

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

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LIDAR-BASED HAZARD DETECTION AND LANDING SITE SELECTION FOR PLANETARY
LANDING**Abstract**

Future planetary exploration missions will aim at landing a spacecraft in hazardous or unknown regions of a distant planet, thereby requiring an ability to autonomously detect surface hazards and land at an affirmed safe site. In this paper we will present a LIDAR-based hazard detection and safe landing site selection approach for planetary landing missions. In this approach both hazard detection and landing site selection are operated on two stages: at the beginning of the powered descent phase terrain flatness of the landing area is assessed and an optimal landing window is selected from a high slant range. When arriving at a specifically low slant range local hazards of the landing window are identified using RANSAC algorithm and a best safe landing site is selected. Algorithms used in each stage are described. And the validation of the presented approach is demonstrated through simulations using ultrahigh resolution elevation maps of Mars.