

Abstract Submitted
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Space Effects Survivability Testing¹ LISA PHILLIPPS, JR DEN-
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Physics Group, JAMES DYER, Space Dynamics Lab — A versatile test facility
has been designed to study the effects of space environment fluxes and radiation
damage on small scale materials samples, system components, and small satellites.
Cost-effective long-duration testing for potentially environmental-induced modifica-
tions is increasingly more important as small satellite programs have longer mission
lifetimes, expand to more harsh environments, make more diverse and sensitive
measurements, minimize shielding to reduce mass, and utilize more compact and
sensitive electronics. The facility simulates environmental components including
the neutral gas atmosphere, the solar spectrum, electron plasma fluxes, and tem-
perature. The UV/VIS/NIR solar spectrum is simulated using a class AAA Solar
Simulator with up to four Suns light intensity. Far ultraviolet radiation is provided
by Kr discharge line sources also with up to four Suns intensity. A low-energy elec-
tron flood gun provides a uniform, monoenergetic (20 eV-15 keV) electron flux. A
medium-energy (20-100 keV), low-flux electron source uses filament-free photoemis-
sion. A Sr-90 β radiation source produces a high-energy spectrum similar to the
geosynchronous spectrum. A stable, uniform temperature range from 100-450 K is
achieved using a cryogenic reservoir and resistance heaters. A data acquisition sys-
tem periodically records the environmental conditions, photographs, UV/VIS/NIR
reflectivity, IR absorptivity/emissivity, and surface voltage of the sample surface and
in situ calibration standards in the chamber.

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