

SOLAR RADIATION

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CURRENT STATUS

- MOST MATERIALS DEGRADE TO SOLAR RADIATION
- INFORMATION AVAILABLE ON SHORT-TERM UV EFFECTS ON MATERIALS;
PROVIDES LIMITED DATA BASE
- FLIGHT DATA ON COATING DEGRADATION CONFUSED BY CONTAMINATION
- LITTLE CORRELATION BETWEEN TESTING LABORATORIES IN: UV EXPOSURE
CONDITIONS, CALIBRATION TECHNIQUES, AND DETECTORS
- FEW FACILITIES WITH EXTREME UV EXPOSURE CAPABILITY
- LIMITED DATA ON THERMAL CYCLING EFFECTS IN LAB AND IN SPACE

TECHNOLOGY DRIVERS

- 30-YEAR LIFETIME OF SPACE STATION
 - UV + AO + THERMAL CYCLING
- 5 TO 15 YEAR-LIFETIME OF SDI MISSIONS
 - UV + HIGH ENERGY RADIATION
 - UV + AO + THERMAL CYCLING
- MATERIALS AND SYSTEMS SURVIVABILITY FOR LONG-LIFE MISSIONS

TECHNOLOGY NEEDS

- DEVELOPMENT OF A UV TESTING METHODOLOGY WITH STANDARDIZED TEST PROCEDURES FOR ACCELERATED UV TESTING OF MATERIALS
- DATA BASE OF FLIGHT DATA FOR LONG-TERM MISSIONS - INCLUDES:
 - OPTICAL FILTERS, WINDOWS, THERMAL COATINGS, HARDENED COATINGS, POLYMERIC FILMS
- FLIGHT DATA BASE ON UV FLUX/DISTRIBUTION
- LONG-TERM THERMAL CYCLING DATA
 - LDEF COMPOSITES COULD PROVIDE 5-YEAR FLIGHT DATA

UV TESTING RECOMMENDATIONS

- NEED CONTINUUM UV SOURCE (FROM EUV TO VISIBLE) FOR LAB TESTING TO DETERMINE SPECTRAL SENSITIVITY OF MATERIALS
- A TEST FACILITY SHOULD BE CONSTRUCTED TO PROVIDE TEST DATA NEEDED TO STANDARDIZE UV SIMULATION SOURCES, FLUX MEASUREMENTS, AND TESTING PROCEDURES
- A FLIGHT EXPERIMENT (1 YEAR MINIMUM) SHOULD BE CONDUCTED FOR CORRELATION OF LAB SIMULATION
 - RADIOMETERS FOR UV MEASUREMENT
 - PROVIDE DATA ON SELECTED MATERIALS
 - EXPERIMENT RETURNED IN VACUUM FOR LAB TESTING

OTHER RECOMMENDATIONS

- QUARTERLY OR SEMI-ANNUAL MEETING OF COMMITTEE TO ADDRESS PROGRESS IN SPACE ENVIRONMENTAL SIMULATION AS REQUIRED FOR PERFORMANCE OF ONGOING AND PLANNED NASA/SDIO MISSIONS