

## NASA'S PROJECT CONSTELLATION

[Project Constellation](#) is NASA's program to design and develop spacecraft and launch vehicles to return humans to the Moon by 2020 and someday send them to Mars. President George W. Bush directed NASA to achieve those goals in his January 14, 2004 "[Vision for Space Exploration](#)" [speech](#).

On February 1, 2010 in his FY2011 budget request, President Obama revealed that he wanted to cancel this program, proposing instead to rely on the commercial sector to build new U.S. crew space transportation systems ("commercial crew") to replace the space shuttle, which will end soon. The commercial systems would take astronauts – and presumably tourists – to and from the International Space Station (ISS) or other low Earth orbit (LEO) destinations. On April 15, 2010, the President added instead of sending astronauts back to the Moon by 2020, he wanted to send them to an asteroid by 2025. Approximately \$9 billion had been spent on Constellation at that time and \$2.5 billion was requested for termination costs.

The President's decision followed a review by a blue-ribbon committee chaired by Norman Augustine whose October 2009 [report](#) stated that Constellation was "not viable" under the President's FY2010 budget plan. Congress included language in [NASA's FY2010 funding bill](#) that does not permit any changes to Constellation until Congress passes another appropriations bill allowing such action.

Congress passed the 2010 NASA Authorization Act and the President signed it into law on October 11, 2010. That bill adopts some, but not all, of the President's proposal. Congress still has not passed an appropriations bill that allows NASA to terminate Constellation, however, so the program is still underway and the talk now is of "restructuring" rather than cancelling it.

All 10 NASA field centers are involved in Constellation; the Constellation Program Office is at NASA's [Johnson Space Center](#) (JSC), Houston, TX. The program was designed to build the –

### **[Ares I and Ares V](#) launch vehicles (including an Earth departure stage for Ares V)**

Ares I is derived from the four-segment Solid Rocket Boosters (SRBs) used today for NASA's [space shuttle](#) system. Ares I would use a five-segment SRB as its first stage, plus a new second ("upper") stage on top that is based on the J2-X engine that traces its roots to Apollo's [Saturn V](#) rocket. Its main purpose is to launch the Orion spacecraft to LEO. A successful test of the Ares I first stage took place in September 2009. Ares V would be much more capable, able to take 414,000 pounds to LEO or 157,000 pounds to the Moon. The Ares Projects Office is at [NASA's Marshall Space Flight Center](#), Huntsville, AL. Ares 1 prime contractors: [ATK Launch Systems](#) for SRBs; [Pratt & Whitney Rocketdyne](#) for the J2-X engines; [Boeing](#) for manufacture and assembly of the upper stage and avionics integration and checkout.

### **[Orion](#) spacecraft to take astronauts to and from Earth orbit and lunar orbit**

Orion is similar in appearance to an Apollo capsule although it would carry four crew members rather than three. Launched atop the Ares I, it initially would be used to take astronauts to and from the ISS. Later Orion spacecraft would take crews to and from lunar orbit and, paired with Altair, allow astronauts to live and work on the lunar surface. Prime contractor: [Lockheed Martin](#).

### **[Altair](#) lunar lander**

Altair would be launched into Earth orbit by the Ares V where it and the Ares V Earth departure stage would dock with an Orion spacecraft that would be launched separately. The combined spacecraft would take astronauts to the Moon. Orion would remain in lunar orbit while Altair takes astronauts to and from the lunar surface and houses them on the lunar surface. A prime contractor was never selected.