

Extreme Manufacturing Workshop

National Institute of Standards and Technology (NIST)

Gaithersburg, MD – January 11-12, 2011

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| <p>Extreme Manufacturing: <i>What are the technology needs for long-term US manufacturing competitiveness?</i></p> <hr/> <ul style="list-style-type: none">- This is a first step to identify the new, long-term technology advances needed to make future manufacturing competitive in the US.- What are the characteristics of US manufacturing that would make it radically different and more competitive in the future than it is today?- What are the dimensions of performance (broadly speaking) that could make a big difference if pushed to extremes?- What long-term technology advances are needed to make these new levels of performance possible?- What are the technological barriers to achieving these innovations?- How can the US build and use its innovative capabilities to foster the creation and implementation of future manufacturing leadership? | <p>Topics for the Extreme Manufacturing Workshop</p> <ul style="list-style-type: none">- Future intelligent manufacturing systems<ul style="list-style-type: none">- Extremely agile, adaptive, responsive and robust manufacturing- Rapid product realization: scale-up of new products based on emerging technologies and materials- “Snap-together” modular process and system modeling and simulation building blocks- Highly integrated control of complex, precise processes throughout distributed multi-level production- Multi-tiered intelligent and interactive collaboration environments and models- Extremely efficient and effective manufacturing: affordability and sustainability<ul style="list-style-type: none">- Exceptionally competitive-affordable customized production- 3D printing: From prototyping to manufacturing- Extreme improvements in usability of advanced technology for small and medium-sized manufacturers- Designed-in sustainability for value-based enterprises- “Condominium” approach for dynamic, modular, affordable facilities infrastructure- Frontiers of manufacturing science<ul style="list-style-type: none">- Advanced bioscience and biosystems for non-medical manufacturing- Computational biology for process control- Precise, high volume directed self-assembly of multi-functional nano-microsystems- Future additive manufacturing—new ways to create durable, high-quality functional parts- The Future Manufacturing Enterprise<ul style="list-style-type: none">- Dynamic collaboration across extremely complex multi-level, reconfigurable supply chains- Rapid engineering and production of integrated high-confidence cyber-physical products and systems- Tightly integrated design, test, validation across vastly distributed production environments- Potential new game-changing production paradigms:<ul style="list-style-type: none">o Digital direct manufacturing of complex products and assemblieso Service-oriented manufacturingo Cloud manufacturing <hr/> <p>Industry, Academic, and Government participation invited to:</p> <ul style="list-style-type: none">- Provide the long-term vision of future manufacturing- Identify the technology needs to reach this vision and the roadblocks to overcome to ensure future success- Inform the US public/private manufacturing community -- and stakeholders -- of the crosscutting and enabling R&D investments needed to build the innovation infrastructure for successful US manufacturing enterprises |
| <p>Why this is important to the future of the US?</p> <ul style="list-style-type: none">- The US faces increasingly global competition as other countries seek to establish prominence in advanced manufacturing and the products of the future.- The US needs to offset the globalization of traditional manufacturing of products based on low cost volume production of commodities for creating comparative advantage in high-value product areas based on product and processes innovation and the implementation of emerging technologies- This workshop seeks to define and focus US priorities on providing the means to effectively develop and implement new technology-based concepts for future US manufacturing as a basis for<ul style="list-style-type: none">o High-value jobso Wealth creationo Sustained economic growtho National security | |

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