



Alloy development benefits the aerospace, energy, nuclear, automotive, electronics, and medical industries.

Metal Alloy Development for Additive Manufacturing

In May 2021, America Makes convened members of the additive manufacturing (AM) supply chain for a three-day workshop to explore metal alloy development for AM. Participants evaluated and prioritized future development efforts addressing the challenges that inhibit rapid and cost-effective alloy development for AM processes.

Development and qualification of metal alloys through existing approaches involves many risks and challenges. This is especially true when cost and time to market inhibit commercialization for additively manufactured products.

Workshop participants defined candidate materials, applications, and AM processes in addition to the associated benefits, cost drivers, and technological gaps to produce a strategic research and development investment plan which advances the nation's ability to effectively develop AM metal alloys. Workshop participants were tasked with considering the development and commercialization of both new and legacy metal alloys.

The workshop resulted in a prioritized strategic investment plan aligned to ten industry sectors. The results showed a wide range of opportunity for the development and validation of new tools, techniques, and methods. The prioritized opportunities for strategic investment offer potential to significantly advance the nation's ability to effectively develop AM metal alloys and strengthens U.S. additive manufacturing competitiveness.

The strategic investment plan stands to greatly benefit the aerospace, energy, nuclear, automotive, electronics, and medical industries. These efforts will lead to improvements in product durability, performance, reliability, temperature capability, energy efficiency, patient standard of care, and system cost.

The plan is composed of sixteen prioritized concepts which offer substantial benefit to a wide range of industrial market sectors and on average deliver a technology readiness level (TRL) of 6 or higher upon conclusion. The plan is presented as a three-phase program with a seven-year period of performance. The rough order magnitude cost of each phase of development is approximately \$20MM — with a total program value of \$60MM — and features an average cost of about \$8.5MM per year.

America Makes members can access the full report via the Digital Storefront

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