MilTech, a Department of Defense Partnership Intermediary located at Montana State University, provides the enclosed comments in response to the NIST-MEP RFI seeking input in advance of competitive funding for new Manufacturing Technology Acceleration Centers (M-TACs).

As a Department of Defense Partnership Intermediary, MilTech has a long history of technology transition and commercialization of technology for the Department of Defense. Many of these projects were delivered in partnership with local MEPs. In addition to delivering over 110 technology transition, dual use and commercialization projects for both DoD Program Managers and small to mid-sized manufacturers across the U.S, MilTech is currently tasked by the Director of the Defense Laboratories Program, Office of the Secretary of Defense to assist with the commercialization of technologies developed by DoD labs.

Below, please find our specific responses to the four primary issue areas as well as the fifth question relating to other critical issues that NIST should consider in strategic planning for future M-TAC investments.

1. What are the specific types of technology transition and commercialization tools and services that should be provided by M-TACs? Emphasis is on the alignment of these tools and services with the most pressing needs of small and mid-sized U.S. manufacturers.

- Technology scouting searches that are relevant to the commercialization of the technology
- Technology transition mapping – steps in the process, defining the design, legal issues, marketing, manufacturing, costs, potential returns, etc.
- Technology transition “push” services to pro-actively match technologies with SMEs.
- Competing technology and patent searches
- Technology readiness level assessments
- Technology Data Package (TDP, mostly used by DoD) review and development
- Innovation Engineering
- Finding and contracting with subject matter experts in multiple areas of the technology transition process
- Product design
- Product prototyping
- Design for Manufacturing and Assembly to accelerate the transition process
- Marketing assessment
- Manufacturing readiness level assessment
- Quality management system assessment and implementation
- Business plan development
- Manufacturing plan development and implementation
- Marketing plan development

- Supply Chain Development
- Financing and venture capital plan development
- Technology Licensing
- Quarterly visits until technology is sold or licensed out, or a product is on the shelf.

a. How would M-TAC services complement the services currently offered by MEP Centers?

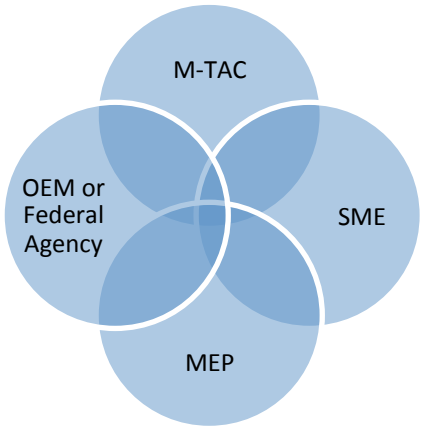
The M-TAC should focus on offering services that the local MEPs do not offer and should focus on successful technology transition vs. local economic development. Most of these services should be brokered out to professionals experienced in the specific technology area, i.e. subject matter experts. The expertise at each local MEP varies immensely and therefore the M-TAC would have to adjust its offerings depending on what the local MEP offers. The goal should be for the M-TAC to use the local MEP whenever possible. The next option would be finding the capability in an MEP outside of the local area. If the expertise cannot be found there, the expertise would have to be sourced outside of the MEP system.

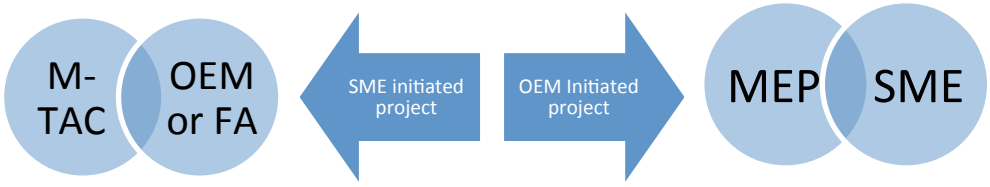
National DoD Partnership Intermediaries, SBIR support programs, EDA Clusters and other programs compliment the services offered by local MEP centers. M-TAC centers should follow these successful examples and leverage the local MEP centers to help SMEs overcome the "technology valley of death."

2. What role should future M-TACs play with respect to supply chain needs? How should OEMs participate? How can industry associations, professional societies, and other appropriate national organizations participate?

- The M-TAC's role should be that of a trusted consultant or partner with the OEM, federal agency (FA), industrial association (IA), professional society (PS) or other national organization (ONO). The M-TAC should also be the facilitator of the technology transition. The M-TAC should sell their services to the OEM, SME, MEP, FA, IA, PS, or ONO. The M-TAC should focus on relationships with the OEM, SME, MEP FA, IA, PS, or ONO and on getting the four organizations together to transition technology.
- The local MEP should be the trusted consultant or partner with the SME. The local MEP should focus on their relationship with the SME and sell their services to the SME.
- M-TAC staff should be adept at qualifying SMEs to ensure their appropriateness for technology transition partnership within a supply chain.
    - M-TACs should partner with organizations that understand specific, demonstrate-able supply chain needs within the DoD, the automotive industry, or other supply chains. M-TACs should carefully assess top supply chain needs to ensure that eventual technology transition and commercialization will have real demand vs. forecast demand.

- M-TACs should partner with EDA TD Clusters that are engaged with sustainable businesses. M-TAC/EDA TD Clusters could provide certain seamless services that would accelerate technology transition.
- M-TACs could play an important role with federal agencies like DHS, BLM, FDA, FAA, DoD, and DoE that regularly fail to meet HUB zone and Disabled Veteran Owned Small Business (DVOSB) purchase minimums. DVOSBs often qualify as SMEs and present excellent opportunities for valuable technology transition.





- Scenario 1: <u>OEM, FA, IA, PS, or ONO initiated project, No relationship between the local MEP and the SME.</u>
  - The M-TAC is asked by an OEM, FA, IA, PS, or ONO to assist the SME in transitioning technology and the SME does not have a working relationship with the local MEP. The M-TAC should lead the project and should subcontract the local MEP to assist. M-TAC and local MEP should define the project and get approval by the SME and the OEM, FA IA, PS, or ONO. The M-TAC should get a quote from the local MEP to assist. Once the final price is determined, the M-TAC should bill the OEM, FA, IA, PS or ONO for ½ of the project cost. The M-TAC should bill the SME for the other half. The M-TAC should pay the local MEP for their part. In this model it is assumed that part of the M-TAC's budget would be used to pay for specific technology transition services from subject matter experts. The local MEP should then send 20% of their fee back to the M-TAC as a type of "finder's fee" or "best pricing". The project should include a minimum of quarterly visits until the technology is sold or the product is being sold.
- Scenario 2: <u>SME initiated project</u>:

- The local MEP is asked by the SME to assist them in transitioning technology and needs the assistance of the OEM, FA, IA, PS, or ONO. The local MEP should lead the project and should subcontract the M-TAC to assist. The M-TAC's role should be to show the OEM, FA, IA, PS, or ONO the benefit of the project and get them to assist in the funding of the project due to financial benefits modeled by the M-TAC. The local MEP and M-TAC should define the project and get approval from the SME and the OEM, FA, IA, PS, or ONO. The local MEP should get a quote from the M-TAC to assist. Once the final price is determined, the local MEP should bill the OEM, FA, IA, PS or ONO for ½ of the project cost. The local MEP should bill the SME for the other half. The local MEP should pay the M-TAC for their part. The project should include a minimum of quarterly visits until the technology is sold or the product is being sold.

3. Potential business models for M-TACs;

a. Because of the programmatic connection to the NIST MEP Program, M-TACs may require cost share. Are there cost share models for future M-TACs that promote scale up to reach nationally dispersed clusters of small and mid-sized manufacturers? If so, what are those models, and why might they be successful?

- Cost sharing would be less burdensome to M-TACs if, prior to a formal agreement, they can count SME staff time and costs associated with exploring technology transition opportunities as match.
- Most Universities have technology transfer and transition offices. The M-TAC should be encouraged to partner with University tech transfer offices regardless of match. These partnerships represent an opportunity for tech transfer as well as the possibility of receiving state budget match.
- Cost share models that promote reaching nationally dispersed clusters of SMEs may include partnerships and contracts with large OEMs or IAs. It would be helpful to the M-TAC to be able to include OEM, FA, IA or PA trade show, or other outreach time as match. It can be assumed that mutually beneficial arrangements with IAs, PAs and some OEMs could be established that would cover some M-TAC match. However, these will be very difficult to establish during the application phase for a new M-TAC.
- One suggestion would be for a specific M-TAC to be funded at $1.5 million per year for three years. This should fund one working director, 2-3 sales/delivery people, partial administration costs and a travel budget. In these three years, as much as $750,000 per year should be used to partially fund projects within the M-TAC specific industry. This funding of projects could, for example, be on a basis of 1/3 of the project is paid for by the OEM, FA, IA, PS or ONO, 1/3 of the project is paid for by the SME and 1/3 of the project is paid for by the M-TAC. Also, the local MEPs would be sub contracted by the M-TAC. The local MEPs should send approximately 20% of the contracted amount back to the M-TAC as a "finder's fee" or "best pricing." During these three years, the objective should

be to show the OEM, FA, IA, PS or ONO what type of work can be done and to use up to $750,000 per year to share in the costs.

- After three years, the M-TAC should be funded at $500,000 per year for two years. In these two years, the projects should be funded on the basis of ½ of the project is paid for by the OEM, FA, IA, PS or ONO and ½ of the project should be paid for by the SME. The local MEPs should be sub contracted by the M-TAC. The local MEP should send 20% of the contracted amount back to the M-TAC as a "finder's fee" or "best pricing." During these two years, the objective should be to get better and long term funding from the OEM, FA, IA, PS or ONO.
- After five years, the M-TAC should be funded minimally by NIST-MEP at $300,000 per year. By this time, the 20% of each of the M-TAC – MEP contracts should provide a reasonable and steady stream of income. The reputation the M-TAC has built for itself should also be paying off with longer term contracts and funding from the OEM, FA, IA, PS or ONO.
- We are confident that this system will work as we have watched it almost work at MilTech. MilTech does not have the $300,000 per year funding that would allow it to sell the next project. This long term minimum funding level will be necessary for the M-TACs to remain successful.

b. The generation of intellectual property is possible, and even likely as a result of M-TAC operations. What types of intellectual property arrangements and management constructs would promote active engagement of industry in these pilots, especially among small and mid-sized U.S. manufacturers that would be supportive of the business model? As appropriate, please include a set of potential options, and please explain your responses.

- In order to avoid conflict of interest, M-TACs should have absolutely no interest in intellection property. The M-TAC's performance should be based on IP getting commercialized vs. ownership. The OEM, FA, IA, PS or ONO will not trust the M-TAC if the M-TAC wants intellectual property rights. The local MEPs will also have to understand that if they subcontract to the M-TACs for project work, they too will have absolutely no intellectual property rights. Any potential conflict related to intellectual property will act as a barrier for parties wishing to engage an M-TAC and could even prevent some local MEPs from subcontracting with the M-TACs.
- Multi-company IP agreements sound beneficial but are rarely, if ever, successful and attempting to broker such agreements would cause significant delays and challenges with commercialization of technology. M-TACs should focus on IP licensing or ownership agreements with one primary SME and within one specific marketplace at a time. The supply chain and distribution network will support the commercialization of the technology if it is done in a manner consistent with single party ownership of the IP, as is common with other successful technology transition projects.
- IP that has value in multiple marketplaces could have licensing agreements exclusive to established vendors in the particular markets. Note that this is different than the point above regarding multi-company IP agreements in a single

marketplace. It can be assumed that many of the technology transition projects would involve multiple licensing agreements. This is very common in DoD and DoE IP licensing and transition projects.

- M-TACs should support technology transfer to SMEs that are already successful and sustainable in their marketplace. Technology transition with startups, university spins-offs, angel funded organizations, or venture capital funded organizations often result in the creation of IP agreements. However, there are often significant delays and/or performance issues when working with startups on technology transition projects.
- Active engagement with industry in M-TAC pilot projects would be accelerated by:
    - Ensuring that M-TACs hire staff with prior qualifications in assessing an SME's appropriateness for being a technology transition partner.
    - Ensuring that M-TACs hire staff with prior experience and contacts in the industry in which the M-TACs is affiliated.
    - Requiring M-TACs to do technology "push" wherein M-TAC staff searches and finds existing, established and successful SMEs and then develops "technology opportunity" promotional materials that define the technology's benefit to the particular SME. Technology "pull" databases that require SMEs to search for IP to license are rarely, if ever, successful when compared to push models. Both methods have been used by DoD and DoE. Push works, pull does not. The M-TAC should be required to hire staff appropriate to a push model for this to be successful.
    - Advancing the IP to the manufacture-able prototype stage significantly improves engagement with industry and promotes successful technology transition. It is recommended that M-TAC funding, when appropriate, be used to advance the IP's TRL to a demonstration stage, or all the way to a complete Tech Data Package whenever possible. Transitioning technology that a partner can see, feel and demonstrate is quicker, easier and more successful than attempting to get an SME to insert a new product development project into an already overloaded pipeline. M-TACs should have local MEP partners or MEP clients assist in this process.

4. How should an M-TAC's performance and impact be evaluated? What are appropriate measures of success for future M-TACs? Please explain your response including the value of the performance measure to business growth. 3. Is there a particular long-term scalable and financially sustainable business model that should be implemented by future M-TACs that will enable small and mid-sized U.S. manufacturers to effectively access and benefit from the technology transition and commercialization assistance and other resources they need?

- First Three Years: The M-TAC should be able to scale-up to complete 10 projects within their industry per year. Each of these projects should be surveyed by the local MEP independent survey process. The M-TAC should be held accountable for the combined MEP survey results of the projects the M-TAC initiated. The M-TAC should also be held accountable in the first three years for

the number of these projects each year that were partially funded by the OEM, FA, IA, PS or ONO. The first year goal might be 25% of the projects were partially funded by the OEM, FA, IA, PS or ONO. The second year, the goal might be 50% of the projects were funded by the OEM, FA, IA, PS or ONO. The third year, the goal might be 75% of the projects were funded by the OEM, FA, IA, PS or ONO.

- After the first three years, the M-TAC can be held accountable for not only the MEP survey results for their projects but also for results of surveys conducted on the OEM, FA, IA, PS or ONO. These questions would of course be different than those that are asked of the SME during the MEP survey. For example, the questions might include "Did this project result in products being sold? Did this project result in the TRL being advanced? How many levels? Did this project result in the technology being matured to the point it was licensed out?"
- Also, by this time, the M-TAC should have technologies that have transitioned. The M-TAC should have been holding hands with the SME until the technology has been licensed out, sold or has produced a product that has been sold. These are the ultimate metrics: actual verifiable commercial sale of transitioned technology. By this time, the records should show a certain percentage of projects that the M-TAC has worked on that have resulted in a product being sold or the technology licensed out or sold. This number would of course be a running average and would look back to the beginning of the organization. In some of these cases, the technology will not produce a product on the shelf for five years or longer. Assuming the M-TAC worked 10 projects per year and after five years 20 of them had transitioned, this would give the M-TAC a 40% rating which might be very good. This will require that the M-TAC remain in contact with the SME until a product is transitioned.
- Long term M-TAC funding may also come from close integration with University technology transfer offices. The M-TAC could, in some cases, become the technology transfer contractor for the University.
- If long term financial sustainability were based on royalties from the sale of transitioned technology the M-TAC would significantly reduce its value to the broad MEP network and lose "honest broker" status with DoD or other government procurement agencies. Federal funding of M-TACs may not increase in the future and encourage M-TACs to seek alternative IA or state government funding and/or improve services by formal partnerships with OEMs and other organizations that benefit from technology transition.

5. Are there any other critical issues that NIST MEP should consider in its strategic planning for future M-TAC investments that are not covered by the first four questions? If so, please address those issues here and explain your response. In addition, NIST seeks comments relating to other critical issues that NIST should consider in its strategic planning for future M-TAC investments.

- To avoid diluting effort and impact, the M-TAC centers should not be part of, or necessarily be co-located with a local MEP. They can however, be independent or a part of another organization with roots in an industry or a federal agency.

Co-location and shared overhead with a local MEP center will result in the loss of focus on a multi-state region or broad technology area, disparate goals and objectives, and customer confusion. Any shared resource efficiencies gained by co-location will not be offset by these negative factors.

- The M-TAC director should be hired by NIST-MEP and answer directly to NIST-MEP, not a local MEP director. The local MEP director and M-TAC director will have entirely different customers and different stake-holders.
- The M-TAC centers should be relatively bare-bones with a working director and, delivery staff. Regardless of the M-TAC's technology focus area, the projects will require subject matter experts outside of the M-TAC's staff. Reducing staff and encouraging or requiring M-TACs to hire subject matter experts on an "as needed" basis, primarily through the MEP network enhances collaboration with IAs, local MEPs and industry and more importantly increases successful technology transition. Multiple examples of this are available through MilTech.
- Each M-TAC center, depending on what its focus is, will have a different operating plan and different industry partners. For instance, if the M-TAC center works with DoD or DoE, it must have security clearances and be capable of receiving MIPR funds. It also will be expected to attend DoD, NDIA and other symposia and trade shows.
- The M-TAC should be allowed to work with companies that are not currently listed as manufacturers by their NAICS code. They may become manufacturers later.
- Each M-TAC should be required to prove a history of successful partnership within the particular technology area or be required to hire staff with a history of success in the particular technology area or prove a history of success in engaging subject matter experts in the particular technology area. For example, an automotive industry M-TAC will require staff with extensive experience integrating new technology into that industry's supply chain.
- The M-TAC should be encouraged, but not required to involve the local MEP in all projects. The M-TAC will sub-contract the local MEP for value added work. If the local MEP cannot add value to the project, the local MEP should be asked to accompany the M-TAC and can survey the SME for impact.
- The local MEP should be encouraged, but not required to involve the relevant M-TAC, i.e. if the local MEP is working with an SME that is trying to commercialize technology that will be used by Boeing, the local MEP should involve the Aerospace M-TAC. Or, if the local MEP is working with a company that is commercializing technology that will be useful to the entire optics industry, the local MEP should involve the Optics Industry M-TAC.
- M-TAC directors must have relevant experience and must be hired by NIST-MEP. For example, the director of an M-TAC that is focused on the Aerospace Industry must have many years of experience in the industry and many relevant contacts.
- The M-TAC centers should not have prototyping capabilities. There are plenty of prototyping companies in industry that are looking for work. The M-TAC should not be competing with private industry, spending government money on

capabilities that already exist in the private sector, or forcing prototyping projects into the local MEPs that have internal prototyping capabilities

- The M-TAC center model should be one of mostly brokering specialized services in particular technology focus areas. The working director and the sales/delivery people should be extremely well versed in their industry, i.e. aerospace. The center should not focus on hiring highly specific expertise within their industry such as a "composites expert" within an Aerospace M-TAC.
- Some suggestions for M-TACs
    - Aerospace Industry
    - Automotive Industry
    - Commercial electronics
    - Optics/Photonics Industry
    - Composites Industry
    - NIH
    - Department of Energy. This could be one M-TAC with departmental divisions or several M-TACs such as:
        - Department of Energy – Labs
        - Individual state departments of Energy (regional or national)
        - Alternative energy
        - Utilities.
    - Department of Defense. This could be one M-TAC with departmental divisions or several M-TACs such as:
        - Department of Defense – Labs
        - Department of Defense – SBIR Army
        - Department of Defense – SBIR Navy
        - Department of Defense – SBIR Air Force
- We believe that the MilTech DoD Partnership Intermediary (PIA) is a sector specific solution to help bridge the technology gap for the Department of Defense.
- Specifically regarding the DoD, the "gap" is actually a two-way roadblock. Not only are SMEs often lacking in the resources required to work with DoD, but the DoD is also inherently ill-equipped to access the SMEs. Therefore, in planning future M-TAC investments, we believe that the MilTech PIA may be a useful model as a sector specific solution for DoD technology transition, commercialization, and supply chain development. This model has proven useful in bridging this gap for, depending upon the method of measurement, what is the single largest sector in the U.S. In fact, MilTech has done so without any recurring funding, relying for over four years now, on only MIPR funds directed to MilTech by specific DoD Program Managers seeking to leverage SMMs.
- Further, beneficial elements of the MilTech model can be used to accelerate and enhance regional or technology area M-TACs. The MilTech staff has worked with over 25 local MEPs to successfully transition technology to the military and is highly motivated to work with NIST to help with the M-TAC development process.

- For an illustration of the effectiveness of MilTech as a DoD technology transition PIA, please see the attached study; *The Economic Contribution of MilTech Assisted Department of Defense Technology Transition Projects to the U.S. Economy.*

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