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USING MLIS AS HYPERVELOCITY IMPACT MITIGATION: AN UNINTENDED TEST IN ORBIT.

Abstract

On May 23, 2013 the first Ecuadorian satellite, the NEE-01 PEGASUS had a close approach with the object SCC-15890 and after such event, the signal of the satellite was lost and even when we knew it was still transmitting we could not decode its signal, the Ecuadorian Civilian Space Agency tried to recover the contact for 3 months until the satellite was declared lost.

On January 25, 2014 we were able to recover of the audio portion of the NEE-01 PEGASUS using the PERSEUS repeater onboard the NEE-02 KRYSAOR twin satellite, we could prove then that the NEE-01 had survived the event and that in fact was a hypervelocity impact event, in this paper we will analyze the role of the SEAM/NEMEA radiation shielding installed on both satellites and we will present the data that led us to believe that it was such shielding that mitigated the consequences of the impact and allowed the satellite to survive the event.

The SEAM/NEMEA MLI system was designed to attenuate the effects of the space environment like thermal control and radiation but it was not thought to work as a hypervelocity impact mitigation measure, however its structure, design and implementation produced such effects as we now know by the means of having to deal with a very unfortunate event, we think that we should share what we know about this rare case for the benefit of the space community, as this shielding is of low cost and can provide a degree of protection against such events even in very small spacecrafts as our 1U cubesats.