

OMIC R&D TECHNOLOGY BOARD

CONCEPTUAL ABSTRACT



TITLE: Improve surface finish on 3D printed parts

RELATED ROAD-MAPPING DESIGNATION ID#: AM5

SUPPORTIVE INDUSTRY: BOEING / SECO / SUGINO

PROJECT TYPE: General Project. Additive Manufacturing.

PROBLEM STATEMENT (What Are We Trying to Solve?): Surface finish of metal and plastic 3d printed parts is typically relatively rough. The process leaves a beaded and layered appearance to metal 3d printed parts. The desirable final finish of the parts is smooth and continuous, similar to machined parts. There are significant post printing operations that take place to achieve a smooth surface finish of metal 3d printed parts. Reducing or removing these post process operations would be an advantage for users of 3d printed materials. Typical powder bed fusion Ra values range from Ra 20-200. Our goal is to optimize the process to reduce this.

PROJECT DESCRIPTION: The goals of the project would be to Determine industry aligned 3d printers and a couple of test case scenario parts with various geometries. Metal and plastic 3d printers to be included. Determine variables that affect surface finish which may include laser spot diameter, laser power, scanning speed, heat of the printing chamber, metal powder granularity, and complexity of surface geometry. Design an experiment using variables with ranges determined to affect surface finish to create 3d prints. Researchers will then determine a method to measure surface finish. Researcher will develop improvements to surface finish, implement them to part manufacturing, and document the results.

Identify Related OMIC R&D Resources:

- Wenzel LH 1210 CMM
- Surface profilometers
- Available 3d printers

PROJECT DELIVERABLES:

- Study of experimental methods that have been used in industry to improve surface finish of 3d printed parts.
- Method for part inspection and locations of surface finish inspection.
- Improvements made to 3d printing surface finish during this project
- Final report, and related presentation, part samples summarizing results.