From: Taylor, Rebecca Racosky [mailto:RebeccaT@ncms.org]
Sent: Thursday, September 08, 2011 11:01 AM
To: amtech
Subject: AMTech Comments

Sir/Madam:

On behalf of the National Center for Manufacturing Sciences I am pleased to submit the attached in response to the RFI on how to structure the proposed new program: Advanced Manufacturing Technology Consortia.

If possible, can you please confirm confirmation of receipt of the comments?

Please feel free to contact me with any questions.

Regards,

Rebecca Taylor

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Request for Information on How To Structure Proposed New Program: Advanced Manufacturing Technology Consortia (AMTech)

Company/institutional name: National Center for Manufacturing Sciences

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Type of Business or Institution: Non-profit Manufacturing Consortium

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Brief description of the operations and mission of business or institution:

Since 1986, the non-profit National Center for Manufacturing Sciences (NCMS) has been the leader in working with manufacturers and technology providers to bring innovations out of the exploratory phase and into commercial implementation. Through the development of collaborative partnerships to address common issues, NCMS accomplishes this goal more quickly, at lower cost, and with fewer risks than going it alone. NCMS leverages the resources and infrastructure of its almost 400 members to arrive at solutions that improve the competitive standing of our nation's manufacturing base. Broad cross-industry participation is the unique strength of NCMS, and allows us to quickly develop and implement the technology innovations that will enable increased global competitiveness. Our success has been recognized by 26 international technology awards involving 35,000 network partners and over the past 25 years NCMS has leveraged more than $1.5 billion to help manufacturers remain competitive.

In 2008 NCMS assisted the Department of Defense in establishing the Robotics Technology Consortium, a non-profit industry organization formed to speed the creation and deployment of ground robotics technology for the Defense Department and other government organizations. The RTC currently has a membership of nearly 200 large and small commercial companies, academic institutions, and non-profit organizations. The consortium develops solutions to meet critical needs identified by the Office of the Secretary of Defense Joint Ground Robotics Enterprise (OSD/JGRE) to support national security objectives. The Army partnered with NCMS for our reach into industry, our ability to bring "non-traditional" companies and small and medium sized enterprises into the collaborations.

NCMS is also working with Alliance for High Performance Digital Manufacturing, a cross-industry industrial group that is working to change the way America manufactures by bringing the power of high performance computing to the value chain. High performance modeling and simulation represents a manufacturing game changer with as much revolutionary potential as the assembly line. Integrating this level of digital modeling and simulation into product design, testing, and manufacturing will realize immense benefits including cost reduction, optimization of processes and shorter time to

market. These and other benefits, not to mention the ability to design new and innovative products which are simply impossible using current methods, demonstrate that high performance computing is the future of global manufacturing. Use of these tools in the AMTech program will help support the DoC's goals of supporting R&D in advanced manufacturing to strengthen long-term U.S. leadership in the development of critical technologies that lead to sustainable economic growth and job creation.

NCMS Responses to NIST's specific questions

1. *Should AMTech consortia focus on developments within a single existing or prospective industry, or should its focus be on broader system developments that must be supplied by multiple industries?*

   Since the goal of AMTech is to support generic technology platforms and early stage technology development, limiting the focus to a single industrial sector will not have the broad impact across the whole of the manufacturing sector as envisioned by the program.

   NCMS has found that many precompetitive and enabling technologies have reach across different sectors (i.e. new materials would impact automotive, aerospace, healthcare, consumer products, etc.) and that cross-industry collaborations with inclusion of many sectors ensure that new technologies developed within the consortium will have the broadest application possible.

   One such example was a rapid prototyping technology project in which teamed NCMS with companies from the automotive, aerospace and healthcare industries. While the aerospace company felt they were leaders in this technology, it was only through NCMS collaboration that they learned the leading edge in this important production technology was resident in the healthcare sector. Ensuring this broad industrial sector participation will ensure that the best technologies are developed and implemented.

2. *Who should be eligible to participate as a member of an AMTech consortium? For example, U.S. companies. i.e., large, medium, and/or small; institutions of higher education; Federal agencies; state, local, and tribal governments; and non-profit organizations?*

   All above mentioned organizations should be eligible to participate. However, the effort should be led by industry. Participation of Federal agencies and state, local and tribal governments are important, but they should not drive the agenda nor should they be able to receive funding as a prime.

   Also, it has been proven time and again that great innovation lies within the small and medium sized companies of our nation (termed the Missing Middle). Special care should be given to attracting these "non-traditional" entities into the consortium to ensure the voices of more than 350,000 manufacturers in our nation are heard.

3. *Should AMTech place restrictions on or limit consortium membership?*

Eligibility should be open to all U.S.-based companies/research organizations and academic institutions as well as non-U.S. based organizations with substantial presence in the United States.

4. *Who should be eligible to receive research funding from an AMTech consortium? For example, U.S. companies i.e., large, medium, and/or small; institutions of higher education; Federal agencies; state, local, and tribal governments; and non-profit organizations?*

   To foster a robust innovation system, participation by a broad array of partners is necessary. This may include industry, academia and government. However, as stated above, funding should go to industry (small and large) as well as institutions of higher learning and non-profit organizations. Nonprofit research organizations, acting as a prime, will be able to facilitate broad industry, government and academic participation without picking winners and losers or funding a single company. No funding should flow to governmental entities as a prime contractor.

5. *What criteria should be used in evaluating proposals for AMTech funding?*

   The criterion used should be geared toward commercialization of technology. An all-encompassing proposal team consisting of technology developers and end users should be present in all funded projects, ensuring commercialization. Both large and small company participation should also be evident and cross-industry teams should be given special consideration for a wide reach across sectors. Also, having multiple industrial sectors represented in the consortia will ensure that the technology is adopted across the manufacturing base and not limited to one industrial sector.

   The proposals should truly be innovative and demonstrate the high risk nature of the work. The proposals should also be high impact – that is, they should have the ability to transform the way manufacturing is performed. There should be a tie to NIST mission objectives/research agendas.

   The funded efforts should take into consideration technical and scientific merit capabilities as well as the track record of participants in these kinds of efforts; the plan for commercialization at the end of the funding term and its transitioning to the manufacturing base. Proposals should be able to span the innovation life cycle.

6. *What types of activities are suitable for consortia funding?*

   Pre-competitive R&D; roadmapping; workforce training and education development for manufacturers and new technology integration are all areas that should be considered for funding. In addition, funding of shared use infrastructure, especially for small and medium sized manufacturers, would be an important capability that should be considered for the program.

7. *Should conditions be placed on research awards to ensure funded activities are directed toward assisting manufacturing in the U.S.?*

   In as much as the program is working for the U.S. industrial base, it is reasonable to expect that only U.S. organizations are eligible for funding and that the majority of the work funded through awards is conducted in the United States in order to retain and create jobs greatly needed in this economy.

8. *What are ways to facilitate the involvement of small businesses in AMTech consortia?*

   SMEs are key to any manufacturing technology development program and are essential for the health of the industrial base. However, these organizations are often wary of working with the federal government on fears of accounting complexities, IP protection, and length of time from application to award.

   In order to engage small businesses, the funding instrument that is used by the government is very important. For example, the use of an OTA (as used by RTC) allows the government to change the terms and conditions that non-traditionals fear in a typical federal contract.

   The reach out to these important small and medium manufacturers, can be easily accomplished by utilizing existing organizations with the experience and track record of working with them. NCMS, with almost 400 members (approximately 70% of them SMEs) would be a great organization to partner with.

   Remote access to tools and technologies is also important to ensuring SMEs are involved and benefited. Virtual tools to communicate, demonstrate and proliferate the benefits of these projects will both enable SME involvement and their ability to broadly benefit.

9. *What are best practices for facilitating the widest dissemination and adoption of knowledge and technology through consortia?*

   Cross-industry participation as well as the involvement of both the technology developers and end users creates a natural path for technology transfer, commercialization and adoption across a broader base.

   Results stemming from the program could be disseminated in periodic working papers, fact sheets, and meetings. As mentioned earlier, the use of collaborative spaces/tools in cloud-based platforms should be utilized. The cloud can provide for portals for dissemination of results and also accommodate user command and control as well as encryption, security and privacy to ensure IP protection.

   In addition, national organizations such as NCMS and others can be utilized for outreach. These organizations also have working relationships with regional, state and national economic development organizations as well as the finance and investment communities that are necessary to commercialize and implement technology.

10. *While it is expected that the research efforts of AMTech consortia (including participants from the Federal, academic, and private industry sectors) will take place largely at the pre-competitive stage in the development of technologies, the generation of intellectual property is possible, and even likely. What types of intellectual property arrangements would promote active engagement of industry in consortia that include the funding of university-based research and ensure that consortia efforts are realized by U.S. manufacturers?*

    An Inventor-Owns Model is recommended for the consortia. In such an arrangement, companies can retain their early advantage in the marketplace and drive faster implementation. Background IP contributed to the project and to project participants and third parties is solely at the discretion of the owner and under conditions established by the owner. At the same time, title to foreground IP vests in the developer/inventor who pays for patent, copyright, trademark and other legal protection. Project participants receive nonexclusive, royalty-free licenses to foreground IP and participants can sublicense IP they develop, but not IP developed by other participants (Notwithstanding the above, participants may sublicense foreground IP to wholly-and majority-owned subsidiaries). Royalties generated stay with the licensing party. The government receives government purpose license rights as appropriate.

11. *Would planning grants provide sufficient incentive for industry to develop roadmaps and initiate the formation of consortia? If not, what other incentives should be considered?*

    Planning grants may be sufficient incentive for roadmap developments but not likely for consortia. Setting up a consortium that can receive funding as an entity (rather than an individual company that would then subcontract with others) is an expensive and time consuming process that will not be incentivized through a planning grant. A better approach might be to use existing consortia (like NCMS) that can pull together teams to address the requirements of AMTech rather than create new consortia. Another approach would be to use NCMS to establish a consortium. Using this model, a consortia could feasibly be up and running in a matter of months – willing and able to begin developing cutting edge technologies together. NCMS would be happy to work with the Department of Commerce in this regard.

12. *Should each member of an AMTech consortium be required to provide cost sharing? If so, what percentage of cost sharing should be provided?*

    Cost sharing should not be mandatory if the participation of non-traditionals and SMEs is important. If created correctly, the consortia could be a place to maximize the leverage of federal investment. Cost sharing could be one of the criteria that is used to evaluate proposals, but not necessary for funding.

    If, however, cost sharing is required, it should be required by the consortium as a whole, but not necessarily by each member. As stated, some of the start-ups, small companies and non-traditionals may not be able to provide the cost share. As a whole, the consortia

should provide cost share but some may provide more than others. In-kind cost sharing should also be considered, per OMB Circular A110.

13. *What criteria should be used in evaluating research proposals submitted to an AMTech consortium?*

    Criteria should focus on the scientific and technological merit of the proposal. This should include evaluation of the level of technical innovation and technical risk. In addition, there should be evidence of scientific feasibility. The proposal should address highly innovative technologies that have applicability across industrial sectors and a plan for implementation.

    The proposal should clearly identify the core innovation, the technical approach, the major technical hurdles and risks, and it must establish feasibility through adequately detailed plans linked to major technical barriers.

    The proposing team must demonstrate a high level of scientific/technical expertise needed to conduct the R&D and have access to the necessary research facilities. Also important to the technical review is the ability of the proposal to show a commercial implementation plan for the technology and its applicability to current commercial technology needs. In addition, the potential for broad economic benefits across the manufacturing base of the U.S. must also be apparent in the proposal.

    Finally, consideration should include the proposer's experience and level of commitment to the project; the extent to which small and medium businesses are involved; the proposer's organizational structure and management plan, including their past success in organizing and managing consortia.

14. *What management models are best suited for industry-led consortia?*

    Industry led consortia are best served by a not-for-profit management model, such as the one NCMS utilizes.

    Another option for the DoC would be to utilize a Consortium Administrative Organization (CAO) as the agent acting on behalf of the industry members of the consortium to execute and administer the efforts on behalf of the government. NCMS plays this role for the Army with RTC and would be happy to work with DoC on a similar arrangement. This would encourage participation from companies that normally do not work with the DoC.

15. *Should the evaluation criteria include the assessment of leadership and managerial skills?*

    Yes – consortia are not created overnight nor are the trust and confidence necessary for successful collaboration. A neutral-third party organization with proven leadership,

management and/or a track record will significantly improve the chances of successful collaborative programs and technology development.

In addition, evaluation of the consortia's IP protection model, their successful federally audited accounting and contract practices and technical program management would be essential. Finally, an organization that has experience with consortium will shorten the timeline by having membership applications, sample bylaws and policies and procedures, contracts, etc. on which to build.

16. *Should limitations be placed on the duration of consortia?*

No - Once the consortium is set up, it should be allowed to continue as long as the members are interested in supporting it. However, decisions on the length of funding the consortia may receive from the government may impact the ability of the consortia to continue.

17. *How should an AMTech consortium's performance and impact be evaluated? What are appropriate measures of success?*

Time from request for project proposal to award should be taken into consideration, the strength of a well-run consortia is reducing the process cycle time. Ability to engage non-traditionals and SMEs should also be used as a marker as should the consortia leadership's ability to manage the programs seamlessly and put the good of the consortia as a whole first and foremost in all decisions. The ability to work well with government, academia and industry should be a requirement as consortia leadership representatives will be the key points of contact for all parties involved. An advanced understanding of government contracting, collaborative agreements and IP protection should be inherent and could be used as a marker from the types of agreements executed.

The consortia should also be evaluated on its ability to engage other stakeholders such as funding/venture organizations, regional and state economic development organizations as well as the creation of new scientific and technical knowledge. Finally, is the consortium providing greater insights into the awareness of manufacturing and providing the tools for economic development and job creation in the sector?

18. *What are the problems of measuring real-time performance of individual research awards issued by an industry-led consortium? What are appropriate measures of success?*

Key milestones and objectives should always be clearly defined and adhered to; to the best ability of the project team awarded funding. Tracking this performance will be dependent upon periodic reports and ample communication between the parties.

Cloud based collaborative program management tools / project team communication tools can be utilized to measure real-time performance of the consortia, the members and the technical progress.

19. How should the NIST AMTech program be evaluated?

An annual review of the program should be conducted which includes a description of the metrics upon which award funding decisions were made in the previous fiscal year, any proposed changes to those metrics, metrics for evaluating the success of ongoing and completed awards, and an evaluation of ongoing and completed awards.

Other factors to consider include:

- did the programs funded stimulate high-risk, high-reward research?
- did the programs funded include evidence that the research would not be conducted by industry in the near term without AMTech funding?
- did AMTech fund programs that were not already developed or commercialized?
- did AMTech fund proposals with scientific and technical merit that may result in IP development for a domestic entity that can commercialize it?
- did AMTech fund proposals that advanced the manufacturing state-of-the-art and contributed to the domestic technology base?
- did AMTech address the critical manufacturing research needs of the nation through the program?
- did AMTech address its stated goal of strengthening long-term U.S. leadership in the development of critical technologies that lead to sustainable economic growth and job creation?

20. What are lessons learned from other successful and unsuccessful industry-led consortia?

A neutral third party leading the group of companies is vital in order to retain the best interest of the effort as a whole. If indeed, a legal entity is engaged and/or created for the purposes of this program, a diverse board of directors and executive committee divided by membership demographic is useful in ensuring the membership as a whole has a voice. Transparency from both the government and the leadership is essential to success and retaining trust within any consortia.

NCMS is a model that has been successful for almost 25 years. It has all the elements of a successful consortium and may be an organization that the DoC considers instead of setting up a new organization. As mentioned earlier, the DoD came to NCMS to set up RTC because of our track record, robust management of IP and impeccable contracts and accounting reputation. To create a new consortia from scratch is time consuming and expensive (legal costs can easily exceed $100,000). In addition, it will take over a year to

get an IRS determination letter and establish the consortium as a government vendor. To function within an existing industry driven consortium will reduce the time and money.

In regard to consortium management, every membership group (large, small, academic, nonprofit and non-traditional) needs equal representation on the governing boards. Membership elections will ensure the consortium is managed in a manner perceived as fair and open.

21. *How can AMTech do the most with available resources? Are there approaches that will best leverage the Federal investment?*

Utilizing an already existing, successful consortia to lead AMTech would be the best use of this Federal investment, it could operate under an already established 501(c)3 such as NCMS, adopting similar bylaws, IP protection, ethics standards and Policies and Procedures. This would create the consortia much more quickly than if organizing on its own and would give the DoC benefit of immediate implementation and work flow.

22. *How should AMTech interact with other Federal programs or agencies?*

Several venues for interagency collaboration exist that could be utilized for AMTech to interact with other federal programs. It would help facilitate interagency program planning and budgeting, collaboration, coordination, and leverage; to review agency priorities and technical issues for federally-funded manufacturing R&D and promote communications among the government, private sector, and academia on R&D requirements and programs.

23. *What role can AMTech play in developing, leading, or leveraging consortia involving other Federal agencies?*

The DoC has a natural lead role in the manufacturing sector and should be the Agency to identify and integrate manufacturing technology requirements and to develop strategies for the Federal Government's manufacturing programs. Commerce can review agency priorities and technical issues for federally-funded manufacturing technology development and ensure there is not replication and that existing investments are leveraged across sectors to ensure economic development, job growth and business development goals are reached.

Additional Comments:

NCMS strongly encourages the Department of Commerce to utilize existing organizations as it creates the program guidelines for AMTech. If the approach is to fund many "consortia" to execute myriad of projects, the best approach would be to use an existing organization, like NCMS, to achieve this in less time, with less cost and less red tape, especially for SMEs. Alternately, the DoC can use NCMS as its Consortium Administrative Organization (CAO). NCMS would be the agent, acting on behalf of the

industry members of the consortium, to execute and administer the efforts on behalf of the government. Using this approach, DoC gets a new consortium up and running in minimal time, reduces the time from RFP to award, and makes it easier to engage the small and medium sized companies. This new consortium can have its own name, identity and management structure as well.

The NCMS stands ready to work with the Commerce Department on this important effort to drive innovation in manufacturing and retain the U.S. status as the world's manufacturing and innovation leader.