

## STS-118 Post-Mission Summary



Weather impacted the STS-118 mission, although not on the actual launch and landing days. Originally scheduled for launch on August 7, numerous showers and thunderstorms at the Kennedy Space Center (KSC) on the days prior to *Endeavour's* launch contributed to work delays on a leaky positive pressure relief valve on board the orbiter. Space Shuttle *Endeavour* lifted off from Pad 39A at 2236 UTC on August 8, 2007. This was *Endeavour's* first flight since November 2002. *Endeavour* docked with the International Space Station delivering supplies and a new truss for the right side of the station. Four space walks occurred during the mission. In addition, Mission Specialist Barbara Morgan flew 22 years after being selected as the backup in the Teacher in Space Project. Powerful hurricane Dean formed in Atlantic while *Endeavour* was in orbit. At one point Houston and Mission Control Center (MCC) were within the margin of error for the forecast track of Dean. If Dean would have taken aim at Houston the MCC would have been preparing for a landing while the Houston and surrounding communities would have been under evacuation orders. Because of the long lead times required for hurricane evacuation and Space Shuttle operations planning NASA mission managers decided to shorten *Endeavour's* flight by one day. *Endeavour* landed one day earlier than planned at the Kennedy Space Center Shuttle Landing Facility at 1632 UTC on August 21, 2007.

A large high pressure center located over the southeastern US brought favorable weather conditions for launch. Weather at all three Transoceanic Abort Landing (TAL) was observed GO for launch as was RTLS weather. Launch was shortly before sunset in Florida providing a dazzling view of noctilucent clouds induced by *Endeavour's* launch plume. Similar clouds had been observed following the STS-117 launch in June and the Phoenix Mars unmanned launch on August 4, 2007.

Spaceflight Meteorology Group (SMG) lead forecaster Tim Garner provided launch abort forecasts and analysis to the Houston flight control team for the Return-to-Launch-Site (RTLS) at the KSC Shuttle Landing Facility; the Abort-Once-Around sites of KSC and White Sands Space Harbor, New Mexico; and the 3rd Rev Primary Landing Site of Edwards Air Force Base, California. STS-118 Assistant Lead/TAL forecaster, Richard Lafosse issued weather forecasts for the Transoceanic Abort Landing (TAL) sites at Zaragoza, Spain; Moron, Spain; and Istres, France. Techniques Development Unit

meteorologist Brian Hoeth issued upper air forecasts for launch and RTLS, monitored weather computing systems, provided graphics support and general forecast aid.

Tropical Depression #4 formed in the far eastern Atlantic on August 13 becoming Hurricane Dean the morning of August 16. Dean continued westward across the Atlantic entering the Caribbean on August 17. Later that afternoon Houston and the MCC were located in the official National Hurricane Center's margin for error of the 5-day forecast.



**Figure 1. SMG STS-118 Lead Forecaster Tim Garner (standing) and forecaster Mark Wiley discuss launch weather conditions prior to briefing the flight control team .**

With landing scheduled only five days later at KSC, the possibility of the MCC controlling a Space Shuttle while local communities near Houston and Galveston evacuated became a real concern. NASA mission managers decided to shorten the STS-118 mission by one day to avoid any complications caused by Hurricane Dean. Dean subsequently moved west northwestward across the Yucatan peninsula. During one of the scheduled space walks the Space Shuttle and International Space Station flew over Hurricane Dean (Figure 2) prompting astronauts Clay Anderson and Dave Williams to comment upon the storm while installing tethers on the solar array truss: “Oh wow! Ooo man, can’t miss that!”

Weather for the August 21 landing was forecast “GO” although winds were expected to be just below the crosswind limit of 15 kts. Since Hurricane Dean was no longer considered a threat to the Texas coastline, KSC only was considered for landing on August 21. Drogue chutes used to slow the Space Shuttle’s speed after landing were in an attempt to gain data needed for a detailed test objective concerning high crosswind landings. It is believed crosswinds were not high enough to meet test objectives.

*Endeavour* touched down at 1632 UTC under a few clouds at the KSC Shuttle Landing Facility concluding the 119th Space Shuttle mission.

The next Space Shuttle mission is tentatively scheduled for liftoff on October 23, 2007.



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**Figure 2. Hurricane Dean as seen from the STS-118 mission on August 18, 2007. Photo courtesy NASA.**