

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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AUTHOR INFORMATION

Author/Presenter Name: Erin M. Betts

Affiliation NASA

Address 4203/ER21

City MSFC State AL Zip 35812

Telephone 256-544-5260 Telefax

e-mail: Erin.Betts@nasa.gov

2nd Author: David C. Reynolds

Affiliation NASA

Address 4203/ER32

City MSFC State AL Zip 35812

Telephone 256-544-5694 Telefax

e-mail: David.C.Reynolds@nasa.gov

3rd Author: David E. Eddleman

Affiliation NASA

Address 4203/ER33

City MSFC State AL Zip 35812

Telephone 256-544-6410 Telefax

e-mail: David.E.Eddleman@nasa.gov

Additional Author(s): Andy Hardin

Affiliation ERC Incorporated

Address 4203/JP50

City MSFC State AL Zip 35812

Telephone 256-544-1741 Telefax

e-mail: Andy.Hardin@nasa.gov

MANAGEMENT APPROVAL

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

Responsible Manager authorizing presentation: Thomas D. Byrd

Title/Agency: J-2X Deputy Program Manager/NASA

Telephone Number: 256-544-7147 e-mail: Thomas.D.Byrd@nasa.gov Date: 06/13/2011

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Unclassified Abstract

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

Many of the manufacturing techniques that are currently used for rocket engine component production are traditional methods that have been proven through years of experience and historical precedence. As we enter into a new space age where new launch vehicles are being designed and propulsion systems are being improved upon, it is sometimes necessary to adopt new and innovative techniques for manufacturing hardware. With a heavy emphasis on cost reduction and improvements in manufacturing time, manufacturing techniques such as Direct Metal Laser Sintering (DMLS) are being adopted and evaluated for their use on J-2X, with hopes of employing this technology on a wide variety of future projects. DMLS has the potential to significantly reduce the processing time and cost of engine hardware, while achieving desirable material properties by using a layered powder metal manufacturing process in order to produce complex part geometries. Marshall Space Flight Center (MSFC) has recently hot-fire tested a J-2X gas generator discharge duct that was manufactured using DMLS. The duct was inspected and proof tested prior to the hot-fire test. Using the Workhorse Gas Generator (WHGG) test setup at MSFC's East Test Area test stand 116, the duct was subject to extreme J-2X gas generator environments and endured a total of 538 seconds of hot-fire time. The duct survived the testing and was inspected after the test. DMLS manufacturing has proven to be a viable option for manufacturing rocket engine hardware, and further development and use of this manufacturing method is recommended.