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**TITLE: Study of Human & Industrial Transportation Robot Interaction**

**RELATED ROAD-MAPPING DESIGNATION ID#: R47**

**SUPPORTIVE INDUSTRY:** Oregon Tool, Boeing, Silver Eagle, Cobot Team

**PROJECT TYPE:** General Project

**PROBLEM STATEMENT (What Are We Trying to Solve?):** Human to robot interaction is one of the largest barriers to incorporating automated solutions on factory floors. This work is a step toward overcoming technological and psychological barriers.

**PROJECT DESCRIPTION:** In modern warehouses and logistics operations settings, robotic carts and pallet transporters are becoming more common due to their potential to extend the abilities of human pickers. As these systems emerge, new challenges also appear related to humans successfully coexisting and collaborating with such industrial robots. In some settings, like the first wave of Amazon warehouse robots, a common strategy was to stall all robots near a person when they enter the production floor. But this type of answer interferes with productivity, and leaves something to be desired in terms of a satisfying and collaborative workplace experience.

- The research must include using multimodal robot expression and input modalities to allow robotic carts and pallet transporters to understand the state of nearby people and communicate essential information about their own states to human interlocutors.
- Overall, this project idea would extend the theory and early empirical results from the past R33 (Human-to-Robot Trust) project in a new application that is well integrated with industry interests.
- This research would require selecting robot transportation scenarios in collaboration with supportive industry partners. These scenarios should clearly identify criterion of the robot's opportunity to interact with humans as case studies.
- The robot states (with options) should be assessed for each of the case studies with a reasonable sample group.
- The ideal human robot interaction state should be identified for each case study.

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## CONCEPTUAL ABSTRACT



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**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.

- 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

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even in project participation. Researchers are required to communicate with supportive industry and facilitate communications as required.

**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 2025 to June 2026). It is preferred that the project be completed by June 2026. 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.

### CONTACTS AT OMIC R&D:

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