

The Fresh Frontiers of NASA

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New legislation, signed by President Obama, is set to rejuvenate NASA (National Aeronautics and Space Administration) and give it a new lease of life and fresh thinking. NASA has had many successes over the past years, including spectacular photographs of Saturn by the Cassini-Huygens probe and the exploration of the Martian landscape by the Mars Exploration Rovers, but none of them has had the same impact as did the 1966 Moon landing. People across the globe waited with anticipation as the Apollo 11 Lunar lander, the Eagle, touched down on the surface of the Moon [1,2]. This event captured the imagination of many young people and inspired them to become the next generation of astronauts and scientists. The NASA Authorisation Act 2010, signed on October 11th, will change the way that NASA conducts its missions and will pave the way for future missions that will rival Apollo in terms of its public enthusiasm [3,4].

In some ways, the Act will actually postpone the number of high-profile space missions. The Space Shuttle will be retired once it has completed its remaining launches in early 2011 and NASA's Constellation program will be terminated [5]. The Constellation program was envisaged as a way of returning astronauts to the Moon in a similar manner to the Apollo missions with very little in the way of new and innovative thinking, instead relying on older styles of technology [6]. Although this could have been as exciting as the Moon landings, it was behind schedule and severely underfunded: even with large budget increases it would have been unlikely to land astronauts on the Moon before 2030 [7-10].

The end of both Constellation and the Space Shuttle missions means that NASA will not have any craft of its own to launch crews so will be reliant on Russian craft for this purpose [7]. At first this may appear to be a bleak future for NASA but this is in fact one of the major changes introduced by the NASA authorisation act. Instead of flying its own craft to carry astronauts, NASA has \$1.3 billion to spend on developing companies that will design and build rockets and capsules for the purpose of lifting astronauts into orbit [9]. Commercial launch vehicles have been used for years to carry most of NASA's satellites into orbit but now they will be used for astronauts as well. NASA will set standards and tests for these craft to ensure that they are built to an appropriate safety standard for human use.

References

1. "Current Missions: Cassini", NASA, US Gov. [Online Newpage]. URL: http://www.nasa.gov/mission_pages/cassini/main/index.html
2. "Current Missions: Mars Exploration Rovers", NASA, US Gov. [Online Newpage]. URL: http://www.nasa.gov/mission_pages/mer/index.html
3. President Signs NASA authorization act, NASA Images, US Gov. 2010 Oct 11. URL: http://www.nasa.gov/multimedia/imagegallery/image_feature_1779.html
4. Weaver, D. "NASA Administrator Thanks President Obama and Congress for Agency's New Direction Support." NASA, US Gov. 2010 Oct 11. URL: http://www.nasa.gov/home/hqnews/2010/oct/HQ_10-255_Admistrator_President_Auth_Act_1011.html
5. Fiscal Year 2011 Budget Estimates. NASA, US Gov. [Online PDF]. 2010 Feb 1. URL: http://www.nasa.gov/pdf/420990main_FY_2011_Budget_Overview_1_Feb_2010.pdf
6. Current Missions: Constellation Program, NASA, US Gov. [Online Newpage].

In the long term, this will create a competitive market for launch vehicles suitable for humans and help to accelerate development of new designs of vehicle.

Information learned from the Constellation program will be used to aid the research and development of heavy-lift rocket systems for future missions to the Moon, Mars and beyond. This type of rocket will be able lift large craft into space and could be used for deep-space exploration, taking astronauts or probes further and faster into the solar system [11]. In addition, NASA will work with industry to create a technology development and testing program that will work on various technologies such as automated and autonomous docking, closed-loop life support systems, in-space propulsion methods and in-orbit propellant transfers [12]. NASA's budget allows for \$3.1 billion and \$7.8 billion to be spent over five years on the heavy-lift vehicles and technology development respectively [5]. It is hoped that this investment will begin to reverse the decades of underfunding in aerospace technology and ideas [7].

In anticipation of future manned missions further out in the solar system, NASA will be spending \$3 billion over five years on robotic precursor missions. These will involve sending robotic probes to locations such as the Moon, Mars and near-Earth objects such as asteroids to demonstrate new technologies and scout these locations both for hazards and for resources for future manned missions [5,7,9].

The passing of this new legislation has ended NASA's immediate ambitions to get into space and forced it to take a step back and refocus its priorities. This is a positive step because instead of rushing to recreate the Moon landings they will now have the funding and time to design safe and efficient spacecraft meaning that, when NASA does send manned missions further into the solar system, the astronauts will be well prepared for it with reliable equipment. It will be this preparation and innovation that will make future missions successful and change science-fiction fantasies into reality. Endeavours such as these are vital to ensure a continued high public profile for space programs and can only serve to inspire a new generation of scientists as to what is possible if we put our minds to it. ■

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URL: http://www.nasa.gov/mission_pages/constellation/main/index.html

7. http://www.nasa.gov/pdf/421063main_Joint_Statement-2-1.pdf

8. Bolden, C., Holdren J. P. "Launching a New Era in Space Exploration." NASA, US Gov. [Online PDF]. URL: http://www.nasa.gov/pdf/420994main_2011_Budget_Administrator_Remarks.pdf

9. Factsheet: A Bold New Approach for Space Exploration and Discovery. NASA, US Gov. [Online PDF]. URL: http://www.nasa.gov/pdf/421064main_NASA_OSTP_Joint_Fact_Sheet_FINAL_2010.pdf

10. "Remarks by Lori Garver for OSTP R & D Budget Rollout", NASA, US. Gov. [Online PDF] 2010. URL: http://www.nasa.gov/pdf/421331main_Remarks_by_Lori_Garver_for_OSTP.pdf

11. Amos, J. "Obama signs Nasa up to new future." BBC News [Online]. 11 Oct 2010. URL: <http://www.bbc.co.uk/news/science-environment-11518049>

12. Factsheet: NASA. The White House, US Gov. [Online]. 2010 Feb 1. URL: http://www.whitehouse.gov/omb/factsheet_department_nasa/