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Sent: Wednesday, October 19, 2011 4:00 PM
To: amtech
Cc: Amirehshami, David H; LaRiviere, Don S
Subject: AMTech Comments

Dear NIST AMTech Staff:

Attached are comments on questions contained in "Request for Information on How To Structure Proposed New Program: Advanced Manufacturing Technology Consortia (AMTech)". Boeing Research and Technology has a strong interest in manufacturing technology development and implementation, and in improving U.S. competitiveness and leadership. We look forward to participating in the proposed program.

Please include us in further discussions and feel free to contact the undersigned for any additional information.

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Response to NIST AMTech “program questions”

The Boeing Company
Assembly and Automation
Boeing Research and Technology

1. Consortia projects should be allowed to focus on either single industries or on multiple industries, depending on the level of detail to which the project goes. For instance, many factory automation issues must be made specific to a single industry due to production rates, and product size, and to allow maximum payback to the application industry (for example, commercial aircraft versus semiconductor manufacture). However, at the same time, many high-level program aspects that can be made generic may be applied to multiple industries (for example, multiple machine integration and control). Either of these examples would make worthy AMTech efforts.
2. Any of the example participants mentioned would make excellent AMTech consortium members. The emphasis should be placed on the team participant contributions toward AMTech goals within the consortium, particularly transitioning new technology to commercial production.
3. There should be few restrictions placed on consortium membership, but the consortium should be evaluated based on not only the proposed project, but the commitment of consortium members on implementing the developed technology. Thus, consortia focused on research only, though important, would miss an important AMTech goal “Transition new technology to commercial production”.
4. Any company in the consortium should be funded according to its activities, as long as the results are focused on U.S. benefits. As the line between foreign and U.S. companies has become blurred over the years, with appropriate safeguards there should not be a significant issue with foreign company participation.
5. Evaluation criteria should include:
 - a. Value to U.S. competitiveness and leadership
 - b. Emphasis on long-term technology development and its deployment, rather than current short-term approaches
 - c. Consortium commitment to the proposal goals, evidenced by cost-share and plans for implementation of successful development, as contrasted to research efforts only.
 - d. Team, including demonstrated management capability, technical team, and consortium mix.
 - e. Lasting value of development success, evidenced by broad usefulness of results beyond the consortium.
 - f. Plans and ability to transfer pre-competitive technology.
 - g. Rapid development and implementation ability and plans.
6. In the manufacturing arena, the highest payoff is typically in the “above the shop floor” capabilities. These efforts range from single enterprise to multiple enterprises and distributed manufacturing among contractor teams. Specific efforts could include secure data sharing, procurement, and supply chain integration. At the factory floor level, integration of machines and shared workloads between machines, and between humans and machines are cutting

- edge and require much development. At the machine level, advanced, autonomous machines and robots are still in development stages and would benefit from the AMTech approach.
7. A key evaluation criterion should be value of the proposed program to U.S. manufacturing competitiveness and leadership.
 8. Small businesses can be more aggressive in technology development, acceptance, and implementation than traditional large companies. Ways of focusing this ability could include:
 - a. Pilot programs implemented at selected small enterprises to verify payoffs and provide scalable lessons learned.
 - b. Emphasize inclusion of small businesses in consortia arrangements.
 9. Best practices could include:
 - a. Establishment of a central organization (NIST) that would disseminate information to qualified companies for implementation.
 - b. Seminars, meetings and so forth for the various skill groups to share information and lessons learned.
 - c. Through documentation in a standard and searchable format available to qualified companies.
 10. Care needs to be taken to assure that deliverables are complete and implementable. This would be a subject for contract negotiation between NIST and the specific consortium. And could include licensing arrangements where necessary.
 11. While planning grants would be positive, they are not seen as a requirement or sufficient incentive. Program award amount and surety, as well as content, would be significant incentives for required early team formation and planning.
 12. Cost sharing would be evidence of interest in the subject matter. Percentages and type should be negotiable.
 13. The consortia would build on the criteria of item 5, but tailored to the specific technology being developed.
 14. Conventional project management structures should be sufficient. Depending on the consortium size, a structure similar to the one used for the Air Force Composites Affordability Initiative may be considered.
 15. Yes, as in item 5, balanced however, with other team components.
 16. A maximum time of performance of the order of 10 years would be adequate, to provide time for sufficient development to assure implementation success of advanced technologies.
 17. Aside from conventional measures of schedule and financial performance, the following should be considered:
 - a. Measurable impact on AMTech goals.
 - b. Task implementation by team members.
 - c. Usefulness outside of the consortium.
 - d. Ability of non-consortium companies to access and implement results.
 18. No significant problems are foreseen that are not present on other projects. Conventional cost and schedule measures would be adequate

19. The main measure would be impact on AMTech goals, primarily transition of new technology to commercial production, and enhancing long-term U.S. competitiveness.
20. To be successful, projects must have adequate funding and committed staff, and strong end-user sponsorship. While many other factors are important, these dominate. Reference Shroyer, E.; "Lean Transition of Emerging Industrial Capability (LeanTEC); AFRL-ML-WP-TR-2002-4191, March 2002.
21. The best approach would be to select the best projects and fund them for success, rather than have a large group of underfunded projects. See LeanTEC referenced in item 21.
22. AMTech programs would be best served by being fully interfaced with appropriate programs and agencies, Federal and otherwise. Part of consortia proposals should include discussion of these interfaces and how they will be utilized to prevent re-invention and duplication.
23. As AMTech evolves, it could become the clearing house and coordination center for AMTech programs and interfaces to other programs and agencies. This would be a critical role in achieving the best value for funds spent on the various projects.