

Digitally Driven Approach to Vertically Integrated Processing and Engineer Repair/Remanufacturing (VIPER) - Terrestrial and Non-terrestrial Manufacturing at the Point-of-Need

ABSTRACT

In-Situ Resource Utilization (ISRU) for terrestrial and non-terrestrial manufacturing requires incremental steps towards the desired end-state of using secondary feedstocks for low-power manufacturing and repair. Therefore, this work summarizes an experimental and computational investigation on the solid-state processing of two secondary feedstock waste streams: (1) manufacturing chips and (2) waste metal such as discarded materials (cannibalization of battle-damaged material, waste from descent stages, and/or expired artificial satellites) via Round Feedstock - Additive Friction Stir Deposition (RF-AFSD), a Direct Additive Recycling (DAR) approach.

BIOGRAPHY

Dr. Paul G. Allison is a Professor in the Mechanical Engineering Department at Baylor University and is leading the interdisciplinary Point-of-Need Innovations (PONI) Center as the founding director. Dr. Allison's research focus is developing the fundamental understanding to enable manufacturing in austere environments to support basic and applied research projects with a special focus on in-situ resource utilization of secondary feedstocks such as machining scrap or battle-damaged components. His research has been supported by a variety of industrial sponsors as well as the Army, Air Force, DHS, DOE, FHWA, Marine Corps, Navy, and NASA during his career.