Paper ID: 34849
oral

SPACE POWER SYMPOSIUM (C3)
Small and Very Small Advanced Space Power Systems (4)

Author: Mr. Hjalti Pall Thorvardarson
Rovsing A/S, Denmark

Mr. Ferdinando Tonicello
ESTEC-European Space Agency Technology and Research Centre, Netherlands (Kingdom of the)
Mr. Rafael Martins
Rovsing A/S, Denmark
Mr. Rasmus Mellemkjaer Jensen
Rovsing A/S, Denmark
Mr. Flemming Goettsche
Rovsing A/S, Denmark
Mr. Cristian Bank
Rovsing A/S, Denmark

A NEW EUROPEAN HIGH FIDELITY SOLAR ARRAY SIMULATOR FOR NEAR EARTH AND DEEP SPACE APPLICATIONS.

Abstract

Following an intensive design, development, and testing effort of almost 3 years, a new European high fidelity Solar Array Simulator (SAS) for near Earth and deep space applications was developed and qualified. ESA now has a versatile, highly modular and efficient SAS at its disposition that serves at simulating modern high power solar arrays for Earth observation, science or telecom satellites as well as for future deep space missions. With the next step, also a versatile, dynamic load simulator, e.g. for electric propulsion, will be added to establish a complete space power simulation environment.

The special features compared to other SAS are:

- Ultra-fast dynamic response performance, the key to high fidelity to SA simulation within the space domain;
- I-V curves can be simulated with up to 4096 point resolution Store 600 I/V curves in memory and create full life cycle simulations;
- Up to 685W of Power from a single module (137V / 5A 68.5V / 10A);
- Class leading energy efficiency from a hybrid design, translating into less heat dissipation and therefore considerable less noise from the SAS rack as a whole;
- The smallest form factor available, 2740W from a single 3U high unit, with no need for additional forced cooling devices or empty space sections between stacked sub-racks;
- Programmable first level protection (OVP, OCP).

Since the beginning of 2016 ESA is able to prepare it's demanding missions with a flexible and leading edge SAS solution. The SAS is already foreseen to support missions like JUICE, MetOp, and the MPCV European Service Module. The paper describes the development logic, challenges and lessons learned as well as the successfully concluded qualification testing phase of the new SAS and gives an outlook on future applications and features that are soon to be added, such as electric propulsion or other space power sources simulation.