NRL BAA Announcement
#63-15-01

MATERIALS PERFORMANCE, PROCESSING, AND MODELING

The Materials Science & Technology Division (MSTD) of the Naval Research Laboratory (NRL) is interested in receiving proposals for research and development in materials, their joining, and their processing, including modeling of materials performance and joining and forming processes to achieve cost- effectiveness. The areas of research and development activities of interest to NRL include, but are not limited to the following:

1. Modeling - *Microstructural/continuum modeling for the development of predictive equations of state for materials which could greatly reduce costs of developing new alloys and forming processes as well as permit optimization of properties and plant weldable aluminum and iron alloys of high strength, toughness, stress corrosion cracking resistance, reduced hydrogen embrittlement, etc.*

2. Forming/Machining - *Forming and machining of hard-to-form and/or machine alloys by the application of high fields. This may include the application, singly or in combination, of electric, magnetic, ultrasonic, and microwave fields and address the casting and/or forming to near-net-shape by rolling, drawing, or forging and the machining by point cutting or grinding of any low ductility materials such as tungsten alloys, aluminides, etc.*

3. Processes for Lower Life Cycle Costs/Simulations - *Design of manufacturing processes that achieve desired product attributes at lowest total life cycle cost. This may include the integration of several unit forming processes and the simulation of such processes to account for geometric effects and the effects of evolving material microstructure and temperature and stress fields. Total life cycle spans issues from the initial material synthesis to the final disposition of components including all costs of acquisition and ownership.*

4. Smart Materials - *Demonstrate the application of "smart materials and structures" (SM&S), in military and dual-use systems. Generically, SM&S should have the capability to sense environmental stimuli, process the acquired data, and actively respond in a controlled manner to achieve a desired goal. This includes a wide range of materials (e.g., shape memory alloys, electrostrictive ceramics, ionic/conductive polymers, and polymer fibers and films, etc.), control algorithms*

and signal processors, and their assembly into devices that can be made to perform battle-related actions robotically (e.g., swim, fly, walk, etc.).

5. Superconductivity - *Development of superconducting materials, devices, components, and systems that address crucial Naval and DoD requirements. Although the principal area of interest is in superconductors with transition temperatures above 30K, unusually sound proposals for research and development devices, components, and circuits fabricated from materials with superconducting transition temperatures below 30K will be considered if deemed suitable for potential Naval applications.*

Address White Papers (WP) to Code 6300, by email to mstdbaa@nrl.navy.mil. Allow one month before requesting confirmation of receipt of WP, if confirmation is desired. Substantive contact should not take place prior to evaluation of a WP by NRL. If necessary, NRL will initiate substantive contact.