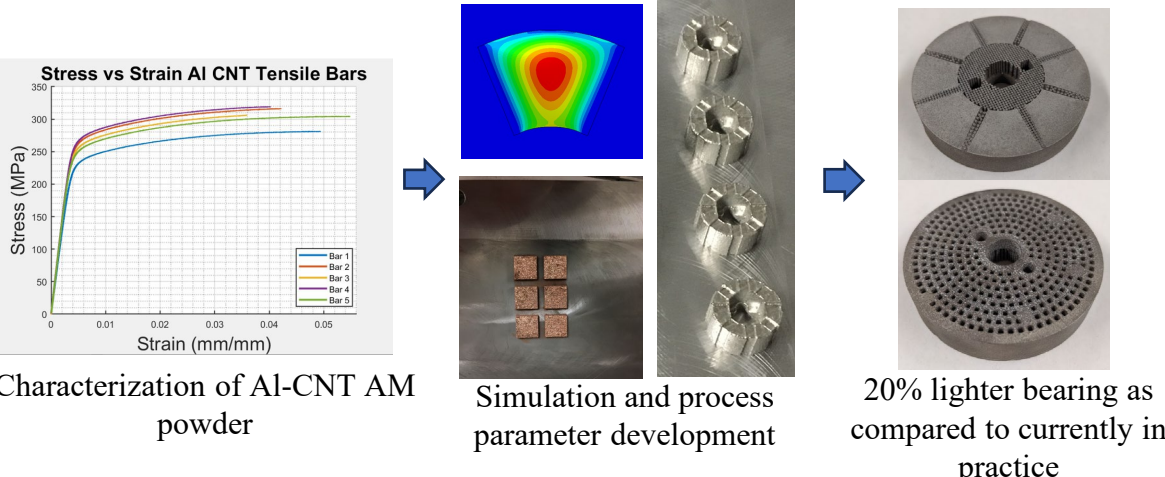


# DREAM: Additive Manufacturing of Wrought Aluminum alloys



Characterization of Al-CNT AM powder

Simulation and process parameter development

20% lighter bearing as compared to currently in practice

**Description:** Work conducted in Air Force STTRs/SBIRs and multiple state of Ohio grants resulted in a low cost and light weight thrust bearing

**Deliverables:**

1. Process control parameters and material characterization data for additive manufactured 6XXX/7XXX wrought alloy
2. Component test data such as bearings for light, reliable, high performance, low cost, and long-lasting Unmanned Aerial Vehicles, aircraft propulsion systems and other ground, sea, and air vehicles
3. Realistic component demonstration at TRL 6-7

**DoD Science & Technology Priority:**  
Advanced Materials & Manufacturing

**JobsOhio Priority:**  
Advanced Manufacturing  
Aviation & Aerospace  
Defense & Federal  
Automotive

**Objective:** Develop the materials, Additive Manufacturing process and post process heat treatment to achieve wrought mechanical properties for 6000 and 7000 series aluminum alloys.

**Benefits:** Reduce costs, weight, parasitic losses, and time to manufacture commercial and military components while increasing components' longevity and performance.

**Approach:** Leverage processes, methods, and component test samples developed under Air Force Phase II STTR 20D-TSCO1, SBIR 23.4-DSCO1 and Phase I STTR FX23D-TCSO1-0164 for 6000/7000 alloys.

**Collaborators:** Ohio University, SHEPRA, Ohio State University, University of Toledo, Hyphen Innovation, Powder Alloy Corporation and MIBA bearings.

**Budget Request**

Item / Task	Non-Recurring	Recurring
Develop process parameters of AM wrought aluminum alloys	\$600K	
Testing and characterization of alloys	\$700K	
Component development, testing, and demonstration		\$2,300K
<b>Total</b>	<b>\$1,300K</b>	<b>\$2,300K</b>

**FY'25 Congressional Budget Request: \$3,600 K**

**Program Element:** Air Force Applied Research Materials: 0602102F  
Metals Affordability Initiative: 0603113F

# Dayton Regional Ecosystem for Additive Manufacturing: DREAM

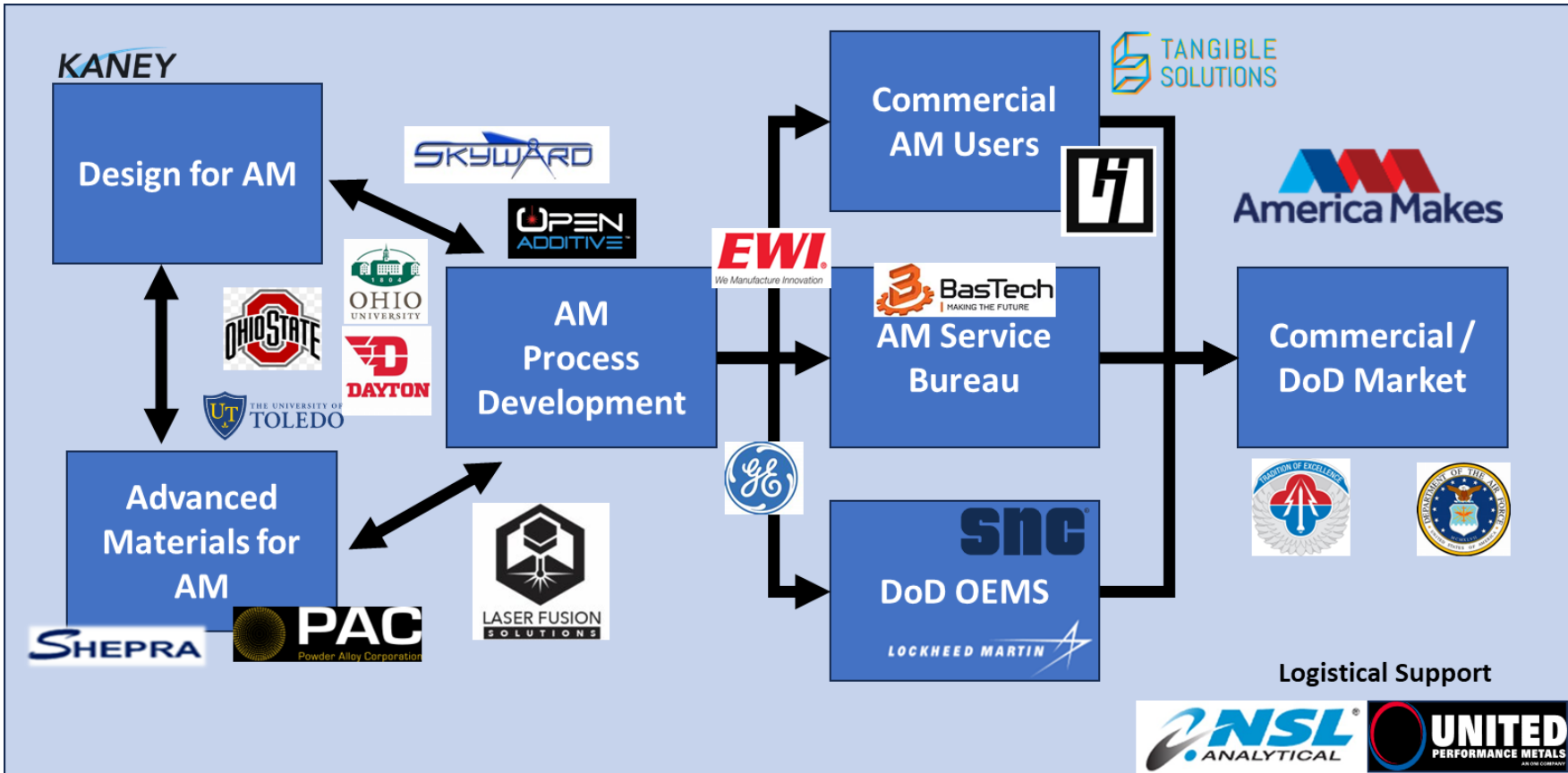
**Objective:** Spur economic growth by developing keep capabilities and technologies that support the utilization of Additive Manufacturing

**Opportunity:** The greater Dayton region and the state of Ohio have established a nascent ecosystem that supports the emerging technology of Additive Manufacturing.

- This ecosystem includes:
  - *Raw materials production and advanced material development,*
  - *Fabrication of additive manufacturing systems,*
  - *Sensor and software development for AM quality assurance*
  - *Contract Additive Manufacturing and logistical Support*
  - *Fabrication of Aerospace and Biomedical components and devices*

**Approach:** Execution of individual projects that collectively develop the workforce and enable new technologies that expand the Additive Manufacturing capabilities of the ecosystem and transition to DoD and Commercial OEMs and spur economic development.

# DREAM Value Stream



## DoD Science & Technology Priorities

Advanced Materials & Manufacturing  
Artificial Intelligence & Autonomy  
Space Technology  
Hypersonics

## Jobs Ohio Priorities

Advanced Manufacturing  
Aviation & Aerospace  
Military & Federal  
Automotive

The DREAM value stream spans the entire innovation pipeline to turn concepts and capabilities into market realities

# DREAM Team: Ohio



**National Policy & Technology Leadership:** US Air Force, AmericaMakes, NASA

**Materials Development:** SHEPRA, Univ of Dayton, Powder Alloy Corp, Ohio State, Ohio Univ. Univ of Toledo

**Design for Additive Manufacturing:** Kaney

**AM Sensor & Software Development:** Skyward, Laser Fusion Solutions, Open Additive, Wright State

**AM Production Systems Mfg:** Open Additive, AddUp, Lincoln Electric

**AM Fabrication Services:** BasTech, Tangible Solutions, Laser Fusion Solutions, Beehive, RP+M

**AM Logistical Support:** United Performance Materials (AM consumables)

## Applications:

**Maintenance & Sustainment:** Sierra Nevada (MRO), SHEPRA (logistics)

**Propulsion:** General Electric, Hyphen Innovations, Beehive

**Hypersonic:** SHEPRA, GoHypersonic, New Frontier Aerospace



October 30, 2023

DREAM: Additive Manufacturing of Wrought Aluminum alloys

**To Whom It May Concern:**

MIBA Bearing LLC (MIBA) is pleased to support this project titled 'Additive Manufacturing of Wrought Aluminum alloys.' The lead applicant is SHEPRA, Inc., Dayton, Ohio, and Principal Investigator (PI) is Fred Herman, currently serving as Principal Consultant of SHEPRA, Inc. MIBA has more than 95 years of experience in design, development, manufacturing, and commercialization of high-performance hydrodynamic bearings and is extremely interested in advancing Additive Manufactured Bearings technology for wrought aluminum alloys to address the needs of Dayton region defense installations, Dayton region aerospace and defense community and national defense needs. As such, MIBA will assist the PI and Co-PIs by providing technical expertise in executing the proposed project.

Sincerely,

A handwritten signature in blue ink that reads "Rick Walker".

Rick Walker  
Product Development Manager  
Bearing Group, Miba Bearings US, LLC  
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