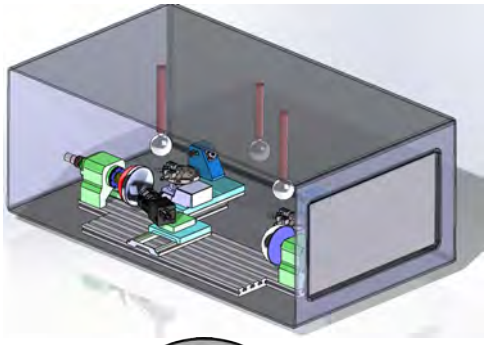
TAO Technical Applications Office

HIGHLIGHTS

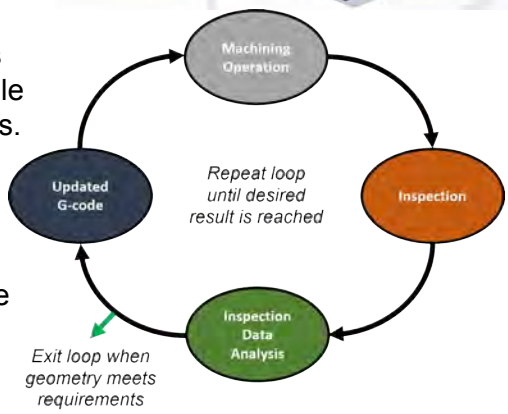
Los Alamos NATIONAL LABORATORY

Future Advanced Machining Platform (FAMP) Research



Los Alamos National Laboratory (LANL) and the Associate Laboratory Directorate for Weapons Production's (ALDWP) Technical Applications Office (TAO) have partnered with Montana State University (MSU) to look at future advanced machining platforms (FAMP). The goal of FAMP is to apply future advanced machine tool technologies to the pit production needs of LANL. The project seeks to provide technology refresh options for US pit manufacturing as current installed (LANL) and planned (Savannah River Plutonium Production Facility) platforms age out during the production life of the equipment.

MSU is developing a prototype machining system that incorporates an optical inspection system to provide it with the necessary data to self-correct/adjust its cutting paths as needed. The resulting equipment is less massive, more capable (integrated inspection system), and less expensive than traditional technologies.



Conventionally components are made on a mill or lathe and then inspected on different machines sometimes located in other rooms or even facilities. Traditionally as part tolerance requirements increase bigger/stiffer/pricier machining centers are needed. By continuously measuring the outcomes of the machining operations MSU can continuously adjust for the delta between the actual and desired geometric results. This allows an increase in the tolerance capabilities of a less stiff machine beyond its baseline. A smaller machining center would result in lower footprint needs and smaller/cheaper glove box enclosures.

MSU is partnering with a local CNC tool manufacturer (PENTA Machine Co.) to see how far they can push their machines by incorporating an inspection feedback loop into them. Physical proximity and familiarity with PENTA systems allow MSU to collaborate at a high level. Researchers are in the process of determining the sensitivity of different types of optical inspection technologies to changes in surface finish (for example due to tarnishing or aging). An optical inspection system would allow us to not physically touch parts and gather significantly more geometric data in less time increasing the viability of these new machining systems.

Integrating inspection and machining operations into a single cell will allows the production of high-tolerance parts with smaller and more economical machines. Furthermore, the parts being produced will already have been inspected reducing the potential for rework.

MSU has classified research capabilities, cleared professional staff, and a strong engineering student population. In addition to work product, MSU continues to provide LANL the opportunity to hire cleared graduates with relevant work experience from our student research teams.

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