

## NTU receives NASA grant to develop 3D printed bi-metallic rocket parts

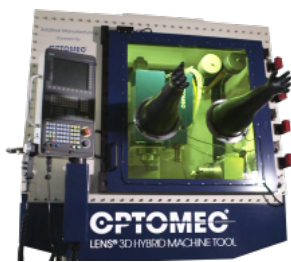
### Navajo Technical University will use Optomec's LENS AM technology for the project



The Navajo Technical University (NTU) and partners have received a grant from NASA to 3D print bi-metallic rocket engine parts for a 2024 lunar mission. The project, which also includes the Marshall Space Flight Center Advanced Manufacturing Center (MSFC), the University of Alabama Huntsville (UAH) and V&M Global Solutions, will rely on Optomec's LENS Directed Energy Deposition (DED) metal 3D printing technology.

Working with [Optomec](#) and its other partners, an NTU team will develop 3D printed bi-metallic parts for rocket engine parts using LENS technology, which will ultimately be used in a 2024 NASA mission to the moon. The grant provided by NASA is part of a program to support AM research and education related to space exploration.

"We're very excited to be working with this team and NASA to explore how the benefits of additive manufacturing can be applied to space exploration," explained Tom Cobbs, Optomec LENS product manager. "LENS is an ideal solution for printing multi-material components used in higher-performance liquid rocket engine components and holds the potential to provide significant advantages in terms of cost and time savings, especially if we can print the bi-metallic parts on one machine in one process."



NTU first [partnered with Optomec in September 2019](#), when it acquired a LENS Hybrid Controlled Atmosphere System for its Center for Advanced Manufacturing, which is expected to officially open in 2020. One of the projects to be undertaken with the AM technology will be the development of parts for NASA rocket engines.

The NASA-backed research will primarily focus on the characterization of the microstructure of AM Inconel-Cu alloy bi-metallic parts. This characterization (both at the micro and nano scale) will cover three conditions for the bi-metallic parts: as built, during hot-isostatic pressing and heat treatment, and after a combined hot-isostatic pressing and heat treatment. The goal is to determine the necessary linkages between microstructure, post-processing, dimensional accuracy and mechanical properties.

The NTU-led research project will also use metrology in order to better understand the dimensional accuracy of 3D printed parts made using LENS DED technology for Space Launch System applications.

“We are extremely honored to receive this grant from NASA,” added Dr. Monsuru Ramoni, Ph.D., an assistant professor of Industrial Engineering at NTU and the principal investigator for this grant. “In addition to providing working parts for NASA to meet its goal of walking on the moon in 2024, these research activities provide unprecedented learning opportunities.

“Collaboration with other academic, government and private companies will enhance our state-of-the-art research and education center in Advanced Manufacturing here at the Navajo Nation and support our goal to prepare a diverse, skilled science and engineering workforce in advanced manufacturing, research, and engineering.”