The Digital Manufacturing Institute

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

MxD-22-01:
Technical Data as a Service

Revision 2.0 Release Date: March 10, 2022

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I.   RECORD OF CHANGE

Revision	Date	Sections	Description

1.0	10 March, 2022	N/A	Original
2.0	11 May, 2022	II, XI	RFP Due Date Extended to June 9, 2022

II.   PROJECT OVERVIEW

RFP Released	10 March, 2022
Team Formation List	Updated on Rolling Basis
Team Formation Opportunity (Optional)	5 April, 2022
Technical and Cost Proposal Due	9 June, 2022
Anticipated MxD Funding	$500,000
Period of Performance	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 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.

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. 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.

TECHNICAL SUMMARY

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IV.   TECHNICAL SUMMARY

PROBLEM STATEMENT

The Technical Data Package (TDP) serves as the single source of data throughout the product life cycle, from engineering to manufacturing, across the supply chain, and out through sustainment. It consists of all the familiar pieces of product development, such as bills of materials (BOMs), 3D CAD models, drawings and schematics, standards documents, supplier instructions, quality inspection information, field service and other requirements-oriented data. Understanding the data elements needed for reuse and repurpose of that authoritative source provides a runway for the following:

- Greater clarity in the bidding process. The component and materials list elements of the TDP provides an unambiguous definition against which costs can be estimated. Furthermore, this definition reduces the amount of clarification and amendment requests from potential contractors and suppliers.
- Instructions that are clearer. The 3D instructional data elements of the TDP guide maintenance, production, assembly, and quality processes.

Incorporating TDPs is a step towards meaningful connectivity to the digital thread by breaking down silos which inhibit effective collaboration. However, connecting everyone across the enterprise to the full array of technical data is cumbersome at best.

- There are significant gaps in consolidating and harmonizing the TDP data elements for the various life cycle activities.
- Lack of effective communication with up-to-date product data down the supply chain and in exchanging data from different systems and databases.
- IP security for manufacturers and system integrators is imperative as well as enabling compensation for reuse and repurpose of technical data.

These problems lead to current TDPs falling short in providing the needed information for product use, provisioning, repair, and modification. Procurement and acquisition strategies resort to negotiating for "complete" TDPs and associated data rights years before specific needs are known. It is not practical to place stiff requirements on the completeness of a product-agnostic TDP; therefore, the focus should move from delivery of a TDP to technical data sets at the time of need. Leveraging specific data elements of the TDP for downstream reuse and repurpose provides a compelling value proposition to organizations seeking clear ROI to the sometimes challenging process of integrating their data into one digital thread.

There is a need in industry for integrated frameworks that can synthesize real and as-observed data in the life cycle to the living technical data package and deliver technical data sets with control to immutably document who accessed the data. To address these industry needs, MxD is funding the development of a data-as-a-service tool that automates the creation of a technical data package and delivers technical data sets based on the user's risk-adjusted, time-phased value. Through this investment, MxD seeks to advance the state-of-the-art for how product data is moved through an enterprise to inform the various stages of the product life cycle when making strategic and tactical business decisions.

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OBJECTIVES

The following objectives outline the key activities that MxD considers applicable for a successful project. MxD's recommended set of requirements are included under each objective, but the team is encouraged to make value-added changes to the requirements as they see fit. These changes should be justified in their proposal. MxD encourages agile development on its projects to ensure that the deliverables are shaped and validated by customers and key stakeholders throughout the period of performance.

Additionally, teams are not expected to provide an all-encompassing solution that covers the entirety of the product life cycle for all disciplines. This is unrealistic. **While it is MxD's larger vision that a single system could integrate data from all phases of the life cycle along a robust, flexible, and continuous digital thread, our expectation for this project is to provide one specific portion of that vision which is stand-alone and demonstrably scalable.** Teams are expected to focus their proposals to a scope that is realistic, achievable, and aligned with their unique subject matter expertise. A wider range of expertise is preferable to MxD, but teams will be evaluated based on their proposed approach and its potential impact in the development of a Technical Data as a Service tool that will have the potential to make a broad impact on industry.

Since the solution aims to address scenarios with potential Intellectual Property (IP) issues, items such as pricing schedule for deferred delivery/access options and other economic research are not within the scope of this project. These items are intended to be addressed by the acquisition community.

They key objectives are defined below:

1. **Technology Development:** Develop and iterate on algorithms and automated tools for collection, synthesis, control, and delivery of technical data.

   The project team is free to pursue a variety of capabilities such as data analytics or others in the development of this automated tool. Tool must be able to generate specific data elements of the TDP with authorization and authentication for data access.

   The requirements for this objective are as follows:

   - The Technical Data as a Service tool should have the ability to automate creation of a TDP and segment technical data based on the user's risk-adjusted, time-phased value.
   - The Technical Data as a Service tool should verify and validate the accuracy of the native and derivative models.
   - The Technical Data as a Service tool should control access, immutably document who accessed and for what purpose, and share with relevant parties.
   - The Technical Data as a Service tool should have bi-directional functionality so internal/external stakeholders can use it, interrogate it, communicate with it, make changes, and push it back through the tool to enrich the TDP.
   - Using an agile methodology, integrate solution, generate algorithms, and develop software prototype.
   - There is no specific required format for the tool itself, but some options include a web-based tool, plugin/addon, or built-in functions in existing PLM or PDM systems.

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- Tool should provide its output in a manner timely enough to avoid interruptions in the user's current work cycle.

2. **Data Integrity:** Conduct mapping, review, and prepare processing approach for the underlying data that will drive the Technical Data as Service tool's output.

Technical Data as a Service must be geared toward the capabilities of small and medium manufacturers to ensure low-cost / low-barrier entry to the digital thread. This must be considered throughout the requirements discovery phase. Additionally, focus should not be on establishing a single, complete description of the data elements in a technical data package. The project team should leverage the product data available in their system of record to harmonize the critical data elements of a TDP and demonstrate a solution which automatically generates and distributes technical data for broad application.

The requirements for this objective are as follows:

- Team should target use cases and manufacturers where sufficient data is present to provide meaningful insights and for which that data is sufficiently well-posed that it can be utilized during the project period of performance.
- Evaluate data silos and leverage industry publications and standards to ensure critical data elements of the TDP are captured and capable of driving downstream application and supporting product life cycle activities.
- Develop a minimal set of data taxonomies to eliminate redundancies and ambiguities.
- Identify requirements for a sufficiently annotated model to support the elements of producibility and desired sustainability.
- Identify mechanism for data collection of modern and legacy data.
- Define a validated translation process for content generation and mode of delivery.
- Define requirements for bi-directional functionality of technical data. Consider internal/external stakeholder's need to make changes and the event-based triggers to publish a new version of the TDP.
- Determine an appropriate manufacturing use case based on the exchange of digital information related to design, material, and manufacturing for provisioning and sustainment.
- Determine which data are sensitive/contain IP and determine a strategy for securing this data including while consumed by the Technical Data as a Service tool. The team should consider permissions to data, immutable transactions, duration of access, and whether the data is directly viewed or anonymized (e.g., to develop derivative models).
- Develop a guidebook for establishing a Technical Data as a Service offering.

3. **Data Management:** Based on results of the team's Data Integrity efforts, develop a data-integration framework that will link TDPs to digital information and other technical data set deliverables.

It is expected that this framework will integrate with the organization's systems of record for consumption of data produced elsewhere during the product life cycle.

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The requirements for this objective are as follows:

- Framework should provide clear, lightweight interfaces between software tools or design output (CAD files, design software, PLM, etc.) and the Technical Data as a Service tool.
- Framework should provide integration with one or more systems of records (databases, MRP/MES, data lakes, etc.) to consume data where it is already stored and generated.
- Team should develop a System Architecture which clearly indicates component subsystems, communication, and interface requirements.
- Wherever possible and practical, the team should use standards-based data formats, file types, and communication protocols to ensure the broadest level of adoption and the highest potential re-use and expansion.
- While it will likely be impossible to provide a framework with developed integrations beyond those chosen for the specific project use case, the framework itself should be flexible and provide a clear pathway to integrate with other software stacks (via API, etc.).
- Framework should address relevant cybersecurity concerns.

4. **System Demonstration of Use Case:** Validate the tool's impact and usability by piloting the tool in a use case where impact to the relevant life cycle activities can be ascertained.

Wherever possible, this use case should conform with a realistic industry situation with broad applicability regardless of specific context. This objective will require validation not only of the tool's accuracy and impact, but also the usability, workflow suitability, and user experience. Project teams should leave sufficient time in the project schedule for their chosen use case to be completed.

The requirements for this objective are as follows:

- Demonstrate the usage and effectiveness of the Technical Data as a Service tool through at least one iteration of the product life cycle activity chosen. For instance, if the tool aims to demonstrate a system integrator acquiring design data from a supplier to perform structural analysis, then one use case must be completed.
- Clearly report the outcomes of the Technical Data as a Service tool by demonstrating impact on relevant KPI's chosen as the target use case compared to a relevant baseline.
- Validate the usability of the tool from a human interface perspective, including obtaining feedback from the members which utilized it.
- The project team is expected to provide their own specific use case, but the objectives of this project are aligned with the following more general use cases:
  - *As a sustainment engineer, I want to access the component manufacturer's tech data so I can add functionality to my system and replace obsolete components.*
  - *As a director of operations, I want to leverage my process manufacturing data as a value proposition and improve customer satisfaction.*

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o *As a program manager, I want to only purchase the data that is needed, when it's needed, and for how long they are needed, to enable significant potential savings in system life-cycle costs.*

5. **Transition the Outcomes:** Develop a transition strategy and refine the deliverables so that they can be distributed broadly to maximize their impact.

While this project will likely only address a narrow use case to complete within time and budget, MxD's broader vision is that of a single system which could integrate data from all phases of the life cycle along a robust, flexible, and continuous digital thread. Competitive teams will clearly demonstrate how their chosen implementation would be extensible to other types of products, manufacturing processes, phases of the life cycle, data landscapes, or data management tools. Beyond technical scalability, the team should also tailor their approach to provide ongoing support for tool development by commercialization, open-source code release, or other strategies.

The requirements for this objective are as follows:

- Wherever possible and practical, the team should use standards-based data formats, file types, and communications protocols to ensure the broadest possible level of adoption and the highest potential for re-use and expansion.
- Special attention should be paid to the flexibility and ease of configuration of the data framework as every instance of a manufacturer has a unique data landscape.
- Clearly indicate what the lowest barrier next steps in development are to the tool (different types of products, more manufacturing processes considered, etc.).
- Clearly indicate what the higher barrier or future challenges in tool development are, that are not on the near-term road map.
- The team must develop a strategy for distributing their outcomes to all members of the MxD membership base. Proposals should outline the team's high-level transition strategy and describe their unique qualifications that enable the team to execute this strategy.
- Provide training materials on the benefits of the new software/tool(s) and how to utilize the new tool(s) developed.
- Develop vendor-agnostic and part family/type-agnostic guidelines and lessons-learned content that will enable members of the broader MxD community to sharpen their own digital design strategies.
- Clearly define MxD's role in the transition including for messaging, outreach, facilitating IP licensing, etc.
- If the team is aware of existing follow-on funding opportunities, the team is encouraged to identify them as part of their transition plan including how MxD can facilitate ongoing development

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RFP SCOPE OF WORK

The above objectives must be completed within the following project constraints:
Period of Performance: 12 months
Anticipated MxD Funding: $500,000
Minimum Cost Share Contribution: $500,000

During the period of performance, the team should perform initial market research to gain a deeper understanding of the needs of the industry to de-risk their approach, further refine the requirements for their deliverables and source any existing material that should be leveraged on the project.

The development process should employ agile methodology. Thus, the team should have active engagement from all partners throughout the period of performance to ensure the development is headed in a value-added direction. The team should avoid developing finished deliverables and then testing them via implementation. Instead, minimum viable products should be developed, validated, and then refined in the implementation phase.

Through this iterative development process, the team must develop (or apply an existing) data framework that is responsive to the manufacturer's specific data landscape. Attention should be paid to data access control and cybersecurity considerations. Once relevant data is available and prepared, team should begin development of software/algorithms to produce a Technical Data as a Service tool deliverable. Requirements should be documented and captured from pilot manufacturer team member, team should guide manufacturer towards requirements that meet their business objectives, the technology goals of the project, and long-term vision of single integrated digital thread. MxD encourages the project team to use best available methodology and frequently update their approach and requirements during research and development. These learnings will inform case studies, guidebooks, user manuals, and transition plan.

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

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Deliverable	Description	Deliverable Due Date (Month #)
System Architecture and Integration Framework	Documentation of the system architecture and integration framework including approach and diagrams	Month 3
Network Architecture	Documentation of the network architecture including approach, diagrams, and considerations for compliance and security	Month 4
Technical Data as a Service Tool	All project-developed software including source code, executables, and APIs	Month 8
Test & Validation Report	Technical report on testing results for the digital technology developed and implemented	Month 9
Implementation at Pilot Manufacturer	Implement the Technical Data as a Service tool at a manufacturing site to validate its effectiveness	Month 10
Detailed Case Study	A case study providing a detailed account of the implementation with a focus on best practices and lessons learned.	Month 11
Guidebook	A general guidebook detailing best practices for other manufacturers to follow when establishing a Technical Data as a Service offering. Guidebook should leverage the data taxonomies and framework chosen and how it can be used to satisfy the larger goal of a continuous digital thread.	Month 11
Technical Demonstrations at MxD	Demonstration of technical research and development outcomes in MxD's factory or via remote presentation	Month 12
Developer Documentation	Includes software documentation, integration documentation, documentation for modifications to software, documentation of known bugs and issues	Month 12
User Manuals	Includes user manuals for operation; also includes installation and configuration instructions	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, open-source software release, or commercialized products available for use. Proposal Teams are expected to tailor their deliverables to their transition goals 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.**

PROGRAM OVERVIEW

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V. PROGRAM REQUIREMENTS

COLLABORATION

Participation in this program requires collaboration with a team of organizations with diverse capabilities. Competitive teams should optimally include representation from the manufacturing base, academia, solution/service providers and standards bodies. While it is not necessary for a proposing team to include all such organizations in their direct performers, MxD believes that involvement of diverse stakeholders increases the strength and applicability of project outcomes while reducing unforeseen risk.

Each Proposal Team must include participation by a 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. Specific team composite will depend on which portion(s) of the product life cycle the proposal addresses.

There is no requirement for a standards organization to be included on the Proposal Team but the Proposal Team is encouraged to collaborate with industrial standards bodies to better inform their draft standards and help popularize their work to increase the potential for endorsement in the future. This is especially true where formats or standards-driven data objects are used or extended.

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 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.

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Table 2. Program Deliverables

Deliverable	Description
Project Immersion Workshop	Face to face meeting with manufacturer(s) including stakeholders from key business units to review project transition plan and define pilot requirements.
Transition Plan	Written plan for successful transition of project outcomes after period of performance including technology integration, educational distribution, and potential commercialization.
Monthly Technical and Financial Reports	Monthly report from the Project Team Lead including the financial and technical status of the project
Member Technical Reviews	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.
Presentations at MxD	Presentation and demonstration of developed technology presented in person at MxD
Annual Patent Reports	Report of inventions and subcontracts
Intellectual Property Reports	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.
Safety Accident/Incident Report	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.
Draft Final Technical Report	Draft report must include a comprehensive, cumulative, and substantive summary of all technical advancements and significant accomplishments achieved during the project.
Final Technical Report	See above
Project Team Lead Release	Release by Project Team Lead confirming scope of work to be complete
Property Report	List of all MxD funded equipment and planned disposition
Final Patent Report	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 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

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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-22-01 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.

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VI.   ELIGIBILITY

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). 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 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

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 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 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:

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Proposal Evaluation Criteria	Order of Importance
Requirements Compliance • *Clearly articulates how the team will meet all the capabilities required by the RFP* • *Proposed solution clearly addresses problem statement and use cases identified in RFP* • *Clear identification of assumptions, risks, and mitigations; proposed deliverables align with requirements* • *Program management plan meets requirements in the RFP and is reasonable for the scope of work described in the technical proposal*	1
Methodology • *Clear and concise work effort scope targeted at problem statement* • *Proposed effort of direct relevance to RFP* • *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 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*	2
Transition Plan • *Transition plan clearly articulates all project results and application into 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 and ROI strategy, key milestones, schedule and go/no-go decision points* • *Proposed team includes appropriate representation from supply chain, researchers and industrial partners* • *Transition tasks and partners identified and thoroughly defined, both to MxD members and the broader industry* • *Solution and strategy to rapidly enable the adoption of the new technologies across the US manufacturing base is presented* • *Clearly defined IP ownership and innovative licensing strategies designed for rapid adoption of the new technologies* • *Discussion of future transition and/or commercialization demonstrates a clear understanding of the industry and possible markets for the technology* • *Benefits of technology are clearly defined and substantiated.*	3

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Team Qualifications • *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 companies* • *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.*	4
Cost Factors • *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* • *Cost share is clearly defined and directly applicable to the performance and success of the project* • *Cost share value is readily discernable* • *Cost share from partners is documented with letters of commitment.*	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.

PROPOSAL PREPARATION INFORMATION

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IX.   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.

X.   TEAM FORMATION OPPORTUNITIES

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 with the following information:

> *"Subject: MxD-22-01 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 22-01."*

TEAM FORMATION OPPORTUNITY

Additionally, MxD will host a **Team Formation Opportunity** on April 5, 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. Participation in the Team Formation Opportunity is not required to submit a Technical Proposal and Cost Proposal.

XI.   SUBMISSION INSTRUCTIONS

SUBMISSION DETAILS

Each Proposal Team must submit their Technical Proposal and Cost Proposal no later than 5:00PM Central Time, June 9, 2022. All submissions must be made electronically to 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.

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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**
Technical Proposal 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
Cost Proposal and Participant Certification 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**

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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 <u>not</u> 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.