

Flexible Solar Arrays qual Protocols (FSAP) – ACO

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Project Overview

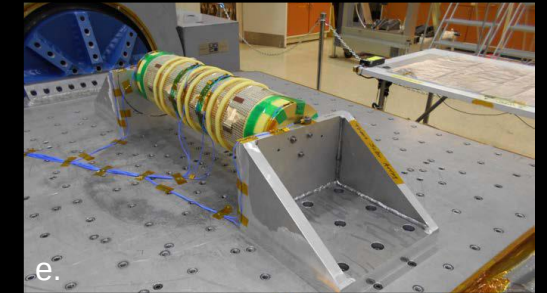
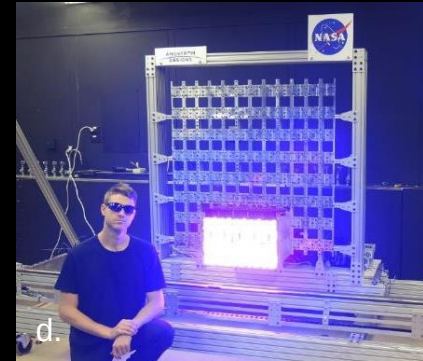
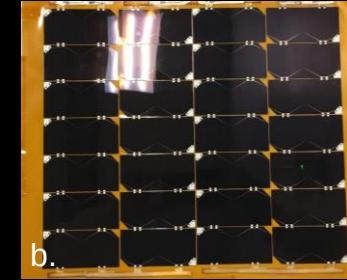
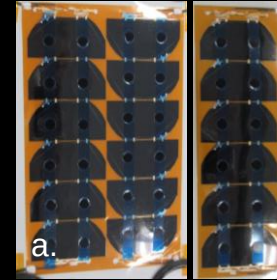
Collaboration effort between Maxar Technologies, GRC, and MSFC to test 5-junction solar cells through qualification protocols similar to AIAA S-111/112 to raise the TRL. Goal to enable future commercial and NASA missions with higher power at a lower mass and provide a smaller area footprint (W/m^2) and higher specific power (W/kg) which are driving metrics for solar arrays in space and on lunar surface.

Technical Approach

High fidelity measurement of solar cell module performance prior to and post multiple environmental tests. Utilizing pulsed LED solar simulators designed for 4 and 5 junction solar cell technology. Uses SolAero IMM- α coupons with electrical performance testing, sine vibe testing, and thermal balance measurement capabilities at GRC along with space environment testing facilities at MSFC. Environmental testing includes electrostatic discharge measurement, UV radiation exposure, electron and proton radiation exposure, and thermal cycling.

Results/Summary

Schedule greatly impacted by Covid-19 restrictions and delays. Expecting to begin testing in Q1 FY22.



- a. IMM- α coupon: 1 string of 12 cells, 1 string of 6 cells
- b. IMM- α coupon: 1 string of 28 cells
- c. Vacuum Facility 21 at GRC, used for thermal balance testing
- d. Pulsed LED solar simulator
- e. Rolled solar array test unit on shaker table
- f. High-Energy Accelerator Lab at MSFC (Electron and Proton Radiation Testing)

Contributing Partners

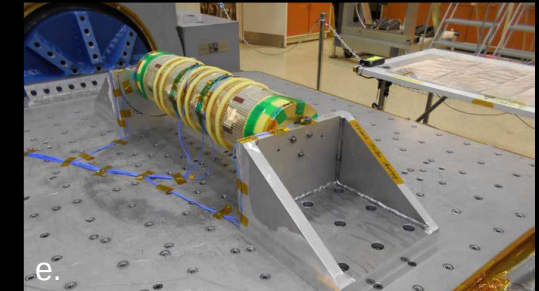
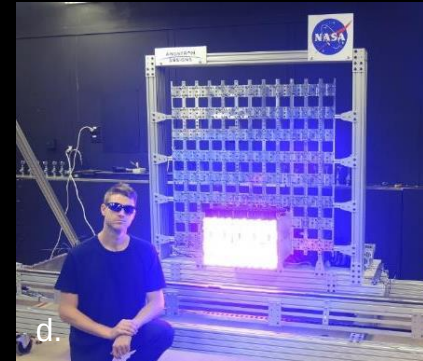
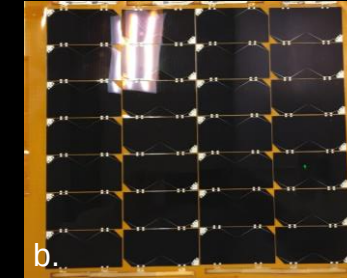
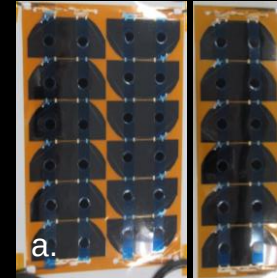
Maxar

NASA Glenn Research Center

NASA Marshall Space Flight Center

Infusion and Transition Plan

Testing results are expected to be published and shared with the space photovoltaic community. Results will help guide the future use of 5 junction inverted metamorphic multijunction solar cells and other 4-5 junction solar cells.



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