

OMIC R&D TECHNOLOGY BOARD

CONCEPTUAL ABSTRACT



TITLE: Robotic controlled 3D printer for enhanced capability

RELATED ROAD-MAPPING DESIGNATION ID#: R2.

SUPPORTIVE INDUSTRY: Silver Eagle, Sandvik

PROJECT TYPE: General Project - Robotics & Sensors

PROBLEM STATEMENT (What Are We Trying to Solve?): Standard 3D printers are only able to move in 3 axes. This has limitations in print geometries and quality of surface finish. Curved surfaces and complex geometries are difficult to produce (especially in planar slicing) and often result in a rough print finish texture. There is a risk to parts settling and a relative requirement of support material based on geometry. As the geometries increase in size and complexity, the printer needs a significantly larger surface bed. This leads to large floor space requirements. The printers are not mobile, and capabilities are limited to their enclosure boundaries. This project seeks to find a solution that will expand printer abilities beyond current limitations.

PROJECT DESCRIPTION:

Check with industry:

- 1) What is the main purpose of this project?
 - a. Develop a robot solution or find and test an existing solution?
IF the latter a, then:
 - b. Mobile solution?
 - c. Print on existing structures solution?
 - d. Stress Analysis?

This work will require a robot, and a print extruder. The robot will allow the print head to move in Roll, Pitch, & Yaw allowing for greater print qualities of complex geometries over a standard printer.

Identify Related OMIC R&D Resources:

- Electronics lab
- Robotics Researcher – Jordan Meader, Machining Researcher – Cody Apple

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PROJECT DELIVERABLES:

Assuming using an existing solution:

1. Identify technologies to meet material needs
2. Identify company tech to move forward with
3. Functional demo/proof of concept
4. Print(s) of desired part
5. Analysis of print performance
6. Report & Presentation

Future phases:

- Mobile print solution
- Print onto existing surfaces
- Stress Analysis.