STS-122 Post Mission Summary

The Space Shuttle Atlantis was launched from Kennedy Space Center (KSC) Launch Pad 39A on February 7, 2008 at 1945 UTC and landed at KSC on February 20, 2008 at 1407 UTC. Commander Stephen Frick and the STS-122 crew successfully delivered Expedition 16 crew member Leopold Eyharts to the International Space Station (ISS) and installed the European Space Agency's (ESA) Columbus Laboratory module to the ISS. Max Walheim participated in three space walks and Stanley Love performed two space walks. During the first two spacewalks they installed and outfitted the Columbus laboratory. ESA astronaut Hans Schlegel participated in one spacewalk to outfit Columbus and complete additional maintenance to the ISS. The third space walk was used to install station components and remove a faulty gyro from the ISS.

Weather was a significant factor on launch day. Rain showers, thunderstorms, cloud ceilings, and crosswinds were the forecast challenges. Weather conditions on landing day were nearly ideal.

Atlantis was originally rolled out to the Launch Pad 39A in November 2007 for a scheduled launch date of December 6, 2007. Faulty Engine Cutoff (ECO) readings resulted in a launch scrub. The Mission Management Team (MMT) decided to try tanking again and a second launch attempt was scheduled for December 9, 2007. The second launch attempt was scrubbed due to continuing problems with the ECO sensors. The subsequent testing and repairs to the ECO gave a new launch attempt date no earlier than January 10, 2008. After extensive testing and repair work to the ECO sensors and external tank, the launch of STS-122 occurred on February 7, 2008.

Launch proceeded smoothly on February 7th with no technical issues. The primary weather feature affecting the Return-to-Launch Site (RTLS) weather was a cold front that stalled over central Florida early on launch day. The Spaceflight Meteorology Group (SMG) RTLS forecast for KSC included flight rule violations for low cloud ceilings, crosswinds greater than 15 knots, and thunderstorms within 20 nautical miles. The stalled cold front began to drift north during the late morning hours, leaving KSC in a warm and unstable airmass. Cumulus clouds began developing in organized convective rolls by 1800 UTC, and radar imagery showed areas of showers developing 50 to 60 NM

south and southwest of KSC. At 1840 UTC, a line of stronger showers formed 40 to 45 NM west of KSC. SMG predicted these showers would be approaching the 20 NM standoff distance by the (2010 UTC) RTLS landing time. At 1900 UTC, SMG updated the NO GO forecast to GO by removing the ceiling and thunderstorm flight rule violations. The peak wind forecast was for a 16 knot crosswind. Weather Flight Rules allow for the 15 knot RTLS crosswind limit to be raised to 17 knots based on aircraft reconnaissance and pilot assessments of aircraft handling qualities. The weather aircraft reported that crosswinds were manageable; therefore, per the rules, the RTLS crosswind limit was adjusted to 17 knots.

Pre-launch, NASA Flight Directors had been briefed that moderate showers would be near the edge of the 20 NM radius from the Shuttle Landing Facility at RTLS landing time (2010 UTC). At launch time (1945 UTC), the WSR-88D radar showed a moderate to heavy rain shower (45 dBZ max. reflectivity) 18 NM northwest of KSC (fig.1). Since both approaches to Runway 33 had a 10 NM or greater distance from this shower, the KSC landing site was considered "GO" at launch time. At (2010 UTC) RTLS time, a rain shower was 18 NM north of KSC and a thunderstorm was 19 NM northwest of KSC (fig. 2). Therefore, the KSC landing site was considered to be NO GO at RTLS landing time. Post-launch, Flight Directors noted that these shower and thunderstorm locations provided two acceptable approaches to RWY 33 for RTLS, if a Return-to-Launch Site landing had been required.

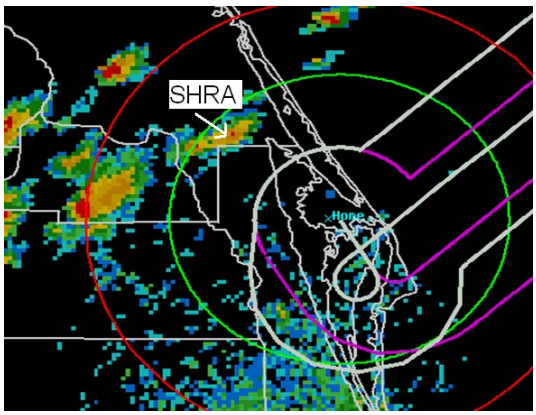

Fig 1 KMLB radar 1947 UTC

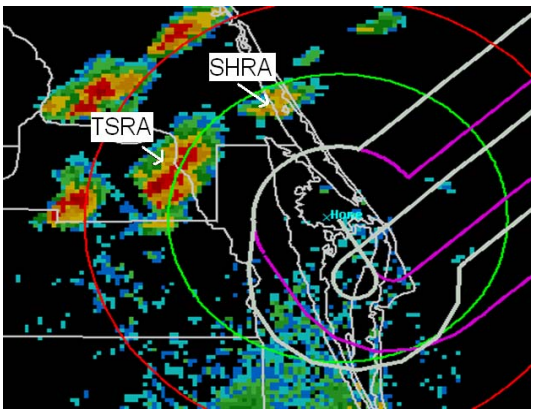

Fig 2 KMLB radar 2012 UTC

Weather for the Transoceanic Abort Landing (TAL) sites during launch was benign. High pressure at the surface and aloft produced clear skies and light winds for Moron, Spain, Zaragoza, Spain, and Istres, France. All three TAL sites were forecast GO throughout the launch count.

Both KSC and Edwards Air Force Base were activated on February 20th, 2008 as possible landing sites for STS-122. Activating multiple sites on the first landing day is unusual.

This was done in part to accommodate the U. S. Dept. of Defense's attempts to intercept a failed satellite in degraded orbit. Atlantis touched down at 1407 UTC under a broken cloud deck at 12,000 feet at the KSC Shuttle Landing Facility. This cloud ceiling was well above the Shuttle landing flight rule limit of 8,000 feet.

For this 121st Shuttle mission, Spaceflight Meteorology Group (SMG) lead forecaster Kurt Van Speybroeck and Tim Oram provided launch abort forecasts and analysis to the Mission Control Center STS-122 Assistant Lead/TAL forecaster Tim Garner issued weather forecasts for the Transoceanic Abort Landing (TAL) sites at Zaragoza, Spain; Moron, Spain; and Istres, France. Techniques Development Unit meteorologist Doris Hood issued upper air forecasts for launch and RTLS, monitored weather computing systems, provided graphics support and general forecast aid.

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