

NAC Space Operations Committee

April 19, 2007

Current Status of Shuttle Operations

- The NASA Space Operations Mission Directorate (SOMD) is truly living in “interesting times.” Scheduling and preparations are always a challenge – now more than ever.
 - Very localized hailstorm, which damaged the External Tank, is the cause of the present delay of STS-117.
 - The discussion of the damage and the repair plan convinces me that, although the damage is extensive, all of the damage spots are within past experience – where fixes were successful.

Shared Shuttle and Ares I-X Operations at Pad B

- We spent much of our time examining the shift from Shuttle launches to the Ares I (including the first test flight, Ares I-X) and eventually the Ares V program.
- We reviewed Ground Operations and scaled the heights of Launch Pad 39B, including climbing all over the launch tower and launch platform.
 - Pad B will be the site of the first Ares vehicle launch, including Ares I-X which is scheduled for April 2009
 - Key timing issue is need to maintain Pad B in parallel for potential launch on need (LON) to support Hubble Space Telescope (HST) servicing mission in August 2008
 - the HST servicing mission will require a second Shuttle to be standing by on Pad B in case a LON flight is needed.
 - timeframe for HST LON mission: 3.5 days for call-up + 7 days for countdown
 - if this second Shuttle is not needed for HST LON, it will be rolled to Pad A for a future ISS mission, and Ares I mods to Pad B will go full speed



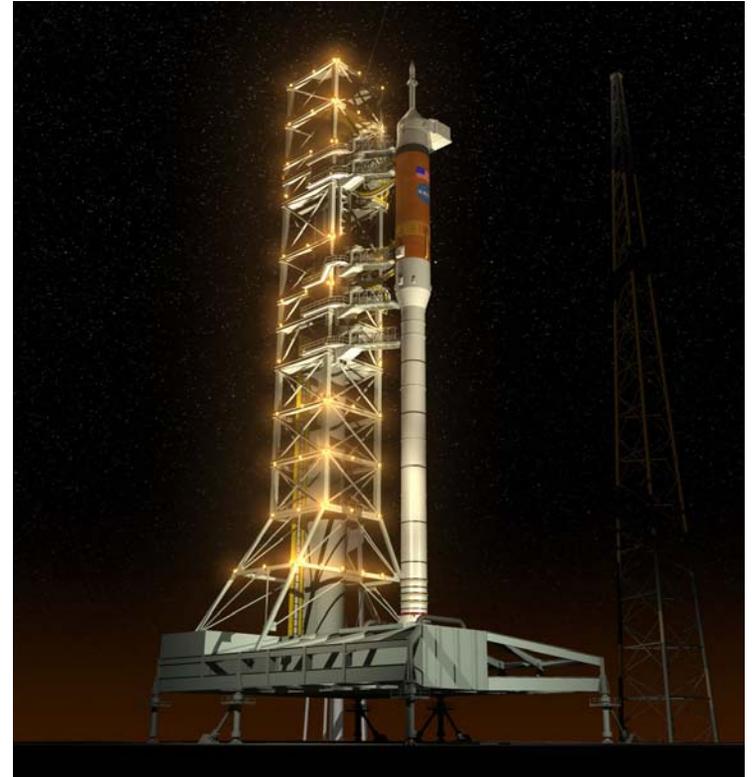
Pad B with Rotating Service Structure (RSS) surrounding the Orbiter.



Artist's rendition of Pad B in Ares I-X configuration, circa April 2009

Pad B Modifications

- The Committee received an outstanding brief and discussion during the Pad B walkdown from Billy Stover, Ground Systems Manager for KSC Launch Facilities.
- The brief included charts showing the planned new configuration for Pad B Ares I operations.
- The Committee got an excellent feel for how the new launch capability uses the integrated experience of Apollo, Shuttle, and all past launch operations.
 - challenge is to simplify launch prep and to decrease “touch labor” by a substantial factor
 - e.g., plans are to minimize preparation time of launch system (from rollout from the Vehicle Assembly Building VAB to the pad, then to launch) down to only 7 days.



Artist's rendition of Ares 1/ Orion vehicle on Pad B, circa 2016.

Pad B Modifications (continued)

- Areas for special attention include:
 - Being sure that the high-aspect ratio Ares I launch vehicle can withstand wind loads during that shorter (7 day) period.
 - plans for bracing and dampening
 - Lightning protection. Three towers will be erected and catenary cabling strung between them forming a triangle, with the Ares I launch vehicle in the center. This approach, used at the Titan complex, should substantially raise the level of lightning protection.



Titan launching through lightning towers at Launch Complex 40.



Ares 1 / Orion vehicle on Pad B with new Mobile Launch Platform and lightning towers, circa 2016.

Safety and Crew Rescue Modifications at Pad B

- **There is a new approach to crew rescue.**
 - Pad abort capability for the Orion vehicle using a launch abort system (“escape tower”)
 - Rail-based crew egress capability (affectionately called the “roller coaster”) which is much faster than current cable-based, “basket” ride-out system
- **New approach to hold-down post system; elimination of pyrotechnic nuts**
- **Our Committee is fortunate to include two former astronauts who are carefully attuned to these improvements and are excited about them.**

Human Capital Transition

- **Transition planning going well for Ground Support and KSC operations**
- **Better definition of technology future is needed.**

Medium Launch Vehicle Capabilities

- Continued availability of launch systems in the medium-lift range is a serious problem.
- NAC Exploration Committee is taking lead role, but Science Committee also depends greatly on this class of launch vehicles (and will for the foreseeable future).
- Foreign launch suppliers appear to be dominant in this lift class, especially for commercial launches.
- Alternatives for the U.S. are going to be quite expensive unless alternative launch providers (ALPs) can emerge.
- There are solutions, of course, but with the familiar trade-off between potentially lower-cost solutions/higher-risk and higher cost/lower-risk capabilities.

Medium Lift Vehicle Capabilities (continued)

- **Time may be most important ingredient.**
 - U.S. ALPs have not been focused on these missions, but that could change.
 - No need for a final decision today since Delta II vehicles are available through 2009
- **The NAC lead for addressing this challenge is appropriately with the Exploration Committee**



Mars Exploration Rover Spirit on a Delta II 7925 awaiting launch.