

15th SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)  
Generic Technologies for Nano/Pico Platforms (6B)

Author: Mr. Ronnie Nader  
Ecuadorian Civilian Space Agency (EXA), Ecuador, rnader@exa.ec

SEAM/NEMEA: THE SPACE ENVIRONMENT ATTENUATION MANIFOLD SHIELD FOR  
NANOSATELLITES

**Abstract**

In order to achieve the goals set by the Space Mission Directorate for the PEGASUS project within the boundaries of a very tight financial budget, we took the approach of building the satellite using COTS electronics; However we wanted this electronics to survive longer than any other previous missions that have used this approach.

The answer was to use a miniature version of a Multi Layer Insulation system, the requirements were to fend off up to 60% of incoming heat, to protect the electronics against alpha and beta particles, to shield them from plasma discharges and to attenuate most of X and gamma radiations.

The result was the SEAM/NEMEA Space Environment Attenuation Manifold, a multi stage MLI capable of blocking alpha, beta, X and Gamma radiation and to block up 67% of incoming heat, while retaining internal heat over eclipse phase, NEMEA can also attenuate and even neutralize EMP and Plasma discharge events.