



The Digital Manufacturing Institute

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

## **MxD-22-06: Safe Operator via Industry 4.0 Technologies**

Revision 1.0 Release Date: September 15, 2022

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## I. RECORD OF CHANGE

Revision	Date	Sections	Description
1.0	15 Sept 2022	N/A	Original
1.1	15 Nov 2022	N/A	Extended due date from 17 November to 1 December

## II. PROJECT OVERVIEW

Project Type	TIA Enterprise Project
RFP Released	15 September, 2022
Team Formation List	Updated on Rolling Basis
Team Formation Opportunity (Optional)	04 October, 2022
Technical and Cost Proposal Due	1 December, 2022
Anticipated MxD Funding	\$500,000
Minimum Cost Share Amount	\$500,000 or requested funding amount, whichever is lower
Period of Performance	Up to 12 Months

## III. INTRODUCTION

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 through 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 is also the DoD's National Center for Cybersecurity in Manufacturing. 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 a 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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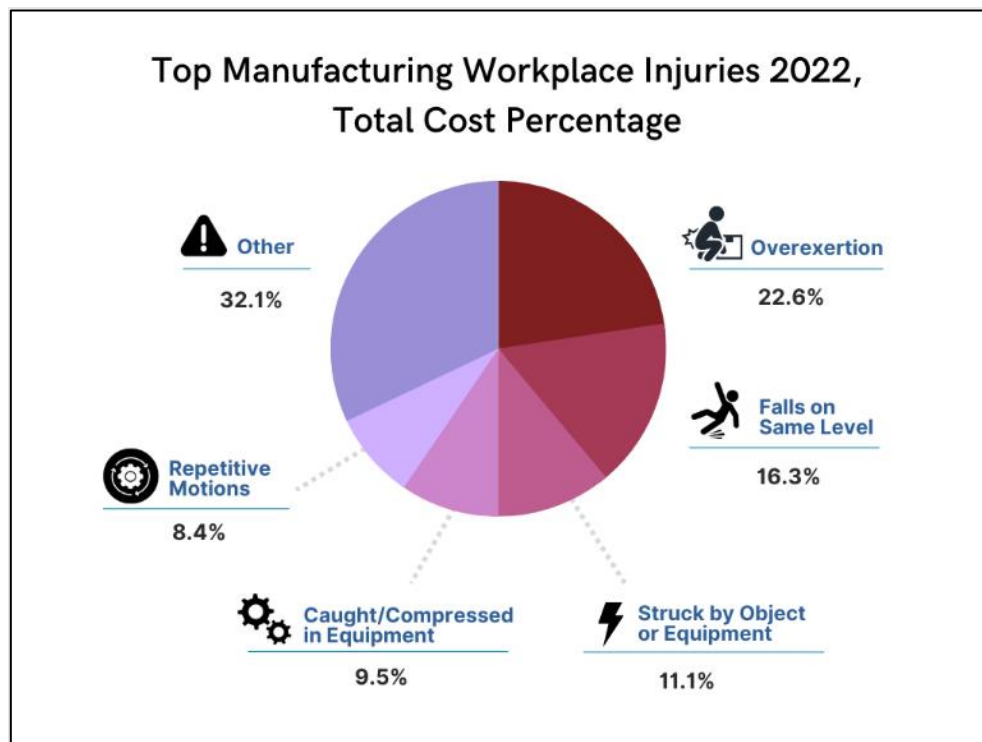
# TECHNICAL SUMMARY

## IV. TECHNICAL SUMMARY

### PROBLEM STATEMENT

With the advent of assembly lines and the digitalization of manufacturing processes, the second and third industrial revolutions saw an exponential growth of workers and increased productivity. This, however, was often at the expense of worker safety leading to numerous preventable injuries and deaths. According to the U.S. Bureau of Labor Statistics, prior to the creation of the Occupational Health and Safety Administration in the 1970's, the worker death rate was as high as 14,000 per year.<sup>1</sup> This administration allowed for the standardization of workplace safety practices such as personal protective equipment (PPE) and held organizations accountable for the well-being of their employees.

Today, the U.S manufacturing industry loses **\$8.4B per year** to serious, nonfatal workplace injuries. Though the automation of production environments has created relatively safer conditions in the 4<sup>th</sup> industrial revolution, operator-in-the-loop workflows are still commonplace and there is a need to proactively improve worker safety and overall well-being. The figure below represents the top manufacturing workplace injuries in 2022 with overexertion accounting for 22.6% of the total cost of injuries.<sup>2</sup>



**Figure 1.** Top Manufacturing Workplace Injuries in 2022, total cost percentage of \$8.4B. Based on Liberty Mutual's Annual Workplace Safety Index for Manufacturing data

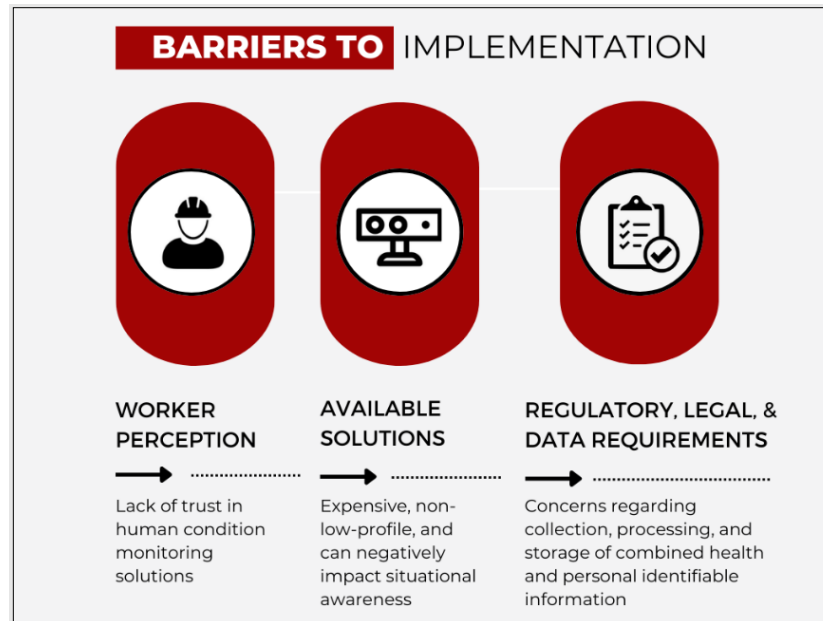
<sup>1</sup> Traveling through Time: A Worldwide Look at Industrial Safety." Transmission & Distribution World, <https://www.tdworld.com/electric-utility-operations/article/21172867/traveling-through-time-a-history-of-industrial-work-safety>.

<sup>2</sup> "OSHA's 30th Anniversary." OSHA's 30th Anniversary | Occupational Safety and Health Administration, <https://www.osha.gov/aboutosha/30-years>.

<sup>2</sup> Workplace Safety Index: Manufacturing - Liberty Mutual Business Insurance. [https://business.libertymutual.com/wp-content/uploads/2022/06/WSI-1005\\_2022.pdf](https://business.libertymutual.com/wp-content/uploads/2022/06/WSI-1005_2022.pdf).

Industry 4.0 technologies such as exoskeletons, intelligent personal assistants, and wearables show potential for creating safer work environments by augmenting a worker's capabilities and enabling real-time health/safety alerts. Though the use of novel technologies is prevalent in industries such as the medical field (e.g. low-profile sensors for patients), the implementation of these technologies in the manufacturing industry are still in its infancy.

There are various barriers to implementation and adoption of digital manufacturing and industry 4.0 technologies to support operator safety and well-being. From a high-level, these can include worker perception of data collection; commercially available solutions; and regulatory, legal, and data requirements as outlined in the figure below.



**Figure 2.** Barriers to implementation of monitoring solutions in manufacturing

- The collection of health data and personal identifiable information (PII) in the workplace is generally viewed negatively by employees. There is a lack of trust in not only who will have access to this information, but how the organization intends to utilize the data (e.g., reduction in scheduled work time or to justify change in employment status based on work performance).
- Commercially available solutions for wearables and augmentation technologies are often not low-profile, can be expensive to deploy, and may introduce new challenges by negatively impacting the situational awareness of the operator. Furthermore, they introduce new attack surfaces, thus requiring the need to secure these devices.
- Data, legal, and regulatory requirements for the accessing, processing, use, and storage of operator health data is ever evolving. There is a lack of clear steps and a framework for implementation of human condition monitoring solutions.

Additionally, there is a lack of standards and concise, actionable steps on how to implement these technologies within manufacturing. To address these industry needs, MxD is funding the implementation of digital manufacturing and industry 4.0 technologies to proactively prevent injuries in production and manufacturing environments. Leveraging off-the shelf technologies, the



solution will provide operators and stakeholders with real-time, actionable insights into worker safety and promote safe work environments.

## OBJECTIVES

The following project objectives are essential for realizing the vision of a safe manufacturing environment in the 4<sup>th</sup> industrial revolution. MxD's recommended set of requirements are included under each objective, but the team is encouraged to make justified, value-added changes to the requirements as they see fit.

- 1. Identify Use Case and Define Requirements:** Engage with a manufacturer to determine appropriate use case(s) based on factors such as “high-risk” occupational areas, data availability and suitability towards demonstrating improvements in defined safety metrics and KPIs.

The requirements for this objective are as follows:

- The Proposal Team should target use cases and manufacturers where sufficient safety and production data is present to provide meaningful insights.
- Where applicable, it is required that representatives from the manufacturer's internal safety resources (e.g. Environment, Health, and Safety; Ergonomics and Human Condition Monitoring researchers, etc.) be included as part of the proposal team to provide recommendations and feedback on the research throughout the project period of performance.
- Where applicable, evaluate and document common data, legal, and regulatory requirements that are relevant to implementations (e.g. OSHA, HRPO, SOC2, etc.). Assess risks and potential concerns regarding the collection, processing, access, and storage of operator data.

- 2. Benchmark Industry 4.0 Technologies:** Conduct a market and internal analysis to characterize and determine appropriate advanced sensors, internal assets, technologies, and tools to enable the safe operator framework.

The requirements for this objective are as follows:

- Deploy exploratory research methodologies (e.g. surveys, focus groups, etc.) to gauge operator and stakeholders views on technologies **before** carrying out implementations. Learnings should be used to guide the selection of tools and inform manufacturing implementations.
- Select appropriate tools based on the manufacturer's requirements such as business priorities, cost, resource constraints, and exploratory research findings.
- Document selection criteria and process through a guidebook or web-based tool to guide other manufacturers interested in understanding the steps necessary to begin their safe operator 4.0 implementations.





**3. Implementations with Manufacturer(s):** Collaborate with manufacturer, operators, and appropriate stakeholders to perform implementation of various digital manufacturing and industry 4.0 technologies previously identified.

The requirements for this objective are as follows:

- Using commercially available, modified, or originally developed technologies, the Proposal Team should demonstrate and document the integration and implementation process of the tools and solutions.
- Implementations should incorporate real-time feedback loops to provide actionable insights to operators and guide stakeholders to make informed decisions.
- Record system architecture and cybersecurity requirements, baseline KPIs and safety metrics being evaluated, strategies for anonymization of data (if applicable), and demonstrable ROI.
- Detail the change management process including the net impacts on operator workflows, worker perceptions, etc.

**4. Develop and Propagate Learning Resources:** Develop educational resources extensible to the manufacturing community that provides a roadmap and tangible, actionable insights on implementation.

The requirements for this objective are as follows:

- Document lessons learned, return-on-investment (where applicable), best practices, and identify common pitfalls to avoid when implementing these solutions for worker safety applications.
- Collaborate with local or national organizations and standards bodies to propagate learnings of how digital manufacturing and industry 4.0 technologies can be leveraged to support worker safety. This may include, but not limited to webinar series, white papers, standards development, conference presentations, etc.

**5. Optional: Develop Factory Floor Demonstration Space:** MxD members have expressed interest in a testing space for worker safety implementations utilizing industry 4.0 technologies. Time and budget permitting, this objective is intended to incorporate the data and learnings gleaned from objectives 1-4 to showcase how industry 4.0 technologies could be leveraged to improve worker safety. Adjustments to the scale of the use case may be needed to ensure the demonstration is appropriate for the MxD Future Factory Floor (view a virtual tour of the space: <https://virtualtour.mxdusa.org/>)

The requirements for this optional objective are as follows:

- Develop a detailed concept for a MxD Factory Floor Demonstration space including design mock-ups, utility needs, and a testing plan. **Note:** Must be approved by MxD before implementation and installation on the Factory Floor.
- Evaluate cybersecurity factors, network infrastructure, and system requirements for utilization of technologies in demonstration space (e.g. cloud access, 5G with MEC capabilities, etc.).
- Document maintenance/ongoing support requirements and develop training handbook for demo space operation.



Through these objectives, the project principally seeks to address the following general use cases though the proposal team is expected to provide relevant, more specific use cases for their proposal.

- As an **Industrial Health & Safety Manager**, I want timely and actionable data on operator working conditions so that I can recommend process changes and proactively improve safety.
- As an **Operator**, I want to have access to my work performance data in real-time to prevent injuries and build confidence that my personal and health data is protected.

## RFP SCOPE OF WORK

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

**Period of Performance:** Up to 12 months

**Anticipated MxD Funding:** \$500,000

**Minimum Cost Share Contribution:** \$500,000 or requested funding amount, whichever is lower

This project is intended to fund the implementation of digital manufacturing and industry 4.0 technologies to address injury prevention. By focusing on observing operator actions and environment, the need for the collection of health data/ PII is no longer necessary and data privacy concerns are mitigated from the human cyber-physical systems. MxD encourages proposing teams to leverage existing work and technologies, such as those being developed in MxD project 19-13-05: “Operator 4.0 via Fatigue and Motion Analyses in a Human Digital Twin Enabled Framework for Smart Manufacturing”.

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**

Deliverable	Description	Deliverable Due Date (Month #)
Requirements Documentation	Documentation of target use case(s), manufacturer requirements, risks and mitigation strategies.	Month 2



<b>Exploratory Research Report</b>	Evaluation of appropriate market offerings, internal assets and technologies, operator and stakeholder perceptions, etc.	Month 3
<b>Data/Legal/Regulatory Assessment</b>	Documentation of current standards and data, legal, regulatory requirements that should be considered for implementation.	Month 4
<b>System Architecture and Integration Framework</b>	Documentation of the system architecture and integration framework including approach and diagrams.	Month 4
<b>Benchmarking and Guidebook</b>	A guidebook documenting selection criteria, best practices, and common pitfalls to avoid when selecting technologies for operator safety applications.	Month 6
<b>Educational Resources</b>	Documentation and propagation of lessons learned, ROI, best practices with MxD ecosystem and/or safety organizations. May include webinar series, draft standards development, conference presentations, etc.	Month 10
<b>Technical Demonstrations at MxD</b>	Demonstration of technical research and development outcomes in MxD's factory or via remote presentation.	Month 12
<b>Optional Objectives</b>		
<b>Factory Floor Demo Documentation</b>	Documentation of design plan, network/system infrastructure, maintenance and support requirements, and training handbook.	Month 12
<b>Factory Floor Demo</b>	Develop and implement a demonstration space based on safety use cases and learnings from manufacturer implementations. <b>Note:</b> Must be approved by MxD before implementation and installation on the Factory Floor.	Month 12

The Proposal Team is expected to develop a transition plan, which is detailed in Table 2 in Section V. MxD is focused on supporting the transition of project outcomes to its membership in the form of pilot integrations on their factory floors, follow-on research projects or commercialized products available for use. Proposal 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. **Pilot deployments and actionable transition plans are a priority for MxD to help maximize the benefits of funded research to the membership and ultimately, help increase the competitiveness of the US manufacturing base through new technological advancements. Thus, it is important that proposals emphasize not just technical merit but transition and deployment.**



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# PROGRAM OVERVIEW



## V. PROGRAM REQUIREMENTS

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### COLLABORATION

Participation in this program requires collaboration with a team of organizations with diverse capabilities. Competitive teams should include representation from the manufacturing base, academia, solution/service providers and standards bodies.

Each Proposal Team must include participation by at least one manufacturer to drive use case and operational requirements. The manufacturer(s) are expected to define technical requirements, drive the business case for project outcomes and serve as a pilot manufacturer for test and validation of the solution. It is encouraged that the Tier 1 or Tier 2 Manufacturing Member provide the research testbed site, but smaller implementations may be better suited at SMMs depending on the Proposal Team's use cases.

There is no requirement for a standards or safety organization to be included on the Proposal Team, but the Proposal Team is encouraged to collaborate with industrial standards bodies or safety organizations to help increase awareness and disseminate their work.

The Proposal Preparation Information section outlines the opportunities that MxD provides to facilitate proposal team development:

- Team Formation List: MxD will collect contact information from parties interested in forming a team during the first month of the proposal period and will then disseminate the compiled list of contacts to the responders via email.
- Team Formation Opportunity: MxD will host a Team Formation Opportunity to provide organizations and/or teams the opportunity to share a snapshot of their solution approach and allow them to identify synergies with other interested parties.
- Participation in the Team Formation List and Team Formation Opportunity is optional and NOT required in order to submit a proposal.

### 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 Senior Director, PMO, 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 Senior Director, PMO, 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>Project Immersion Workshop</b>	Face to face meeting with manufacturer(s) including stakeholders from key business units to review project transition plan and define pilot requirements.
<b>Transition Plan</b>	Written plan for successful transition of project outcomes after period of performance including technology integration, educational distribution, and potential commercialization.
<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

### TRAVEL REQUIREMENTS

Proposals should include funding for four (4) trips per year for two (2) people for each member of the Proposal Team. These trips will be used for face-to-face meetings and presenting to the MxD membership. These trips may be for travel to MxD or to another location at the request of MxD (e.g., a conference, workshop, showcase, etc.). For estimation purposes, use Chicago, IL as the destination. Proposals may include additional funding for travel to pilot site for implementation and testing with proper justification.

### PERIOD OF PERFORMANCE REQUIREMENTS

Proposed projects should be no more than twelve months (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 one project for no more than \$500,000 of Federal Funding, not inclusive of required cost share, under the MxD-22-06 RFP. MxD reserves the right to fund all, some or none of the Technical Proposals received under issued RFPs. Final award amounts will be adjusted accordingly based on proposals received and subsequent evaluations.

This project requires a **minimum** 1-to-1 Cost Share in aggregate by the Proposal Team. 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. Cost share must be accounted for in the cost proposal, as described in the Cost Development Guide found in the Proposal Preparation Kit.

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 approval of the project plan by the government and the allotment of funds from the government.





## VI. ELIGIBILITY

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### **MxD MEMBERSHIP**

This RFP is open to the public; any organizations regardless of membership status may submit a Technical Proposal and Cost Proposal in response to this RFP. However, the MxD Membership Agreement must be fully executed with every Proposal Team member within 30 days of notification of project down select; acknowledgement 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 direct questions to MxD's Director of Business Development, Tony Papke ([tony.papke@mxdusa.org](mailto:tony.papke@mxdusa.org)). For more information on how to become a 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. If any member of the proposal team is not either a U.S. citizen or a lawful permanent U.S. resident (green card holder), please reach out to MxD at [projects@mxdusa.org](mailto:projects@mxdusa.org) before submitting a proposal. 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.

## VII. TECHNICAL & COST PROPOSAL EVALUATION

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### EVALUATION PROCESS

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 Senior Director PMO, 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 Senior Director PMO, 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 technologies 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
<b>Requirements Compliance</b> <ul style="list-style-type: none"><li>Clearly articulates how the team will meet all the capabilities required by the RFP</li><li>Proposed solution clearly addresses problem statement and use cases identified in RFP</li><li>Clear identification of assumptions, risks, and mitigations; proposed deliverables align with requirements</li><li>Program management plan meets requirements in the RFP and is reasonable for the scope of work described in the technical proposal</li></ul>	1
<b>Methodology</b> <ul style="list-style-type: none"><li>Clear and concise work effort scope targeted at problem statement</li><li>Proposed effort of direct relevance to RFP</li><li>Clear identification of barriers to implementation and explanation of how they will be overcome</li><li>Innovative methodology with high potential for market impact</li><li>Significant and impactful use of external resources</li><li>Methodology demonstrates scientific and technical merit</li><li>SMART metrics and KPIs identified and described and demonstrate clear understanding of proposed work</li><li>Provides a maturity level assessment of both current and future state of technology with substantiation of assessed levels</li><li>Deliverables are fully described and identified</li></ul>	2
<b>Transition Plan</b> <ul style="list-style-type: none"><li>Transition plan clearly articulates all project results and application into commercial and/or government products, systems and applications</li><li>Plan includes detailed descriptions of project results, risks/assumptions/mitigations, all required actions and timing, detailed funding and ROI strategy, key milestones, schedule and go/no-go decision points</li><li>Proposed team includes appropriate representation from safety organizations, researchers and industrial partners</li><li>Transition tasks and partners identified and thoroughly defined, both to MxD members and the broader industry</li><li>Solution and strategy to rapidly enable the adoption of the new technologies across the US manufacturing base is presented</li><li>Clearly defined IP ownership and innovative licensing strategies designed for rapid adoption of the new technologies</li><li>Benefits of technology are clearly defined and substantiated.</li></ul>	3



<b>Team Qualifications</b> <ul style="list-style-type: none"><li>• <i>Members of proposed team are highly qualified to accomplish project tasks with clear delineation of roles and responsibilities</i></li><li>• <i>Solid evidence of commitment by team members, such as letters of commitment from their companies</i></li><li>• <i>Team members have unique capabilities that are directly associated with the target technology</i></li><li>• <i>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></li></ul>	4
<b>Cost Factors</b> <ul style="list-style-type: none"><li>• <i>Proposed cost estimates are reasonable and realistic for the proposed work effort</i></li><li>• <i>The minimum cost share proscribed in the RFP has been met or exceeded</i></li><li>• <i>Cost share is clearly defined and directly applicable to the performance and success of the project</i></li><li>• <i>Cost share value is readily discernable</i></li><li>• <i>Cost share from partners is documented with letters of commitment.</i></li></ul>	5

## VIII. PROJECT AWARDS

### CONTRACT

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. **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 to RFP requirements.



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# PROPOSAL PREPARATION INFORMATION





## IX. PROPOSAL PREPARATION INFORMATION

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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.**

## X. TEAM FORMATION OPPORTUNITIES

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### TEAM FORMATION LIST

To facilitate proposal team formation, MxD will collect contact information from parties interested in forming teams during the first month of the proposal period. MxD will then disseminate the compiled list of contacts to the responders via email. If you are interested in submitting your contact info to this distributed list, please email [projects@mxdusa.org](mailto:projects@mxdusa.org) with the following information:

***“Subject: MxD-22-06 RFP Team Formation***

*[Organization Name]*

*[Name of Contact]*

*[Email address of contact]*

*[1 sentence description of expected contributions to Proposal]*

*I agree to have the information herein disseminated to other organizations that have indicated interest in forming a team for MxD’s RFP 22-06.”*

### TEAM FORMATION OPPORTUNITY

Additionally, MxD will host a **Team Formation Opportunity** on October 4, 2022 to provide organizations and/or teams the opportunity to share a snapshot of their solution and receive preliminary feedback from the MxD community. It will also serve as an excellent opportunity for individuals and groups to identify synergies between their pitches. Team Formation Opportunity registration information will be posted at [www.mxdusa.org/projects](http://www.mxdusa.org/projects). Participation in the Team Formation Opportunity is not required to submit a Technical Proposal and Cost Proposal.

## XI. SUBMISSION INSTRUCTIONS

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### SUBMISSION DETAILS

Each Proposal Team must submit their Technical Proposal and Cost Proposal no later than 5:00PM Central Time, December 1, 2022. All proposals must be submitted via the MxD website. The SUBMIT button can be found on each RFP webpage at [www.mxdusa.org/projects](http://www.mxdusa.org/projects). By clicking the SUBMIT button, applicants will be directed to the official Submission Form.



## 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.xlsm	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. Additionally, if the proposal is down selected, the Proposal Team Lead must provide single audit results or other audited financials if Proposal Team Lead is not subject to single audit requirements.**

- 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.**

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