**Government Reference Concept for a 10 kW Lunar South Pole Solar Array**

Richard Pappa, Chuck Taylor, Jay Warren, Matt Chamberlain, Scott Belbin

NASA Langley Research Center

Hampton, VA

Martin Mikulas

National Institute of Aerospace

Hampton, VA

Joe Blandino

Virginia Military Academy

Lexington, VA

Jeremiah McNatt, Anna Pal, James Fincannon

NASA Glenn Research Center

Cleveland, VA

Deployable and relocatable free-standing, solar arrays will be required for future lunar South Pole missions. Major design requirements for these arrays will be low mass, compact launch stowage, and highly reliable deployment and retraction performance. A novel conceptual design referred to as the Relocatable Solar Array (RSA) is presented for a 10 kW solar array to address these requirements. Simply stated, the concept is a pair of solar cell blankets freely hanging from a horizontal cross arm that is supported by a vertical slender telescoping mast, all of which, rests on a deployable tripod base. A major factor in simplifying this array is that the force exerted by lunar gravity is used to deploy and maintain the extension of the hanging array blankets. The other major factor in achieving the desired low mass and high volumetric efficiency is that the resulting array system operates in the vacuum, low-gravity, lunar environment with no deployed vibration frequency requirement. Such an environment enables the use of extraordinarily slender and low mass structural members to support the hanging array blankets. This concept was developed, in part, to serve as a NASA reference solar array concept against which other proposed arrays can be compared.

***Technical Point of Contact:***

Richard S. Pappa, NASA Langley Research Center

757-864-4321

[Richard.S.Pappa@nasa.gov](mailto:Richard.S.Pappa@nasa.gov)