

SPACE EXPLORATION SYMPOSIUM (A3)
Mars Exploration – Part 1 (3A)

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CURIOSITY: THE MARS SCIENCE LABORATORY MISSION

Abstract

The Curiosity rover is scheduled to land in Gale Crater, Mars on August 5, 2012. This event will be a dramatic high point in the decade long effort to design, build, test and fly the most sophisticated scientific vehicle ever sent to Mars. The real achievements of the mission will only have just begun, however, as Curiosity starts searching for signs that Mars once possessed habitable environments. The Mars Science Laboratory Project has been one of the most ambitious and challenging planetary projects that NASA has undertaken. It started in the successful aftermath of the 2003 Mars Exploration Rover project and was designed to take significant steps forward in both engineering and scientific capabilities. This included a new landing system capable of emplacing a large mobile vehicle over a wide range of potential landing sites, advanced sample acquisition and handling capabilities that can retrieve samples from both rocks and soil, and a high reliability avionics suite that is designed to permit long duration surface operations. It also includes a set of ten sophisticated scientific instruments that will investigate both the geological context of the landing site plus analyze samples to understand the chemical organic composition of rocks soil found there. The Gale Crater site has been specifically selected as a promising location where ancient habitable environments may have existed and for which evidence may be preserved. Curiosity will spend a minimum of one Mars year (about two Earth years) looking for this evidence. This paper will report on the progress of the mission over the first few months of surface operations, plus look retrospectively at lessons learned during both the development and cruise operations phase of the mission.