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Sent: Friday, September 09, 2011 1:52 PM
To: amtech
Subject: AMTech Comments

Ms. Barbara Lambis and Mr. Michael Walsh

NIST

Attached pls find a response to the NIST RFI on the Advanced Manufacturing Technology Consortia (AMTech) Program. Pls contact me directly if you would like to discuss our company's response.

Rgds, Mike Ciesinski

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AMTech Initiative Response

This response is directed towards the National Institute of Standards and Technology (NIST), Department of Commerce, Request for Information on an Advanced Manufacturing Technology Consortia (AMTech) program.

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Company Operations and Mission

The FlexTech Alliance (FlexTech) is a North American organization focused on promoting and building a high-volume flexible and printed electronics manufacturing infrastructure in the U.S. We are both an R&D consortium administering a robust technical program and a trade association offering our 90+ member companies and institutions industry services and benefits. Since 1993, FlexTech has managed ~\$110M in federal funding, matched by \$160M in industry funding. This cost share of ~62% is significantly higher than most federal R&D programs achieve.

The mission of FlexTech is to advance the growth of the flexible, printed electronics industry. Bringing together printing, materials, electronics, academic, government and industry stakeholders, we facilitate collaboration between and among them to share practical experience and develop solutions for advancing displays, flexible and printed electronics, and related technologies from R&D to commercialization. FlexTech's technical emphasis is on design for manufacturability and developing manufacturing expertise that will position member companies to supply major emerging markets, including communications, energy, healthcare, and security. Consequently, we are very supportive of the AMTech initiative and would readily work with industry and government partners to help assure a supply of new technology solutions.

Responses to the RFI

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?

R: FlexTech advocates a broad approach that would focus on single industries, as well as multiple, intertwined industries. For example, in the flexible electronics industry improvements must be made in the supply chain including substrates, conductive inks, various processing tools, inspection and metrology tools, etc. But, integration of a properly built device to a power supply or a display must be accomplished in order for a product to be successfully developed. Therefore, inter and intra industry teaming should be encouraged.

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?

R: AMTech consortia should be led by companies and by non-profit organizations which have a manufacturing thrust. Participation by the academic community and federal, state and local governments should be sought when necessary and when value can be determined.

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

R: No. Experience has taught FlexTech that consortium members often align organically and with common interests and complementary strengths. Moreover, the consortium's proposed structure and partners, past performance, and likelihood for future success should be the gating metrics.

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?

R: Primary beneficiaries of AMTech consortium funding should be U.S. based companies, or non-U.S. based companies with a substantial R&D or manufacturing presence in the U.S., regardless of size, and non-profit organizations who have a manufacturing charter or thrust. Cost share should be an important consideration in awarding funding. Ample programs exist for the academic community and for federal, state and local governments and they are often unable to provide cost share.

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

R: Creative application of existing or new technology and manufacturing platforms; strength of partnerships; amount of cost share; regional diversity; potential for U.S. based employment; experience and track record of the organizers.

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

R: There are several including supply chain development (tools, materials, processes), applied R&D, prototyping, and a shared R&D or prototype manufacturing facility.

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

R: Companies receiving awards should be U.S. based and/or have substantial R&D or manufacturing facilities in the U.S. Provisions can be made for a return of an award if a company receiving an award is sold to or otherwise acquired by a non-U.S. firm in a set period of time, e.g., 3 years after receiving and completing the award.

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

R: Outreach should be conducted to the small business community through well-publicized workshops and webinars. Trade associations and other professional groups can help facilitate outreach and should be used by NIST to do so.

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

R: Increasingly, FlexTech sees a demand for electronic distribution of data and information. Principal vehicles are password protected areas of websites and hosted webinars. We have had success with tightly focused, 1 day workshops that include facility tours. Finally, general purpose, multi-day conferences are appropriate if there is enough new, high level content to justify travel.

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?

R: Experience has shown that a successful consortium must have an intellectual policy (IP) regime that encourages wide-spread industry participation and dissemination of results. FlexTech succeeds because our IP policy encourages our partners to commercialize their successful developments. This is accomplished by vesting IP in the developer with adequate safeguards should they fail to commercialize a successful outcome.

With respect to universities, establishing a manufacturing ecosystem does not play to university strengths. Nor do many universities have the needed facilities. Therefore, care should be taken that, if universities are engaged in the consortium, layers of complexity are not added to the IP protocol.

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?

R: Planning grants are a reasonable tool to use for roadmapping and consortia development

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

R: In practice, the government should seek the highest amount of cost-share that industry can provide. In its federal program FlexTech has achieved a 62% industry cost share. Certainly, all consortium participants who are receiving funds should provide cost share in cash or in defined in-kind contributions. However, start-up companies may participate in an AMTech consortium and they can wither when they spend too much time seeking funding rather than developing their product and markets. The US-Israel BIRD Foundation uses a model where some fraction of the funding money is paid back with revenue generated from product sales upon successful commercialization. This model should be considered.

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

R: The criteria to evaluate a proposal could include percentages applied to:

- *A project proposal, including problem definition, scope and objectives, technical approach, performance target metrics and/or specifications.*
- *A statement of work (SOW) including the project management approach, personnel, task description, milestones and deliverables.*
- *A detailed project cost analysis and a cost share and a project risk assessment.*
- *A market needs and competitive landscape assessment.*
- *Finally, company background and capability to meet objectives.*

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

R: FlexTech has enjoyed success with:

- *an industry-led Governing Board*
- *an industry-led Technical Council*
- *representation from the Department of Defense (our federal partner) on the Governing Board and Technical Council*
- *experienced executive management and staff*
- *experienced outside service providers, e.g. legal, accounting, audit*

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

R: Successful experience in leading and managing consortia should be a significant factor in determining AMTech awards. This would include not only leadership and managerial skills, but also a prior track record in obtaining industry cost share, experience in constructing and managing an R&D program, a sound IP policy, existing outlets for results dissemination, and a plan to quickly initiate projects.

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

R: Not necessarily so; if the consortium is successful, why require an expiration date?

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

R: Project identification, initiation and successful completion are elements that could be considered in an evaluation.

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?

R: Real time measurements of performance will be impractical. Instead, NIST should ensure that the consortium has a sound and time-tested process for monitoring projects underway. For example, a Statement of Work (SOW) is an essential element of a project with defined milestones and often go/no decisions. Frequent contact between the consortium and the contractor via quarterly reports and in-person updates also add to good oversight.

19. How should the NIST AMTech program be evaluated?

R: FlexTech assumes that government programs have existing evaluation procedures. With respect to AMTech, NIST could consider an independent review board of distinguished industry professionals and academicians who are versed in best practices of collaboration and consortia management.

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

R: FlexTech prefers to address this in the context of elements that would comprise a successful consortium:

- *Industry-led and a market focus*
- *Sufficient funding – including federal funding and expected industry cost share - to attract significant industry interest and more than a passing commitment*
- *A start-up plan that quickly engages members and initiates successful projects*
- *A sound IP policy that can work for companies small -> large*
- *Experienced management*

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

R: FlexTech strongly encourages NIST to look beyond “bricks and mortar” proposals, as those can easily consume funds better applied to collective R&D. The use of company facilities and/or shared research facilities is a much more cost effective approach to distributing limited R&D funds. Teaming, therefore, is essential and a “customer and supplier” consortium is preferred.

22. and 23. How should AMTech interact with other Federal programs or agencies? What role can AMTech play in developing, leading, or leveraging consortia involving other Federal agencies?

R: FlexTech is aware of consortia sponsored by DOD, e.g., flexible displays and by DOE, e.g. OLEDs. There are likely others. An inter-agency workshop involving those and other agencies to learn about best consortia practices, organizational approaches, funding scenarios, etc., might prove useful.

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