



The Digital Manufacturing Institute

# **MxD REQUEST FOR PROPOSAL TECHNICAL SUMMARY, PROGRAM OVERVIEW and PROPOSAL PREPARATION INFORMATION**

## **MxD-21-10: Emerging Technology in Advanced Manufacturing & Cybersecurity**

Revision 1.0 Release Date: July 8, 2021

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## I. RECORD OF CHANGE

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Revision	Date	Sections	Description
1.0	8 July 2021	N/A	Original

## II. PROJECT OVERVIEW

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Program Details	
Anticipated MxD Funding	\$75,000
Potential Industry Cost Share Support	\$75,000
Anticipated Number of Awards	Multiple
Period of Performance	9 - 12 Months
Potential Follow-on Funding Period	Up to 2 additional years

Key Dates	
RFP Released	8 July 2021
Technical and Cost Proposal Due	9 September 2021

MxD intends to continue our investments into Emerging Technology in Advanced Manufacturing and Cybersecurity. On an annual basis MxD will re-release this RFP to solicit new research ideas; previously awarded teams will receive a separate communication containing an opportunity to request additional funding to complete follow-on research. As advances are made in manufacturing technologies, there is the possibility that the topic areas listed in this RFP may be modified on an annual basis. Additionally, successful “emerging technology” projects have the potential to define larger, more specific, MxD research projects in the future.

## III. INTRODUCTION

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MxD: The Digital Manufacturing Institute is where innovative manufacturers go to forge their futures. In partnership with the Department of Defense, MxD (also referred to as the Institute) equips U.S. factories with the digital tools and expertise they need to begin building every part better than the last. MxD’s core mission is to transform American manufacturing, by fully integrating the digital thread across the manufacturing enterprise to reduce overall manufacturing costs, stabilize and grow the manufacturing industrial base and improve US competitiveness throughout the world.

MxD has invested over \$120 million in more than 85 applied research and development projects in areas including design, product development, systems engineering, future factories, agile and resilient supply chains, and cybersecurity.

MxD operates from a nearly 75,000-square-foot innovation center near downtown Chicago. Its future factory floor features some of the most advanced manufacturing equipment in the world, which partners can use for experimentation and training on everything from augmented reality to advanced simulation techniques.

MxD uses a broad and collaborative process to develop the Strategic Investment Plan (SIP) and Technology Roadmap to ensure its technology, outreach, and education investments provide U.S.

manufacturing with the right skills, solutions, and tools to compete globally. A Request for Proposal (RFP) is initiated when MxD desires new and creative solutions to problems and/or advances in knowledge, understanding, and technology for digital manufacturing and design. Once the RFP topic is developed and approved, the MxD RFP will be posted to the MxD website and represents the official notification to Proposal Teams of a request to submit the required documents.

This RFP contains the following elements:

1. Technical Summary: description of a specific technology objective
2. Program Overview: description of technical and program requirements
3. Proposal Preparation Information: background and guidance for the preparation of required forms and instructions needed to submit a proposal to MxD

The RFP is available on the MxD website at <https://mxdusa.org/projects/>. Amendments to an MxD RFP may be used to extend due dates, clarify procedural requirements, or modify technical requirements. If an updated RFP is issued, the previous RFP will be rescinded. Proposal Teams should carefully monitor the MxD website after an original posting of an RFP, up to the time of the Technical Proposal and Cost Proposal submission date. Any revisions, amendments, or updates will appear in the same section of the website as the original solicitation. It is the responsibility of the Proposal Team to monitor the MxD RFP updates and ensure their proposal meets the solicitation requirements. MxD welcomes any comments or suggestions for improving the contents of this guide. Please address them to [projects@mxdusa.org](mailto:projects@mxdusa.org).

MxD refers to the Proposal Team Lead as the non-Federal organization that submits a proposal in response to a Request for Proposals. Proposal Team members are other participants on the proposal and are further broken down into Recipient/Subrecipient relationships similar to a prime/subcontractor relationship in traditional contracting.

Any questions regarding this solicitation must be provided to [projects@mxdusa.org](mailto:projects@mxdusa.org). The questions will be sent to the appropriate MxD and/or Government POC, and answers will be published on the MxD website, if appropriate. Questions submitted within one week prior to a deadline may not be answered.



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# TECHNICAL SUMMARY





## IV. TECHNICAL SUMMARY

### PROBLEM STATEMENT

MxD is committed to improving U.S. manufacturing competitiveness and is at the leading edge of emerging digital manufacturing technologies. Technology breakthroughs can be unpredictable, but MxD is continuously monitoring and evaluating rapidly evolving transformative manufacturing technologies. MxD plays an important role in connecting industry partners with the resources they need to better understand novel technologies that will have the highest impact to their businesses. Through project investments and programming activities, MxD engages its vast academic network to gain greater visibility into the manufacturing technologies of the future and invests in these technologies to proactively support the long-term development pipeline. Thus, MxD is releasing a Request for Proposals targeted at academic institutions to aid in the development of early stage (TRL 3-6) applied research in advanced manufacturing and cybersecurity.

This program is intended to enable MxD to partner with academia on early-stage technology and cybersecurity R&D to better define our technology roadmapping, strategic investment planning, and preparation for future technology topics while also providing value to our academic and industry partners. Through early engagement with industry stakeholders, researchers will be able to better structure their work to have maximum impact in the future. MxD is coming together with its industry partners to provide funding, guidance, and feedback for early stage applied research.

Academic organizations should provide a vision of how their early-stage research could have a direct impact on manufacturing through increases in accuracy, speed, repeatability, safety, etc. For academic organizations without an industry partner, MxD plans on leveraging its network to appropriately pair an industry partner with their research after the submission of a proposal.

MxD and its industry members are most interested in the development of technologies in the following key cutting-edge domain areas:

Physical Process Knowledge and Improvement	Digital Process Knowledge and Improvement	Cybersecurity
<ul style="list-style-type: none"> <li>• Machines and Processes</li> <li>• Digital Twin Implementation</li> <li>• Artificial Intelligence/Machine Learning</li> </ul>	<ul style="list-style-type: none"> <li>• Interaction of Multiple Digital Twins</li> <li>• Multiple Repository/ Database Integration</li> <li>• Proliferation of Model Based Design (MBD)</li> </ul>	<ul style="list-style-type: none"> <li>• Explore new technological advancements in Cybersecurity</li> <li>• Implement learnings and solutions</li> <li>• Expansion into 5G, Wi-Fi 6, UWB</li> </ul>

### CRITICAL OBJECTIVES AND REQUIREMENTS

MxD believes that this is the time to invest in the further development of emerging technology in advanced manufacturing and cybersecurity. To that effect, this project will focus on furthering research by academic institutions in one of the domain areas listed below. Proposals may be



submitted on topics outside of these domain areas if they are value-added and extensible to the broader manufacturing community.

## Physical Process Knowledge and Improvement

### **Machines and Processes**

*By leveraging technology and advanced data analytics, manufacturers can analyze key metrics within their physical space (industrial machines and processes) to improve operations. Data gathered in real-time allows for increased visibility into operations, ability to monitor machine status, and improves predictive quality – minimizing scrap. Physics-based models and simulation tools can assist in optimizing machine parameters or even transform entire processes.*

### **Digital Twin Implementation**

*Complex manufacturing systems can be improved through the implementation of digital twins that monitor, predict, and detect disturbances thus reducing risk. Recent advances in these technologies allow manufacturers to analyze their capabilities in real-time and plan for what-if scenarios. Consideration should be given to the need for many manufacturers to be able to interface with existing legacy equipment and production systems.*

### **Artificial Intelligence/Machine Learning**

*While AI is poised to disrupt many industries, the technology is exceptionally well suited to drive massive improvements in manufacturing and has already begun to do so. Further investments and exploration of AI/ML for manufacturing will ultimately improve quality control, shorten design times, reduce material waste, and predict machine capabilities across the supply chain.*

## Digital Process Knowledge and Improvement

### **Interaction of Multiple Digital Twins**

*Cyber-physical production systems of the future will comprise complex assets that require a holistic model of interconnected digital twins. Known as a composite digital twin, this integrated network of multiple digital twins will allow a manufacturer to generate answers for various what-if scenarios and evaluate asset performance. It is critical to establish a framework that will enable models from multiple inputs to communicate easily through various methodologies.*

### **Multiple Repository/Database Integration**

*As more data is generated from Industrial IoT and production systems, manufacturing enterprises will need to have a framework and methodologies in place to refine and integrate stored data. Siloed content repositories and databases can lead to decreased efficiency, lack of data visibility, and increased costs. Further advancements in the integration of multiple repositories/databases will allow manufacturers to leverage content and lead to better informed decision making. Adequate consideration should be given to research and technologies that improve ease of access and unifies processes.*

### **Proliferation of Model-Based Design (MBD)**

*Previous limitations in a product's lifecycle can be addressed with the use of model-based designs, capturing manufacturing requirements within a 3D model. Serving as the single source of truth, MBD has the potential to improve accuracy, reduce costs, and ultimately reduce time-*



*to-market for new products. Further advancements in requirement elicitation, trade-off analyses, verification & validation, and collaboration are still needed.*

## Cybersecurity

### **Explore New Technological Advancements**

*The goal is for research into new or existing technology solutions that can be adapted for use in manufacturing to improve security. Digital advancements can create organizational vulnerabilities if not properly secured. New technologies will need to be introduced to protect enhanced assets, enhance productivity, and enable other key improvement needs. Adequate considerations should be given to technologies dedicated to securing operations and support advancing digital manufacturing.*

### **Implement Learnings and Solutions**

*In response to an ever-evolving technology landscape, manufacturers must have adequate cybersecurity tools in place to protect against cyber threats. A holistic approach is needed that not only leverages research to create effective technologies but also works to implement these learnings and solutions in the manufacturing sector. Research should be aligned with the needs of manufacturers and will be especially beneficial to small and medium manufacturers (SMMs) who often struggle to adopt these new technologies.*

### **Expansion into 5G, Wi-Fi 6, and Ultra-Wideband**

*The march to industry 4.0 and technologies like wireless connectivity is further enabled by the relative ease of deployment and flexibility these technologies allow. The security and secure deployment of these technologies are vital to their successful widespread adoption in manufacturing. The focus is on related research that explores practices and technology solutions for the secure use of these technologies.*

To effectively respond to this RFP, there are a number of key items that need to be addressed in the responding team's Proposal.

### **Focus and Scope of Research**

An overview describing the focus and scope of the research planning to be completed during the duration of this project. It is important that the proposal team's recent experience in performing work relating to this effort be elaborated upon. Define the current baseline of technology. Clearly define what the expected outcomes of this research will be in both the context of this project and the context of future work. Specifically, define the future state of both the research and technology if provided one-to-two years of additional funding. Discuss the extensibility of the research being completed.

### **Industry Application or Use case**

Clearly define what industry or manufacturing problems the research being conducted will focus on. Define what potential transformative impact the proposed research could have on industry. The proposed research must be driven by an industry use case. It is



required that a use-case is provided and that it is defined as user stories, framing the problem from the perspective of an end user. A user story describes the type of user, what they want and why they want it. An example format for framing problems as user stories has been included below.

*As a < type of user >, I want < some goal > so that < some reason>.*

Define the role an industry partner needs to play at this stage of research. Furthermore, outline what items you may need from an industry partner at this time, such as better defined requirements or use of their facilities.

### **Methodologies**

Clearly define how the research will be completed, elaborating on both development methodologies and program execution. Elaborate on testing plans, supporting technologies that will be used to complete testing, and stakeholder involvement. Thoroughly define what potential challenges and risks may be posed in the research efforts and mitigation plans for each. Define what success looks like at the end of the initial and subsequent funding periods. Define what the ideal transition of the technology looks like (e.g. commercial partners, industry partners, follow-on research)

### **RFP SCOPE OF WORK**

The above objectives must be completed within the following project constraints:

<b>Period of Performance:</b>	9 - 12 months
<b>Anticipated MxD Funding:</b>	\$75,000
<b>Potential Industry Cost Share Support</b>	\$75,000
<b>Anticipated Number of Awards</b>	Multiple
<b>Potential Follow-on Funding Period</b>	Up to 2 additional years

During the period of performance, the Proposal Team will produce deployable deliverables that will be shared with the MxD membership in accordance with the Membership Agreement. The recommended deliverables are listed below in Table 1, but **the Proposal Team is encouraged to include additional deliverables or provide value-added changes to the recommended set of deliverables.**

**IMPORTANT:** If changes are made to the deliverables, the Proposal Team must provide the reasoning and detail any assumptions to provide context for the changes. Their proposed set of deliverables must align with MxD's focus on achieving deployable outcomes and enabling the transition of the research.



**Table 1. Technical Deliverables**

<b>Deliverable</b>	<b>Description</b>
<b>Final Technical Report</b>	Report must include a comprehensive, cumulative, and substantive summary of all technical advancements and significant accomplishments achieved during the project.
<b>Transition Plan</b>	Written plan for the successful transition of project outcomes after period of performance including distribution and follow-on efforts for phase(s) 2 & 3. Desired future industry partners should be clearly identified with a plan of action for future participation.
<b>Final Technical Presentation/Demonstration</b>	Presentation must include a comprehensive, cumulative, and substantive summary of all technical advancements and significant accomplishments achieved during the project. A demonstration of the technology in its current state must be performed.
<b>Educational Impact</b>	Provide documentation on a course/lab module presented to students demonstrating the use of technology to increase awareness in the topic area. Will be made available to MxD Learn for future educational content.

The team is expected to develop a transition plan, which is detailed in Table 1. MxD is focused on supporting the transition of the outcomes of these efforts in the form of **follow-on research projects**. On an annual basis, MxD will re-release this RFP to both solicit new research ideas and give previously awarded teams an opportunity to receive additional funding to complete follow-on research after an annual review. The outcomes of these projects will inform our investment strategy and may ultimately lead to larger, more targeted, research projects. Teams are expected to tailor their deliverables to their transition goals in order to provide outcomes that have continuing impact after the period of performance is complete.

## **V. INDUSTRY SUPPORT**

MxD has identified an industry member that is interested in supporting academic teams in their research in a number of ways. The specific organization, their interests, and their offerings have been provided below.

### **Autodesk**

Autodesk makes software for people who make things; they offer commercial software that could provide value to proposing teams. If the objectives of the proposal align with Autodesk’s offerings, Autodesk will provide software licenses to Education users as outlined in their Education Users - Additional Terms.



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# PROGRAM OVERVIEW





## VI. PROGRAM REQUIREMENTS

### COLLABORATION

Teams are required to be led by an academic organization. More than one academic organization can be on the same proposal team. Preference will be given to teams that are comprised of both academic and industry partners. If the academic team is unable to find an industry partner, MxD will leverage its network to the best of its ability to pair the offering academic organization(s) with one. The differences between the two collaboration methodologies have been outlined in the table below.

Team with Industry	Paired with Industry
<ul style="list-style-type: none"> <li>Academic Institution proposes to the open project call with an Industry Partner as part of the proposal team</li> <li>Industry Partner provides feedback on research</li> </ul>	<ul style="list-style-type: none"> <li>Academic Institution proposes to the open project call <b>without</b> an industry partner on the offering team</li> <li>MxD will identify interested Industry Partners for pairing</li> <li>Industry partner provides feedback on research</li> </ul>

### PROGRAM MANAGEMENT

MxD will be responsible for managing the project to ensure the team meets all the technical objectives and requirements proposed within the project’s period of performance and budget. The MxD Project Manager will coordinate with Principal Investigators (PIs) of the Proposal Team to manage the program following MxD’s project processes. The Director of R&D Projects, in coordination with the assigned MxD Project Manager, will monitor technical performance and project costs of the associated Enterprise Award Agreement (EAA), the agreement that governs a project awarded by MxD to the Proposal Team Lead. Proposal Teams will submit the reports listed below in Table 2 to their identified Project Manager to fulfill their reporting requirements. These reports will be internally accessed by the MxD Director of R&D Projects, the Government, the Project Manager, and other authorized MxD staff members in the course of their official duties. Technology advancements will be summarized at least annually in order to support reporting to the Executive Committee, Technical Advisory Committee, MxD Members, and the Government, when applicable.

**Table 2. Program Deliverables**

Deliverable	Description
<b>Monthly Technical and Financial Reports</b>	Monthly report from the Project Team Lead including the financial and technical status of the project
<b>Member Technical Reviews</b>	Presentation encompassing all technical advancements made prior to key milestone and presented to the MxD Project Manager, members of the Technical Advisory Committee, and other interested MxD members.



<b>Presentations at MxD</b>	Presentation and demonstration of developed technology presented in person at MxD
<b>Annual Patent Reports</b>	Report of inventions and subcontracts
<b>Intellectual Property Reports</b>	Participants must promptly notify the MxD Project Manager apprised of Project IP created, filing status, claims against the Project IP, and BIP licensed to other Members.
<b>Safety Accident/Incident Report</b>	Participants must report any major accident/incident (including fire) resulting in any one or more of the following situations: one or more fatalities or one or more disabling injuries; damage of Government property exceeding \$10,000; impact to Project planning or production schedules or degradation of the safety of equipment under contract. Such report will also identify potential hazards requiring corrective action.
<b>Draft Final Technical Report</b>	Draft report must include a comprehensive, cumulative, and substantive summary of all technical advancements and significant accomplishments achieved during the project.
<b>Final Technical Report</b>	See above
<b>Project Team Lead Release</b>	Release by Project Team Lead confirming scope of work to be complete
<b>Property Report</b>	List of all MxD funded equipment and planned disposition
<b>Final Patent Report</b>	Report of inventions and subcontracts

### PERIOD OF PERFORMANCE REQUIREMENTS

Proposed projects should be no more than 9-12 months in duration. Please note that projects are initiated once an EAA is signed, therefore, the project duration must include the subcontracting of all project participants between the Proposal Team Lead and each member of the Proposal Team.

### OWNERSHIP OF DELIVERABLES AND INTELLECTUAL PROPERTY

To accelerate digital adoption, cybersecurity, and workforce development across the U.S. manufacturing sector and to support the increased priority from our funding partners to transition project technology, MxD desires to own or co-own all the rights to intellectual property (IP) created during the project (Foreground IP or Project IP). It is the expectation that a member of the Proposal Team will co-own or will have a non-exclusive, non-transferable license to use the Foreground IP it creates. MxD will negotiate in good faith to achieve this result. MxD expects that the IP Management Plan (Attachment 1b) submitted with this proposal will reflect this position. MxD will have no rights to pre-existing intellectual property (Background IP) belonging to any member of the Proposal Team except as may be expressly agreed to in the Project documents. It is important to note that MxD will consider proposals that do not meet this request; proposals with IP Management Plans that reflect this will be favorably reviewed.

### FUNDING REQUIREMENTS

MxD anticipates awarding multiple projects for Emerging Technology in Advanced Manufacturing and Cybersecurity for \$75,000, not inclusive of expected cost share, under the MxD-21-10 RFP. Final Award amounts will be adjusted accordingly based on Proposals received and subsequent evaluations.

There are two potential funding methods for this project. For academic organizations that do not have an industry partner on their proposing team, MxD will leverage its network to assist in matchmaking after the submission of Proposals. It is expected that the Industry partner on each



offering team covers the cost share requirement for their academic partner(s). The details and expectations of the offering organization(s) have been outlined below.

Team with Industry	Paired with Industry
<ul style="list-style-type: none"> <li>• Academic Institution proposes to the open project call with an Industry Partner as part of the proposal team</li> <li>• Industry Partner covers cost share requirements</li> <li>• Industry partner provides feedback on research</li> </ul>	<ul style="list-style-type: none"> <li>• Academic Institution proposes to the open project call without an Industry Partner on the offering team</li> <li>• MxD will identify interested Industry Partner(s) for pairing</li> <li>• Industry Partner covers cost share requirements</li> <li>• Industry partner provides feedback on research</li> <li>• Academic institution clearly identifies the purpose of cost share funding</li> </ul>

This project requires a minimum 1-to-1 Cost Share in aggregate by the Proposal Team, as described in the Cost Development Guide found in the Proposal Preparation Kit. For every dollar of Federal funding awarded, the Proposal Team must contribute at least a dollar of in-kind effort or cash. Thus, the Proposal Team in aggregate will need to provide at minimum 50% of the total project cost (inclusive of labor, equipment, materials, indirect, etc.) in cost share. This cost share can be in-kind or cash and can be distributed among the members of the Proposal Team however the team decides.

**If the proposing team does not have an industry or other cost-share sponsor identified, cost share matching does not need to be captured in the Cost Proposal submission. The Proposal Team must communicate on Pg.3 of the Proposal template that they are not able to secure matching cost share;** MxD will then leverage its network to assist in identifying cost share opportunities for those without a cost share partner.

Neither MxD nor the U.S. Government has any responsibility for costs associated with Technical Proposal or Cost Proposal development, submissions, or pre-award negotiations.

If down selected, the Proposal Team must submit substantiating documentation for all Proposal Team Member costs (including cost share) and MxD will complete a comprehensive cost analysis (including cost reasonableness and cost realism) prior to award. In addition, the Government Agreements office may conduct a cost analysis of all submitted cost proposals to approve the project. Approval of the Cost Proposal and Technical Proposal by the Government Agreements office and the DoD Program Manager is required for all MxD projects.

**NOTE:** Project award timelines are subject to the approval of the project plan by the government and the allotment of funds from the government.



## VII. ELIGIBILITY

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MxD's value proposition is its network consisting of over 300 partner organizations from academia, industry, government, and non-profit. MxD intends to conduct outreach to institutions with programs focused on relevant domain areas and hold information sessions following RFP release. **Proposals are strongly encouraged from member and non-member academic institutions and Minority Serving Institutions.**

### **MxD MEMBERSHIP**

This RFP is open to the public; any organization regardless of membership status may submit a Technical Proposal and Cost Proposal in response to this RFP. However, the Membership Agreement (MA) must be fully executed with every participant within 30 days of notification of project down select; acknowledgment of this is required in the Technical Proposal submission. Any non-MxD members are strongly encouraged to conduct a legal pre-review of the Membership Agreement prior to submission as this is a common source of delay during negotiations with proposal teams that have been chosen during down selection.

Please contact MxD's Director of Business Development, Tony Papke ([tony.papke@mxdusa.org](mailto:tony.papke@mxdusa.org)) for a copy of the Membership Agreement. For more information on how to become an MxD Member, please visit the MxD Membership page on our website.

Federally Funded Research and Development Centers (FFRDCs) and Government entities (Government/National laboratories, military educational institutions, etc.) are subject to applicable direct competition limitations and cannot propose to RFPs in any capacity unless they address the following conditions:

- FFRDCs or Government entities may not exclusively team on any specific proposal team.
- FFRDCs must clearly demonstrate that the proposed work is not otherwise available from the private sector and must also provide a letter on letterhead from their sponsoring organization citing the specific authority establishing their eligibility to compete with industry and propose to solicitations utilizing Government funding.
- Government entities must clearly demonstrate that the work is not otherwise available from the private sector and provide written documentation citing the specific statutory authority, as well as, where relevant, contractual authority, establishing their ability to propose to solicitations utilizing government funding.

Government agencies interested in participating in MxD RFPs as part of Proposal Team should notify MxD in advance of Proposal submission. For RFPs utilizing Federal funding, special agreements and considerations may need to be implemented to enable participation.

### **NOTIFICATION OF PARTICIPATION BY FOREIGN FIRMS & NON-U.S. CITIZENS**

Membership in MxD shall be granted only to U.S. companies, firms, organizations, institutions, or other entities organized or existing under the laws of the United States, its territories, or possessions (as defined in Section 120.15 of International Traffic in Arms Regulations, 22 CFR § 120 et. seq. ("ITAR")).

Membership and project participation (or participation in projects without membership status) will be granted on a case-by-case basis at the sole discretion of the MxD Senior Leadership Team upon approval of the U.S. Government for any of the following:



- Any agency or instrumentality of a foreign government;
- Companies, firms, organizations, institutions, or other entities not organized or existing under the laws of the United States (as defined in Section 120.16 of the ITAR); and
- Non-U.S. Citizens.

In such event, all Members will be notified immediately of the foreign entity's role.

If a Member is a Corporation with subsidiaries or affiliates, its membership will include its wholly owned and controlled and majority-owned and controlled U.S. subsidiaries and affiliates who qualify as a U.S. person under Section 120.15 of the ITAR.

**It is a requirement that work related to the project must be completed in the U.S. by people legally authorized to work in the U.S.** All proposed project participation by non-U.S. Citizens must be disclosed to MxD on Attachment 2c MxD Foreign Firms, Travel, & Non-U.S. Citizens at least 60 days prior to proposed participation. Written approval of foreign firms and/or non-U.S. Citizens must be received by the member of the Proposal Team from MxD prior to commencing work.

## VIII. TECHNICAL & COST PROPOSAL EVALUATION

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### EVALUATION PROCESS

MxD is requiring the submittal of a four-to-ten page Technical Proposal in response to this RFP. The proposal should outline the proposing team's technical and strategic approach to completing their research/solution.

An MxD Evaluation Board (EB) will review and evaluate each submitted Technical Proposal utilizing the evaluation criteria specified in the following section.

The EB may consist of recognized experts from industry and academia and key government stakeholder representatives (when appropriate). MxD representatives, such as the Director of R&D Projects, and respective Project Managers, may participate in and lead EB meetings. All members of the EB will need to meet strict standards of personal and organizational conflict of interest. The evaluators may be supported by subject matter experts to review and comment upon the proposed work.

Through its deliberations, the EB will determine "selectability" of each submission. Selectability determination incorporates average EB score, judgement of market impact, and budget availability. The EB will identify a list of all proposed Technical Proposals that are "selectable for negotiation" leading to a subagreement award, along with their associated evaluation scores, to the Project Manager. The Director of R&D Projects, with the consultation of other MxD representatives, will determine which subset of the proposed Technical Proposals deemed "selectable for negotiation" will be down selected for negotiations. This determination will take into account the EB's recommendation, funding availability, alignment with MxD's SIP as well as external stakeholder requirements (when applicable).

### EVALUATION CRITERIA

MxD's primary goal is to apply digital manufacturing technology to solve business problems. To this end, successful proposers must demonstrate an understanding of both the business needs as well as the technology solutions. Proposals should provide a clear explanation of how the



solutions address business problems and technical requirements outlined in the RFP, any assumptions, and considerations for deployment of developed solution through a pilot.

Each proposal is evaluated by a specific set of criteria. Below are the Proposal Evaluation criteria for this RFP:

Proposal Evaluation Criteria	Order of Importance
<p><b>Potential Industry Impact</b>  <i>Clearly articulates how the research has the potential to be impactful to industry; Proposed solution clearly addresses problem statement and use cases identified by the proposing team; Clear identification of assumptions, risks, and mitigations; proposed deliverables align with requirements. The work being done is clearly driven by an industry use case</i></p>	1
<p><b>Methodology</b>  <i>Clear identification of barriers to implementation and explanation of how they will be overcome; Innovative methodology with high -potential for market impact; Significant and impactful use of external resources; Methodology demonstrates scientific and technical merit; SMART metrics and KPIs identified and described and demonstrate a clear understanding of proposed work; Provides a maturity level assessment of both current and future state of technology with substantiation of assessed levels; Deliverables are fully described and identified.</i></p>	2
<p><b>Transition Plan</b>  <i>Transition plan clearly articulates all project results and application into follow on research, commercial and/or government products, systems, and applications; Plan includes detailed descriptions of project results, risks/assumptions/mitigations, all required actions and timing, detailed funding strategy, key milestones, schedule and go/no-go decision points; Clearly defined IP ownership and innovative licensing strategies designed for rapid adoption of the new technologies; Discussion of future transition and/or research demonstrates a clear understanding of the industry and possible markets for the technology; benefits of technology are clearly defined and substantiated.</i></p>	3
<p><b>Team Qualifications</b>  <i>Members of proposed team are highly qualified to accomplish project tasks with clear delineation of roles and responsibilities; Solid evidence of commitment by team members, such as letters of commitment from their organizations; Team members have unique capabilities that are directly associated with the target technology; Team includes a broad mix of capabilities and experiences to ensure success along with the commitment of top-tier facilities to accomplish all project tasks.</i></p>	4
<p><b>Cost Factors</b>  <i>Proposed cost estimates are reasonable and realistic for the proposed work effort; The minimum cost share proscribed in the RFP has been met or exceeded; Where applicable, cost share from partners is documented with letters of commitment.</i></p>	5



## IX. PROJECT AWARDS

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### CONTRACT AND ACKNOWLEDGMENT FORM

MxD projects will be funded under the MxD Technology Investment Agreement (TIA), Contract Number W15QKN-19-3-0003 between MxD and the Government. All contractual negotiations related to RFPs will be executed by MxD. Funds will be distributed to the Proposal Team Lead selected through the evaluation/selection process utilizing an Enterprise Award Agreement (EAA). EAAs are usually Cost Reimbursement/Cost Share agreements; Milestone Payment/Cost Share based EAAs will be considered upon request.

MxD has provided an EAA template within the PPK for Proposal Teams to review prior to proposal submission as a legal review is a common source of delay during negotiations. **The EAA should not be submitted with the proposal.** After receiving a notification of down selection, MxD will request the down selected Proposal Team to officially begin contract review and negotiations. **The EAA must be fully agreed with the proposal team lead within 60 days of down selection notification;** acknowledgment of this is required in the Technical Proposal submission. MxD would prefer to execute an EAA only with the Proposal Team Lead. Once the EAA is executed, the Proposal Team can begin working on the project. When applicable, it is the sole responsibility of the Proposal Team Lead to issue contracts with applicable flow down clauses outlined in the EAA to any subcontractors, consultants, and any suppliers.

### FINAL TECHNICAL PROPOSAL & COST PROPOSAL REVISIONS

MxD reserves the right to negotiate the cost and scope of the proposed work with the Proposal Team that has been down selected prior to award. MxD will facilitate the creation of a Statement of Work with the Proposal Team including technical scope modifications and program management aspects. All members of the down selected Proposal Team who intend to pursue selection are required to participate in the proposal revision process prior to award. For example, MxD may request that the organizations revise the technical scope to better align with RFP requirements.



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# PROPOSAL PREPARATION INFORMATION





## X. PROPOSAL PREPARATION INFORMATION

This Proposal Preparation Information section offers detailed instructions on how to respond to this RFP; the Proposal Preparation Kit (PPK) includes the required proposal templates and reference documents on how to complete the templates. Together, the Proposal Preparation Information and PPK are intended to provide the basic information necessary for assembling complete proposals.

**NOTE: MxD recommends Proposal Teams review the Request for Proposal Technical Summary & Program Overview prior to the PPK.**

## XI. SUBMISSION INSTRUCTIONS

### SUBMISSION DETAILS

Each Proposal Team must submit their Technical Proposal and Cost Proposal no later than 5:00PM Central Time, September 9, 2021. All submissions must be made electronically to [projects@mxdusa.org](mailto:projects@mxdusa.org). Please include the RFP designation (e.g., “MxD-<XX>-<XX> – <RFP Title> - <Proposal Team> - <Proposal Title>”) in the subject line of the email.

### REQUIRED PROPOSAL DOCUMENTATION

The following section provides guidance on the necessary documentation, templates, and submission formats required to submit a Technical Proposal and Cost Proposal in response to this RFP. Below are the documents (organized by PPK folder) that must be completed and submitted by the due date:

Required Proposal Documentation			
Title	Document	Template	Submission Format
<b>Technical Proposal</b>  ONE PER PROPOSAL TEAM	Technical Proposal	Attachment 1a MxD Technical Proposal Template.docx	PDF
	Resume(s) of the Principal Investigator and Key Technical Personnel	N/A	PDF
	Letter(s) of Commitment	N/A	PDF
	Intellectual Property Management Plan (IPMP)	Attachment 1b MxD IP Management Plan.xlsx	XLS
<b>Cost Proposal and Participant Certification</b>  ONE PER PROPOSAL TEAM	Cost Proposal	Attachment 2a Project Cost Proposal Template.xlsx	XLS
	Cost Narrative	Attachment 2b Cost Narrative Template.docx	PDF
	Certification of Foreign Firms, Travel, and Non-U.S. Citizens	Attachment 2c Foreign Firms, Travel, & Non-U.S. Citizens.docx	PDF



- Each Proposal Team must submit **one Technical Proposal** (Attachment 1a). The instructions for completing the Technical Proposal are in the Technical Proposal template provided in the PPK folder. All questions are required, and attachments should be included.
- Each Proposal Team must submit **one completed IP Management Plan** (Attachment 1b) for the entire team with the Proposal. Instructions for completing the IPMP are provided in the template. The IPMP must contain Background Intellectual Property (BIP), Project (Foreground) IP, and assertions of limited rights to the Government.
- Each Proposal Team must **submit one Cost Proposal** (Attachment 2a) including the Cost Narrative (Attachment 2b) that is a summary or “roll-up” of all Proposal costs including cost share. Please reference the MxD Cost Proposal Development Guide for instructions on how to develop the Cost Proposal. An example Cost Proposal Excel Sheet and Cost Narrative are provided for reference. **Proposal Teams should be prepared to provide substantiating documentation for all Proposal Team Member costs within two weeks of down selection if the proposal is down selected.**
- Each Proposal Team must submit **one Certification of Foreign Firms, Travel, and Non-U.S. Citizens** (Attachment 2c) with information from every Proposal Team member. If there is personally identifiable information, separate certifications may be submitted.
- The EAA is provided for review prior to submission. **The EAA should not be submitted with the proposal.**
- The proposal template includes acknowledgment of the Membership Agreement and EAA timeframe requirements.

Proposals that do not include the minimum requirements identified in the RFP will be deemed non-responsive and will not be evaluated.