

HUMAN SPACE ENDEAVOURS SYMPOSIUM (B3)
How Can We Best Apply Our Experience to Future Human Missions? (2)

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THE LASER CAMERA SYSTEM ON THE SPACE SHUTTLE: EXPERIENCES AND
RECOMMENDATIONS FOR THE FUTURE

Abstract

Following the recommendations of the Columbia Accident Investigation Board in 2003, the Laser Camera System (LCS) flew as a component of the Orbiter Boom Sensor System (OBSS) on all Shuttle missions including and subsequent to STS-114 Return-to-Flight. As the primary sensor for on-orbit focused-inspection activities, it was tasked with providing high-resolution three-dimensional scans and measurements of possible damage sites on the Space Shuttle Thermal Protection System. Additionally, it provided imaging, observation, and measurement functions for secondary tasks as required or requested. As the Shuttle program draws to a close, we report on the history and summarize the outcomes of the usage of the LCS in the Space Shuttle program. We outline each particular mission involvement and draw on experiences of the management, analysis, or operations crew of the LCS team in treating standard operations as well as any out-of-spec operational situations, highlighting outcomes as well as any required fixes, modifications, upgrades, or workarounds. We summarize the performance of LCS in the Space Shuttle program, and report on any outstanding or remaining issues. Finally, we provide a vision for LCS capability on future missions with inspection requirements, whether for the purposes of mission operations or improved safety of crew or equipment, and we suggest directions for future hybrid sensors combining situational awareness, inspection, automated rendezvous and docking, and high-bandwidth communication.