

## A Legacy of Achievements

Originally created to support the mission of the IHDIV/NSWC – which houses the Department of Defense's largest concentration of energetics science and technology experts – the CECD, under the leadership of Director Davinder K. Anand, Ph.D., former chairman of the Mechanical Engineering Department at the University of Maryland, has established itself as a leading educational, research, technology transfer and workforce development partner with the Navy.

Among its achievements are:

- For the Office of Naval Intelligence, investigation of the safety of harbors from the transportation of fuels.
- Increasing the number of doctoral students working in undersea technology.
- Establishing a distance learning program at the University of Maryland offering a Master's degree in energetics.
- Creation of a MEMS (microelectromechanical systems) laboratory.
- With the College of Southern Maryland, establishing energetics technician training programs.



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# Energetics R&D, Prototyping, and Workforce Development

***Centers at College Park  
and  
Southern Maryland***





## Fighting The Threat To America's Security

Energetic systems are a critical component for America's national security posture. And yet, while our nation has long enjoyed a position of superiority in the field of energetics, forces are now at work that threaten America's preeminence:

- Experienced energetics professionals are retiring in accelerated numbers.
- Fewer young people are pursuing careers in science and engineering.
- Increased homeland security concerns are engendering a need for more sophisticated energetics systems to counter terrorism.
- Without an emphasis on energetics, America risks the possibility of being "surprised" in the future by an unexpected energetic formulation created by an adversary.

To regenerate our energetics workforce – and maintain our technology superiority – the Center for Energetic Concepts Development (CECD), an alliance between the Naval Surface Warfare Center Indian Head Division (NSWC/IH) and the University of Maryland, has expanded its vision to "become the preeminent national center concerned with the science and manufacturing of energetic materials and products for national defense and security, and further, to train the next generation of scientists and engineers working in energetics".

## How CECD Plans To Meet This Challenge

Since its founding in 1998, CECD has been at the forefront of research activities advancing the science and engineering of energetic systems, and, through programs at the University of Maryland and the College of Southern Maryland, has worked to recapitalize the nation's energetics professional workforce.

Now CECD has launched an effort, the Southern Maryland Initiative for Energetic Capability Development, which will significantly enhance its work in three vital areas:

- Energetic systems and processing research conducted in partnership with the University of Maryland and other research institutions nationwide;
- Workforce development, recapitalizing the national energetics intellectual capability through the combined efforts of the University of Maryland and the College of Southern Maryland;
- A new state-of-the-art research facility, the Energetics Technology Center (ETC), to be built in Charles County, Maryland, where applied research and technology development will be conducted in partnership with selected institutions and industry nationwide.



## Role of the Energetics Technology Center

To achieve these areas of excellence, CECD's partnership team – including NSWC/IH, the University of Maryland, Charles County and State of Maryland leaders – have joined in establishing the Energetics Technology Center (ETC) in Southern Maryland. Designed to be a world-class facility, the Center will feature laboratories, training facilities, manufacturing capabilities and simulation technology for working in virtual environments. Ultimately, the ETC will serve the nation as a vital resource supporting America's defense and homeland security programs.

## Areas of Technical Excellence

Along with the development of new energetic systems, CECD's expansion calls for the creation of other areas of excellence, including:

- Workforce Revitalization — Building the future workforce through technical training and graduate education.
- Energetic Materials and Systems — Creating sixth generation energetic materials, incorporating nanotechnology.
- Lean Manufacturing – Developing world-class manufacturing processes, reducing manufacturing cycle time and improving tooling and quality.
- Visualization in Virtual Environments – Overcoming major bottlenecks caused by physical prototyping.
- Design Optimization – Using new methods of Multi-Disciplinary Optimization to find the most preferred design alternatives.
- Harbor Safety – Developing efficient models to predict the risks of open detonations in harbors resulting from ignition of released chemical cargoes.