

December 2011 MSS/LPS/SPS Joint Subcommittee Meeting

ABSTRACT SUBMITTAL FORM

The submission of an abstract is an agreement to complete a final paper for publication and attend the meeting to present this information. Complete all information requested in the author and co-author information sections; the first author listed will receive paper acceptance notices and all correspondence. Abstracts must be submitted electronically; submittal instructions are located in the call for papers. **The abstract deadline date is June 13, 2011.**

ABSTRACT INFORMATION

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MANAGEMENT APPROVAL

The individual below certifies that the required resources are available to present this paper at the above subject JANNAF meeting.

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ABSTRACT SUBMITTAL FORM

Unclassified Abstract

(250-300 words; do not include figures or tables)

Objective:

The objective of this paper will be to investigate advancements and any commonality between spacecraft debris containment and the improvements being made in ballistic protection.

Scope:

This paper will focus on cross application of protection devices and methods, and how they relate to protecting humans from failures in spacecraft. The potential gain is to reduce the risk associated with hardware failure, while decreasing the weight and size of energy containment methods currently being used by the government and commercial industry.

Method of Approach:

This paper will examine testing that has already been accomplished in regards to the failure of high energy rotating hardware and compare it to advancements in ballistic protection. Examples are: DOT research and testing of turbine containment as documented in DOT/FAA/AR-96/110, DOT/FAA/AR-97/82, DOT/FAA/AR-98/22. It will also look at work accomplished by companies such as ApNano and IBD Deisenroth in the development of nano ceramics and nanometric steels. Other forms of energy absorbent materials and composites will also be considered and discussed.

New Advances in State of the Art:

There have been numerous advances in technology in regards to high energy debris containment and in the similar field of ballistic protection. This paper will discuss methods such as using impregnated or dry Kevlar, ceramic, and nano-technology which have been successfully tested but are yet to be utilized in spacecraft. Reports on tungsten disulfide nanotubes claim that they are 4-5 times stronger than steel and reports vary about the magnitude increase over Kevlar, but it appears to be somewhere in the range of 2-6 times stronger. This technology could also have applications in the protection of pressure vessels, motor housings, and hydraulic component failures.