

Abstract Submittal Form

JANNAF

**Liquid Propulsion Subcommittee and Advanced Materials Panel
Technical Interchange Meeting
3 – 5 September 2014****Abstract Due Date: Wednesday, June 4, 2013**

Title: Investigation into the use of the Concept Laser QM system as an in-situ research and evaluation tool

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

Sponsoring organization if SBIR-funded:

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Approval Approved by Management Placeholder

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

The NASA Marshall Space Flight Center (MSFC) is using a Concept Laser Fusing (Cusing) M2 powder bed additive manufacturing system for the build of space flight prototypes and hardware. NASA MSFC is collecting and analyzing data from the M2 QM Meltpool and QM Coating systems for builds. This data is intended to aide in understanding of the powder-bed additive manufacturing process, and in the development of a thermal model for the process. The QM systems are marketed by Concept Laser GmbH as in-situ quality management modules. The QM Meltpool system uses both a high-speed near-IR camera and a photodiode to monitor the melt pool generated by the laser. The software determines from the camera images the size of the melt pool. The camera also measures the integrated intensity of the IR radiation, and the photodiode gives an intensity value based on the brightness of the melt pool. The QM coating system uses a high resolution optical camera to image the surface after each layer has been formed.

The objective of this investigation was to determine the adequacy of the QM Meltpool system as a research instrument for in-situ measurement of melt pool size and temperature and its applicability to NASA's objectives in (1) Developing a process thermal model and (2) Quantifying feedback measurements with the intent of meeting quality requirements or specifications. Note that Concept Laser markets the system only as capable of giving an indication of changes between builds, not as an in-situ research and evaluation tool. A secondary objective of the investigation is to determine the adequacy of the QM Coating system as an in-situ layer-wise geometry and layer quality evaluation tool.

- 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@cpiac.jhu.edu.