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LAUNCHING AND DEPLOYING THE JAMES WEBB SPACE TELESCOPE

Abstract

On December 25, 201 at 12:30 UTC, the James Webb Telescope lifted off and onward to its destination in orbit at the second Lagrange point. With more than two decades in development, and an international collaboration between NASA, CSA, and ESA, Webb is one of the most anticipated science mission launches ever. After a dramatic and flawless launch, Webb's toughest and riskiest days lie ahead. Unprecedented in its complexity and ambition, Webb would undergo the most complex on-orbit deployment sequence ever attempted, with any single deployment anomaly carrying the risk of full mission failure. An exquisite design, years of ground testing, a exhaustively trained and rehearsed operations and engineering team, and an unprecedented level of contingency planning, all resulted in a fully and successfully deployed Webb observatory, on its way to L2, and nominally cooling to its cryogenic temperatures. Although Webb still had five more months of commissioning left, there was a collective sigh of relief heard round the world.

This incredible achievement was not by chance but was years in the making. We go behind the scenes of Webb's first month on orbit, starting with the unique and challenging launch itself, the time critically of its mid-course corrections, and the day by day timeline of each deployment, focusing on the hundreds of steps to unfurl and tension the large multi-layer sunshield. We discuss what went better than planned and how years of robust and detailed contingency planning were applied to unanticipated events and on-orbit spacecraft behavior. Overall observatory performance to date is also presented along with operational and team lessons learned. And finally, we provide a status and summary of the remaining commissioning steps.