Improvements in Manufacturing Productivity via Additive Capabilities and Techno-Economic Analysis - IMPACT

Brandon D. Ribic, PhD.

America Makes, NCDMM
America Makes Technology Director
Brandon.Ribic@ncdmm.org

IMPACT

- 1 step response – Full Proposal
- Standard full proposal format

America Makes RFP

Project Call for America Makes
Applied Research Projects

Improvements in Manufacturing Productivity via
Additive Capabilities and Techno-Economic Analysis
(IMPACT)

America Makes | Driven by NCDMM

Prepared by

The National Center for Defense
Manufacturing and Machining (NCDMM)

Jason Thomas, Program Coordinator
236 W. Boardman Street
Youngstown, OH 44503
Phone: (330) 409-9160
jason.thomas@ncdmm.org

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Overview of Opportunity – 4 themes

- Demonstrating Lead Time, Productivity, and Yield Improvements for Casting and Forging Manufacturing Operations Using Additive Manufacturing Technologies
- Disseminating the Value Proposition of Bridging Component Sourcing Gaps with AM Parts for Critical Casting and Forging Production
- Identifying and Disseminating the Impact of Strategic R&D to Scale Powder Bed AM Technology
- Advancing AM Processing for Continuous Fiber Reinforced Composites

Background - Demonstrating Lead Time, Productivity, and Yield Improvements

- Understand the interrelationships of casting, forging, and additive manufacturing to identify opportunities where AM technology can increase capacity and capability within the existing U.S. industrial base and reduce lead times for the acquisition of cast and wrought (forged) DoD products

- Throughout March and May of 2023, America Makes and members of the U.S. additive manufacturing, casting, and forging supply chain participated in a series of expert interviews, manufacturing site visits, and workshops

- Common Themes
  - AM for tooling
  - Improving confidence in AM
  - Improving competency for decision making and quickly accessing qualified manufacturing capacity

Background - Value Proposition of Bridging Component Sourcing Gaps with AM Parts

- There are instances where AM can offer unique value to serve as a “bridge” component sourcing method for casting and forging applications
- Potential applications and opportunities lack definition and understanding which fosters immediate ability to execute targeted and high impact potential effort
- Our inputs and feedback gathered suggest a preliminary analysis of product types, considerations and acceptance standards analysis in concert with an AM technology/manufacturing readiness assessment is needed to deliver a techno-economic framework for when, where, and how to utilize AM technologies for bridge component sourcing.

Background - Impact of Strategic R&D to Scale Powder Bed AM Technology

- Powder bed AM has the potential to revolutionize manufacturing in the aerospace and defense industry, particularly for complex and low-volume parts
- There is currently a lack of understanding about how to best allocate resources to have the biggest impact on the Air Force (AF) mission in the context of powder bed additive manufacturing
- To address this challenge, a techno-economic analysis specific to powder bed additive manufacturing can be performed to evaluate potential investments in this technology
- One of the challenges with performing a techno-economic analysis for powder bed additive manufacturing is that this technology is still relatively new and rapidly evolving

Background - Advancing AM Processing for Continuous Fiber Reinforced Composites

- USAF strategy is to augment existing manned aircraft with fleets of unmanned, autonomous systems
- To become more agile, the Air Force must augment its high-end platforms with larger numbers of inexpensive, low-end systems.
- Swarms of low-cost, autonomous air and space systems can provide adaptability, rapid upgradability, and the capacity to absorb losses that manned systems cannot.
- While this vision is intriguing, it cannot be achieved affordably by using existing design and manufacturing practices.
- Thus, AFRL is maturing a broad set of technologies that will allow attrition-tolerant platforms to meet diverse mission requirements while also being affordable, agile, scalable, and reconfigurable.
- One line of effort to achieve this vision is to develop the ability to print primary composite structures for attrition-tolerant platforms
- Advanced design tools are capable of optimizing material placement along critical load paths, yet for a myriad of reasons, those geometries cannot actually be produced as designed with current continuous fiber printers.
- Such designs often feature complex features oriented within the part volume that neither neatly simplify to printable features nor take advantage of exquisite fiber steering and placement to leverage advantageous anisotropic properties.

Objectives - Demonstrating Lead Time, Productivity, and Yield Improvements

- DoD is seeking casting and forging-related AM technologies that improve cost efficiency and provide increased capabilities, quality, and/or capacity. Proposed efforts should address areas of relevance to the Department of Defense which include:
  - Thin-walled light alloy sand castings (e.g., magnesium, aluminum, and other lightweight metals)
  - Casting and forgings for high-tensile, high yield strength, low alloy steel
  - Large and very large titanium/specialty alloy castings
  - Complex castings for high performance turbine engines with specific application-driven material systems and stringent quality requirements
  - Nonferrous, corrosion-resistant castings and forgings using material systems such as, but not necessarily limited to, CuNi, NiAlBr, and Ni-alloys
  - Addressing the need for extra-large forgings for naval and aerospace applications
  - Reducing forging lead-times for all DoD applications

Objectives - Demonstrating Lead Time, Productivity, and Yield Improvements

- Demonstrate impact through quantitative metrics which exhibit a threshold and objective value. Examples of high priority factors for consideration to successfully demonstrate impact for this topic area include:
  - Baseline cost, cost reduction %, and opportunities for future cost savings
  - Baseline lead time, lead time reduction %, and opportunities for future lead time reduction
  - Baseline yield/scrap, reduced scrap %, and opportunities for future yield improvements
  - Reduced time to realize/on-time delivery of first articles demonstrated (or other industrially recognized qualification metrics)
  - Baseline man hours per part, % reduction or reduced number man hours per part, and opportunities for future labor reduction
  - Baseline tonnage, increased tonnage due to introduction of AM technology, and opportunities for future increase in tonnage
  - Baseline throughput, %increase in throughput due to introduction of AM technology, and opportunities for future increase in throughput
  - Verification of specific critical to quality metrics (porosity, inclusions, geometric dimensioning and tolerancing [GD&T] factors, etc.)
  - Number of qualified part numbers
  - Number of qualified/approved vendors or suppliers

Objectives - Value Proposition of Bridging Component Sourcing Gaps with AM Parts

- An analysis of product types, considerations, and acceptance standards analysis in concert with an AM technology/manufacturing readiness assessment is needed to deliver a techno-economic framework for when, where, and how to utilize AM technologies to bridge gaps in component sourcing for critical casting and forging production with AM parts
- Conditions which influence AM viability
  - Multiple AM modalities
- Consider cast and forged products
- Manufacturing capability (TRL and MRL) challenges and opportunities in order to scale to MRL 7 (key milestones, deliverables, data etc.)
- Documentation of risks
- Target application opportunities identified and documented which may realize impact (MRL 7) within less than 2 years, 3 to 4 years, or more than 4 years
- “Roadmap” or detailed technology transition plan

Objectives - Impact of Strategic R&D to Scale Powder Bed AM Technology

- Techno-economic analysis specific to powder bed additive manufacturing to evaluate potential investments in this technology
- Include a comprehensive evaluation of the costs and benefits of different powder bed additive manufacturing technologies, materials, and processes and their potential impact on the USAF mission
- Deliver a paper study on powder bed additive manufacturing and identify the most promising technologies and applications centric to USAF mission and needs
  - Interviews with experts in powder bed additive manufacturing and aerospace and defense
- Detail investments in new powder bed additive manufacturing technologies, materials, or processes that could improve the speed, reliability, and cost-effectiveness of manufacturing for aerospace and defense applications
- Capture insights on value statements for manufacturing technology investment
  - “Where is our money best spent to have the biggest impact to the USAF mission?”

Objectives - Advancing AM Processing for Continuous Fiber Reinforced Composites

- Mature solutions that will reduce the printability gap between the part geometries we can design and the geometries that current state-of-the-art continuous fiber printers can produce
- Seeking innovations on one of the foundational challenges limiting the realized design freedom of continuous fiber printing: robotic process planning
- Measurably close the gap between the complex designs that methods like topology optimization or generative design can create and what can actually be programmed and fabricated by emerging AM platforms.
- Innovations will be considered that address any aspect of the workflow between generating a CAD design and printing that design
- **While there are clearly material and processing limitations that impact the ability to print complex 3 dimensional shapes with continuous fiber printing processes, maturation in those areas is beyond the scope of this effort**
- Structural composites using continuous fiber additive manufacturing is the driving application space, but innovations in this space are anticipated to have implications for other robotic AM processes.

Topics

- Topic Area 1 – Develop/disseminate leading practices and accelerate adoption of 3D printed molds/cores for sand castings
- Topic Area 2 – Mature AM ceramic technology and promote adoption for rapid, low volume production of investment castings for defense applications
- Topic Area 3 – Develop and disseminate tools/frameworks to improve die (die casting) life with AM-printed cooling channels
- Topic Area 4 – Mature and promote methods to add high wear layers and complex geometric features to forgings
- Topic Area 5 – Pilot the industrialization of AM preforms to expedite the forging process for low volume forged components
- Topic Area 6 – Develop and disseminate leading DED and cold spray practices to promote adoption of die repair for forging applications
- Topic Area 7– AM for casting and forging innovations relevant to DoD acquisition or sustainment programs
- Topic Area 8 – Techno-economic analysis and manufacturing readiness assessments to address bridging component sourcing gaps with AM parts for critical casting and forging production
- Topic Area 9 – Powder AM techno-economic analysis
- Topic Area 10 – Innovations in robotic additive manufacturing process planning

Schedule – Topic Areas 1 through 8

Event	Date
Project call announcement and posting	5/26/2023
Project Call Kick-off Webinar – Registration Required	6/1/2023
Questions from proposers about scope or approach due	6/7/2023
Responses to proposers about scope or approach due	6/12/2023
Deadline for proposal lead to complete a fully executed America Makes Membership Agreement	6/14/2023
Fully Executed NDA with NCDMM (only if proposal contains proprietary information)	6/14/2023
Full project proposal submission due date (Note: No Concept Paper Submission)	6/28/2023
Anticipated decision and notification to project proposal teams	7/21/2023
Anticipated date to have all projects on contract	8/31/2023

Schedule – Topic Areas 9 and 10

Event	Date
Project call announcement and posting	5/26/2023
Project Call Kick-off Webinar – Registration Required	6/1/2023
Questions from proposers about scope or approach due	6/7/2023
Responses to proposers about scope or approach due	6/12/2023
Deadline for proposal lead to complete a fully executed America Makes Membership Agreement	6/23/2023
Fully Executed NDA with NCDMM (only if proposal contains proprietary information)	6/14/2023
Full project proposal submission due date (Note: No Concept Paper Submission)	7/7/2023
Anticipated decision and notification to project proposal teams	8/4/2023
Anticipated date to have all projects on contract	8/31/2023

Topic Area	Number of Awards Anticipated	Maximum Federal Award Available Per Proposal	Maximum Number of Months of Technical Effort Execution	Number of Months Required for Final Report Finalization	Maximum Allowed Period of Performance
1	5	$2,000,000	24	3	27
2					
3					
4					
5					
6					
7					
8	1	$500,000	18	3	21
9	1	$350,000	9	3	12
10	1	$800,000	18	3	21

Eligibility

- The lead proposer for responses to topic areas 1 through 8 is a current member of America Makes and in good standing by Wednesday, June 14, 2023.
- The lead proposer for responses to topic areas 9 or 10 is a current member of America Makes and in good standing by Friday, June 23, 2023.
- Information on how to join America Makes is available at www.americamakes.us/membership. Any non-America Makes members contributing to proposed effort execution are not permitted to participate in project team discussions until completing a fully executed America Makes Membership Agreement. (Note: The foreign membership approval process requires a minimum of three weeks to complete.)
- Cost share accrued in this project may also be applied towards membership, as with other project calls. However, cost-share proposed on a future project cannot be counted towards a new America Makes membership. To become a member by the deadline, organizations shall commit to a cash payment and / or complete an @Program MOU.
- A 50% cost share is required for each project submittal. Example: If $1.00 of funding is requested from America Makes, $0.50 in cost share must be committed against that $1.00 for a total scope of $1.50
- The lead Proposer is fully responsible for all project and subcontract performance
- The lead Proposer shall be registered in U.S. System for Award Management (SAM) and have a cage code and duns number before submitting a proposal
- Proposal team acknowledges that information from this project will be shared with America Makes members in accordance with the membership agreement
- Proposal team arrangements are identified and relationships are fully disclosed
- **All members of proposing teams in response to topic areas 8 or 9 must submit a valid copy of their respective organization's military critical technical data agreement (DD2345)**
- **No foreign national participation will be allowed for topic areas 8 or 9.**
- **Any foreign nationals conducting work on the project shall be declared within the Project Team Appendix. Any project activities occurring outside of the U.S. must be reported and approved in advance by the America Makes Program Management Office. Execution of activity outside of the U.S. in response to this project call is discouraged.**

Minimum Deliverables – Topic Areas 1 through 7

Minimum Deliverable	Timeline
Written Technical Progress Reports	Quarterly
Project update calls or virtual meetings between project team, America Makes/NCDMM PM, and Government advisory	Monthly, or more as necessary
Financial and man-hour reports	Monthly
Kickoff Meeting	1 month after award or sooner
Data Management Plan including at minimum: Any commercial software packages to be used, standards or data schemas to be used, and methodology for notating and labelling data to enable linking of various sample properties and characteristics, and plans for incremental delivery of data, and key performance parameters (KPP's)	Draft at time of proposal Final no later than 4 months after award
Data Persistence Plan (how will data be stored and accessed after project conclusion) – this is meant to address data storage by the project lead by means aside from America Makes CORE	Initial at proposal Final no later than 4 months after award
Planned project deliverables list with corresponding (existing/ new) Technology Roadmap Requirements	Draft at time of proposal Final no later than 60 days after award
Experimental, qualification, material, testing and inspection data (feedstock, process, material, post-process, property, etc.) available in a static format and in a database with property meta-data (including CAD models and build files); non-destructive inspection data and meta-data	Delivered or posted to America Makes CORE database regularly as available
Schema and Data Compliance Reviews, Data shall: Be provided electronically, demonstrate pedigree and provenance, identify test apparatus/manufacturing/ fabrication equipment and calibration, testing standards or processing specifications used to include sample preparation and/or manufacturing equipment configuration, experimental/ characterization/manufacturing process conditions and procedures, raw mechanical test data, data reduction and statistical analysis procedures, and any uncertainty associated with data	Quarterly

Minimum Deliverables – Topic Areas 1 through 7

Minimum Deliverable	Timeline
Presentation at an America Makes Meeting (MMX/TRX)	Once per calendar year
Presentation at one major conference/event (besides America Makes hosted event) such as RAPID + TCT, ASTM ICAM, DMC, Forge Fair, Metal Casting Congress	Once per calendar year
Lead organization shall participate on at least one swimflane working group (Design, Materials, Process, Value Chain, or AM Genome) relevant to subject matter of the project	Quarterly (via progress reporting) Effort performed (as well as hours) via working group participation shall be documented in progress reports and regular attendance should be maintained for all working group teleconferences/meetings. Minimum of one presentation outlining all deliverables (CDIP, associated tangible artifacts, and associated roadmap requirements), KPP's, and data management plan within 4 months of project start date. Minimum of one presentation of milestone achievements, KPP's, and lessons learned relevant to the fulfillment or creation of roadmap requirements no later than 60 days of the period of performance end date.

Minimum Deliverables – Topic Areas 1 through 7

Minimum Deliverable	Timeline
Value proposition framework development and demonstration which may consider feedstock/ precursor costs, labor, depreciation, production volumes, equipment size (part size limitations), productivity factors (for AM and casting or forging) that facilitates techno-economic tools for determining when to deploy AM capabilities for certain cast or forged products	No later than 3 months prior to the end of the period of performance
Written Final Project Report (minimum one round of revision completed with PM/NCDMM prior to final submission). **At a minimum report will outline: application, approach, team members and roles, potential benefits of effort, motivations and reasoning for technical approach, KPPs, summary of tasking, methods, standards and specifications used, deviations to those standards or specifications, outcomes/results, summary and observations and analysis of data gathered, how data substantiated successful outcome of this effort, lessons learned, measurable impact realized due to this effort, future opportunities for research and development realized through this effort**	27 months after award Complete preliminary draft submission 24 months after award
Additional Deliverables specific to the proposed effort	"Deliver (upload to CORE) as you go" – As soon as data or deliverable is finalized for release

Minimum Deliverables – Topic Area 8

Minimum Deliverable	Timeline
Written Technical Progress Reports	Quarterly
Project update calls or virtual meetings between project team, America Makes/NCDMM PM, and Government advisor	Monthly, or more as necessary
Virtual teleconference updates for advisory group	Quarterly at a minimum, more frequently as necessary
Financial and man-hour reports	Monthly
Kickoff Meeting	1 month after award or sooner
Data Management Plan, Key performance parameters (KPP's), Planned project deliverables list with corresponding (existing/ new) Technology Roadmap Requirements	Draft at time of proposal Final no later than 9 months after award
Presentation at an America Makes Meeting (MMX/TRX)	Once per calendar year
Presentation at one major conference/event (besides America Makes hosted event) such as RAPID + TCT, ASTM ICAM, DMC, Forge Fair, Metal Casting Congress	No later than 18 months after award
Lead organization shall participate on at least one swimlane working group (Design, Material, Process, Value Chain, or AM Genome) relevant to subject matter of the project	Quarterly (via progress reporting) Effort performed (as well as hours) via working group participation shall be documented in progress reports and regular attendance should be maintained for all working group teleconferences/meetings. Minimum of one presentation outlining all deliverables (CDIP, associated tangible artifacts, and associated roadmap requirements), KPP's, and data management plan within 9 months of project start date. Minimum of one presentation of milestone achievements, KPP's, and lessons learned relevant to the fulfillment or creation of roadmap requirements no later than 60 days of the period of performance end date.

Minimum Deliverables – Topic Area 8

Minimum Deliverable	Timeline
Program Review (In-person) with virtual option as necessary to facilitate advisory group attendance/participation	No later than August 31, 2024
Draft manuscript submitted to NCDMM for publication in America Makes LAYERS	No later than August 31, 2024
Written Final Project Report (minimum one round of revision completed with PM/NCDMM prior to final submission). At a minimum report will outline: applications considered, factors influencing AM as a viable sourcing approach, current technology or manufacturing readiness levels and considerations utilized for that determination for at least (4) AM modalities, future opportunities for development, summary of program review (including feedback, discussions, minutes), time phased impact opportunities, team members and roles, potential benefits of effort, KPPs for application of component sourcing, documented gaps in AM capabilities, necessary data/evidence to advance MRL including tools, technology, and methods to accelerate realization of MRL 7 for at least (4) application/product types [2 casting and 2 forging]	21 months after award Complete draft submission 18 months after award
Additional deliverables specific to the proposed effort	"Deliver (upload to CORE) as you go" – As soon as data or deliverable is finalized for release
Value proposition framework documented which may consider feedstock/precursor costs, labor, depreciation, production volumes, equipment size (part size limitations), productivity factors (for AM and casting or forging) that facilitates techno-economic tools for determining when to deploy AM capabilities to certain cast or forged bridge sourcing applications	No later than 3 months prior to the end of the period of performance

Minimum Deliverables – Topic Area 9

Minimum Deliverable	Timeline
Written Technical Progress Reports	Quarterly
Project update calls or virtual meetings between project team, America Makes/NCDMM PM, and Government advisor	Monthly, or more as necessary
Financial and man-hour reports	Monthly
Kickoff Meeting	1 month after award or sooner
Data Management Plan, Key performance parameters (KPP's), Planned project deliverables list with corresponding (existing/ new) Technology Roadmap Requirements	Draft at time of proposal Final no later than 4 months after award
Presentation at an America Makes Meeting (MMX/TRX)	Once per calendar year
Presentation at one major conference/event (besides America Makes hosted event) such as RAPID + TCT, ASTM ICAM, DMC, Forge Fair, Metal Casting Congress	No later than 9 months after award
Lead organization shall participate on at least one swimlane working group (Design, Material, Process, Value Chain, or AM Genome) relevant to subject matter of the project	Quarterly (via progress reporting) Effort performed (as well as hours) via working group participation shall be documented in progress reports and regular attendance should be maintained for all working group teleconferences/meetings. Minimum of one presentation outlining all deliverables (CDIP, associated tangible artifacts, and associated roadmap requirements), KPP's, and data management plan within 4 months of project start date. Minimum of one presentation of milestone achievements, KPP's, and lessons learned relevant to the fulfillment or creation of roadmap requirements no later than 60 days of the period of performance end date.

Minimum Deliverables – Topic Area 9

Minimum Deliverable	Timeline
At least one interchange meeting, or more as needed	5 months after award
Interim project report	6 months after award
Written Final Project Report (minimum one round of revision completed with PM/NCDMM prior to final submission). At a minimum report will outline: summary of current demand signals, associated DoD needs, prioritized focus areas ranked according to associated impact potential, identified gaps in data and understanding, investment areas, impact of investments in various areas, insights on value statements for manufacturing technology investments, value statements from specific entities, demand signals for powder AM, notes from the interchange meeting, and quantified returns on potential investments based upon techno-economic analysis	9 months after award Complete draft submission 12 months after award
Additional Deliverables specific to the proposed effort	"Deliver (upload to CORE) as you go" – As soon as data or deliverable is finalized for release
Value proposition framework documented which may consider feedstock/precursor costs, labor, depreciation, production volumes, equipment size (part size limitations), productivity factors (for AM and casting or forging) that facilitates techno-economic tools for determining strategic investment return ratios (or similar metrics)	No later than 9 months after award

Minimum Deliverables – Topic Area 10

Minimum Deliverable	Timeline
Written Technical Progress Reports	Quarterly
Project update calls or virtual meetings between project team, America Makes/NCDMM PM, ARM Institute, and Government advisor	Monthly, or more as necessary
Financial and man-hour reports	Monthly
Kickoff Meeting	1 month after award or sooner
Planned project deliverables list with corresponding (existing/ new) Technology Roadmap Requirements	Draft at time of proposal Final no later than 60 days after award
Data Management Plan including at minimum: Any commercial software packages to be used, standards or data schemas to be used, and methodology for notating and labelling data to enable linking of various sample properties and characteristics, and plans for incremental delivery of data	Draft at time of proposal Final no later than 4 months after award
Key performance parameters (KPP's)	Draft at time of proposal Final no later than 4 months after award
Schema and Data Compliance Reviews, Data shall: Be provided electronically, demonstrate pedigree and provenance, identify test apparatus/manufacturing/ fabrication equipment and calibration, testing standards or processing specifications used to include sample preparation and/or manufacturing equipment configuration, experimental/characterization/ manufacturing process conditions and procedures, raw mechanical test data, data reduction and statistical analysis procedures, and any uncertainty associated with data	Quarterly

Minimum Deliverables – Topic Area 10

Minimum Deliverable	Timeline
Data Persistence Plan (how will data be stored and accessed after project conclusion) – this is meant to address data storage by the project lead by means aside from America Makes CORE	Initial at proposal Final no later than 4 months after award
Design, experimental, qualification, material, testing and inspection data (feedstock, process, material, post-process, property, etc.) available in a static format and in a database with property meta-data (including CAD models and build files); non-destructive inspection data and meta-data	Delivered or posted to America Makes CORE database regularly as available
Presentation at an America Makes Meeting (MMX/TRX)	Once per calendar year
Presentation at one major conference/event (besides America Makes hosted event) such as RAPID + TCT, ASTM ICAM, DMC, or other industry recognized conferences	No later than 18 months after award
Lead organization shall participate on at least one swimlane working group (Design, Material, Process, Value Chain, or AM Genome) relevant to subject matter of the project	Quarterly (via progress reporting) Effort performed (as well as hours) via working group participation shall be documented in progress reports and regular attendance should be maintained for all working group teleconferences/meetings. Minimum of one presentation outlining all deliverables (CDIP, associated tangible artifacts, and associated roadmap requirements), KPP's, and data management plan within 4 months of project start date. Minimum of one presentation of milestone achievements, KPP's, and lessons learned relevant to the fulfillment or creation of roadmap requirements no later than 60 days of the period of performance end date.

Minimum Deliverables – Topic Area 10

Minimum Deliverable	Timeline
Written Final Project Report (minimum one round of revision completed with PM/NCDMM prior to final submission).	21 months after award Complete preliminary draft submission 18 months after award
Transition and Commercialization Plan – How will solutions be adopted or implemented by the community?	Draft at time of proposal Updated NLT 12 months after award
Additional Deliverables specific to the proposed effort	"Deliver (upload to CORE) as you go" – As soon as data or deliverable is finalized for release

Reporting

1. Technical progress reports
2. Kickoff meeting
3. Virtual teleconferences with project team
4. Virtual teleconferences with advisory groups as necessary and applicable
5. Interchange meetings as necessary and applicable
6. Financial and man-hour reports
7. Man-hour reports for attending working group meetings and supporting working group activities
8. Data management plan
9. Data persistence plan
10. Interim project reports as applicable
11. Value proposition framework documentation
12. Presentations at national meetings/conferences
13. LAYERS manuscripts as applicable
14. Transition and commercialization plan as applicable
15. Program review as applicable
16. Project briefings annually at America Makes Members Meeting (TRX or MMX)
17. Reports, presentations, or teleconferences upon request by NCDMM, OSD(R&E), or AFRL
18. Working group, advisory group, or steering committee participation shall include presentation of milestone achievements or lessons learned relevant to the fulfillment or creation of roadmap requirements, requesting subject matter expertise support, and consultation for project steering group purposes or as necessary
19. Finalized, written report (minimum one round of revision with NCDMM required before final submission)

Evaluation Criteria

- **Executive Summary** (Executive summary is not scored but will be considered as part of the overall value proposition of the proposal.)
- **Technical Approach and Methodology (40%)**
- **Data Management Plan (10%)**
- **Technology Dissemination to America Makes Members, Impact to OSD(R&E), AFRL, and Likelihood of Impact to DoD Broader Supply Chain Partners (40%)**
- **Program Management Approach (10%)**
- **Cost** (Cost and cost share are not scored but will be considered as part of the overall value proposition of the proposal.)

Proposal and Contracting Information

- Executive Summaries must contain information which is publicly releasable, non-proprietary
  - Purpose
    - To aid in America Makes public release process for award announcement
    - To demonstrate impact and merits of Institute's efforts to the public
- No fee allowed
- Cover page should include DUNS and CAGE of at least team lead
- Teams must submit additional information to accelerate contracting
  - Sub-recipient agreement will be included in RFP, must be reviewed and any requested changes be sent in with proposal
  - No response certifies agreement as is upon award
    - Otherwise, award will be canceled

When America Makes America Works

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Questions

America Makes AM Cross-Platform Consistency (AM-CPC)

- Congratulations to Colorado School of Mines

COLORADO SCHOOL OF MINES
EARTH • ENERGY • ENVIRONMENT

3D SYSTEMS · ACONITY 3D · AddUp GLOBAL ADDITIVE SOLUTIONS · EOS · CONCEPTLASER a GE Additive company · OPEN ADDITIVE™ · RENISHAW apply innovation™ · VELO 3D · XACT METAL

- Collaboration with nine different PBF-LB original equipment manufacturers (OEMs) to develop a neutral manufacturing plan to establish consistency across platforms and determine methods for analyzing and improving the consistency of PBF-LB processes