

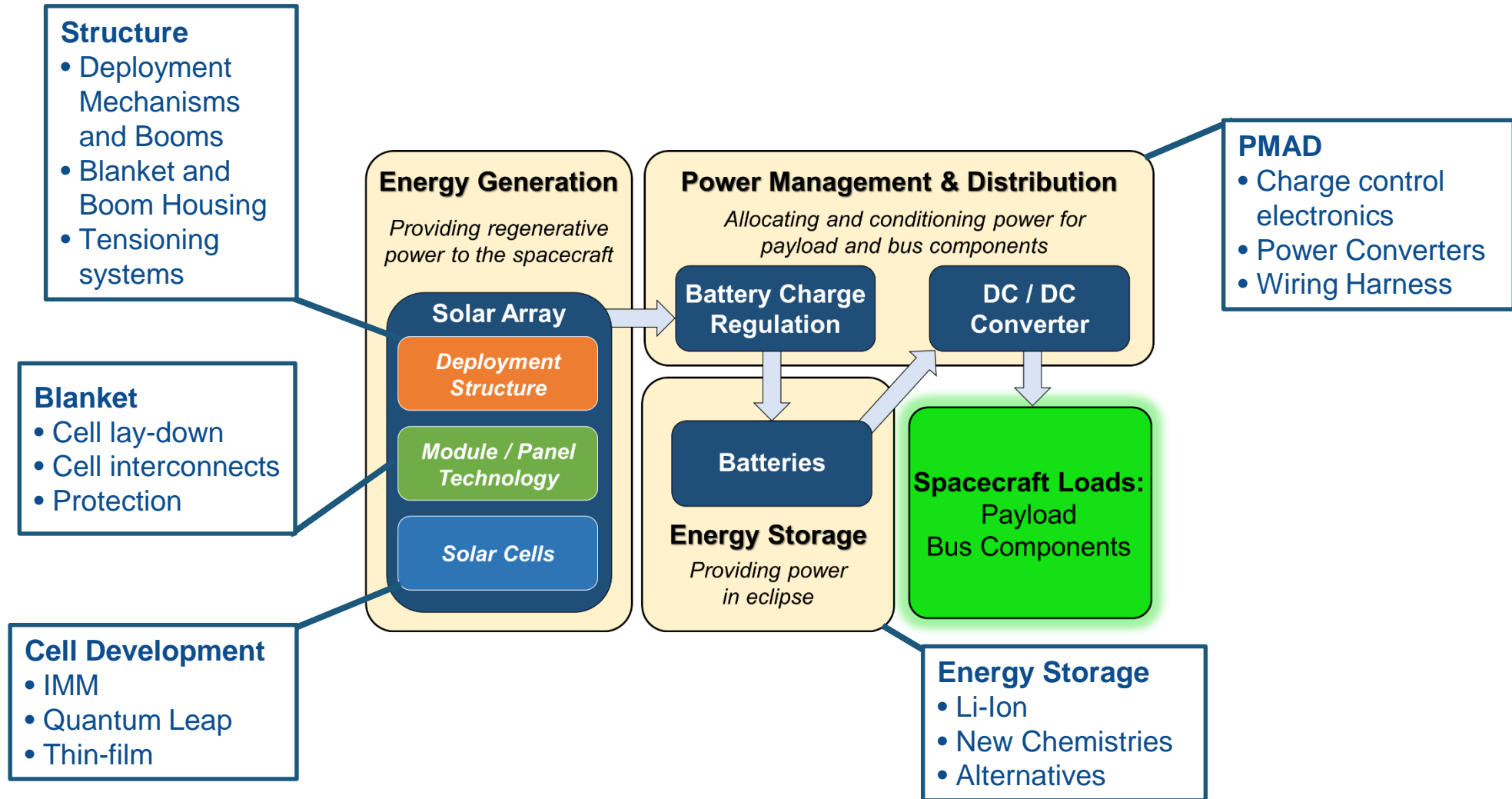


Strategic Changes in Space Power R&D at AFRL

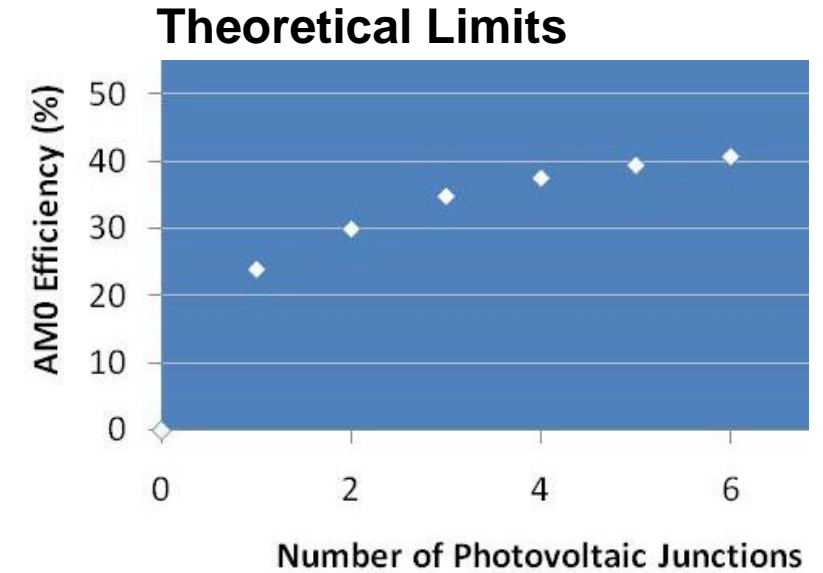
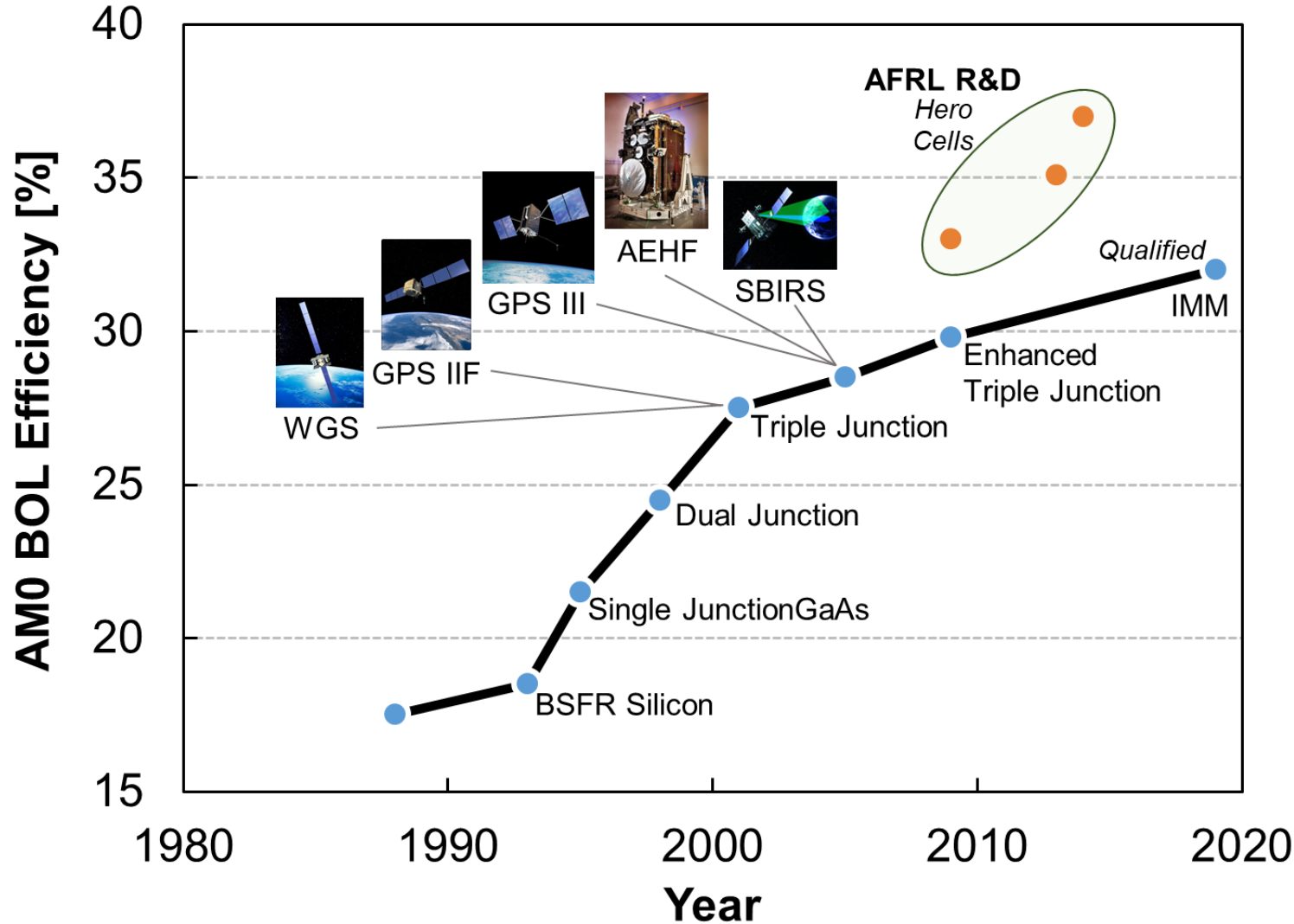
DR. KYLE MONTGOMERY, PROGRAM MANAGER

ADVANCED SPACE POWER, SPACE VEHICLES DIRECTORATE, 02 APRIL 2019

Traditional Technology Focus Areas



Where We Have Been – Space Solar Cells

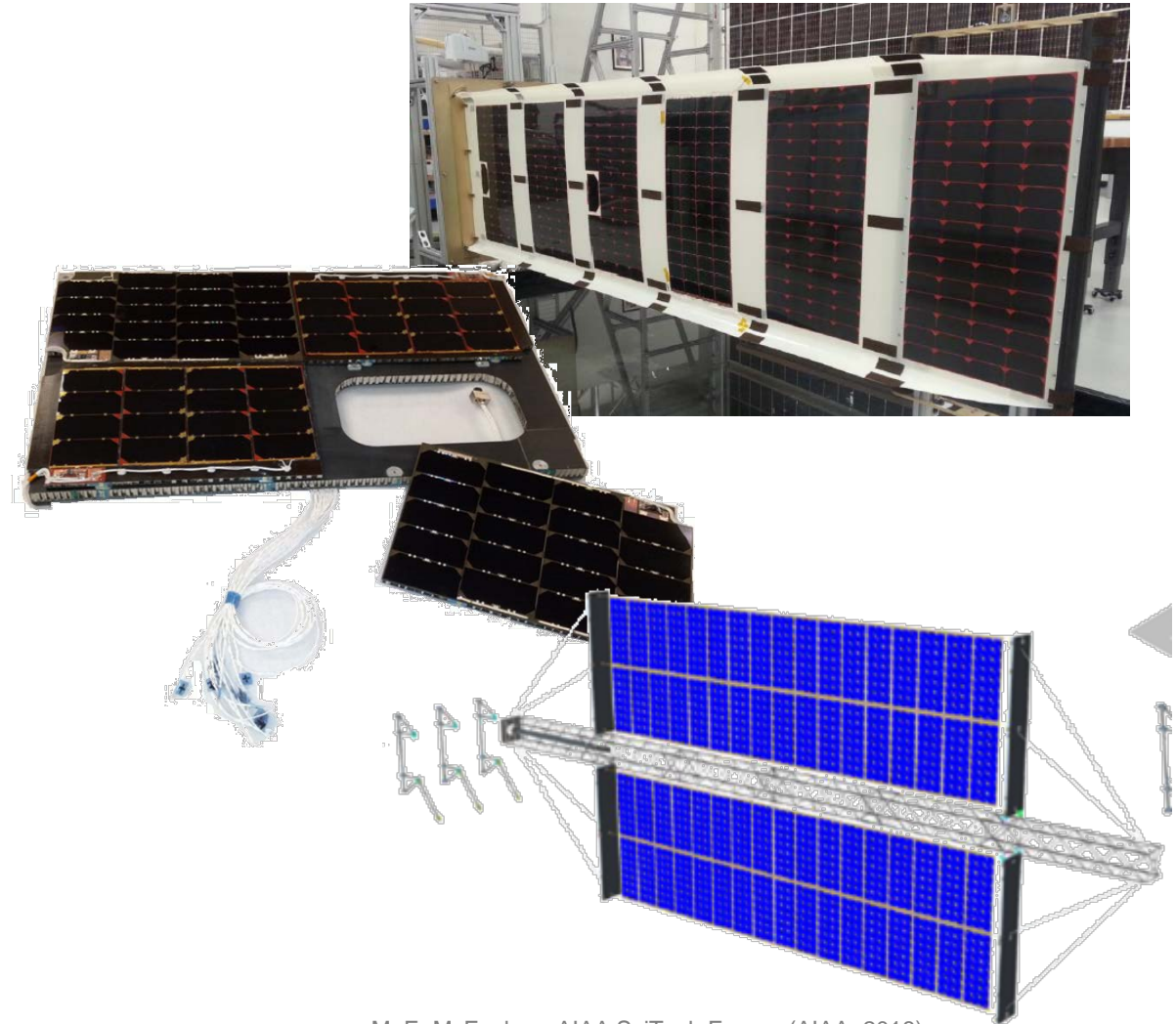


Source: P. Sharps, 33rd IEEE PVSC, 2008

Where We Have Been – Space Solar Arrays

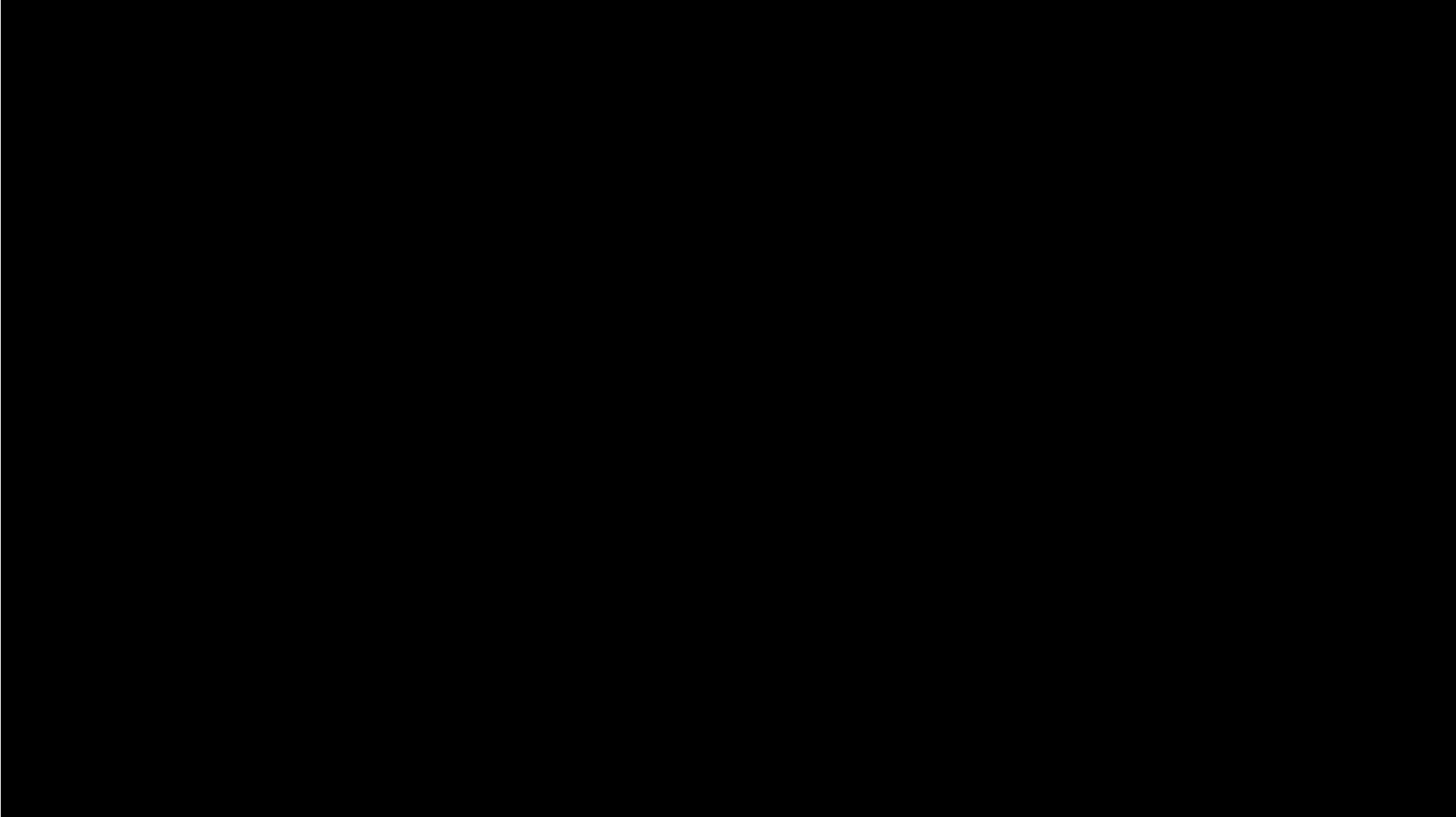


Credit: <https://www.lockheedmartin.com/en-us/products/gps.html>

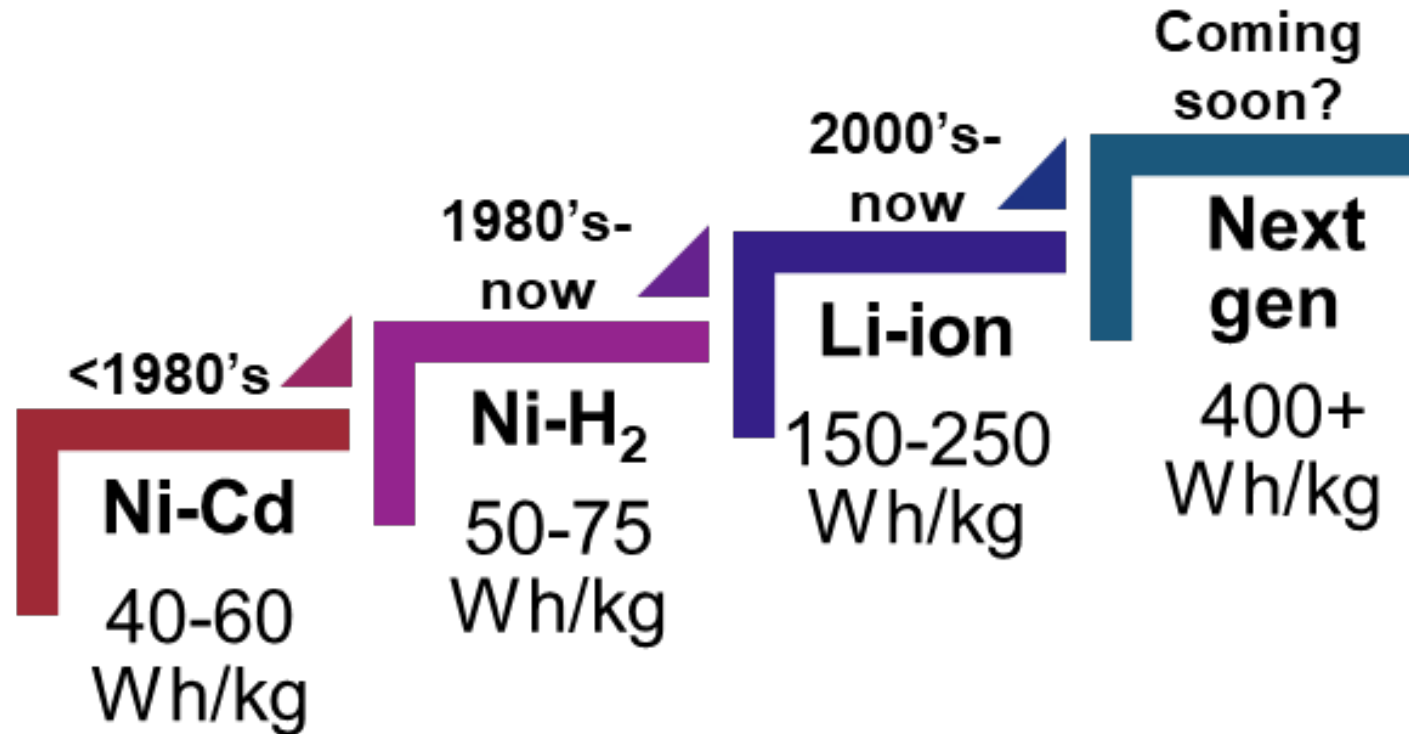


M. E. McEachen, AIAA SciTech Forum, (AIAA, 2018)

Roll Out Solar Array (ROSA) – June 2017 Flight Experiment

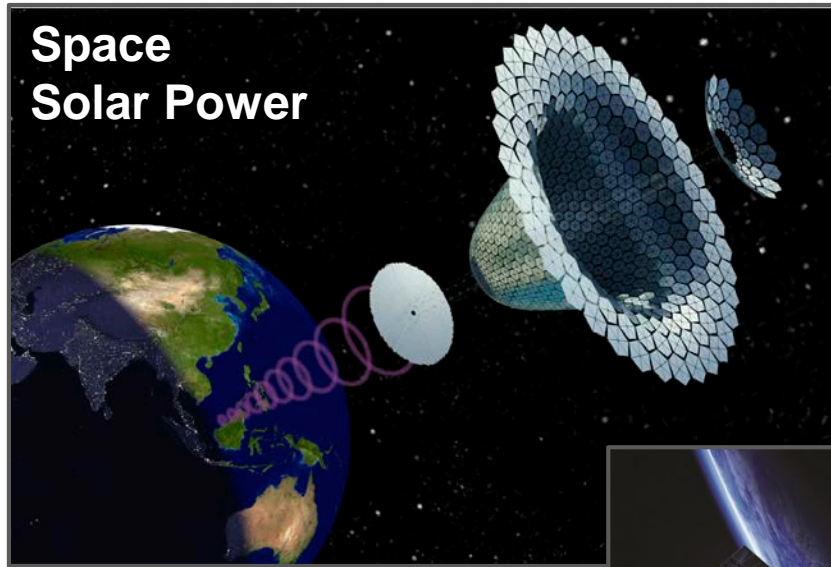


Spacecraft Battery History



Continual Challenge: Balancing Risk vs. Benefit

Shift Towards Enabling *New Capabilities*



Space Solar Power

Credit: <https://www.wired.com/2014/03/space-solar/>



Game Changing

Credit: <http://environment.umn.edu/discovery/game-changing-research/>

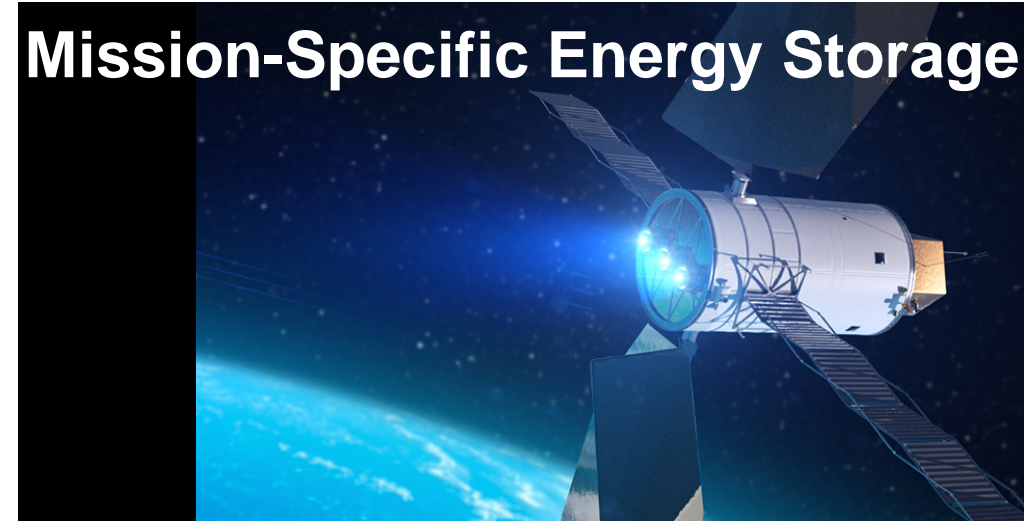


Space System Resilience

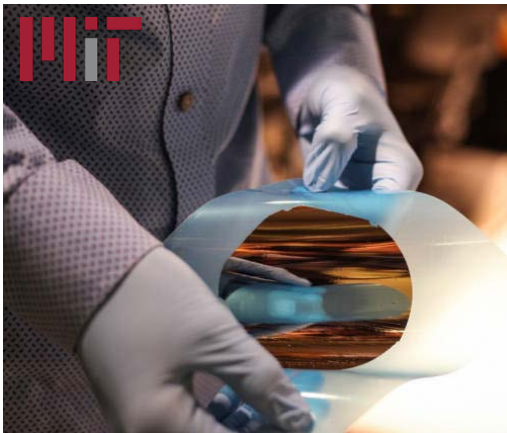
Credit: <https://spacenews.com/op-ed-the-move-from-survivability-to-resilience/>

New Technology Focus Areas (A Sampling)

Credit: <https://www.darpa.mil/program/blackjack>



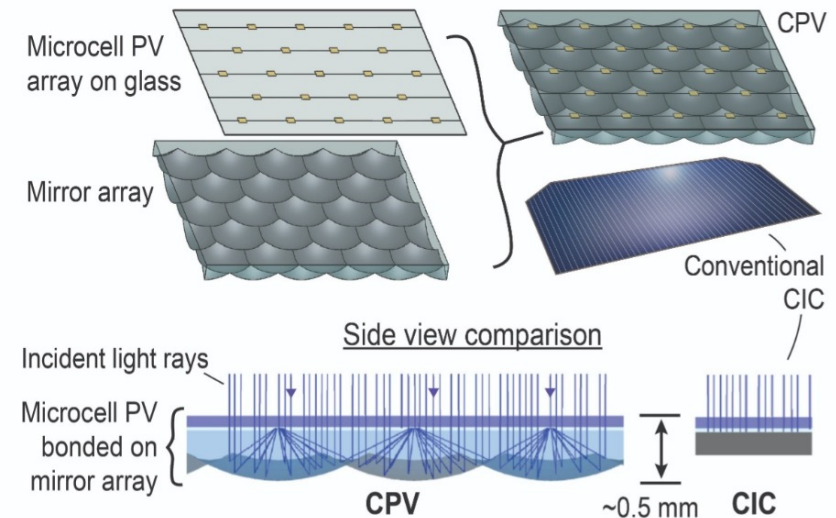
Cell/Module/Panel Proliferation



Credit: <https://www.electronicweekly.com/news/research-news/graphene-layer-allows-re-use-expensive-wafers-2017-04/>
THE AIR FORCE RESEARCH LABORATORY

See: E. Redher, Adv. Concepts, Wed.

CPV



Credit: https://compoundsemiconductor.net/article/106548/Sending_CPV_Into_Space/feature

Changes On Our Team

Core Team



Dr. Kyle Montgomery
Program Manager



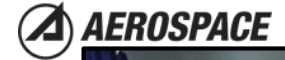
Dr. Jessica Buckner
Deputy Program Manager
Energy Storage Lead



Dr. Alexander Haas
Program Tech Advisor



Dr. Geoffrey Bradshaw
Test & Characterization Lead



Dr. Bernie Carpenter
Array & Systems Advisor

Supporting Staff and New Hires:

- 2 Lab Techs
- 1 New-Hire Test Engineer
- 2 New-Hire Gov't Project Leads
- 4 Student Interns, Summer 2019



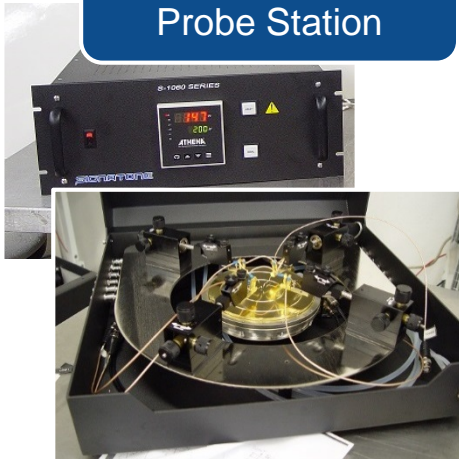
Mr. David Wilt
Branch Tech Advisor

Characterization Facilities at AFRL/RV (Albuquerque)

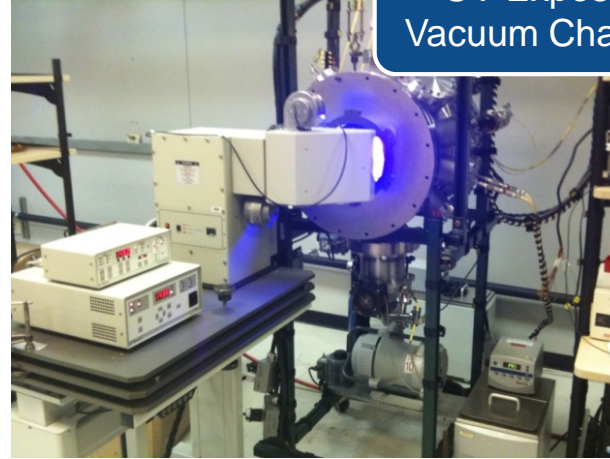
Spectrolab X-25 Large Area Solar Simulator



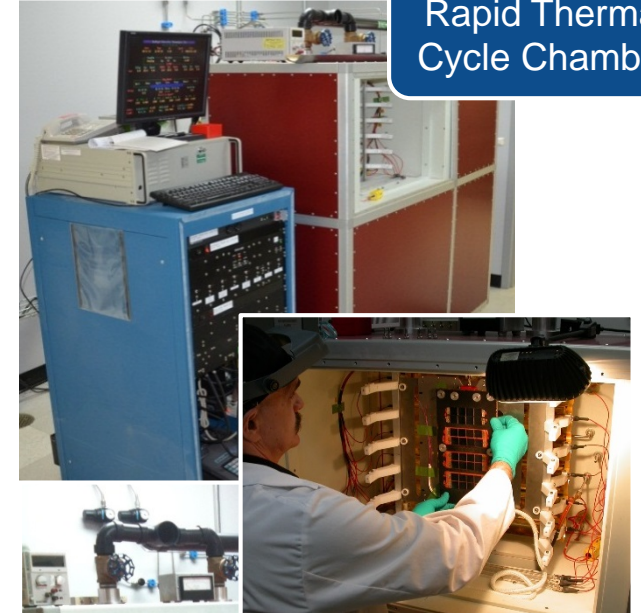
Signatone Thermal Probe Station



UV Exposure Vacuum Chamber



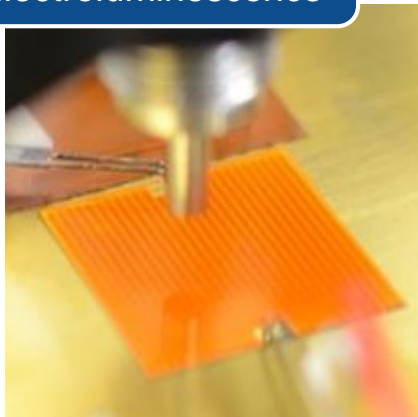
Rapid Thermal Cycle Chamber



TS-Space 4-Zone Simulator



Quantitative Electroluminescence



TauScience EL Imager



Also:

- SEM
- AFM
- XRD
- UV/Vis
- EQE/IQE



Questions?

kyle.montgomery@us.af.mil