



**Center for Advanced Engineering and Research  
Strategic Plan  
Approved by CAER Board of Directors May 20, 2011**

**Vision**

The CAER is dedicated to the creation of an industry-led research center in Region 2000 that provides a research university environment. It will bring together private and public money, talent and resources to foster knowledge creation, facilitate technology transfer and improve the scientific and engineering workforce to benefit regional industry.

**Mission**

The CAER will target growth technologies and high tech industries in Region 2000 and work to establish effective and beneficial relationships between these industries and major R&D resources, resulting in innovation and the practical implementation of innovation in the region's industries and professional development opportunities for scientists and engineers. As a result, the CAER will continue to drive the shift from traditional economic development activities to Technology-Based Economic Development (TBED) activities in the region.

**Outcomes**

- Increased levels of innovation based activities including, but not limited to applied research and development, technology transfer, and technology commercialization
- Increase in the number and quality of collaborative partnerships that support these innovation activities
- Improve the quality of the science, technology, engineering and math (STEM) workforce in Region 2000
- The CAER will be recognized statewide and nationally as a “best practice” in technology based economic development, as an industry-university partnership and in the targeted research program areas (RPA) for the CAER
- Improve the long term prospects of both existing and prospective technology based employers in Region 2000

**Key Strategies**

- Leverage the CAER research and education facility and the Center for Safe and Secure Nuclear Energy (CSSNE) to establish and grow collaborative partnerships with DOE, NRC, UVA, VT and other universities and federal laboratories in the fields of new instrumentation and controls, advanced control room concepts, human factors engineering, advanced modeling and simulation and analysis and assessment methods for safety and security for nuclear power plants
- Leverage the CAER research and education facility to establish and grow collaborative partnerships with universities, private companies and federal laboratories in the fields of wireless sensor networks and cognitive radio technologies.
- Identify and develop sources of long term baseline funding for the operation of the CAER research and education facility
- Expand and strengthen other collaborative partnerships with universities and federal laboratories in the targeted industry clusters of nuclear energy and wireless communications
- Build a knowledge based workforce by providing improved educational opportunities in post-secondary and graduate STEM programs as well as other professional development opportunities.

**Metrics**

- Innovation Activities:
  - # of SOW, # of faculty engaged, R&D \$ allocated, # of companies engaged, # of research partners, evaluation of research projects, research publications, patents, SBIR awards, IPO's, etc)
  - Financing, business support(business planning, marketing, product development)
- Quality of partnerships between industry and research labs
  - # of MOU, # of MRA, clear communications, matching funds, workshops and other services, industry involvement
- STEM Workforce and Education

- o # of courses offered, # of students enrolled, # of FTES, # of degrees offered - capacity
- o Graduates, job placement, wage levels – output
- Recognition
  - o Media articles, journal articles, awards, references in speeches and conferences, social media followers

## Center for Advanced Engineering and Research (CAER) – Analysis

The Center for Advanced Engineering and Research is a Region 2000 Partnership initiative to develop an industry-focused regional research and development center that drives the development of innovative products and processes by providing local access to university and federal research and inventions. It targets the growth industries specific to the region and puts university innovations into action through practical implementation in industry! The goal is to increase the competitiveness for core, high wage industries and improve the long-term prospects of existing industrial employers by creating a knowledge-based research hub for the region.

The region’s 2006 work program recommended that the region build on the assets of strong nuclear, wireless and niche manufacturing industries to create a resident research institution. A significant challenge for the region was the lack of a local research capacity to support these high tech industries. Additional assets in the region supporting this effort include:

- Strong science, technology, engineering and math (STEM) workforce programs in the region
- The Wireless Research Lab at Liberty University
- New undergraduate engineering programs at Liberty University and Sweet Briar College
- New undergraduate engineering program with CVCC and UVA

The major changes from the 2009 strategic plan are the addition of a strategic objective to have the CAER recognized outside the region for its work, to leverage the new research and education facility as a major asset, to address the issue of long term baseline operations funding as a weakness/threat, and to investigate programs and opportunities that reach beyond the region.

An updated SWOT analysis summary for the CAER is included in the graphs that are attached to this plan. The key findings of this analysis are summarized below:

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• New research and education facility opening May 2011</li> <li>• Presence of AREVA NP and B&amp;W (Nuclear Cluster)</li> <li>• Presence of over 20 companies focused on wireless communications technologies – result of Ericsson’s former presence (Wireless Cluster)</li> <li>• Strong local industry support</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Level of funding for operations and staffing – mitigated somewhat by 3-year support grant from TICRC</li> <li>• Limited but growing research capacity in immediate area (LU engineering growing but still young)</li> <li>• Difficulty attracting/retaining both research faculty and trained workforce</li> <li>• Nuclear industry is highly regulated</li> <li>•</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>• Potential partnerships with DOE, NRC and other federal labs</li> <li>• Collaboration with UVA, VT, NRC and DOE on CSSNE</li> <li>• REU programs for Produced, Sweet Briar and LY engineering students</li> <li>• Proposed cognitive radio testbed at CAER</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of steady operations funding sources</li> <li>• Current economic crisis impact on state budgets and private sector support</li> <li>• Upfront capital costs for new plant construction much greater than other power generation technologies – status of federal loan guarantees a critical issue</li> <li>• Trying to do too much too soon</li> <li>•</li> </ul>