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**Sent:** Tuesday, September 20, 2011 1:17 PM
**To:** amtech
**Cc:** Lambis, Barbara
**Subject:** AMTech Comments

Green Oak Consulting, LLC is please to provide the attached responses to the Department of Commerce / NIST, AMTech initiative. If you have any questions about the responses, or require additional information / clarification, please let me know. Thank you very much for the opportunity to respond to this inquiry.

Respectfully,

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## DEPARTMENT OF COMMERCE / NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

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

AmTech - [Docket No.: 110620345–1331–02]

**AmTech Question: Green Oak Response**

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?

**Response: I believe the future of manufacturing is in advanced technologies; advanced technologies created and developed through research, and ultimately supplied by the manufacturing sector. Look to the largest manufacturing sectors to get an assessment of current technology requirements, and also forecasts on what future technology requirements will be (eg., where they see their respective industries going 50-100 yrs in the future). The future of their operations will set the dialogue for future technology. Necessity is the mother of invention. I would take a serious look at nanotechnology, the material sciences, 3-D imaging and others. You might look to the petroleum and coal industry (energy), computers/electronics, chemical, aerospace/defense, pharmaceuticals', auto/heavy machinery, and health care. Each industry has its own requirements that current day technology cannot provide. They also are going to need advanced technology to stay competitive and to continue their leadership for, IP rights, health and safety, and communication. If we know what their current state is, and then determine where they want to go, the right match of creative talent, scientific engineers, and cat-herders working together through the scientific process, we could deliver unprecedented spin-off technology prior to reaching the advanced stage materials.**

**The possibilities of what will be discovered are almost endless, including the indirect benefits as well. One indirect benefit will be a demand for skilled labor, which hopefully will put pressure on our secondary and post-secondary institutions to re-think their approach to math and science curricula. With respect to post-secondary institutions, we're just now beginning to see coursework in nanotechnology. I believe an initiative such as this would drive changes at the secondary and even primary education levels. Not to put too fine a point on this submittal, but another benefit might entail the indirect promotion of western culture (eg., western democracy) through the dissemination (reference #9) of scientific information. The**

**ancient Persians have a rich history in science, mathematics and technology. A theme, as suggested in question #8 might promote their involvement, if it's so desired. As an example might be a scientific approach to John F. Kennedy's Peace Corp initiative.**

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?

**Response: I would add to what has been outlined in the 2012 NIST National Technical Information Service Budget to Congress, by including the military, possibly foreign research institutions (eg., Rikon, Japan; Hebrew Univ, Israel; the Italian universities; Trinity College, the Brits, Ireland, and many of the U.S. universities), and independent subcontractor entrepreneurs who possess the ingenuity and creative talents, and who can contribute to the discourse.**

**How do the federal agencies view the participation of foreign institutions? I believe we are going to need these research institutions, so the question about national security, confidentiality and intellectual property become important discussion with respect to having the access to research and overall collaboration in general.**

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

**Response: Either way, you don't want to limit solutions, intellectual creativity, ideas, or the advancement of value-added benefits. The challenge will be to manage the number of stakeholders, intellectual property concerns, and the collaboration process. It's crucial that all ideas and approaches are reviewed/considered, even the most outlandish. Under the scenario presented in this particular submittal, there could be a high potential for an overwhelming number of participants in the early pre-competitive stage(s). I would try to manage the program in such a way that does not restrict ideas and solutions during this particular stage. I believe the "market," would in part, manage membership during the subsequent teaming / JV stages of research and development.**

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?

**Response: All should eligible, especially those who are collaborating on joint projects, research institutions who have available laboratory equipment and equipment manufacturers who are designing and building. These are a few simple examples, and more would be revealed during the pre-competitive stage.**

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

**Response: I like the idea of having a "roadmap". I think the criteria should be evaluated based on a roadmap that can lead to accomplishing short-term and long-term goals. I might start by considering the scope and approach presented in each roadmap, followed by creativity in the approach, creativity in cost savings, potential for success, total cost of the project funding, level of return, management of scope/schedule, ability to adhere and demonstrate budgetary constraints. Look to the needs of the potential customer and end user, and let the private sector, non-profit, and/or joint venture explain how they're going to get there.**

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

**Response: Research and development/ proof of concept and pilot studies. I agree with Dr. Yousoo Kim, principle investigator at RIKEN, RNC in Japan who believes additional research needs to be conducted into the *essence of phenomenon*. A few very simple examples of some of the research projects currently underway are: 1) the effects of Van der Waal forces on nano-particles such as graphene; 2) the effects of temperature and pressure on various nano-particles; 3) the effects of magnetism; 4) electrical conductivity; and 5) molecular level catalytic reactions. This list could be overwhelmingly long, so the key here is to put conditions on each research proposal (see #7) keeping an end goal (eg., commercial application) in mind. I would suggest getting feedback from the end users and start by agreeing on the type of applications needed and wanted.**

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

**Response: The research needs to deliver, and it needs to be well defined. Conditions need to be present to counter the possibility of the research falling short of the respective proposal scopes. Ultimately a successful program in advanced technology should be curtailed toward manufacturing. This type of program has the potential to revolutionize society and manufactured products as we know it.**

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

**Response: Through solicitations and invitations from our federal agencies; possibly release announcements through small business organizations, manufacturing associations, Department of Commerce, the SBA, other federal entities and non profits. Possibly consider establishing one central virtual portal for all interested parties to review the requirements. You might also consider establishing a theme or slogan reminiscent of WWII – one of service, contribution and call to duty. The ideas for this type of initiative, as presented in this submittal, has the potential to become unlike any other that has been created in a very long time.**

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

**Response: The Social Media site LinkedIn would be an excellent resource for acquiring and disseminating some types of information. The use of Twitter would also be excellent for dissemination. Another form of information dissemination might be the standards generating process, and other forms of technical publications. Prior to and following each research assignment, standards will need to be developed by standards generating institutions. I'm beginning to see the need for additional standards in nano via the types of inquiries being made on LinkedIn. Conferences and expositions would be extremely beneficial. Virtual conferences will need to be utilized, as well as annual conferences to facilitate face-to-face interaction. If security were deemed an issue, you might consider an online, robust, state of the art portal similar to LinkedIn, but one designed specifically for communicating and sharing information related to this program; one that allows group and subgroup collaboration; one that has a smart phone application for travelers. It should be robust enough to allow large volumes of information to flow in and out. The question then becomes, how secure would this need to be?**

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?

**Response: As an example, joint ventures between two-party and multiple parties could occur. I would assume these ventures would be interested in converting intellectual property into tangible forms such as patents, copyrights, trademarks, and potential licensing agreements. As eluded to in question 2 above, I think the area of IP and patents will be one area that will present the most difficulty in managing in terms of information sharing and effective collaboration. Possibly voluntary licensing of IP would enable the transfer of "soft technology" and might help to avoid the sensitivities surrounding compulsory licensing issues? Furthermore, compulsory licensing / government use of IP to help provide expedited use of the technology, driving the research to commercialization process might be considered? Additionally, the use of economic incentives, and the effective use of policy tools (pre-grant opposition or the possibility of compulsory licensing) might facilitate an expedited process and engage industry and the public sector in healthy competition. I believe a great deal of political will is needed on the part of our federal sponsors to promote a consortium such as this, and implement a policy framework conducive to healthy competition in the advancement of technology and ideas. Our federal stakeholders (eg., Dept of Commerce and U.S. Patent and Trademark Office) could provide contractual and IP assistance in this area. The Leahy-Smith America Invents Act may provide the conditions necessary to expedite patent development and proof-to-**

**commercialization.**

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?

**Response: Possibly. You might consider the website idea, followed by an industry sponsored forum for collaboration and brainstorming, with the goal of developing your "roadmap." Just an idea, but if you had a list of wanted / must have collaborators, you might then invite them to a "planning forum" for this industry sponsored event. The Department of Commerce, AmTech and/or a third party subcontractor could assist by developing the forum. If a collaboration forum is properly developed, bringing the right stakeholders together face to face, ideas, camaraderie and collaboration could occur ultimately leading to group roadmaps. In my opinion, these stakeholders need to spend a lot of time together in meaningful dialogue. I have over four years experience managing in a virtual environment and a combination of virtual, conference call, web-based hosting and face-to-face would be needed if this initiative were to be carried out in an expedited manner. If cross collaboration between industries and foreign institutions is needed, then individuals in one industry most likely will not know C-level execs, scientists and engineers from a different industry. If a JV is to form, eventually these parties will need to meet face to face to collaborate and build a relationship, I would presume. Under that scenario I don't believe email alone will get the job done.**

**Group roadmaps may lead to the proposal writing teams and joint ventures. It might be helpful to have collaboration sessions, or have a pre-release with all requirements made available ahead of time so small business can have ample time to prepare and respond with sound information and creative ideas. You might try this route first, and to "hone" each roadmap, provide planning grant assistance (ie., cost saving mechanism)?**

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

**Response: I like the idea of self-funding, but a project initiative such as this will require contributions from the private, public and federal sectors. One simple example of a form of cost-sharing would be a university or equipment manufacturer loaning out its equipment for a visiting JV fellow.**

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

**Response: Some of the same criteria currently used to evaluate federal proposals and grants, but this process will need to adapt from its current state. The reason for adaptation and change is due to this type of initiative. This type of initiative needs to link current research and current capabilities with those areas**

**that are not yet known or not completely understood. What type of applications and equipment do we want to develop, and how do we get there? Your idea of a "roadmap" is excellent. The review criteria should use each roadmap and evaluate the respective scopes against the potential for success (return on investment).**

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

**Response: PMI; lean, agile – use and borrow what is necessary to expedite, but also reduce risk. Build the foundation through the planning and charter / contractual process, and expedite the delivery component.**

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

**Response: In accordance with FAR, Section 9 requirements?**

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

**Response: Yes – if the consortia cannot deliver value-added benefits, or at some point the program appears to have "stalled", optimization of the program structure should occur, and then look to program elimination. A charter containing requirements for program optimization could provide the "teeth" to reduce waste and inefficiency from the outset.**

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

**Response: Overall management of the program consortium, delivery of scopes and schedules meeting and/or exceeding milestones. Each contracted joint-venture will be responsible for assigning earned value, adhering to budgetary requirements, and meeting target milestones for the individual projects.**

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?

**Response: If I understand the question, measuring and forecasting cost and schedule performance in real time is always a difficult process; however, as indicated above, the use of earned value management should be required. You might look to a third party consultant for project management oversight to assist with program management, all or in part.**

19. How should the NIST AMTech program be evaluated?

**Response: Through earned value, setting and meeting milestones, time to full scale commercialization, and any other metrics set by the potential end users (customers) or the program sponsors.**

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

**Response: A program, as alluded to in this submittal, would have an impressive budget and would have various multifaceted components present. I would not recommend an open voting structure during the pre-competitive stage. It would be nearly impossible to effectively manage. I would however, suggest a "vetting" process. Additional information can be provided on request.**

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

**Response: Optimization and streamlining federal program budgets. The idea would be to reduce duplication and program cost, increase efficiency, and sharing information across industry. I also think combining budgets from other federal agencies would prevent the overall vision from being spread too thin, and would meet the aforementioned objectives.**

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

**No response.**

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

**Response: Information sharing and collaborating is helpful to leverage other consortia. The Dept of Commerce might consider retaining a subcontractor to assist with initiating and/or leading the program effort.**