
TITLE: Multi-Process AM for Multi-Material Fabrication

RELATED ROAD-MAPPING DESIGNATION ID#: AM76

SUPPORTIVE INDUSTRY: Silver Eagle.

PROJECT TYPE: General Project

PROBLEM STATEMENT (What Are We Trying to Solve?):

As additive manufacturing (AM) continues to evolve, the limitations of individual processes have become more apparent. No single AM method can simultaneously achieve fine resolution, high deposition rates, large build volumes, and multi-material flexibility. Such solutions could benefit industry such as aerospace, tooling, and automotive.

PROJECT DESCRIPTION:

In this project, we propose Multi-Process Additive Manufacturing (MPAM) approach to address these challenges by integrating two or more AM processes into a cohesive system. Through this integration, MPAM allows each process to perform the function it does best. Such as, using one for precision features and another for structural deposition. This could result in superior efficiency, versatility, and part performance. This combination enables manufacturers to produce hybrid/multi material parts that benefit from the unique capabilities of each process. For example:

- LPBF provides fine resolution and tight tolerances.
- LDED, Cold Spray, or WAAM enables high deposition rates and large build volumes.

Multi-Process Additive Manufacturing marks a significant step toward next-generation manufacturing systems capable of producing complex, high-performance, and multi-material components in a single, streamlined workflow. By combining the best attributes of existing AM technologies, MPAM delivers new levels of design freedom, efficiency, and material functionality—driving innovation across the manufacturing landscape

Identify Related OMIC R&D Resources: Proposing researchers should use their best judgment 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.

OMIC R&D TECHNOLOGY BOARD

CONCEPTUAL ABSTRACT



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- Machines and equipment at OMIC can be reviewed at:
<http://omic.us/applied-research/additive/>
<http://omic.us/applied-research/subtractive/>
<http://omic.us/applied-research/materials/>
<http://omic.us/applied-research/robotics/>
<http://omic.us/applied-research/inspection/>
 - OMIC Staff or SMEs
<http://omic.us/applied-research/>

PROJECT DELIVERABLES:

- Final report
- Final 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. 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.

OMIC R&D TECHNOLOGY BOARD CONCEPTUAL ABSTRACT



ADDITIONAL COMMITMENTS TO FACTOR: Researchers may be asked to present their final project at an OMIC R&D biennial Technology Exchange Symposium. This symposium is an in-person event, held at the OMIC R&D campus in Scappoose Oregon. The Symposium is held in the spring, and researchers should factor in their availability when bidding on projects.

Researchers may be invited to participate in OMIC R&D's marketing efforts that showcase the working history of the project.

PROJECT DURATION: It's OMIC R&D's strong preference that duration of a General Project aligns with the academic calendar cycle (July 2026 to June 2027). It is preferred that the project be completed by June 2027. 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 project's useful working duration is typically 9 to 10 months. Researchers are also encouraged to give 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.

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