatim, the contents of the much criticised 2006 policy.

While the announcement of a space policy by a new administration encourages the idea that it represents significant new initiatives, as would

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be expected with economic policy for example, the reality is that the document shows striking similarities to the G W Bush administration space policy, which in turn followed the Clinton policy closely. This has been a feature of US space policy historically, the policies of new administrations build on and modify those of their predecessors, rather than dramatically altering them. US space policy has in fact been marked by a consistency of principles and policy goals since its inception in the late 1950's. These core ideas are freedom of access to space and free passage through it for all nations, an emphasis on the peaceful use of space while reserving the right to use space for purposes of national self-defence, and seeing spacecraft as sovereign national vehicles, but denying the existence of sovereignty in space itself or on heavenly bodies. In order to accomplish these objectives, the US has divided responsibility between three complementary, but distinct programmes, conducted by NASA (civil), the Department of Defence, (military) and the intelligence community.

4.2. Key Features of the Obama Space Policy

The Obama document highlights a number of key themes that distinguish it from the approach taken by the previous administration, for example a new

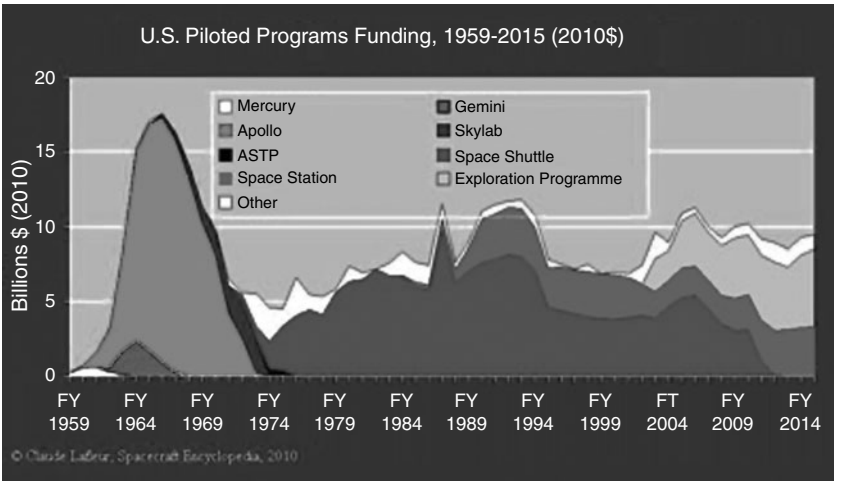

Fig. 5: *The amount spent by the United States on piloted spaceflight from 1959 to 2015.*

emphasis on international cooperation. The changes in the document also reflect the evolution of the environment in which space policy is now being constructed, for example the growing emphasis on the role of the private sector. The new policy also lays stress on a new concept "the sustainability of the space environment", though it does not make clear exactly what activities are thought to help or hinder achieving this objective.

The new policy reflects the evolving space regime in the way that it seeks to partner with commercial organisations for the transport of crew and supplies to the ISS and to begin manned missions to "new destinations" by 2025. The 1996 space policy referred only to manned missions in low-Earth orbit and launcher technology development proposals reflected this, with a focus on reusable shuttle follow-on technologies.

It puts a strong emphasis on international cooperation. There may be a budgetary logic for this, in an era where funding is likely to be constrained, but it reflects also the Obama administrations preference for multilateralism, unlike the previous administration, and a recognition of the increasingly sophisticated space programmes of a number of other countries and organisations. US government departments and agencies are specifically encouraged to identify potential areas of cooperation and the emphasis on cooperation is a theme found throughout the document. Certainly the language is far less militant than the 2006 Bush document and the Obama administration emphasises that "in fact one of our central goals is to promote peaceful cooperation and collaboration in space". However it should be noted that the 2006 policy also spoke of the pursuit of international cooperation to further the exploration and peaceful use of space. Where the emphasis differs is that the earlier policy saw cooperation more in terms of encouraging other states to follow the US lead. It spoke of "diplomatic and public diplomacy effortsto build an understanding of and support for US national space policies and programs" and encouraging "the use of US space capabilities and systems by friends and allies".

In April 2010 Obama cancelled NASA's planned programme to return to the Moon, a decision that former lunar astronauts Armstrong, Lovell and Cernan described as "devastating". The administration has opted instead for the long-term goals of sending crewed missions beyond lunar orbit, initially for an asteroid rendezvous, (2025), and subsequently to a landing on Mars, (2030). In a very different geopolitical context however, there is little evidence that the White House is willing to make the sustained political efforts to win the funding from Congress that would be required to sustain such a venture, unlike President Kennedy's 1961 lunar commitment. The robotic exploration of the Solar System is to continue, with some missions having the additional goal of scouting "locations for future human missions".

This is a major change from the 2004 Bush administration *Vision for Space Exploration* policy document .[699] The 2004 document called for the development of a new manned exploration vehicle, the *Crew Exploration Vehicle*, to provide the first long-range manned spacecraft since the Apollo. The vehicle would be used to return American astronauts to the Moon between 2015 and 2020, and this would be used as a stepping stone for the manned exploration of the Solar System. The crew exploration vehicle was to be tested no later than 2010 and to be operational by 2014. Lunar rovers, based on the Mars *Spirit* design would explore the lunar surface beginning in 2008, and the manned lunar presence would become increasingly long-stay to develop techniques and technologies, and exploit lunar resources to allow subsequent exploration beyond the Moon, beginning with Mars.[700] NASA was directed to review all existing plans and direct them towards the new goals. NASA declared that it would "make use of destinations like the Moon and near-Earth asteroids to test and demonstrate new exploration capabilities".[701] The asteroid mission would be subsequent to manned lunar landings. By shifting the objective away from the Moon, the Obama policy not only puts back a vigorous manned exploration programme by a decade, it also raises major challenges for the Japanese programme, which had adopted a lunar focus in order to allow for effective co-operation with NASA.

4.3. The gap

NASA plans to close down the space shuttle programme in the first half of 2011 after the final mission and with the completion of the International Space Station. However the planned successor manned systems were not due to enter service until 2015 at the earliest. This five year period when the United States would lack a manned spacecraft of its own is commonly called "the gap". It is not the first time the United States has been in this position. There was a six-year gap between the final Apollo mission in 1975 and the first flight of the space shuttle in 1981. Nevertheless, this is a serious concern for the US, which will be forced to rely on other countries for the transportation of its astronauts to the space station during this period. The former NASA Administrator Michael Griffin called the gap "unseemly in the extreme" and it marks a clear retreat from traditional commitment, reflected in the 2005 NASA Authorisation Act to "possess the capability for human access to space on a continuous basis".[702] In April 2010 however President Obama announced the cancellation of the launcher element of the new Orion spacecraft, but the new policy asserts that that the operational life of the International Space Station is to be extended from 2016 to at least 2020, and

"likely beyond". Because of the gap, crewed missions to the ISS will have to be accomplished using the Russian Soyuz spacecraft. The policy declares that commercial companies are to be encouraged to take over as providers of crew transfer vehicles to and from the ISS. But the Orion crew capsule would continue to be developed as a "lifeboat" for the ISS.

In many ways the abandonment of the manned lunar missions means that the administration is largely committed to completing the Clinton space policy. In civil space, the Clinton policy was built around the construction of the ISS, operation of the shuttle fleet and robotic exploration of the solar system, particular the landing of robotic explorers on Mars. The long-term programme to identify planets around other stars was also flagged. NASA was tasked to develop 'smaller, more capable spacecraft' to perform these missions. Acquiring spacecraft from the private sector was encouraged, but with significant caveats. However, there was no commitment to developing a manned deep-space exploration programme, unlike the 2006 and 2010 documents. The call for a manned asteroid rendezvous mission does represent a significant difference, but since the required vehicle will not be ready before 2025, the commitment will be hostage to the policies of successor Administrations, and the objective may be modified.

4.4. Next generation spacecraft

There is an emphasis on the potential of nuclear power systems, which was not featured in the 2004 NASA *Vision for Space* plan, although it was quite prominent in the 2006 Space Policy document. In the 2006 document the purpose for the nuclear systems was not made clear, so it was reasonable to assume that it related more to specialised military microsatellites, rather than large propulsion systems for manned missions.[703] However the Bush document also referred to nuclear power systems for non-government spacecraft, where the operator would be responsible for safe operation. The 1996 Clinton space policy also gave the Department of Energy a requirement to "maintain the necessary capability to support space missions which may require the use of space nuclear power systems". These would not be used in Earth orbit without the specific approval of the President, a requirement repeated in the 2006 document. However, while the Clinton and Bush documents refer to both government and commercial spacecraft in this regard, the 2010 policy only describes government systems. One section on nuclear space systems in the Clinton document was classified and did not appear in the published version. The 2010 policy commits NASA to develop "next-generation" launch systems, including new US rocket engine technologies,

and declares that the US will "develop and use space nuclear power systems where such systems safely enable or significantly enhance space exploration or operational capabilities".[704] In relation to this the Secretary of Energy and Secretary of Transportation are to cooperate in the licensing of activities involving spacecraft with nuclear power systems.

This should perhaps be understood in conjunction with the Presidents April 2010 space policy statement. That cancelled the launcher element of the *Constellation* spacecraft, but at the same time spoke of a US commitment to manned missions to the asteroids and Mars using "new spacecraft designed for long journeys to allow us to begin the first ever crewed missions beyond the Moon into deep space".[705] The President declared that the US must begin development of a new heavy-lift rocket no later than 2015, but that it must be based on "new propulsion technologies". The new Space Policy document clearly suggests that these propulsion technologies may be nuclear, which would be a dramatic innovation, with significant safety issues. It is noticeable also that this statement drops the Bush/NASA objective of using manned lunar missions to prepare for deep space exploration and moves directly to the asteroid mission that the 2004 Vision for Space Exploration document lined with the lunar programme. In a speech outlining the policy, President Obama declared both that the new deep-space spacecraft would be ready by 2025 and that "we'll start by sending astronauts to an asteroid for the first time in history".[706]

4.5. US space policy governance

The policy document gives additional guidance in terms of three identified sectors, commercial, civil and national security. This section of the document clearly envisages a significant shrinking of NASA's historic role. The US government is to "purchase and use commercial space capabilities and services" from the commercial sector "to the maximum practical extent", and government agencies and departments are to "refrain from conducting United States Government space activities that preclude, discourage, or compete with US commercial space activities unless required by national security or public safety".[707] These statements simply repeat with little change, the wording of the 2006 space policy, and indeed the 1996 policy, which similarly stated that the US government "shall not conduct activities with commercial applications that preclude or deter commercial space activities except for reasons of national security or public safety". The 2010 policy also encourages the transfer of routine operational space activities to the commercial sector, and making US space technology and infrastructure available

Tab. 1: *Costs of US piloted programs by Claude Lafleur, Monday, March 8, 2010 (source: U.S. Office of Management and Budget).*

Year	NASA budget		
	Nominal	Fed Budget (%)	Constant 2007 Dollars
1996	13,881	0.89	16,457
2000	13,428	0.75	14,926
2004	15,152	0.66	15,559
2006	15,125	0.57	16,085
2007	15,861	0.58	15,861
2008	17,318	0.60	17,138
2009	17,782		
2010	18,724		
2011	19,000		
2012 (est.)	19,450		
2013 (est.)	19,960		
2014 (est.)	20,600		
2015 (est.)	20,990		

to the commercial sector. Of significance for the European Union and China is the policy's emphasis on making the US space industry more competitive in international markets, particularly in relation to satellite manufacturing and services and space launch applications, though this too echoes the 2006 document.

The Obama administration has indicated that it plans to revive the National Aeronautics and Space Council, (NASC). This body was created under the National Aeronautics and Space Act in 1958 and was a highly effective body in its early years. However, it was abolished in 1973 and then recreated by President H W Bush in 1989 as the National Space Council. The incoming Clinton administration abolished it once more in 1993. The Obama administration argues that a revived NASC is needed to "report to the President and oversee and coordinate civilian, commercial and national security space activities".[708] It might be argued that a new body will simply create a forum for political and bureaucratic struggle between NASA and the White House. However, given the administrations division of space policy into discrete sectors, all seen as important, a high powered advisory council may facilitate development of coherent space policy.

4.6. The national security dimension

The Obama document continues the emphasis on the importance of space for US security seen in earlier administrations, and reiterates a commitment to defeat any efforts by adversaries to attack US or allied space systems. As with the 2006 policy, the Obama policy also places strong emphasis on "protecting US global access to, and operation in, the radiofrequency spectrum". This may reflect both Iraqi attempts to jam US military satellites during the 2003 Gulf War and the lengthy dispute with the EU over the *Galileo* satellite constellation. Despite a softening of tone, the new policy in fact echoes many of the concerns of the Bush administration.

In particular the 2010 policy echoes the Bush document language in asserting the need to invest in capabilities to "deter, defend and if necessary, defeat efforts to interfere with or attack US or allied space systems". The new policy emphasises that the US will continue to pursue measures to enhance the survivability of its satellites. This embraces not only continuity with earlier administrations in stressing efforts to enhance the protection of key satellites and associated infrastructure, but also, in the reference to "relationships", a new recognition of the role diplomacy can play. However, a novel element is the statement that it will also "develop and exercise capabilities and plans for operating in and through a degraded, disrupted or denied space environment for the purposes of maintaining mission-essential functions". This seems to suggest that the administration is accepting the inevitability of anti-satellite warfare in any future large-scale conflict. In this regard it is significant that the new policy also notes that 'options for mission assurance may include rapid restoration of space assets and drawing on allied, foreign and commercial assets where necessary. In practice the development of a rapid replacement capability would make US satellites less attractive targets in wartime, reducing the pressures for space weaponisation, pressures that adversaries would inevitably feel given the US capacity, reiterated in the new policy, for "the space support, force enhancement, space control and force application missions".[709] This also demonstrates continuity with the 1996 as well as the 2006 policy.

The Clinton administration had also argued that the US would seek to develop space control capabilities to ensure its freedom of action in space, but that it would do so only when such actions were "consistent with treaty obligations". Like the Bush and Obama documents, the Clinton space policy asserted that the US will acquire the capability for "deterring, warning and if necessary, defending against enemy attack" and "countering if necessary, space systems and services used for hostile purposes". The Obama policy places these issues within an allied as well as a national context, declaring that the U.S. will

employ measures to "... defend our space systems and contribute to the defense of allied space systems".

The language used in the 2006 G W Bush Space Policy document alarmed many observers, because it appeared more open to the idea of eventual space weaponisation, though the administration denied this. [710] The policy reaffirmed the traditional US position being "committed to the exploration and use of outer space by all nations for peaceful purposes and for the benefit of all humanity". However, the document overwhelmingly emphasised the security dimension, though there was also encouragement for private enterprise, a theme repeated in the Obama policy. Unlike Obama however, space diplomacy was seen more in terms of persuading other states to follow the US lead, rather than embracing genuine multilateralism. In particular, there was a firm opposition to any arms control initiative that might restrict US military space options. However, the strong language again concealed the continuities with the policies of preceding administrations. The 1996 Clinton space policy did however see a role for arms control, and was open to agreements provided that they were "equitable, adequately verifiable and enhance the security of the United States and our allies". This commitment was dropped from the 2006 policy, but has re-emerged with almost identical wording in the 2010 Obama policy.

Shortly after taking office the Obama administration seemed to commit itself to space arms control. The White House web-site declared that the administration would seek to negotiate a ban on weapons that "interfere with military and commercial satellites". This commitment was later quietly dropped.[711] The new space policy like the Clinton policy is agnostic on space arms control, saying it will pursue "confidence building measures" in space and "consider proposals and concepts for arms control measures if they are equitable, effectively verifiable and enhance the national security of the United States and its allies".[712] It is unlikely that the administration will pursue a comprehensive arms control agreement or one specifically on anti-satellite technologies. More probable is an effort to develop "rules of the road" or confidence building measures in relation to space usage.

Like the Bush administration policy, the 1996 document rejected territorial claims in space and asserted that the US considered "the space systems of any nation to be national property with the right of passage through and operations in space without interference" and that "purposeful interference with space systems shall be viewed as an infringement of sovereign rights". [713] This passage attracted criticism in the 2006 document even though it simply repeated the earlier Clinton administration policy, which had been unremarked. It is once again repeated verbatim in the 2010 Obama policy.

Whereas the Clinton document described America's overall goals as being "to enhance knowledge of the Earth, the solar system and the universe through human and robotic exploration", and to "strengthen and maintain the national security of the United States", the Bush policy emphasised the need to "strengthen the nations space leadership and ensure that space capabilities are available in time to further US national security, homeland security, and foreign policy objectives" and to "enable unhindered US operations in and through space to defend our interests there". Even more controversially, the 2006 policy asserted a claim to the right to deny access to space to anyone "hostile to US interests". However, both the Clinton and Bush policies instructed the Department of Defence to pursue capabilities for "force enhancement, space control and force application" missions.[714] This terminology is also repeated verbatim in the Obama policy.

In relation to the national security intelligence gathering role, the document strengthens the previous administrations statement on monitoring foreign space programmes. The 2006 document spoke simply of providing "a robust foreign space intelligence collection and analysis capability". The 2010 document outlines a requirement for the Director of National Intelligence to have a specific focus on the space related activities of other states. The DNI shall, "provide robust, timely and effective collection, processing, analysis and dissemination of information on foreign space and supporting information system activities" and "develop and enhance innovative analytic tools and techniques to use and share information from traditional and non-traditional sources for understanding foreign space-related activities".[715] It should be noted that some sections of the policy are classified and are not in the published version.

Although it is addressed in the civil rather than the national security section, the long sections on environmental earth observation and weather, and land remote sensing can also be seen as falling into the broader definition of security. NASA will remain the lead organisation for satellite development in relation to environmental observation. NASA will also lead, alongside the US Geological Survey, research and monitoring of natural and human-induced changes to the earth's land surface and inland waters. This part of the document is not dissimilar to the 2006 policy, which had the same broad themes. A novel feature of the new policy however is the emphasis placed upon the "long-term sustainability" of the space environment itself. This new emphasis appears in the goals section of the policy, but is not linked to specific policy initiatives or objectives other than in relation to orbital debris and collision prevention measures, so that its implications are not fully spelt out.

The Obama administration seems more relaxed about multilateralism in addressing security related issues than its predecessor, seeking for example to

cooperate with other nations in terms of space surveillance for debris monitoring. This had been prefigured in Obama space policy position papers published during the 2008 election campaign, which referred to developing an international approach to minimising space debris', and "enhancing capabilities for space situational awareness". These documents also spoke of opposing space weaponisation and developing with other nations "rules of the road" for space to ensure all nations have a common understanding of acceptable behaviour'.[716] In relation to this, the new Obama space policy introduces a key concept of "stability" in space, which it deems to be in the vital national interests of the United States. While this concept is introduced to US space policy for the first time in this document, it is not defined.

4.7. Conclusions

Reaction to the Announcement of the 2010 Obama space policy has tended to mix disappointment at the abandonment of the manned lunar return objective, with relief that the policy marks a sharp break with the previous Bush policy and is seen as being either a valuable updating of the US position or a return to the balanced space policies of the Clinton era. A detailed analysis of the Obama document in comparison to the earlier policies shows that these judgements are misplaced. There is a degree of novelty, for example in the abandonment of the manned lunar programme, but for the most part the Obama policy largely repeats the Bush document, including in areas that attracted great criticism in 2006, but have apparently passed without public concern in 2010. While the lunar mission has been dropped, the asteroid and Mars goals were already part of NASA's long-term plans. However, the abandonment of the lunar return objective is a setback for NASA's need for a clear focus for its manned programme, and to that extent represents a major shift in US policy. As in 2004, NASA will now have to translate these aspirations into a set of goals and programmes and hope that they will not suffer the fate of their predecessors and see them abandoned by the next administration.

In the longer term, the new policy has serious implications for NASA, which faces dramatic changes. Near-Earth space utilisation activities will largely transfer to the private sector, though NASA will remain key to deep space *exploration.* Like earlier space policy revisions, the Obama administrations will ultimately be assessed not in terms of the new rhetoric or philosophical guidelines outlined for the space programme, but rather in the light of the actual budgetary commitments which would bring the vision to life. The administrations of Presidents

H W Bush and G W Bush were both strong on lofty rhetoric, but weak in terms of committing resources, so that the visions were never realised. The danger in the shift to the asteroid/Mars goal is that a similar failure to materialise will be the final result.

[697] J Garnett, "Defence Policy Making", J Baylis, K Booth, J Garnett and P Williams, *Contemporary Strategy*, 2nd edn, (New York, Holmes and Meier, 1987), p. 2.
[698] Presidential Decision Directive/NSC-49/NSTC-8, *National Space Policy,* 14 December 1996.
[699] *Vision for Space Exploration*, (The White House, 14 January, 2004).
[700] *Vision for Space Exploration*, (The White House, 14 January, 2004).
[701] *The Vision for Space Exploration*, (NASA, Washington DC, February, 2004), p. 3.
[702] US Public Law 109–155, section 501.
[703] Joan Johnson-Freese, "The New US Space Policy: A Turn Towards Militancy?", *Issues in Science and Technology*, (Winter, 2007).
[704] *National Space Policy of the United States of America*, (Washington, DC, 28 June 2010).
[705] Jonathan Amos, "Obama sets Mars goal for America", *BBC News*, 15 April 2010.
[706] Jonathan Amos, "Obama sets Mars goal for America", *BBC News*, 15 April 2010.
[707] *National Space Policy of the United States of America*, (Washington, DC, 28 June 2010).
[708] Office of Science and Technology Policy, *Issues: Technology*, http://www.ostp.gov/cs/issues/technology.
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[710] "Bush Sets Defense as a Space Priority", *Washington Post*, 18 October, 2006.
[711] Victoria Samson, "Making a Mark in Space: An Analysis of Obama's Options for a New US Space Policy", *Arms Control Today*, October, 2009. http://www.armscontrol.org/act/2009_10Samson.
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[714] "US Nixes Arms Control in New Space Policy", *Arms Control Today*, November, 2006. http://www.armscontrol.org/act/2006_11/ACSpace.
[715] *National Space Policy of the United States of America,* (Washington, DC, 28 June 2010).
[716] Obama for America, *Advancing the Frontiers of Space Exploration*, nd, www.fladems.com/page/Obama_space.pdf (17 August, 2008).