



March 29, 2022

TO:
Applied Science & Technology Research
Organization of America (ASTRO America)
6701 Democracy Blvd., Suite 300
Bethesda, Maryland 20817

Re: AM Forward

Lockheed Martin is pleased to join ASTRO America and the Biden-Harris Administration in implementing AM Forward— a voluntary compact aimed at strengthening U.S. supply chains by supporting U.S.-based suppliers' adoption and deployment of additive manufacturing (AM), or industrial 3D printing capabilities.

AM is a leading-edge production technology that is foundational to U.S. global competitiveness; it has several benefits, including forming geometries that are unattainable through any other medium. Aerospace and defense companies use this technology to significantly consolidate part-counts and design high-performing components across a number of platform-types, ranging from hypersonic systems to aircraft engines.

Scaling AM practices also has the potential to improve the agility of casting and forging supply chains where legacy processes are often resource- and time-intensive, in part because of the small number of domestic suppliers. If appropriately qualified and applied, we believe additive manufacturing can result in shrinking the lead times of parts, even under current supply chain conditions. To achieve this outcome, our suppliers—including small and medium sized enterprises as well as large suppliers—will need considerable support.

Through AM Forward, Lockheed Martin will establish a goal for U.S.-based suppliers to increase their ability to additively produce parts, enhancing their competitiveness, agility, and productivity, within the next 12 months. Such an initiative will demonstrate clear, consistent, and growing demand for additively produced parts, provide training to suppliers' workers to support broad additive capabilities, engage in standards development, and offer technical assistance. We appreciate the Biden Administration's support of these efforts through U.S. Government financing programs, capacity building, and workforce development initiatives.

Lockheed Martin has been an industry leader in developing and promulgating AM technologies for decades. From extensive work with Small and Medium-sized Enterprises (SME) and AM equipment manufacturers to qualification and development of new materials and standards, our investment has continued to grow consistently

during this time. Over the past two years alone, Lockheed Martin has worked with SME suppliers to procure more than 25,000 AM parts and we expect this trend to increase over the next five years. We have also invested more than \$55M since 2018 in several additive manufacturing and advanced manufacturing startups across software, hardware, integrated parts, and custom materials. These American businesses are driving innovation forward in the manufacturing domain.

Lockheed Martin will support AM Forward goals by committing to:

- Work with suppliers to conduct research to improve AM techniques specifically focused on the use of AM as an alternative to castings and forgings
- Work with other AM Forward OEMs and U.S. Government agencies to:
 - Explore establishing an AM material consortium to develop and share AM material properties and design data
 - Develop the framework to establish an AM Approved Supplier List (ASL) to simplify and accelerate the procurement process of AM parts
- Participate in university and technical college programs for additive workforce development, including coursework and apprenticeship programs
 - Where feasible, share existing Lockheed Martin AM learning resources with a network of suppliers
 - With our community and technical college partners where we have existing advanced manufacturing apprenticeship and pre-apprenticeship programs, explore incorporating additive manufacturing into curriculum; and engage regional suppliers with the intent to scale the program
 - With external national entities (e.g., NIST MEP) facilitate geographic-driven supplier consortia to collaborate with national networks to activate access to AM training and technology solutions
- Continue to drive critical AM standards development through leadership of and participation in Standard Development Organizations (SDOs) including SAE AMS, ASTM F42, ANSI, and AWS.

We will begin immediately to deliver on these commitments and will regularly report on progress to ensure that AM Forward achieves its ambitious objectives.

Lockheed Martin will also support efforts by suppliers within our sourcing network to take part in key U.S. government programs associated with AM Forward. For example, we believe various federal agencies can play an important role in accelerating AM supplier access to necessary capital, workforce training, technical assistance, and technology transition support. For this reason, we will work with relevant federal government agencies as well as nonprofit organizer ASTRO America to encourage participation in AM Forward workshops and, as appropriate, support proposals for assistance associated with government programs, such as those described in the White House fact sheet on AM Forward dated TBD.

Additionally, Lockheed Martin is committed to collaborating with other AM Forward participants, as well as U.S. Government agencies, to improve the capability, agility, and competitiveness of our supply base. This activity will require engagement at both a working-level and a senior executive-level along with government officials and other industry peers to support a range of activities by industry, government, and non-profits. We understand as an AM Forward participant, we will receive support from 501(c)(3) nonprofit organization staff, including the Applied Science & Technology Research

Organization of America (ASTRO America) and Gettysburg College's Eisenhower Institute.

We know the competitiveness of the U.S. industrial base, including Lockheed Martin, relies on the capability of a wide spectrum of suppliers producing and post-processing critical aerospace parts. However, we recognize over the last several decades many suppliers have lacked access to resources to upgrade technologies that catalyze productivity gains. Through AM Forward, we are confident we can collaboratively accelerate AM adoption at scale; increase the agility, capacity, and resiliency of U.S. supply chains; and support and expand good-paying jobs across the U.S.

Thank you for your leadership on this important initiative.

Respectfully,

A handwritten signature in blue ink, appearing to read "Robert H. Head". The signature is fluid and cursive, with the first name "Robert" and last name "Head" clearly distinguishable.

Robert H. Head
Vice President, Lockheed Martin Government Affairs