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1. A13A-T001: Electrochemically Assisted Precision Form Grinding

Release Date: 01-25-2013Open Date: 02-25-2013Due Date: 03-27-2013Close Date: 03-27-2013

OBJECTIVE: This topic seeks to develop a new class of machine tools that can produce hypersmooth (less than 1 microinch Ra roughness), burr-free ground surfaces on hard metallic materials such as case hardened steels. This new class of grinding machine shall combine the latest advancements in form grinding techniques with those of electrochemical machining to allow the production of complex precis ...

STTR Army

2. A13A-T002: Solar Blind, Plasmonic Enhanced Ultraviolet Photodectector

Release Date: 01-25-2013Open Date: 02-25-2013Due Date: 03-27-2013Close Date: 03-27-2013

OBJECTIVE: Design, fabricate, and demonstrate a new category of solar blind ultraviolet photodetectors with enhanced sensitivity through the use of a plasmonic electrode or other electrode to funnel and localize ultraviolet energy while rejecting solar radiation. DESCRIPTION: Ultraviolet photodetectors have numerous applications including the detection of missile plumes and muzzle flash, mis ...

STTR Army

3. A13A-T003: Printed Flexible Power Solutions for Armament Systems

Release Date: 01-25-2013Open Date: 02-25-2013Due Date: 03-27-2013Close Date: 03-27-2013

OBJECTIVE: Develop and demonstrate the use of printed, flexible power solutions to increase the power and help reduce the weight of armaments and unmanned systems, as well as reduce the weight burden on U.S. soldiers by providing power for individual weapons. DESCRIPTION: Today"s advanced gun-fired munitions, unmanned systems, and ballistic fire control systems require energy sources with incr ...

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4. A13A-T004: Liquid Crystal-based Sensors for Detection of Airborne Toxic Chemicals for Integration with Unmanned Robotic Systems

Release Date: 01-25-2013Open Date: 02-25-2013Due Date: 03-27-2013Close Date: 03-27-2013

OBJECTIVE: Development of rugged light-weight liquid crystal-based chemical sensors for integration with unmanned vehicles. DESCRIPTION: Unmanned vehicles (UMVs) that allow assessment of threat before entering an unknown environment are becoming an integral part of critical missions to ensure personal safety. These remotely controlled robotic devices are typically equipped with multiple infrar ...

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5. A13A-T005: Construction of 3-D Terrain Models from BIG Data Sets

Release Date: 01-25-2013Open Date: 02-25-2013Due Date: 03-27-2013Close Date: 03-27-2013

OBJECTIVE: To design, analyze, and implement a new class of models and algorithms for constructing high-resolution, multi-resolution, and accurate 3D terrain models from BIG point data sets that can handle noise, uncertainty, and dynamic updates in data. DESCRIPTION: Terrain analysis is an integral part of the military intelligence preparation of the battlefield, commonly used to support both ...

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6. A13A-T006: Solar-blind (Be,Mg)ZnO Photodetectors (260-285 nm wavelengths)

Release Date: 01-25-2013Open Date: 02-25-2013Due Date: 03-27-2013Close Date: 03-27-2013

OBJECTIVE: Develop ZnO based UV photodetectors for the solar-blind detection window of 265-280 nm for various military applications. DDESCRIPTION: The photoresponse of current solar blind detectors (SBDs) is not sufficient for many applications where UV light needs to be sensed. Solar blind photodetectors are specified to the 265-280 nm region of the ultraviolet spectrum and require greater ...

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7. A13A-T007: New Approaches for Ammonia Synthesis

Release Date: 01-25-2013Open Date: 02-25-2013Due Date: 03-27-2013Close Date: 03-27-2013

OBJECTIVE: Develop and demonstrate new methods of ammonia synthesis capable of utilizing atmospheric nitrogen that do not require the sustained high pressures required for the Haber-Bosch process. DESCRIPTION: Ammonia is one of the most widely produced chemicals with a variety of uses including hydrogen storage for fuel cell applications, refrigeration, and fertilizer. In addition, it is al ...

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8. A13A-T008: Non-Deteriorating Numerical Simulation of 3D Unsteady Wave Phenomena over Long Times

Release Date: 01-25-2013Open Date: 02-25-2013Due Date: 03-27-2013Close Date: 03-27-2013

OBJECTIVE: To build a high fidelity framework for the treatment of artificial outer boundaries in 3-D numerical wave propagation (electrodynamic or acoustic) which will extend a variety of specified advantageous properties to arbitrarily long time intervals, and to develop algorithms and computer software that will implement these in military and commercial simulation applications. DESCRIPTION ...

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9. A13A-T009: Near Real-Time Quantification of Stochastic Model Parameters

Release Date: 01-25-2013Open Date: 02-25-2013Due Date: 03-27-2013Close Date: 03-27-2013

OBJECTIVE: To build a framework for the near-real time computation and representation of estimates and uncertainty bounds (uncertainty ellipsoids, confidence bands, etc) for the nonparametric estimation (via an inverse problem formulation) of functional parameters in probability-based mathematical models. DESCRIPTION: In the mathematical modeling of physical and biological systems, the case o ...

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10. A13A-T010: Additive Manufacturing of Multifunctional Nanocomposites

Release Date: 01-25-2013Open Date: 02-25-2013Due Date: 03-27-2013Close Date: 03-27-2013

OBJECTIVE: Investigate the feasibility of additive manufacturing techniques, also known as 3-D printing, to produce multifunctional materials to facilitate the development of multiscale hierarchical energy dissipation at the nano- and microscale level enabled by creating microstructures that eliminate traditional inverse material property relationships. There is a vital need for the development o ...

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