

Constellation Program FY 2010 Planned Events

(As of March 4, 2010)



- NOTE: NASA is continuing to execute the FY 2010 baseline program. However, it is possible that changes could happen due to efforts by the Agency to fit within the constraints imposed by the FY 2010 budget. Please see response to Question 2 for more information.

Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Programmatic Reviews								
	▲ 3/3 CxTF PDR Kick off		▲ 5/13 Ares US FSW PDR2 Board					
	▲ 3/4-5 Cx PDR Board			▲ 6/2 u/r GO PDR Board				
		▲ 4/6-7 GO PDR Kickoff			▲ 7/9 MO PDR			
		▲ 4/12 Orion Software PDR Board			▲ Jul – Ares I Interim CDR			
Development Events								
	● 2/11 Orion Parachute Drop Test @ Yuma Proving Grounds							
	● 2/25-2/26 EVA Prime IBR/EVA CSSSS ATP2						Sep Ares I FS DM-2 Test ●	
	● 3/2-18 Orion PA-1 LAS Softmate/Phasing Test						Sep CM GTA AIT Complete u/r ●	
	● 3/17 Orion ACM DM-2 Test (Elkton, MD)							
	● 3/23-24 Orion PA-1 Pre-FTRR @ WMSR							
		● 4/1 Orion PA-1 FTRR @ JSC u/r					Sep – EVA Suit PDR ●	
		● 4/14 Ares FS Drogue Parachute Drop Test @ Yuma						
		● 4/15 Orion STORRM DTO FRR						
			● May Orion PA-1 Launch @ White sands u/r					
			● 5/11-5/13 GO IBR u/r					

ATP – Authority to Proceed
 CDR – Critical Design Review
 CLIN – Contract Line Item Number
 Cx – Constellation

CxTF – Constellation Training Facility
 DDT&E – Design, Development, Test & Evaluation
 EGLS – Exploration Ground Launch System
 EVA – Extravehicular Activity

FS – First Stage
 FSW – Flight Software
 GO – Ground Operations
 IBR – Integrated Baseline Review

MO – Mission Operations
 PDR – Preliminary Design Review
 US – Upper Stage

Constellation Program Major Acquisitions



Project	Description
Orion	Orion Contract Award: 31 Aug 2006
Ares I	J-2X Contract Award (PWR): 16 Jul 2007
	1 st Stage Contract Award (ATK): 10 Aug 2007
	Upper Stage Production Contract Award (Boeing): 28 Aug 2007
	Instrument Unit Avionics Production Contract Award: 12 Dec 2007
EVA	Space Suit Systems Contract Award: 26 Feb 2010 (Definitized)
Ground Ops	Mobile Launcher contract Award (Hensel-Phelps): 8 May 2008
	Ground Support Equipment IDIQ Contract Award (Multiple): 6 Jun 2008
Lunar Surface Systems	Concept Development Broad Area Announcement (BAA) Contract Awards (Multiple): 28 Jul 2008
	<i>Concept Development Outbrief: 25-27 Feb 2009</i>

Achievements of NASA's Constellation Program

The following are some of the Orion Project's key achievements:

- The Orion PDR was conducted during the summer of 2009, and completed in August 2009. The PDR was an extensive review of Orion's detailed subsystems and integrated systems designs to date. The PDR board unanimously recommended proceeding with detailed designs toward Critical Design Review (CDR) in February 2011.
- In 2009, NASA conducted preliminary capsule recovery tests at both the Navy's Carderock facility in Maryland and in the ocean near Kennedy Space Center (KSC) in Florida. Using a mockup of the Orion capsule, these Post-landing Orion Recover Tests involved search and rescue teams simulating stabilization and recovery of the Orion capsule in a variety of sea state conditions. Results were intended to lead to design features for both the spacecraft and recovery equipment, as well as contributing to development of the final recovery procedures.
- Fabrication of the Orion Ground Test Article crew module is progressing at the Michoud Assembly Facility in Louisiana. Completion is estimated for the fall of 2010, followed by completion of the service module and launch abort system ground test article, currently scheduled for 2011. NASA is using a friction stir welding technique on this ground test article, and is hoping to demonstrate the longest continuous friction stir weld ever attempted.
- In May 2010, NASA plans to perform its first developmental test of the Orion Launch Abort System (LAS) at the White Sands Missile Range, New Mexico. Orion's Launch Abort System (LAS) includes three newly designed solid rocket motors: 1) abort motor, 2) jettison motor, and 3) attitude control motor. All of these motors have been successfully demonstrated in static firings on the ground. The next step is the Pad Abort-1 test, which will be the first integrated firing of all three motors in a real flight environment.

The following are some of the Ares I Project's key achievements:

- Having completed its PDR in 2008, the Ares I Project is now working toward its CDR, which is scheduled for September 2011.
- In September 2009, NASA and ATK conducted the first successful test of the Ares I's five-segment development motor in Promontory, Utah. Beyond validating the basic performance characteristics of the stage, the test has enhanced modeling and understanding of key attributes that have historically been very difficult to predict analytically such as erosive burning, thrust oscillations and thrust tail off. The next static test, DM-2, is currently scheduled for September 2010.
- In October 2009, the Ares I-X test flight took place at Kennedy Space Center in Florida. Data from more than 700 on-board sensors showed that the vehicle was effectively controlled and stable in flight. Thrust oscillation frequencies and magnitude data from the Ares I-X flight also were consistent with measurements from recent Shuttle flights that were instrumented, leading us to conclude that the oscillation vibration on the Ares I would be within the bounds that the Ares I is currently being designed to. In the end, this test flight provided tremendous insight into the aerodynamic, acoustic, structural, vibration, and thermal forces that Ares I would be expected to experience.
- J-2X Test Hardware Status: Having passed its CDR in 2008, development and verification testing at the component and subsystem level continues. Current planning includes a fully assembled engine, minus the full nozzle extension, to be available the end of calendar year 2010,

followed by receipt of an additional developmental engine in 2011. Static fire testing for engines is currently slated to begin in the February-March 2011 time frame.

The following are some of the recent infrastructure achievements for the Constellation Program:

- The Operations and Checkout building at KSC was completed in January 2009, marking activation of High Bay Facility. When outfitted, the O&C will support final assembly of the Orion spacecraft.
- The final 600-foot Lightning Protection Tower at KSC's Pad B was completed in February 2009. This was where the Ares I-X test flight launched from in October 2009.
- Workers at KSC topped out the tenth and final segment of the new mobile launcher (ML) after it was lifted by crane and lowered onto the ninth segment in January 2010. When completed, the tower will be 345 feet tall and have multiple platforms for personnel access. Its base was made lighter than Space Shuttle mobile launcher platforms so the crawler-transporter can pick up the heavier load of the tower and a taller rocket.
- A-3 Test Stand at Stennis Space Center in Mississippi: Construction of the long-duration altitude test stand for the J-2X engine is nearly 75 percent complete. When completed in 2012, the A-3 facility will provide a unique critical capability to simulate environments at greater than 100,000 ft altitude necessary to demonstrate altitude starting and perform full-duration hot-fire testing.
- Space Environmental Test Facility (SET) at Glenn Research Center's Plum Brook Station in Ohio: Construction started in 2007 and is about 75 percent complete. SET is planned for conducting qualification testing of the fully integrated Orion spacecraft, including vibration, acoustics, and EMI testing.