OMIC R&D TECHNOLOGY BOARD
CONCEPTUAL ABSTRACT

TITLE: **OMIC-R22 Mobile Printing Platform P2 of OMP434**

RELATED ROAD-MAPPING DESIGNATION ID#: R22

SUPPORTIVE INDUSTRY: Boeing, Oregon Tool.

PROJECT TYPE: General Project (Phase 2 of OMP434 - R2-Y5-FY22)

PROBLEM STATEMENT (What Are We Trying to Solve?): The ability to approach an object in the build environment and add new printed features or repair existing structures can be a transformative technology for additive manufacturing. In Phase 1, the team constructed a first prototype of a unique mobile 3D printer that is capable of printing on a non-planar work-surface to print simple features. Issues with print precision became apparent through the construction of the prototype and slicing when working on complex curved surfaces. Generalizing the slicing and print movements would allow printing in more directions which has applications in both plastic and eventually metal 3D printing.

PROJECT DESCRIPTION: Continuing the project for a second year would allow the team to produce a larger and more-effective device capable of handling complex environments (including concave surfaces and a larger range of threshold angles) and print structures. The research and development will focus on the computational challenges to properly move the print head and automatically align the device in subsequent printing regions. The team intends to demonstrate the ability to print a structure much larger than the printer itself on a curved or faceted surface.

Identify Related OMIC R&D Resources: Proposing researchers should use their best judgement in deciding on the optimal resources for the research. To further aid in this decision, the OMIC staff has taken the initiative to best identify on-site resources (machines, equipment, and staff) that may relate to the scope of this research. Please recognize that researchers are not limited to these resources.

- o Identify OMIC machines: The spectrum of capabilities at OMIC R&D can be reviewed at the following link: https://www.omic.us/explore/facility
- o Collaborative Robots: Sawyer, Doosan H2017.
- o OMIC Staff: Jordan Meader, Kyle McGann.

PROJECT DELIVERABLES:

1. Identify technologies to meet material needs
2. Identify company tech to move forward with
3. Improvement and scaling of original proof of concept
4. Creation of software for generalized prints

5. Print(s) of desired parts
6. Analysis of print performance
7. Report & Presentation

SPECIAL NOTE: It should be recognized that this Conceptual Abstract is written based on comments collected during OMIC R&D Road-mapping workshop and based on industries need for applied research. However, researchers as SMEs, are encouraged to lend specific technical feedback to further refine the Project Description and or Project Outcomes. The proposing researcher may do so either directly to OMIC R&D, or in the submitting proposal.

UTILIZATION OF OMIC RESOURCES: Researchers are encouraged to utilize the capital and personnel resources available on the OMIC R&D campus in their proposals. Use of OMIC time and machines should be included in the Proposal funding request. If use of OMIC resources are not identified in a proposal and are requested during, the project sponsor will be responsible for requesting a costed project amendment from the Tech Board.

PROJECT UPDATE EXPECTATIONS: Researchers are required to have monthly update discussion with OMIC R&D to provide a summary update on project status. This is done by way of a user-friendly format known as the OMIC 6-Block update. Typically, these meetings are scheduled on the first Wednesday and Thursday of each month. Secondly, depending on the scope of the project, OMIC R&D's industry Tech Board representatives are often interested in periodic project updates, and even in project participation. Researchers are required to communicate with supportive industry and facilitate communications as required.

PROJECT DURATION: It is OMIC R&D's strong preference that duration of a General Project aligns with the academic calendar cycle (July 2022 to June 2023). It is preferred that the project be completed by June 2023. Researchers are encouraged to factor in variables such as contracting, student hiring (if needed), procurement, holidays, and travel. It has been OMIC R&D's experience that a projects useful working duration is typically 9 to 10 months. Researchers are also encouraged to lend feedback, and to adjust the scope of work to best fit this preferred timeframe. Additionally, it is reasonable to even recommend phasing breakdowns to the project. In some unique circumstances, if the project is to take significantly longer than the duration of the academic year, this reasoning should be explicitly explained in the proposal.

CONTACTS AT OMIC R&D:

Urmaze Naterwalla	**Craig Campbell**	**Jen Kammerman**
Head of R&D	Executive Director	Executive Assistant
Urmaze.Naterwalla@oit.edu	Craig.Campbell@oit.edu	Jen.Kammerman@oit.edu