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

In order to strengthen long-term U.S. leadership in the development of critical technologies that lead to sustainable economic growth and job creation, NIST must maintain an influence-free controlling position in the proposed program as **The AMTech Consortium**. Congress makes the laws; the Administration, of which NIST is a part, implements the laws and is the only branch of government held responsible for its performance by the entire electorate. Multi-layering consortia and diminished control will result in an extension in the elapsed time to realization of intended benefits, political interference, increased cost, and the least predictable outcome.

Simultaneously, NIST must not attempt to be the source or dictator of innovation. Innovation must come from the private sector where the business case will be the filter. The envisioned AMTech Consortium would be structured and operate as follows in its assessment and selection of projects to be pursued:

The Consortium will consist of a 10-member Leadership Council headed by NIST, which will be represented by the leader plus one member. The remaining Council members would include one member from a large manufacturer headquartered in the U.S., e.g., Caterpillar Corp.; one medium manufacturer (all members must be headquartered in the U.S. regardless of size); five small manufacturers representing five manufacturing growth sectors; and two academicians representing different disciplines. Membership may rotate dependent on area of innovation. This Council will make the initial assessment and selection of proposed projects.

The Leadership Council will be supported by nine Focus Groups, each consisting of twenty members and one dedicated administrative support person. Membership of each Focus Group would consist of two from NIST and/or NSF, two from large manufacturers, four from medium manufacturers, six from small manufacturers, three from academia, and three from Administrative areas of interest, i.e., DoD, DoE, DoT, EPA, and/or NASA. Focus Group participation, or direct benefit from the results, shall be made available only to companies headquartered in and manufacturing in the United States.

The above structure would be supported by a two-tier Solicitation Data Base. The first tier is the one to which proprietary and confidential proposals and synopses of manufacturing innovations for which patents have either not been applied or are in pending status can be securely submitted with controlled distribution. The second tier would contain proposals and synopses of manufacturing innovations that are either unpatentable or are new uses of concepts, patented components, techniques, etc, but that would advance manufacturing within the United States..

This structure would eliminate layers of vested interests (industry-led consortia) seeking diversion of taxpayer funds to the politically connected. The composition would be limited to U.S. citizens only. Stated succinctly, no representation within the structure, either at the Leadership Council level or within a Focus Group, or direct

benefit from the results of an AMTech project, shall be afforded to any company headquartered abroad or with foreign production for the U.S. consumption.

The 'pre-competitive' parameter is meaningless. Every innovation competes with *what was* and *what is* in an effort to become *what will be*. Nor should development of roadmaps be a separate objective as opposed to the natural outgrowth of innovation. Roadmaps in and of themselves are costly, delaying bridges to no-where in the advancement of U.S. manufacturing. The identification and elimination of current roadblocks will automatically expose the roadmaps to the future. Therefore, advancement in manufacturing must start with the elimination of past and current pitfalls. The clarion call must be for safer, advanced machine tools that simultaneously reduce production costs, non-contaminating or polluting materials, advanced and flexible robotic components, and integration of technologies. For example., national highway and railway construction should be integrated with utilities and communications infrastructures, thereby facilitating growth throughout the nation while reducing the cost of devastation from natural disasters. Such integration represents a challenge for innovation in engineering, manufacturing, and construction as well as opportunities for propagation at the state and local levels.

Another example would be truly turning solar power into a source of mass energy for use residentially, commercially, and in transportation. It would reduce dependencies on the vulnerabilities in the noise pollution and currents of wind power, the dams and floods of water power, the oil pipeline disruptions, disasters, and foreign dependencies, and the limited nationwide availability of gas pipelines. It should be done not because it is green, but rather because it best serves the nation in both the short and the long term.

The above discussion is a preface to the specific requests for commentary (identified by number below). Both the above and what follows are the result of personal observation, investigation, and fifty years of experience in manufacturing, innovation, and invention.

- 1. Focus:** The actual focus should be determined by solicitation/proposals from industry, academia, and the federal areas of oversight, use, or consumption of manufactured products, such as those identified above as Administrative areas of interest.
- 2. Participation:** As outlined above. Because the goal is not information distribution, but rapid manufacturing implementation, there should be no state, local, tribal government, or non-profit (other than academia) participation. Focus, focus, focus!!!
- 3. Restrictions:** Membership should be as outlined above with the one caveat: Neither the Leadership Council nor any Focus Group shall be lead by a current or former lobbyist.
- 4. Funding Eligibility:** Any single or group of U.S. citizens who can demonstrate the ability to deliver on a selected proposal should be eligible. If pre-qualifications had been established, we might never have landed on the moon. My proposal to provide and control the accuracy required for navigation to and from the moon was the only one considered viable and therefore selected by NASA. I was then, and am now, a non-entity in the scientific community. NASA requested an engineering solution from the foremost scientists in the world, but they reviewed every submission, including mine which gave them an accuracy within two parts per million although their calculation required only twenty parts per million.
- 5. Proposal Funding Evaluation:** High **priority** must be given to **immediate manufacturing needs** with **short-term implementation** and **long-term impact**. Innovations must address identified present and/or future needs. The economy cannot afford 'I wonder if...'. Innovations must themselves have a major manufacturing component. That major and all proprietary components must be manufactured or implemented (if a process rather than a product) within the U.S.
- 6. Activities Suitable for Funding:** No feasibility studies. Otherwise, anything from engineering prototype and alpha tests to production prototype and beta tests to initial production-line creation. Any pre-determination of suitable areas would stifle innovation.
- 7. Research Funding Restrictions:** Research must be conducted by U.S. citizens. The results of the research shall be available only to companies headquartered in the U.S. All proprietary manufacture must be done within the U.S.
- 8. Small Business Involvement:** As outlined above, small business is fully integrated into the process and therefore will no doubt be in the implementation.

- 9. Best Practice for Dissemination and Adoption of Results:** Minimization of layers and levels of reinterpretation/misinterpretation through the structure of industry and academia dominated Focus Groups within the Amtech Consortium.
- 10. Intellectual Property Rights:** Since NIST, with assistance, is making selections from solutions submitted by the Private Sector and/or Academia, intellectual property rights automatically belong to the innovator(s), not the government or its assignees. Where there is joint effort, e.g., between the private sector and academia, joint patenting would apply and they would determine royalty distribution.
- 11. Planning Grants:** An unnecessary and financially wasteful step. See comments on roadmaps above. In any case, there are numerous 'industry' and 'trade' organizations that would vie for an opportunity to contribute/participate to justify their existence without giving away taxpayer funds.
- 12. Cost Sharing:** As I've outlined the Consortium, cost sharing would not be necessary. In addition, it would eliminate participation by any but large corporations who are so cash-rich they have no need of AMTech funds if they were inclined to innovate. The Focus Groups would only be activated when a selected submission was within their area of expertise and interest, thus minimizing costs.
- 13. Evaluation Criteria:** 1) Need; 2) Viability of proposed product/process; 3) Plausibility of outcome; 4) Elapsed time to implementation
- 14. Management Models for Consortium Proposed Above:** Japan's MITI used T.J.Watson Sr and Jr's IBM as its model to build the world's second largest economy. I suggest NIST do the same by copying the original IBM model. Before that model was trashed, IBM was the world's most admired and most valuable corporation.
- 15. Management Evaluation Criteria:** The criteria must include leadership and managerial skills.
- 16. Duration Limitations:** In the recommended structure, the term within a Focus Group would be dictated by the selected project.
- 17-19. Determination of Proposed AMTech Success (Performance and Impact Assessment):** After the first year (success in the first year would be determined by implementation of the structure and the number of viable solicitations received), success would be measured annually by 1) the number of needs being addressed; 2) the number of projects under implementation; 3) the increase in manufacturing employment; and 4) costs/AMTech man-year versus economic yield.
- 20. Lessons from Other Consortia:** My observation is that the Consortia is most successful at perpetuation itself with little or no impact on the advancement of the industry to which is supposedly tied
- 21-23. Recommendations:** Abandon the current approach and implement the one outlined above.