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**Sent:** Monday, September 19, 2011 6:18 PM

**To:** amtech

**Subject:** AMTech Comments

To whom it may concern,

Please accept the attached document as comments submitted by Semiconductor Equipment and Materials International (SEMI) on behalf of the 450 mm Semiconductor Manufacturing Consortium for the AMTech Consortia RFI.

Thank you for your consideration of these comments. If you have any questions, please do not hesitate to contact me.

Sincerely,

Jonathan Davis

President, Semiconductor Business

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## 450 mm Semiconductor Equipment Manufacturing Consortium

### Response to Request for Information

#### On How To Structure Proposed New Program:

#### Advanced Manufacturing Technology Consortia

**AGENCY:** National Institute of Standards and Technology (NIST), Department of Commerce.

**SUBMITTED BY:** Semiconductor Equipment and Materials International (SEMI), 3081 Zanker Road, San Jose, California, 95134.

**CONTACT:** Jonathan Davis, President, Semiconductor Business. 408-943-6937, [jdavis@semi.org](mailto:jdavis@semi.org).

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?
  - We believe investments in targeted industries will provide the biggest impact and payback for the AMTech program. AMTech should focus on those U.S. industries that create high paying jobs, aid our trade deficit and provide the U.S. with a competitive long-term advantage in their particular industries. Requiring the investment be spread over multiple industries with a single consortium will dilute the investment value of the AMTech program.
2. Who should be eligible to participate as a member of an AMTech consortium?
  - We recommend that any U.S. based company, university or FFRDC be eligible to be a member of an AMTech consortium. We also believe the vast majority of the funding (minimum 90%) should be spent in the U.S.
3. Should AMTech place restrictions on or limit consortium membership?
  - We believe the only restrictions should be the requirement of being based in the U.S. and that the vast majority of the funding be spent in the U.S.
4. Who should be eligible to receive research funding from an AMTech consortium?
  - It is our position that all U.S. based businesses, universities and FFRDCs should be eligible to receive AMTech funding. To truly impact U.S. manufacturing, all elements of the business community need to have the opportunity to be involved and benefit from the AMTech program.

5. What criteria should be used in evaluating proposals for AMTech funding?
  - AMTech proposals should be evaluated based on the following: 1) potential to create a major impact on a manufacturing sector, 2) viability, both in terms of prospective technical and economic success and 3) risk versus reward, what investment can be made that will provide the biggest gain for the investment made?
  
6. What types of activities are suitable for consortia funding?
  - Our opinion is this program should be focused on research and development activities intended to create, stimulate and/or jump-start U.S. manufacturing sectors. These activities would include the direct research and development expenses incurred by the participants and associated indirect costs such as overhead and G&A.
  
7. Should conditions be placed on research awards to ensure funded activities are directed toward assisting manufacturing activities in the U.S?
  - Yes, expenses incurred should be substantially incurred in the U.S., 90% at a minimum. There should be controls in place to ensure a consortium member does not subcontract their portion of the effort to a non-U.S. entity.
  
8. What are ways to facilitate the involvement of small businesses in AMTech consortia?
  - We believe the best way to encourage involvement of small businesses is to make the involvement of small businesses part of the proposal evaluation criteria. AMTech should require an explanation in the proposal from each consortia as to how they will involve small businesses in both the work they propose to gain funding for and for how their commercialized results will involve and provide benefits to small businesses. We suggest larger companies be involved and that they encourage the involvement of their supply chains.
  
9. What are best practices for facilitating the widest dissemination and adoption of knowledge and technology through consortia?
  - A consortium of companies, by definition, are a group of organizations coming together to solve a problem, that individually, they are unable to address. As such, research programs will often take on the form of collaborative development efforts, thus ensuring dissemination of knowledge. If properly organized, an AMTech Consortium should have a required quarterly program review where each member company gives a briefing to the group of their

development efforts progress and upcoming requirements. This sharing of knowledge leads to increased dissemination of information and results in greater collaboration amongst the partner companies. In addition, consortium members should be encouraged to publish their results and present project updates at relevant technical conferences. This will lead to increased interest and eventually broader adoption of the project technology

10. What types of IP 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?

- In order to attract industry leading companies to join an AMTech consortium, individual companies need to be able to retain the rights to project IP they develop themselves. Jointly developed IP should be jointly owned. Ownership of all project IP, including IP developed within universities, should be required to be in the hands of U.S. for-profit corporations. This ensures the commercialization of the IP will be a primary focus, rather than the creation of IP for academic purposes.

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?

- We do not believe there is any need to provide incentive for industry to develop roadmaps or initiate formation of consortia. In today's economic environment, businesses are very much aware of the potential support the Government can provide in aiding research and development activities. All the AMTech program needs to do is have a strong industry outreach program, making all sectors of the manufacturing community aware of its existence and the program will get strong participation.

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

- Yes, we believe cost sharing provides all participants with the requirement to equally share the risk and ensure focused participation. All participants need to have some "skin in the game". Universities and FFRDCs should be exempt from the requirement. Large and Medium sized businesses should be required to cost share 50% of the total cost of the program, while small businesses should only be required to cost share 25%.

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

- Research proposals should be evaluated by the following criteria: (a) Overall Scientific and Technical Merit; (b) Potential Contribution and Relevance to the AMTech Program Mission; (c) Plans and Capability to Accomplish Technology Transition; and (d) Cost Realism. Each of these areas of evaluation are critical to ensuring a proposal is complete, well thought-out, technically superior and addresses the overall goals of the AMTech program.

14. What management models are best suited for an industry led consortium?

- We believe a Consortium is best organized around a Management Committee, consisting of members from each consortium organization. The Management Committee is charged with managing all administrative, financial and technical issues of the consortium, in a manner consistent with the original goals of the program. A chairperson must be appointed to lead and run the Management Committee meetings and provide overall direction. Each consortium member has an equal vote on consortium issues and no member can be forced to redirect their research or efforts against their wishes.

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

- The success of a consortium is often the result of strong leadership and managerial skill being applied to the program. These attributes are essential in keeping a group of companies, often with varying degrees of focus and commitment, pointed in the same direction and working together to achieve the overall program goals and objectives. We strongly believe these areas should be considered when evaluating proposals from various consortiums.

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

- Our opinion is that consortia should be limited to an initial three year term, with an option to extend for two additional years if significant technical/ economic gains can be demonstrated. Three years is needed for a true research and development program to complete initial development projects and actual field testing of prototype technologies and manufacturing processes. Additional time could be allowed for consortia that clearly demonstrate additional potential for significant economic impact from their research and development efforts.

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

- Performance should be evaluated by establishing clearly defined technical milestones for each member of the consortium. Progress against these milestones should be evaluated on a quarterly basis at a technical program review meeting. Members should be prepared to discuss their progress, future plans and proposals for changes to future milestones. The ability to adapt and change future milestones is a key requirement as technical progress is made.

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

- A true research and development program, by nature, takes time. It takes time for planning, engineering, development, prototyping and evaluation. All of these phases of research take considerable time, which makes it very difficult to judge the performance of a program on a monthly or even quarterly basis. One of the keys to a successful research program is careful up-front planning and delineation of technical milestones. A careful analysis of the program will yield key go/no-go decision points or critical milestones, where a decision must be made to continue along a development path, change course or stop the program altogether. We believe the appropriate measures of success are completion of a majority of the technical milestones each consortium member faces over a year's time frame.

19. How should the NIST AMTech program be evaluated?

- The achievement of the goals of the AMTech program are exactly how this program should be evaluated. Did the projects funded by AMTech make a positive impact on manufacturing in the U.S.? How large of an impact and how long lived will the impact be?

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

- Successful consortia have defined a critical problem that requires the resources, knowledge and scope of a larger organization to make a significant impact. A team of for-profit companies, universities and FFRDCs, if focused on solving a problem, can address an issue of broader scope and complexity than a single entity is able to impact.
- We believe a successful program must be based on the achievement of progressive technical milestones. This is to ensure all participants are

focused on the achievement of objectives that are agreed upon in advance and they also provide a methodology to measure progress and success.

- Unsuccessful consortia have in the past attempted to solve too broad of an issue or a problem that is not clearly defined. In addition, it is important to have consortium members who are truly committed to the success of the program and not just in the program for aesthetic reasons.

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

- AMTech's resources are limited in the 2012 budget, but with support of industry and broad support within the Government, we believe the program can grow to enable a broader, more significant impact on the U.S. manufacturing sector. With required cost sharing of 50%, the program will basically double the amount of money being spent on the objectives of the AMTech program.

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

- In our opinion, the AMTech program should stand on its own. Certainly other related programs within the Government could benefit from the stimulation of the manufacturing sector in the U.S., but this program should not be co-opted by other programs. If the Government wants meaningful, long-lasting growth in the manufacturing sector, then this program, focused on accomplishing those specific goals needs to remain unfettered by other Government programs and agendas.

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

- Supporting manufacturing within the U.S. is a nationwide issue, crossing over every major Government agency including the Departments of Energy, Defense, Agriculture, Commerce and State. We strongly believe the AMTech program needs to grow significantly, both in scope and budget to have any hope of actually impacting the state of the manufacturing sector in the U.S. The 450mm semiconductor equipment manufacturing consortium stands ready to help AMTech achieve its goals and to promote the growth of this program in Washington DC.