

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

Author: Dr. Francesco Topputo
Politecnico di Milano, Italy, francesco.topputo@polimi.it

Prof. Franco Bernelli-Zazzera
Politecnico di Milano, Italy, franco.bernelli@polimi.it

Prof. Amalia Ercoli Finzi
Politecnico di Milano, Italy, finzi@aero.polimi.it

POWER PRODUCTION FOR SMALL BODIES LANDERS: POST-LAUNCH ACTIVITIES ON
PHILAE'S POWER SUBSYSTEM**Abstract**

Producing power with solar arrays for small bodies lander is a challenging task as the possible 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 power production via solar arrays for small bodies mission landers. More specifically, the experience gained in the post-launch activities on Philae's solar generators is reported. Indeed, to overcome the above-cited problematics, solutions in terms of hardware and software tools have been developed for power estimation and simulation. These are briefly discussed in this note. 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. Ongoing activities and open problems are also discussed.