



Additive Design and Manufacturing of SmallSat Structures

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Program: Strategic Initiative

Project Objective:

The long-term objective of the project is to demonstrate the viability of producing large structures using GE's ATLAS laser powder bed fusion machine and HRL's Al 7075 powder to create multi-functional structure for smallsats. The effort will demonstrate a cross-cutting, multi-disciplinary approach to generate structure on the world's largest laser powder bed fusion system

FY18/19 Results:

The project was able to purchase 250 kg of HRL's Al 7075 for FY2020 research purposes. This experimental powder, which contains a unique grain stabilization agent, can be used for laser powder bed fusion additive manufacturing techniques, unlike conventional 7XXX aluminum alloys.

Benefits to NASA and JPL (or significance of results):

The work accomplished in FY19 will feed into the proposed ADAMMS project in FY20, which will demonstrate multi-functional design and testing of an integrated propellant tank and structure. The proposed work will demonstrate the viability for a smallsat missions in the 50 – 100 kg class, with a test case focusing on the proposed Cupid's Arrow structure, which is a Venus atmosphere skimmer.

The proposed FY2020 strategic task would develop the largest demonstrated integrated structure ever fabricated and the first flight-like structure fabricated from the HRL powder.



The HRL powder in canisters with , from left to right, Andre Pate (357D) and Ian Luczon (5126) at HRL, Malibu, CA.

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