

SPACE EXPLORATION SYMPOSIUM (A3)
Small Bodies Missions and Technologies (4)

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MODELING AND SIMULATION OF PHILAE SOLAR ARRAYS FOR ON-COMET POWER
PRODUCTION**Abstract**

Producing power with solar arrays for small bodies lander is a challenging task as the low-intensity, low-temperature environment, together with possible dust deposition and ice condensation, worsen not only the production of power but also make it difficult to formulate predictions on the subsystem's performances. Moreover, the motion of the target body (both orbital and attitude dynamics), its landscape, the landing site location, and the lander orientation further increase the level of uncertainties on the daily power profile. On the other hand, the lander survival and the ultimate mission goals strictly depend on the ability of the lander of being able to produce enough power to feed the system and to recharge the batteries.

In this note we discuss issues related to the modeling and simulation of the solar arrays behavior for comet landers. To overcome the above-cited problematics, in the frame of Rosetta mission, solutions in terms of hardware and software tools have been developed for estimating the power produced by Philae. Ongoing activities and open problems, such as the support to the landing site selection as well as the reconstruction of the lander attitude by using solar arrays data, are also discussed. Although these issues are reported for the case of Rosetta lander Philae, they apply for possible future missions aimed at performing in-situ operations on comets, asteroids, and distant planets.