

US Overview

11th Spacecraft Charging Technology Conference

Hotel Albuquerque, Albuquerque, NM

20-24 September, 2010



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AFRL/RVBXR
Space Vehicles Directorate
Air Force Research Laboratory

New BattleSpace Environments Lab, Kirtland AFB, NM



US Universities Doing Spacecraft Charging Research and Testing

- University of Alabama Huntsville
- Johns Hopkins
- MIT
- Bethel University
- Pennsylvania State University
- University of Michigan
- University of Texas at Dallas
- University of Houston
- Auburn University
- Stanford University
- Cornell University
- University of Colorado
- Colorado State University
- Utah State University
- Embry-Riddle Aeronautical University
- University of New Hampshire
- University of Southern California
- Virginia Polytechnic Institute and State University
- Others

US Companies Doing Spacecraft Charging Research and Testing

- Aerospace Corporation
- SAIC
- Emcore
- Spectrolab
- Entech Solar Inc.
- OAI
- Goembel Instruments
- Space Systems/Loral
- Northrop Grumman
- Boeing
- Lockheed-Martin
- Ball Aerospace
- Tethers Unlimited
- Carbon-Free Energy, LLC
- Deployable Space Systems, Inc.
- ElectroDynamic Applications
- Radex, Inc.
- Mori Associates
- PSI, Inc.
- Jacobs Engineering
- Trek, Inc.
- Others

GOES 13, 14, AND 15

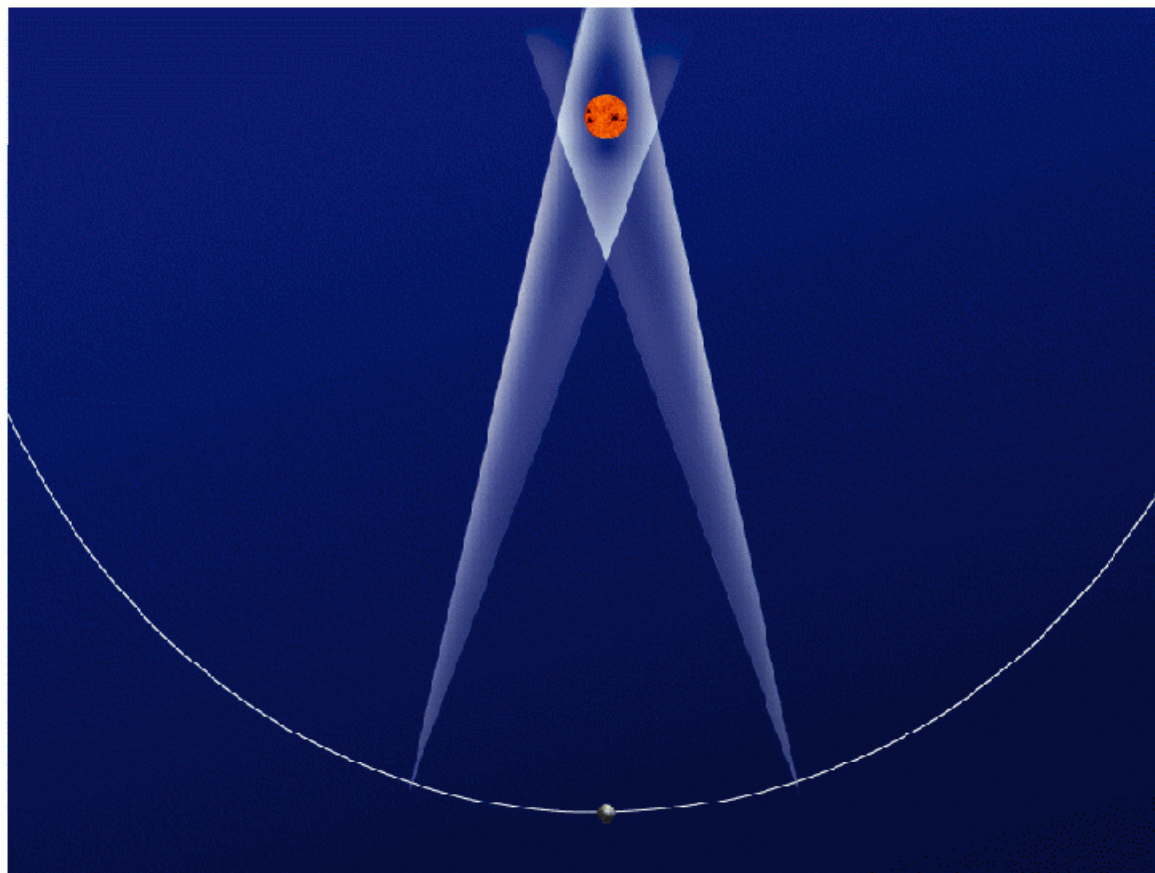


GALAXY 15



NASA STEREO SPACECRAFT

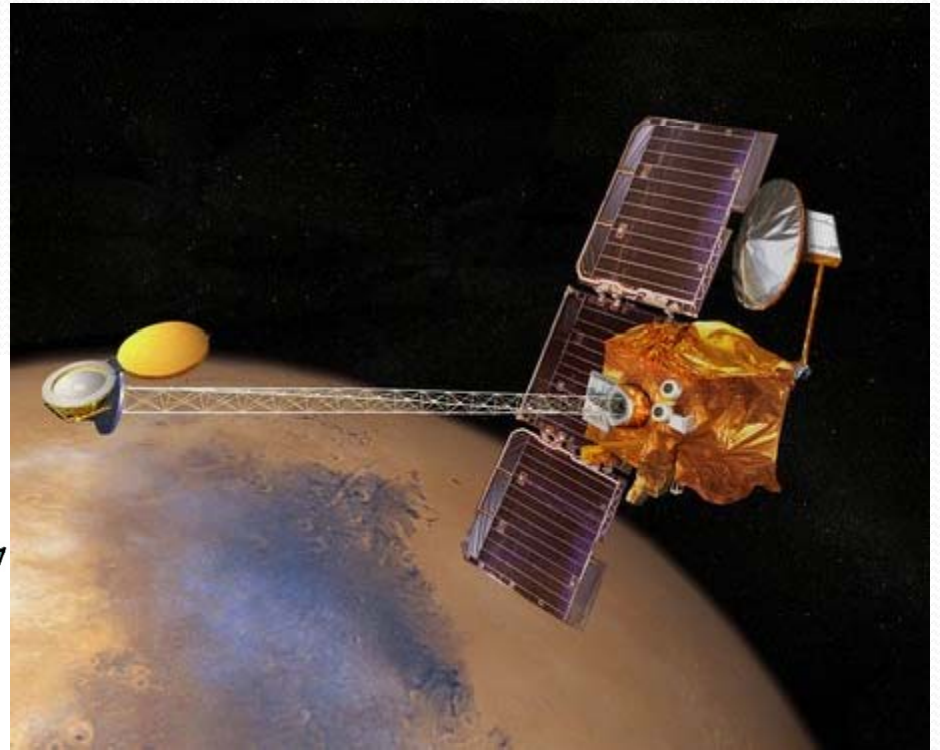
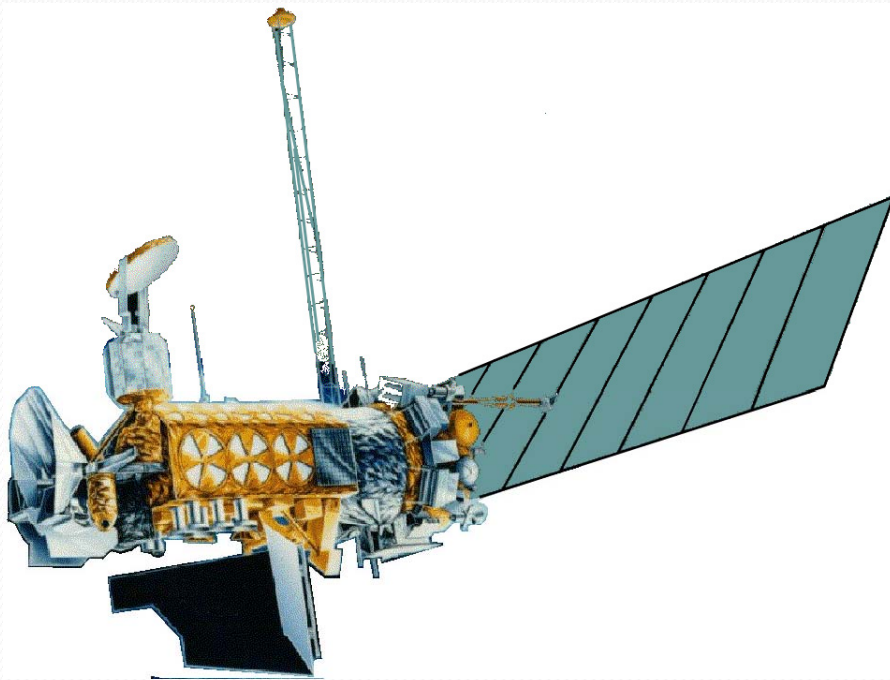
Region of Overlap from CORs on each S/C



C/NOFS



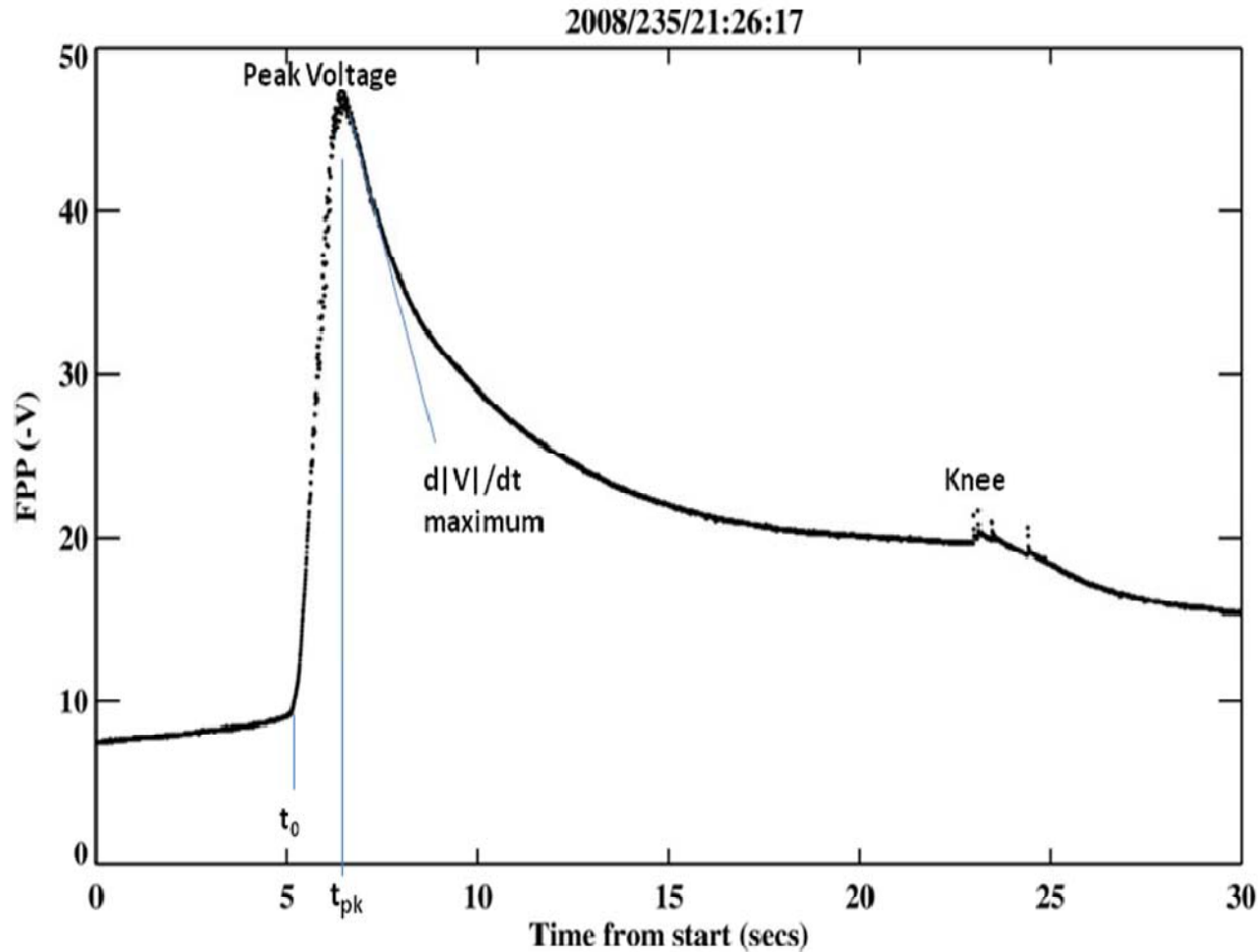
DMSP-F19 and GPS IIF SV-1



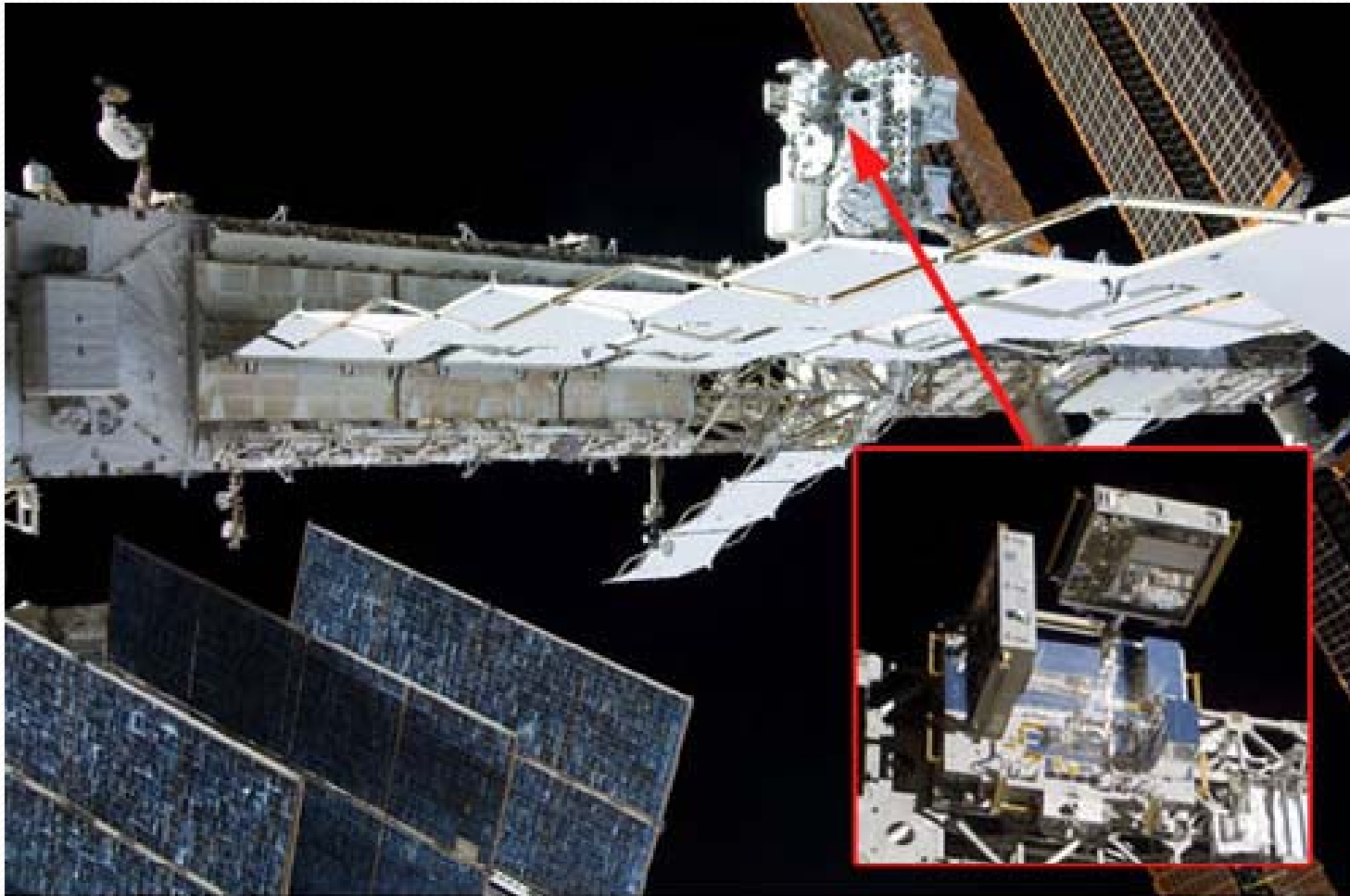
FPMU on ISS



Rapid Charging Event on ISS

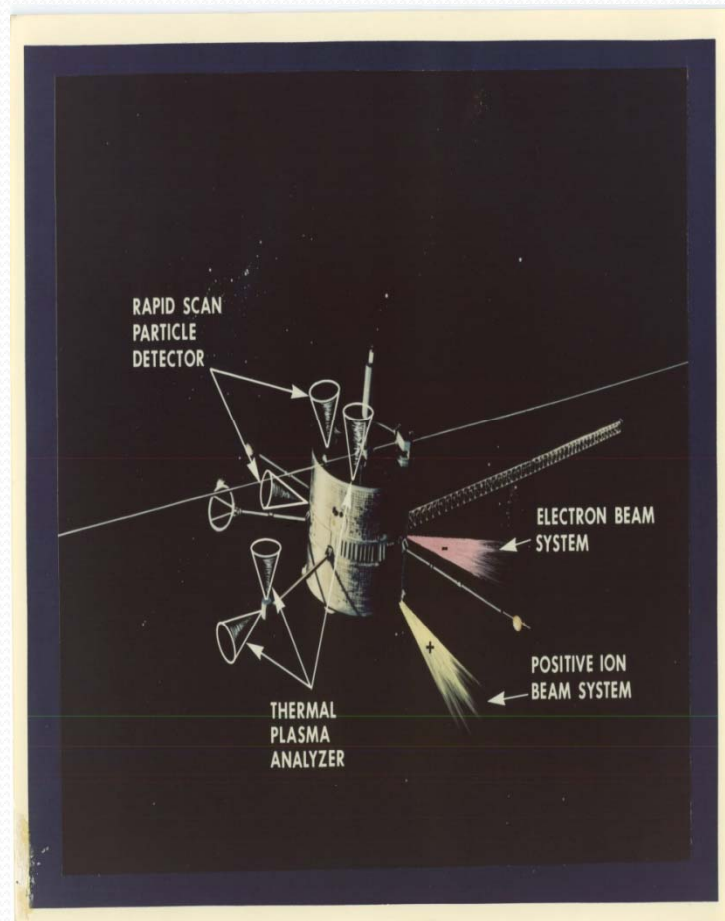


MISSE-7

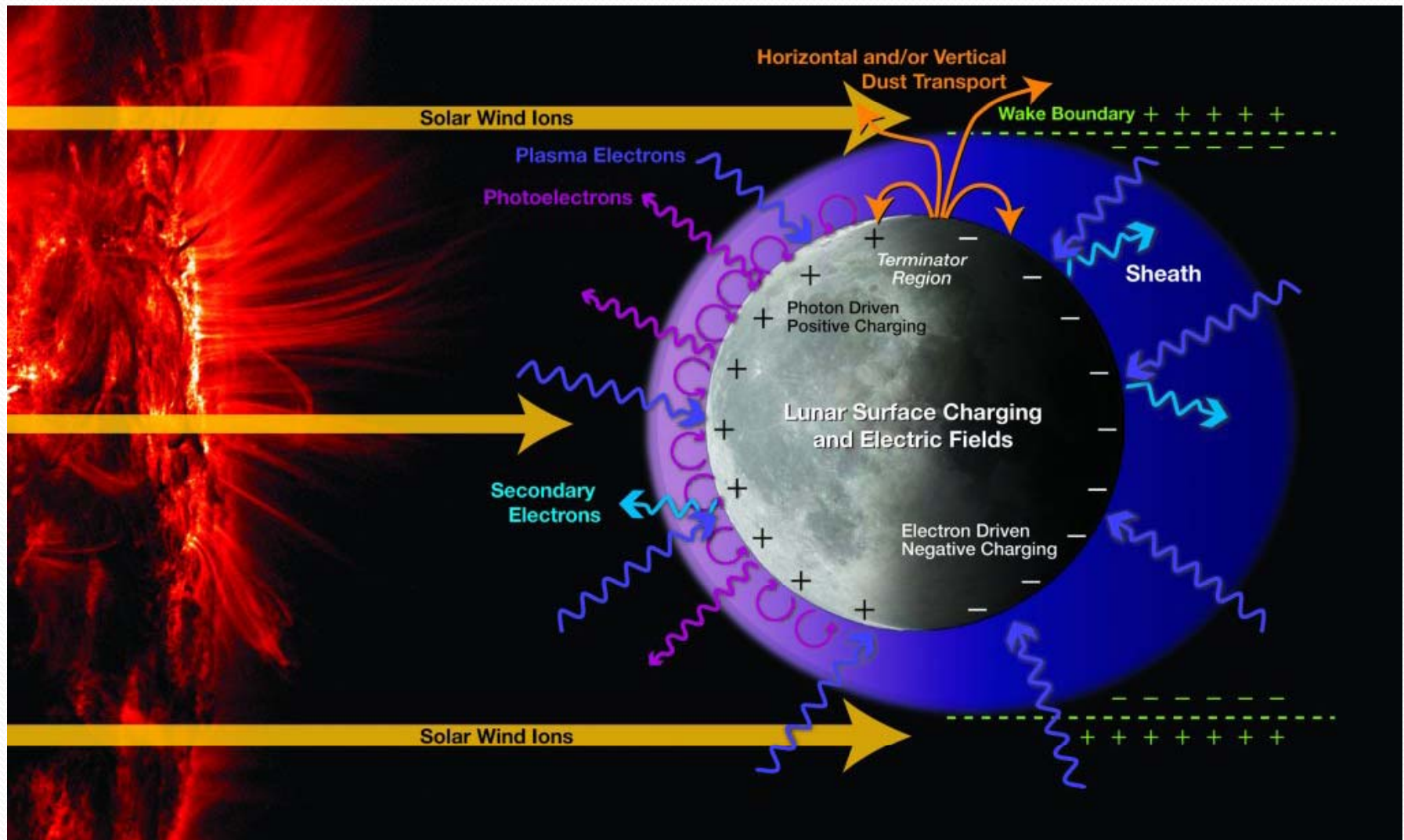


Photos Courtesy Of NASA

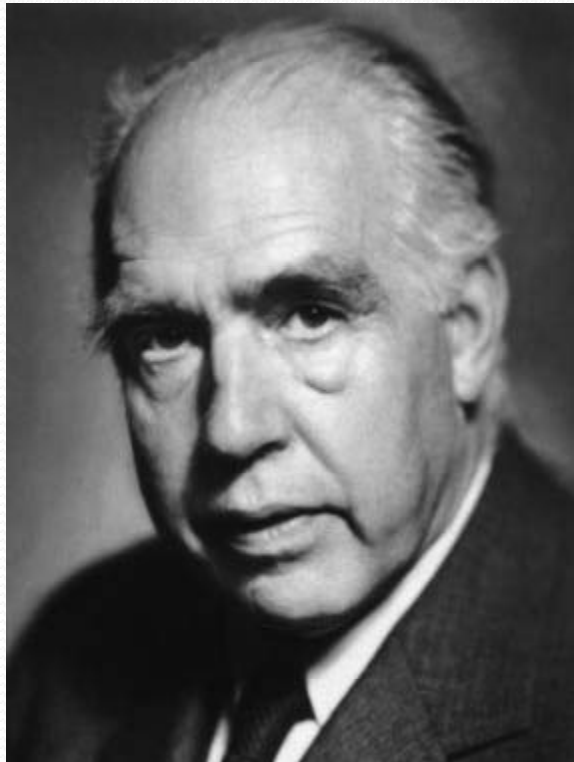
SCATHA (1978!)



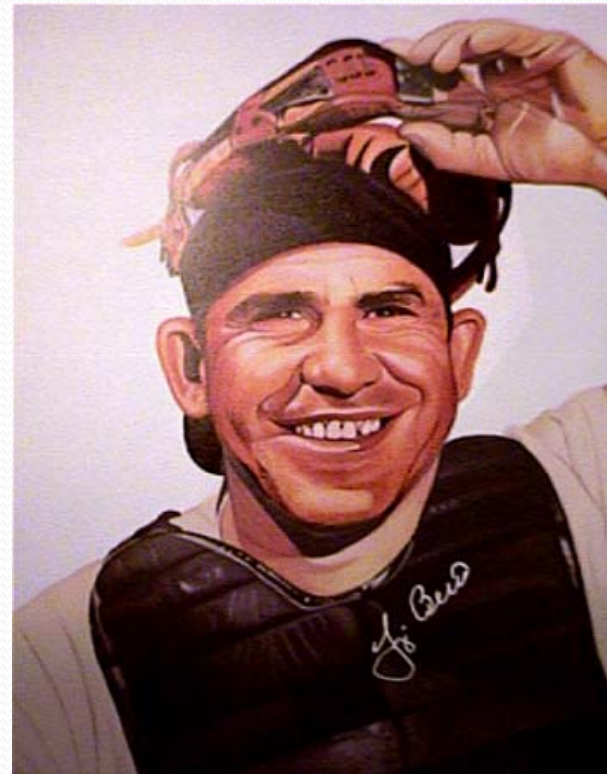
Lunar Surface Charging



Niels Bohr vs Yogi Berra

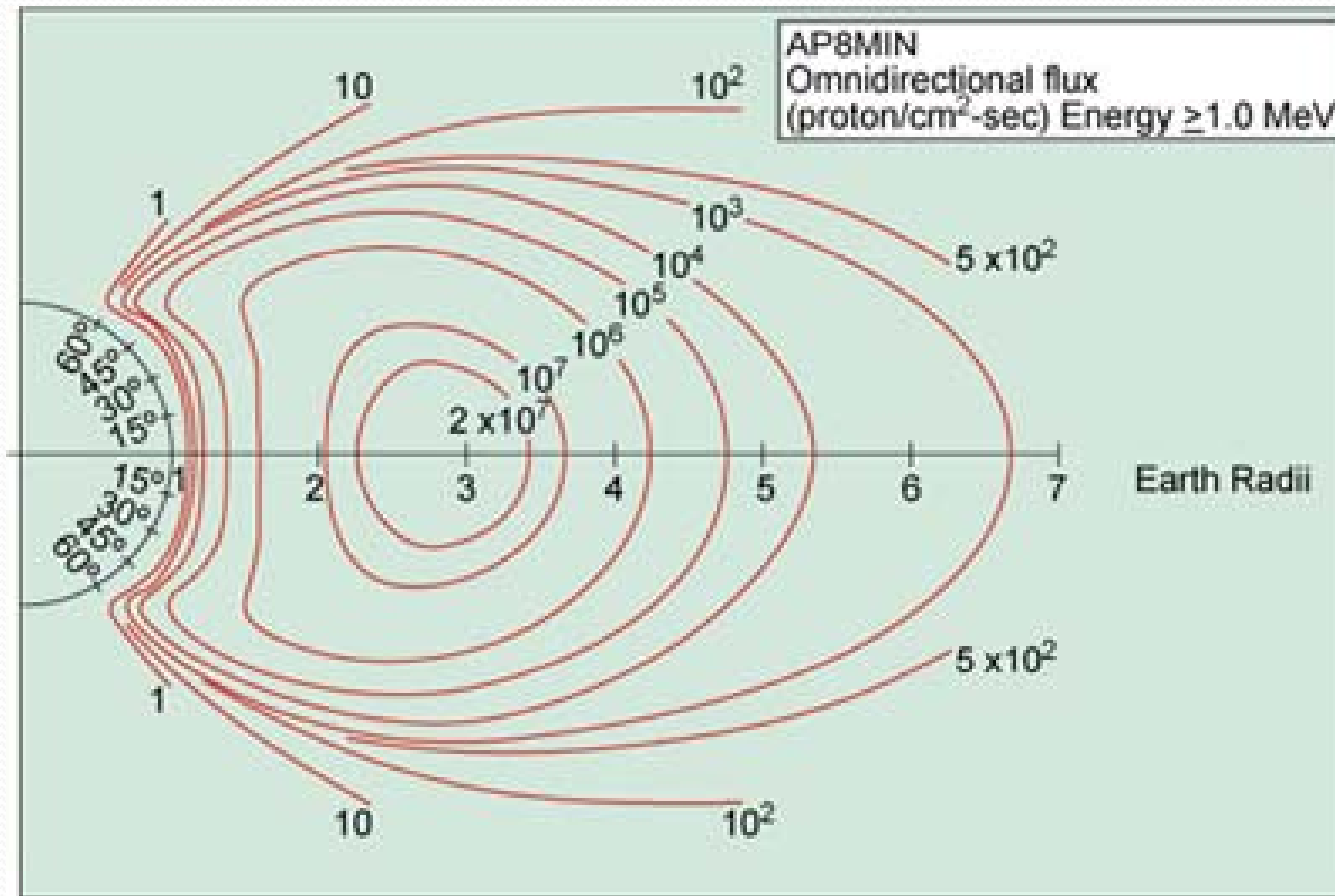


“Prediction is difficult...especially the future.”



When asked what time it was,
“You mean now?”

AP9, AE9 Radiation Models

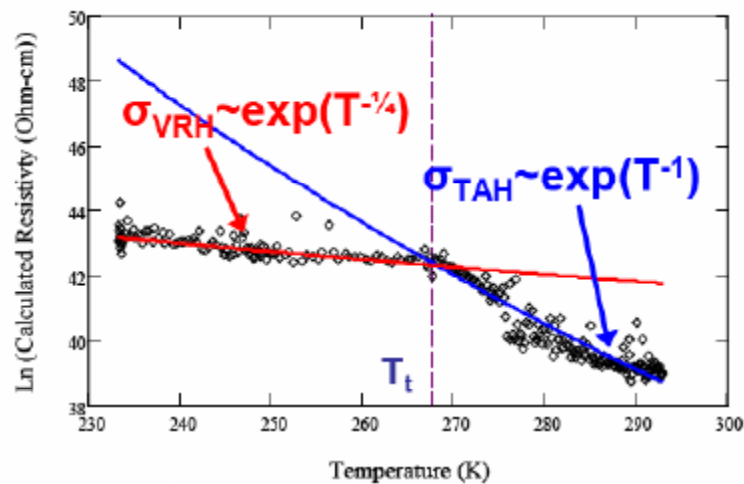


AP8 Min! Did you think I had AP9 already?

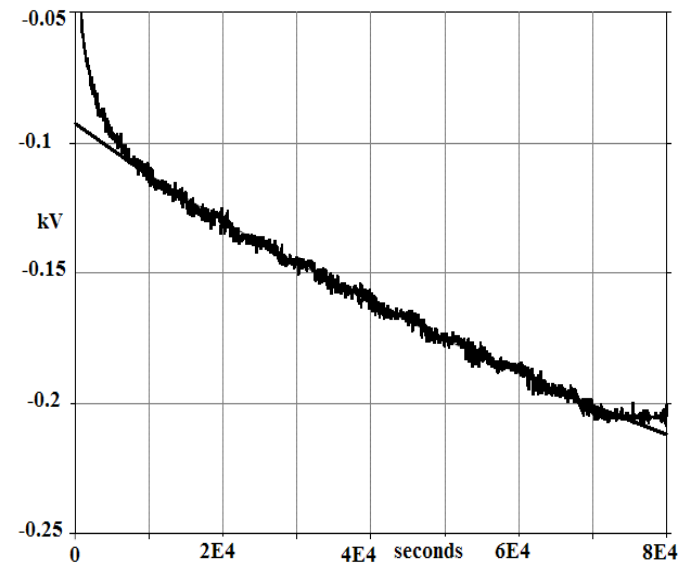
NASCAP-2k Improvements



Materials Properties

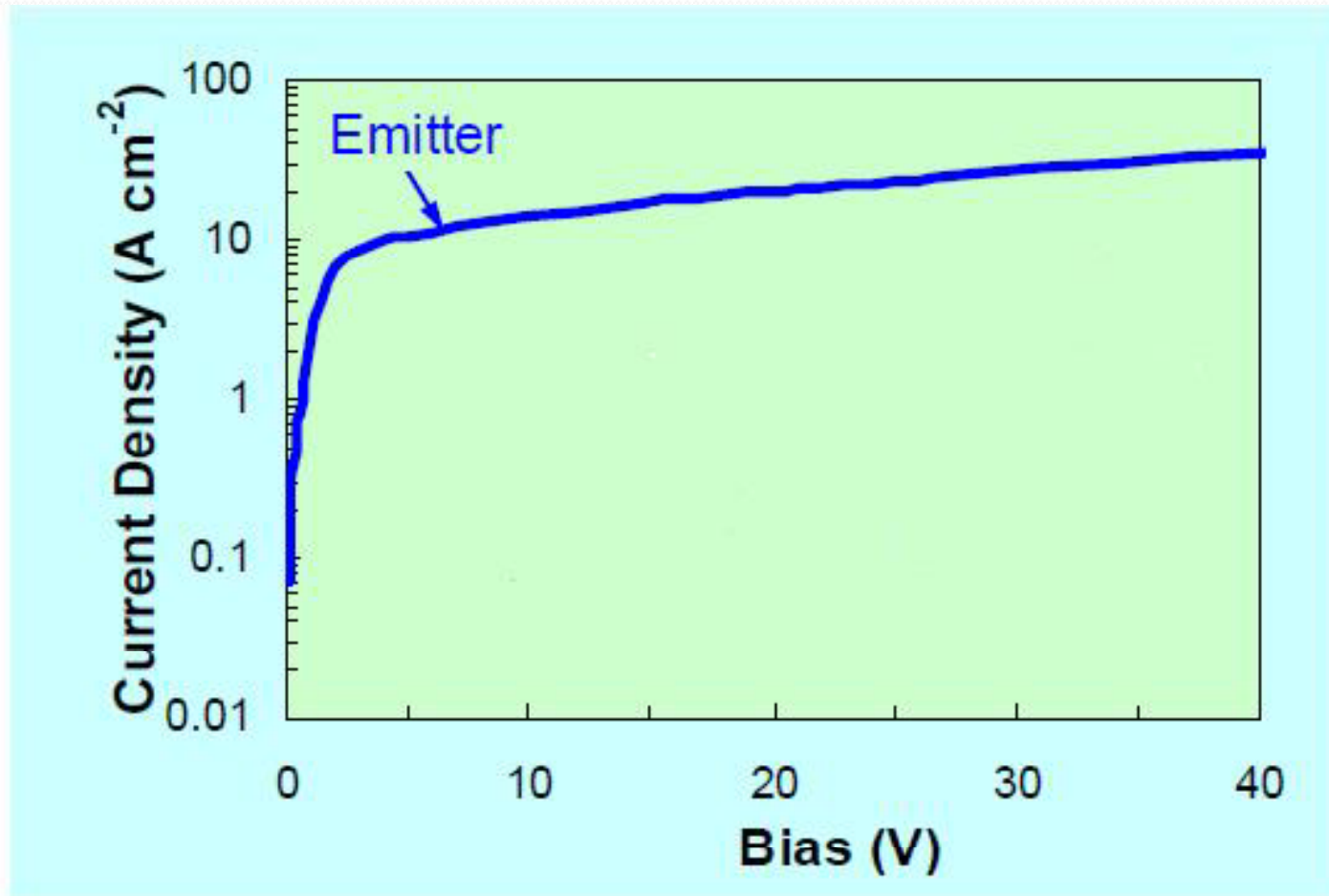


Temperature Effects

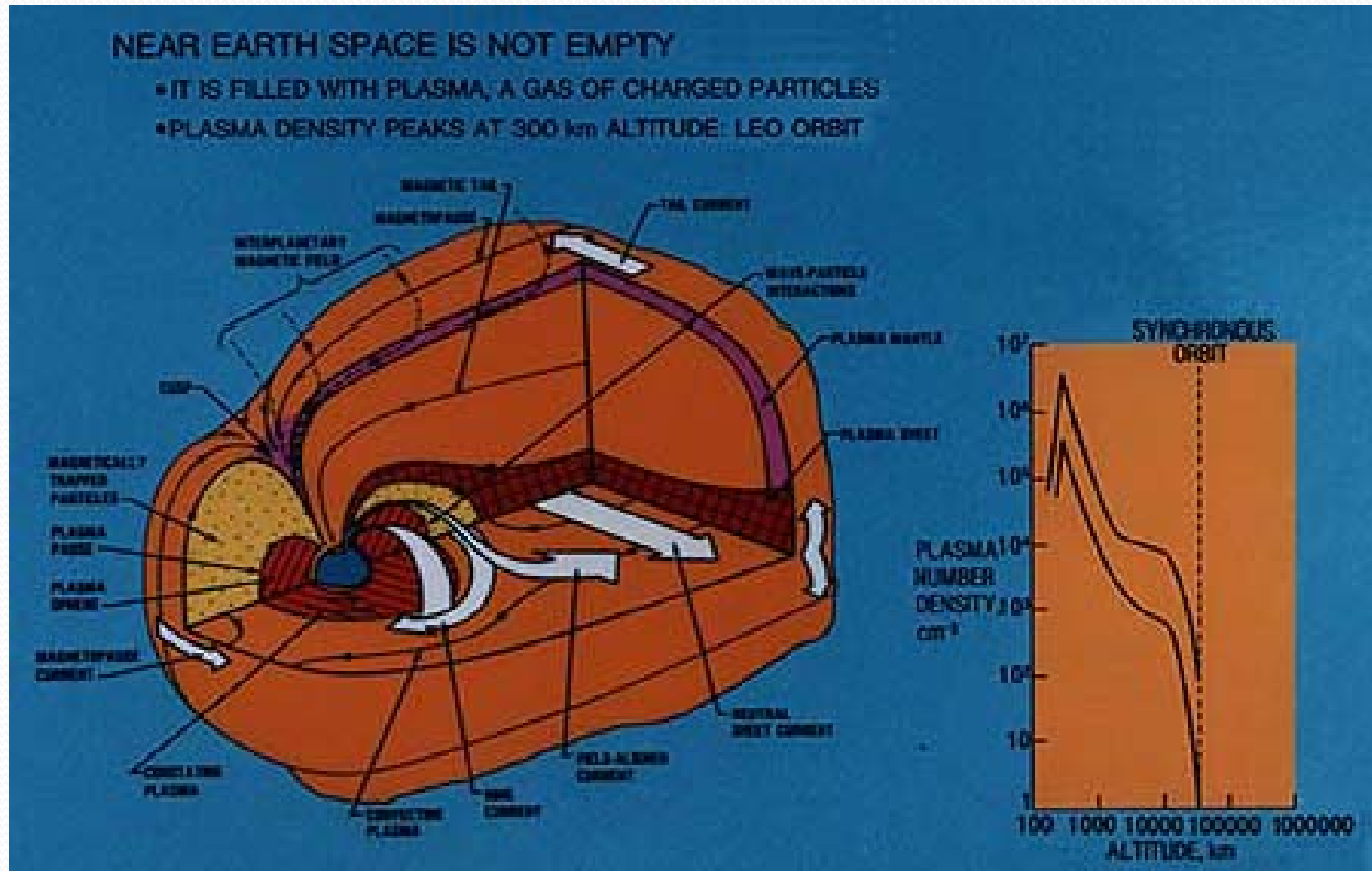


Radiation Induced
Conductivity

Special Electron Emitters

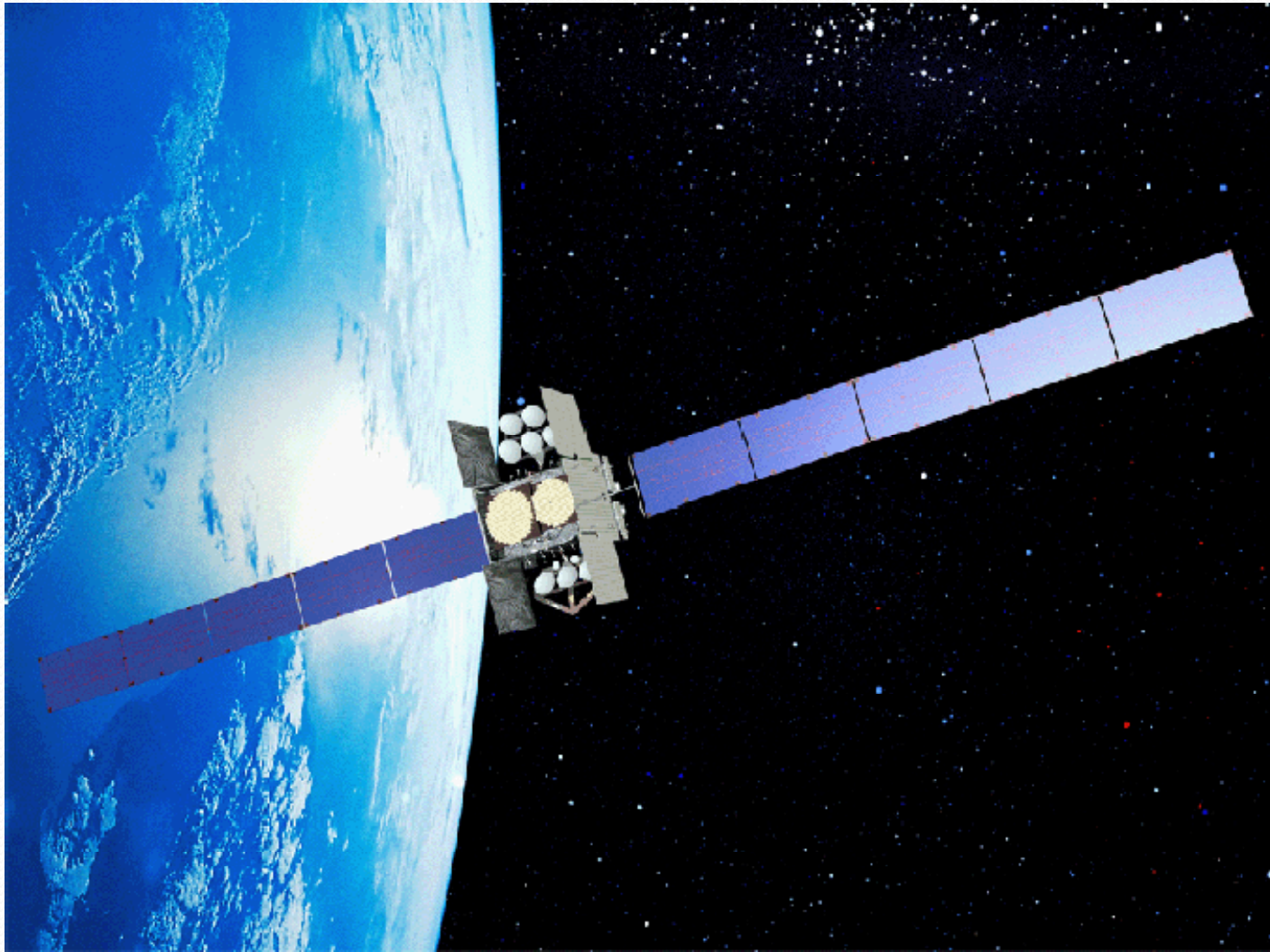


Spacecraft Charging



Carolyn Purvis' Spacecraft Charging Introduction Slide (circa 1983)

Satellite Designs



Adios, Pardners!



Dave Cooke,
Head SCTC 11
Organizer