

# OMAC API Development Activities under TIME

## PROBLEM / OBJECTIVE

The desire for open-architecture controller components is high, but vendors are slow to respond. One reason for the delay in industry action is that no clear open-architecture solution has evolved. In an effort to promote open architecture control solutions, the Open Modular Architecture Controller (OMAC) Users Group sponsors an Application Programming (API) workgroup, whose eventual goal is the submission of a specification to an established standards body.

Based on a subset of the OMAC API, Lawrence Livermore National Laboratory (LLNL) has developed a toolkit for use in implementing OMAC compliant controllers. This toolkit, referred to as DOE/OMAC version 2.0, was used by LCMS (Louisiana Center for Manufacturing Sciences) and Raytheon Professional Services to develop and integrate the first OMAC compliant controller system for a milling machine.

The objective of this project is three-fold: 1) perform concept validation on the OMAC developed by LLNL as a platform for the development of OMAC components, modules and applications, 2) extend the DOE/OMACv2.0 toolkit to other control domains, and 3) transfer the OMAC technology developed at LLNL to LCMS and ARDEC.

## ACCOMPLISHMENTS / PAYOFF

### *Process Improvement:*

DOE/OMACv2.0 is a Java implementation of the interfaces and modules specified by the OMAC API working group. It is a toolkit that allows the user to develop controller applications and components that are consistent with the recommendations of the OMAC API working group.

LCMS and Raytheon used the DOE/OMACv2.0 toolkit to develop an OMAC for a KT600 mill at LCMS. Development activities included the creation of a DCX/OPC IO module based on the OMAC API, the integration of a COTS soft PLC, and the addition of a tool changing capability. The DCX/OPC IO module was developed from the DOE/OMACv2.0 reference architecture, the COTS soft PLC was integrated using the IO module, and the tool change was accomplished using components developed in accordance with the OMAC API.



### *Implementation and Technology Transfer:*

Due to the success of DOE/OMACv2.0 as an OMAC development platform for the KT600, efforts are currently underway to design, and develop an OMAC for use in model-based control. These efforts will culminate with the creation of new components and modules for DOE/OMACv2.0 that extend its applicability to process control. The OMAC is now being offered for commercial licensing.

### *Expected Benefits:*

Developers will be able to reconfigure machine controller functionality more easily using industry accepted instruction sets, leading to more versatile machine controllers, faster response to change and lower costs. Now underway are related activities that will allow direct machining from STEP files. The immediate results of this project will be; 1) an alternative to proprietary controllers for the customer, allowing for the full benefits of OMAC, 2) potential OMAC commercialization, and 3) future refinement on the reference architecture, allowing "building blocks" or components to be designed with a more "plug and play" feel.

## TIME LINE / MILESTONE

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End Date: December 2001

## FUNDING

Army ManTech:

## PARTICIPANTS

Louisiana Center for Manufacturing Sciences  
Raytheon Professional Services  
Lawrence Livermore National Laboratory  
ARDEC