

Abstract Submittal Form

Joint Army-Navy-NASA-Air Force (JANNAF)
61st JPM / 42nd SMBS / 38th PEDCS / 29th RNTS / 27th SEPS
Joint Subcommittee Meeting
19 – 22 May 2014

JPM Abstract Due Date: Monday, February 3, 2014

Title: A Modular Aerospike Engine Design Using Additive Manufacturing

Submitted to: JPM SMBS* PEDCS* RNTS* SEPS*

Mission Area : 1 2 3 4 5 6 7 8 9 10

Security Classification: Secret Unclassified

Updated Paper? Yes No

Student Paper? Yes No

Sponsoring organization if SBIR-funded:

Primary Author (this author will receive all correspondence regarding participation in this program)

Name: John Peugeot

Organization: NASA MSFC ER21

Address: ER21 Marshall Space Flight Center

City: MSFC

State: AL

ZIP Code: 35812

Phone: 256-544-4154

Fax:

Email: john.w.peugeot@nasa.gov

2nd Author

Name: Dr. Chance Garcia

Organization: NASA MSFC ER32

Address: ER32 Marshall Space Flight Center

City: MSFC

State: AL

ZIP Code: 35812

Phone: 256-544-6252

Fax:

Email: chance.garcia-1@nasa.gov

3rd Author

Name: Wendel Burkhardt

Organization: WASK Engineering

Address: 3905 Dividend Drive

City: Cameron Park

State: CA

ZIP Code: 95682

Phone: 530.672.2795 x105

Fax:

Email: wendel.burkhardt@waskengr.com

4th Author

Name:

Organization:

Address:

City:

State:

ZIP Code:

Phone:

Fax:

Email:

Approval

Approved by Management

Placeholder

*** Additional Abstracts for SMBS, PEDCS, RNTS & SEPS will be considered on a space available basis. You are welcome to contact the Mission Area Chairs to inquire whether abstracts are needed.**

Abstract Submittal Form

JANNAF
61st JPM / 42nd SMBS / 38th PEDCS / 29th RNTS / 27th SEPS
Joint Subcommittee Meeting
19 – 22 May 2014

JPM Abstract Due Date: Monday, February 3, 2014

Unclassified Abstract (250 – 300 words; do not include figures or tables)

A modular aerospike engine concept has been developed with the objective of demonstrating the viability of the aerospike design using additive manufacturing techniques. The aerospike system is a self-compensating design that allows for optimal performance over the entire flight regime and allows for the lowest possible mass vehicle designs. At low altitudes, improvements in Isp can be traded against chamber pressure, staging, and payload. In upper stage applications, expansion ratio and engine envelope can be traded against nozzle efficiency. These features provide flexibility to the System Designer optimizing a complete vehicle stage. The aerospike concept is a good example of a component that has demonstrated improved performance capability, but traditionally has manufacturing requirements that are too expensive and complex to use in a production vehicle. In recent years, additive manufacturing has emerged as a potential method for improving the speed and cost of building geometrically complex components in rocket engines. It offers a reduction in tooling overhead and significant improvements in the integration of the designer and manufacturing method. In addition, the modularity of the engine design provides the ability to perform full scale testing on the combustion devices outside of the full engine configuration. The proposed design uses a hydrocarbon based gas-generator cycle, with plans to take advantage of existing powerhead hardware while focusing DDT&E resources on manufacturing and sub-system testing of the combustion devices. The major risks for the modular aerospike concept lie in the performance of the propellant feed system, the structural integrity of the additive manufactured components, and the aerodynamic efficiency of the exhaust flow.

- By submitting an abstract, you agree to both complete a final paper for publication and to attend the meeting to present this information.
- Submit abstracts electronically; submittal instructions are found in the call for papers.
- Direct questions to Shelley Cohen, by phone at 410.992.7302 x 215, or email to scohen@cpjac.jhu.edu.