

<b>Abstract Submittal Form</b>	<b>JANNAF</b> <b>Liquid Propulsion Subcommittee and Advanced Materials Panel</b> <b>Technical Interchange Meeting</b> <b>3 – 5 September 2014</b>
<b>Abstract Due Date: Wednesday, June 4, 2013</b>	

Title: Cleaning Process Development for Metallic Additively Manufactured Parts

Session Area:    1    2    3    4    5    6    7    8    9

Sponsoring organization if SBIR-funded:

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## Abstract Submittal Form

JANNAF

Liquid Propulsion Subcommittee and Advanced Materials Panel

Technical Interchange Meeting

3 – 5 September 2014

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

Additive Manufacturing of metallic components for aerospace applications offers many advantages over traditional manufacturing techniques. As a new technology, many aspects of its widespread utilization remain open to investigation. Among these are the cleaning processes that can be used for post finishing of parts and measurements to verify effectiveness of the cleaning processes.

Many cleaning and drying processes and measurement methods that have been used for parts manufactured using conventional techniques are candidates that may be considered for cleaning and verification of additively manufactured parts. Among these are vapor degreasing, ultrasonic immersion and spray cleaning, followed by hot air drying, vacuum baking and solvent displacement drying. Differences in porosity, density, and surface finish of additively manufactured versus conventionally manufactured parts may introduce new considerations in the selection of cleaning and drying processes or the method used to verify their effectiveness.

This presentation will review the relative strengths and weaknesses of different candidate cleaning and drying processes as they may apply to additively manufactured metal parts for aerospace applications. An ultrasonic cleaning technique for exploring the cleanability of parts will be presented along with an example using additively manufactured Inconel 718 test specimens to illustrate its use. The data analysis shows that this ultrasonic cleaning approach results in a well-behaved ultrasonic cleaning/extraction behavior. That is, it does not show signs of accelerated cavitation erosion of the base material, which was later confirmed by neutron imaging. In addition, the analysis indicated that complete cleaning would be achieved by ultrasonic immersion cleaning at approximately 5 minutes, which was verified by subsequent cleaning of additional parts.

- By submitting an abstract, you agree to complete a final paper/presentation 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 Kathleen Biglari, by phone at 410.992.7300 x 208, or email to [kbiglari@cpiaac.jhu.edu](mailto:kbiglari@cpiaac.jhu.edu).