## **STS-117 Post-Mission Summary**



The Shuttle Atlantis launched from Kennedy Space Center (KSC) Launch Pad 39A on June 8, 2007 at 2338Z and landed at Edwards Air Force Base on June 22, 2007 at 1949Z. Commander Rick Sturckow and the STS-117 crew successfully delivered Expedition 15 crew member Clay Anderson to the International Space Station and installed an additional truss and solar arrays on the Space Station. Weather had significant impacts to the mission including a rollback to the Vehicle Assembly Building following hail damage to the vehicle and four waveoffs for landing attempts at KSC. Following the unsuccessful landing attempts at KSC on June 21st, an on-orbit burn was performed to provide an additional opportunity at Edwards to try and avoid the potential for gusty afternoon winds.

Atlantis was originally rolled out to the pad on February 15th, 2007. However, a hail storm on February 26th produced damage to the external tank. The vehicle was rolled back to the vehicle assembly building to perform repairs. Atlantis was then rolled back out to Pad 39A on May 15th to complete preparations for a June 8th launch attempt.

Launch proceeded smoothly on June 8th with no weather flight rule violations forecast for KSC. Rain showers moved briefly within flight rule limits during the final countdown but were never a threat to scrub the launch. After closely monitoring the potential for low clouds and fog using Meteosat satellite imagery and weather reconnaissance reports, SMG forecast Istres, France GO for launch. Light showers developed within flight rule limits at Zaragoza, Spain about 1-hour prior to launch. However, analysis of Spanish radar images and weather reconnaissance reports allowed SMG to update the Zaragoza forecast to GO 15 minutes prior to launch giving the crew and Flight Director two possible TAL sites in the event of a launch abort. The launch produced a beautiful launch plume in the evening sunlight - a scene captured by several photographs.

End-of-mission was set for June 21st after Mission Managers extended the mission for 2-days to perform repairs to the thermal blankets surrounding the Orbital Maneuvering System (OMS) pods and complete other on-orbit activities. KSC was the only CONUS landing site called up for the first days landing opportunities.

Weather on the 21st provided little opportunity to land at KSC. A weak low pressure area was slowly moving south-southeast across northern Florida. The low produced cloud ceilings below flight rule limits and the threat of showers and thunderstorms. SMG forecast both landing opportunities NO-GO throughout the morning. In addition, forecasters predicted thunderstorms would develop by the 2nd opportunity. Although initially acceptable, ceilings quickly deteriorated to below flight rule limits. Rain showers also began developing within flight rule limits and moving across the Shuttle Landing Facility and through the orbiter's planned flight path. Weather reconnaissance did not find the conditions any different than depicted by the weather radar and satellite images. Flight Director Norm Knight then decided to wave off the

landing opportunities and bring up both KSC and Edwards Air Force Base as potential landing sites for the landing opportunities on Friday June 22nd. In addition, the Flight Control Team performed a "burn" to alter the orbit in order to provide a 3rd, earlier opportunity at Edwards to try and avoid the potential for gusty afternoon surface winds.

The low pressure area producing the low clouds and enhanced showers had moved to a location northeast of KSC by Friday morning. However, a trough from the low extended southwest in the vicinity of KSC producing an area of convergence over the landing site. In addition, a sea breeze was forecast to develop enhancing the potential for lift as daytime heating occurred. Morning upper air soundings indicated the presence of some low level stability that might slow down convective development enough to allow a chance for landing. As the landing preparations continued, the southwest surface winds impeded the movement of the sea breeze developing south of the Shuttle Landing Facility while showers and low ceilings occurred in the northeasterly flow predominant to the west and north of the landing site. The cloud tops of the rain showers slowly grew in altitude throughout the landing countdown as daytime heating occurred. In addition, the showers produced outflow boundaries that moved within 10 miles of the Shuttle Landing Facility providing an additional boundary to focus convective development. Although weather reconnaissance reports indicated that the conditions immediately over the Shuttle Landing Facility might be acceptable, SMG's forecast remained NO-GO and the Flight Director determined that the conditions in the vicinity of KSC were too unstable. Edwards first opportunity was then chosen for the de-orbit burn and landing. Edwards first opportunity had been forecast GO although peak winds above flight rule limits were forecast to develop for the third Edwards landing opportunity. The landing was uneventful with surface winds peaking to only 6 knots and a thin, broken cloud deck at 30,000 feet. The landing was the 51st at Edwards and the 18th when a planned KSC landing had to be diverted to Edwards.

<u>SMG's</u> ascent/entry team for STS-117 consisted of meteorologists Tim Oram (Lead/CONUS), Tim Garner (Assistant Lead/TAL), Doris Hood (TDU), and Steve Early (TDU-Trainee).

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