Abstract: Ares I-X Overview

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The Ares I-X flight test is the first development flight of the Ares I crew launch vehicle. This mission, first conceived in 2006, will be launching later in 2009. Its primary mission objectives will be to demonstrate flight and roll control of a dynamically similar vehicle, perform a separation event and measure its shock effects, stack and recover a first stage booster, and demonstrate ground operations. All of the primary flight test vehicle's hardware is at Kennedy Space Center, and is being stacked in the Vehicle Assembly Building for a liftoff at Launch Complex 39B. Mission hardware specific to Ares I-X also is being installed at Launch Complex 39, which has been supporting Space Shuttle operations. This presentation will provide a status and preview of the upcoming mission.

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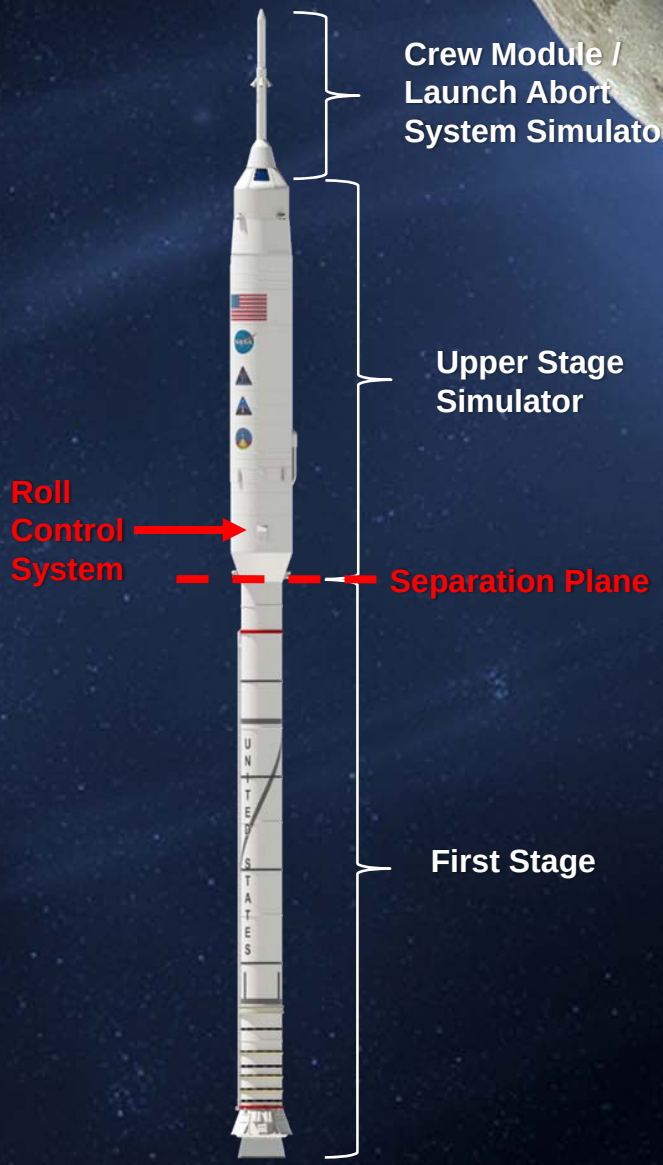
Ares I-X Overview

Mission Overview

- **First development flight test of Ares I crew launch vehicle**
  - **Demonstrate control of a dynamically similar, integrated Ares I/Orion**, using Ares I relevant ascent control algorithms
  - **Perform an in-flight separation/staging event** between a Ares I-similar first stage and a representative upper stage
  - **Demonstrate assembly and recovery** of a new Ares I-like first stage element at KSC
  - **Demonstrate first stage separation sequencing**, and quantify first stage atmospheric entry dynamics, and parachute performance
  - **Characterize magnitude of integrated vehicle roll torque** throughout first stage flight
- **Ares I-X is an uncrewed, suborbital development flight test**
- **Ares I-X will provide opportunity to test ground facilities and operations at NASA's Kennedy Space Center**



Mission Profile

Vehicle Height:	327 feet
Weight at Ignition:	1.8 M-lbm
Max. Acceleration:	2.5 g's
Max. Speed:	Mach 4.7

~ 150,000 feet

P2) Perform in-flight separation/staging event

P4) Demonstrate FS entry dynamics and sequencing of events (parachute deployment, etc.)

P5) Characterize integrated vehicle roll torque

in-flight separation plane

P1) Demonstrate controllability

USS/CM/LAS Uncontrolled descent and impact

P3) Demonstrate assembly and recovery of an Ares I similar FS

Booster parachutes and recovery

Flight Test Vehicle

- **First Stage:** Motor from Space Shuttle inventory delivered to Kennedy Space Center (KSC) in March 2009. Aft skirt and forward structures completed in May 2009. Turned over to System/Ground Operations in June 2009
- **Upper Stage Simulator (USS):** Hardware completed and delivered to KSC in November 2008
- **Roll Control System (RoCS):** Modules A and B delivered to KSC April 2009. Installed in the USS interstage
- **Avionics:** Sensor, harnesses, airborne avionics boxes, and support ground subsystems delivered to KSC except for inertial navigation unit (INU). INU in test
- **Crew Module/Launch Abort System Simulator:** Hardware completed and delivered to KSC in January 2009

Ground Elements

- **Ground Operations:** Operational Readiness Reviews November 2008 – August 2009. Stacking of full vehicle in the KSC Vehicle Assembly Building (VAB) started in July 2009
- **Ground Systems:** Launch Pad modification to be complete August 2009
- **Launch** scheduled for October 31, 2009

NASA Artist's Rendering

Mission Milestones

- Mission planning begun in 2006
- Critical Design Review completed in 2008
- Vehicle hardware delivered to KSC in 2009
- Vehicle stacking completed in August
- Roll out to pad October 29
- Launch October 31
- Final mission report due January 31