

IAF MATERIALS AND STRUCTURES SYMPOSIUM (C2)
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UTILIZATION OF SHAPE MEMORY ALLOYS FOR MULTI-PURPOSE DEPLOYABLE SOLAR
PANELS**Abstract**

This paper intends to develop shape shifting Solar Panels using Shape Memory Alloys (SMA) like Nitinol (Alloy of Ni and Ti). Due to the Shape Memory Effect of SMA's, the panel is able retain a particular shape at an initial temperature T1 and then change its shape at another temperature T2 after a controlled heating procedure. The proposed mechanism effectively allows us to coil Solar Panels, hence reducing the use of bulky Solar Panels and increasing the total available space on the body of the test vehicle. The solar cells are coated with graphene, a translucent, flexible, but tough material able to withstand the rough conditions in space. When needed, the Solar Panels can be moved into place to shield the satellite from small debris. Alternatively, graphene can be replaced by ALON, which is 80% transparent, radiation resistant and almost as hard as sapphire. The paper elegantly introduces the concept of space efficient coilable solar panels that can be used to protect satellites from debris.