

**NASA BUDGET PROPOSALS: THE RACE TO THE BOTTOM**

Vying to outdo each other in their race to destroy the space program, the FY12 proposal outdo NASA's budget from the Obama Administration and the Republicans call for severe cuts, that would continue to make it impossible for Americans to ever get out of Earth orbit.

The Administration FY12 budget proposal freezes NASA's spending at the 2010 level of \$18.7 billion. This is \$300 million less than the FY11 Administration budget proposed last year, which was never passed. NASA, like the rest of the Federal government, is currently operating at its FY10 level through a Continuing Resolution. The Congress did pass an FY11 Authorization Act in October, which directed NASA to carry out a number of exploration programs, but that money was never appropriated.

The money that will be "saved" this year, when the Space Shuttle is retired, is allocated by the White House to increase commercial crew funding to \$850 million, which is a level that the Congress will not accept. The rest is for a \$1 billion "technology" development program, which Congress will also not go along with, because there is no serious mission in sight which would use new technology. For the Moon/Mars future, NASA has already told Congress that there is not enough money in the budget for a new heavy-lift launch vehicle for trips beyond Earth orbit, which Congress has mandated to fly by 2016.

The Republican budget proposal outdoes the White House, proposing what would be a \$578 million cut, for FY11. This is contained in their bill to fund the rest of this year, after the Continuing Resolution expires in March. In addition, the bill prohibits any funds from being used, in any way, to cooperate with the country with the world's fastest-growing space program—China.

**BRAZIL AND ARGENTINA TO BUILD NUCLEAR PLANTS TOGETHER**

Brazil and Argentina signed an agreement in late January to cooperate in building two multi-purpose research reactors—one for each country. This cooperation is "an non-renounceable common patrimony of the Brazilian-Argentine strategic association," Argentine President Cristina Fernández de Kirchner and Brazilian President Dilma Rousseff stated, explaining that the expertise that each nation has developed over the years will be brought to bear in this project, working through the Bilateral Nuclear Energy Commission (COBEN). Argentina's Atomic Energy Commission and Brazil's National Nuclear Energy Commission will work together closely in producing the research reactors.

The agreement emphasizes that cooperation in this field will have "a great impact on the development of their respective nuclear sectors." COBEN will also be instructed to continue advancing education and training of human resources, while the Permanent Argentine-Brazilian Committee on Nuclear Policy is instructed to deepen the dialogue, with bilateral and political cooperation in those areas encompassed by the bilateral nuclear agenda. Argentina and Brazil each has two nuclear reactors and one under construction;

**VERNADSKY INSTITUTE HELPS PREPARE UNMANNED MISSION TO PHOBOS**

Among the photos taken by the European Space Agency's Mars Express spacecraft in its fly-by of the Mars moon Phobos on Jan. 9, there are several that feature proposed landing sites for Russia's Phobos-Grunt mission, scheduled for launch later in 2011.

The photos, taken at a distance of 100 kilometers, show in new detail the previous and currently planned landing sites for Phobos-Grunt, which would be the first spacecraft to land on Phobos, reported Alexander Basilevsky, a member of the Phobos-Grunt team based at the Vernadsky Institute in Moscow. Using the new images, scientists can construct a high-resolution topographic map of the landing sites, which should help determine where Phobos-Grunt will ultimately touch down. That decision will take place later this year, most likely after the craft has been launched, but the new images indicate that the old landing site may be as hospitable as the new one, says Basilevsky.

The team also has selected potential landing sites on the Moon, for future Russian space missions there.

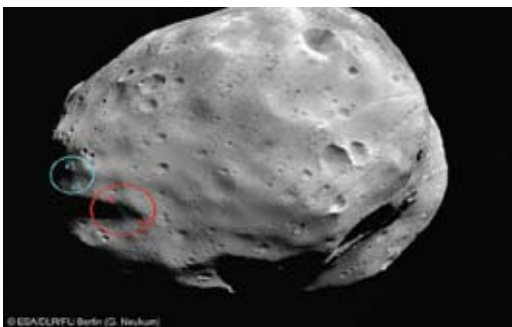
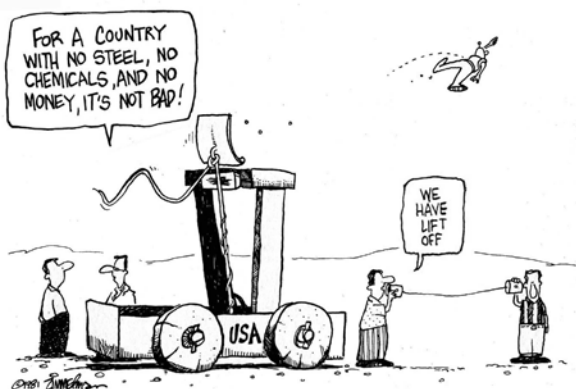


Image of Phobos (above) by Mars Express (shown here in artist's concept), taken Jan. 9, 2011, at a distance of 100 km. The ellipses mark the previously planned (red) and currently considered (blue) landing sites for the Russian Phobos-Grunt mission.



## NUCLEAR-POWERED MARS HOPPER DESIGNED BY INL TEAM

A team at the Idaho National Laboratory has designed a nuclear-powered hopper that can examine one Martian site, jump to another, and repeat, hundreds of times. "We've got a little guy that we think can hop about 15 kilometers [more than 9 miles] every five to seven days," says Steven Howe, director of the lab's Center for Space Nuclear Research. The hopper design is about as big and heavy as an adult emperor penguin and capable of travelling almost 200 times as far as the solar-powered rovers Spirit and Opportunity did in their first five years on Mars.

A single rocket launch from Earth could deploy several hoppers at once, and a few dozen hoppers could map the entire Martian surface in a few years, Howe says. Hoppers could also serve as a network of weather stations monitoring the Martian climate and could collect air, rock, and soil samples to send back to Earth.

The long-lived hoppers don't have to carry fuel with them, and they can suck up the carbon-dioxide-rich Martian atmosphere and use it as a propellant. On cue, stored heat from a radioisotope power source hits the propellant and rockets the hopper in an arc toward its next landing site. Smaller thrusts orient the hopper and soften its landing.

## AFTER STAY IN SPACE STATION, CHERRY TREE SEEDS BLOOM AND GROW

Tiny seeds from the prized Chujohime Seigan-zakura mountain cherry in Japan were sent to outer space in November 2008, to see whether it would help them to germinate, and the experiment was a success. Preservationists had been unable to cultivate more of the variety without grafting, because its seeds did not germinate. In a collaborative effort between preservationists and the Japan Aerospace Exploration Agency, about 265 Chujohime Seigan-zakura seeds were stored in the International Space station for 8 1/2 months, along with seeds from other cherry varieties.

Upon their return, some of the mountain cherry seeds produced buds, and others have shown extraordinary growth, reported *Yomiuri Shimbun* on Washington's Birthday, Feb. 22. This raises the important question of the effect of zero gravity and the cosmic radiation environment on life. Traditionally it has been thought that cosmic radiation is damaging to life, but this is an example of the opposite.

## FULL SUN NOW VISIBLE IN 3-D STEREO

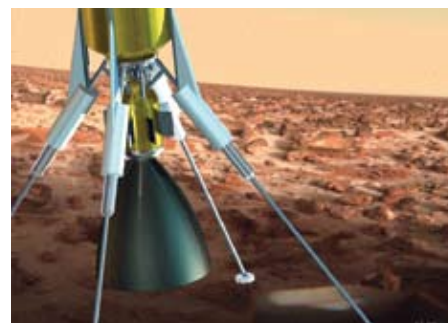
NASA's twin STEREO probes moved into position on opposite sides of the Sun on Feb. 6, and are now beaming back uninterrupted images of the entire Sun, front and back. "For the first time ever, we can watch solar activity in its full 3-dimensional glory," says Angelos Vourlidas, a member of the STEREO science team at the Naval Research Laboratory in Washington, D.C. "STEREO has revealed the Sun as it really is—a sphere of hot plasma and intricately woven magnetic fields."

Each STEREO probe photographs half of the Sun and beams the images to Earth, where researchers combine the two views to create a sphere. STEREO's telescopes are tuned to four wavelengths of extreme ultraviolet radiation, designed to trace key aspects of solar activity such as flares, tsunamis, and magnetic filaments. Now, active sunspots on the far side of the Sun, which can lead to coronal mass ejections that disrupt the Earth's power grid, will not hit as a surprise. Scientists will be able to improve space weather forecasts for airlines, power companies, satellite operators, and others.

For more information and graphics, see [http://science.nasa.gov/science-news/science-at-nasa/2011/06feb\\_fullsun/](http://science.nasa.gov/science-news/science-at-nasa/2011/06feb_fullsun/)



Idaho National Laboratory



Idaho National Laboratory

*The Mars hopper (above) would use heat from the radioisotope with a Stirling engine to generate electricity to power on-board scientific instruments and the propellant capture system. After collecting Martian rock and dust samples at the source, the hoppers could deliver them to an Earthbound rocket (top).*



Jay Friedlander/stereo.gsfc.nasa.gov

*An artist's illustration of the two STEREO (Solar Terrestrial Relations Observatory) satellites, which were launched in 2006. Prior to STEREO, astronomers could see only the side of the Sun facing Earth.*