

MxD 15-07-07	Category: PO to 1 st Article, Recurring Manufacturing
Title:	Rapid Process Certification and Verification for High-Value-Added and Low-Volume Production
Completion Date:	2018-05-31
Project Team:	Northwestern University, Northern Illinois University, PDA LLC, QuesTek Innovations LLC, Siemens
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Problem:

The market value of one-of-a-kind or low-volume metallic parts easily exceeds multi-billion dollars each year, considering new and legacy parts in aerospace or defense applications, tooling for mass-production, functional prototyping parts for new or legend cars, or patient-specific parts. The current certification and verification of high-value-added and low-volume production are not well developed. This is also under-developed in flexible manufacturing processes, such as additive manufacturing processes provide demonstrated promise for value-added manufacturing. This project is attempting to certify the process for a specific production, enable one to know whether the just-made, one-of-a-kind part can perform the desired structural or other functional requirements, without performing extensive experimental testing.

Objective:

This project will certify the rapid process for high-value-added and low-volume production, enable one to know whether the just-made, one-of-a-kind part can perform the desired structural or other functional requirements. The new rapid certification and verification system can be performed rapidly without extensive experimental testing compared to the other developed certification technology in conventional manufacturing productions.

This project will develop a software to be connected with Siemens NX using its API to virtually build parts, quantify the quality of the manufactured parts in terms of geometric fidelity and to predict their mechanical properties. Testbeds for additive manufacturing (AM) and casting processes will also be developed to meet the industrial requirements.