

October 2, 2023

The Honorable Caren Merrick
Secretary of Commerce and Trade
Commonwealth of Virginia
Patrick Henry Building
1111 East Broad Street
Richmond, Virginia 23219

The Honorable Barry D. Knight
Chair, House Appropriations Committee
Virginia House of Delegates
Pocahontas Building
900 E. Main Street
Richmond, Virginia 23219

The Honorable Terry L. Austin
Vice Chair, House Appropriations Committee
Virginia House of Delegates
Pocahontas Building
900 E. Main Street
Richmond, VA 23219

The Honorable Janet D. Howell
Co-Chair, Finance and Appropriations
Committee
Senate of Virginia
Pocahontas Building
900 E. Main Street
Richmond, Virginia 23219

Honorable George L. Barker
Co-Chair, Finance and Appropriations
Committee
Senate of Virginia
Pocahontas Building
900 E. Main Street
Richmond, Virginia 23219

Michael Maul
Director, Virginia Department of Planning and
Budget
1111 East Broad Street
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Joseph Benevento
Deputy Secretary of Commerce and Trade and
interim CEO Virginia Innovation Partnership
Authority (VIPA)/ Virginia Innovation
Partnership Corporation (VIPC)
Gather
313 East Broad Street
Richmond, Virginia

Commonwealth Center for Advanced Logistics Systems (“CCALS”)

Ladies and Gentlemen: Respectfully submitted is the full and complete report of CCALS required by Section M.2 of Item 127 of the 2023 Session enrolled budget. This report covers the period from January 1, 2022 through June 30, 2023 to align future reporting with the “fiscal” year reporting period as specified in the budget language (as follows):

*M.2. CCALS shall submit a report by October 1st of each year to the Secretary of Commerce and Trade, the Chairs of the House Appropriations and Senate Finance and Appropriations Committees, the Director of the Department of Planning and Budget, and VIPA to include (i) all planned and actual revenue and expenditures along with funding sources, including state, federal, and other revenue sources for CCALS, (ii) the research activities of CCALS, and (iii) relevant economic outcomes as a result of the CCALS' work in each **fiscal** year.*

Sincerely,

Dr. Dawit Haile, Chairman

cc w/enclosure: Paul Olsen, Secretary, CCALS

Commonwealth Center for Advanced Logistics Systems (CCALS)

Report of Unaudited Revenues, Funding Sources, Research Activities and Relevant Economic Outcomes For Fiscal Year 2023

CCALS Mission

CCALS is a multi-university, multi-disciplinary ecosystem that provides an opportunity for faculty and students to collaborate with private, public, and nonprofit sector professionals to proactively engage logistics and supply chain challenges through projects, research experiences, and career-ready workforce opportunities.

CCALS Board Members

Officers

Dawit Haile – Chair, Interim President and Executive Director

Vince Barnett – Vice Chair

James C. Haug – Treasurer

Paul Olsen – Secretary

Dr. James C. Haug, P. E.

Associate Professor of Management

College of Business and Economics

Longwood University

Keith Martin

Executive Vice President, Public Policy and

Government Relations

General Counsel

Virginia Chamber

Associates

Karen R. Jackson – CCALS Senior Fellow

Barbara Nelson

Vice President, Development and

Transportation Authority

Virginia Port Authority

Board of Directors

Vince Barnett

Senior Vice President, Business Investment

Virginia Economic Development Partnership

Dr. Fred Epstein

Associate Dean for Research, School of

Engineering

University of Virginia

Paul Olsen, P.E.

Executive Director, Institute for Innovation

& Entrepreneurship (IIE)

Old Dominion University

Dr. Dawit Haile

Dean, College of Engineering and

Technology

Virginia State University

Dr. Gary C. Tepper

Interim Dean, College of Engineering

Virginia Commonwealth University

CCALS Staff

CCALS is currently led by Senior Fellow, the **Honorable Karen Jackson**, former Commonwealth Secretary of Technology. In this capacity, she works to develop opportunities for CCALS universities to collaborate on logistics and supply-chain related research, problem solving, and career-connected experiences.

CCALS Primary Partners



The Port of Virginia
portofvirginia.com



Virginia Economic Development
Partnership
vedp.org



Virginia Chamber of
Commerce
vachamber.com



Longwood University
longwood.edu



Old Dominion University
odu.edu



University of Virginia
virginia.edu



Virginia Commonwealth
University
vcu.edu



Virginia State University
vsu.edu



Crater Planning District
Commission
craterpdc.org

CCALS FY 2022-23 Research Activities and Relevant Economic Outcomes

I. Revenue and Funding Sources as of June 30, 2023

Revenue and Funding Sources as of June 30, 2023 (18-month period)

Revenue and Support

VIPA	\$525,000.00
Crater Planning District Commission	\$30,000.00
In-Kind	<u>\$1,800.00</u>
Total Revenue and Support	\$556,800.00

Operating Expenses

Program Services	\$174,888.00
Management and General	<u>\$284,615.00</u>
Total Operating Expenses	\$459,503.00

Increase in Net assets without donor restrictions \$97,297.00

II. CCALS Research Activities and Relevant Economic Outcomes

New Initiatives

1) CCALS Statewide Logistics Research Fellows Project

- a) In May 2023, CCALS assembled and launched a team of fellows (consisting of one student from each of the five CCALS member universities) to work in collaboration with thought leaders across Virginia, including, but not limited to, the Virginia Chamber of Commerce, the Virginia Economic Development Partnership, the Virginia Freight Advisory Committee, and the Port of Virginia. The team's goal is to benchmark and explore Commonwealth supply chain and logistics challenges and opportunities, and to formulate and present recommendations to advance the innovative supply chain and international trade policies and initiatives as outlined in the Virginia Chamber's strategic plan, [Blueprint Virginia 2030](#), and Governor Youngkin's [Compete to Win](#) plan for Economic Development.
- b) The project's current period of performance runs from May 2023 - January 2024.

2) CCALS Business Advisory Council

- a) To ensure close alignment with the needs of Commonwealth logistics providers and supply chain-dependent industries, CCALS launched a new Business Advisory Council (BAC) comprised of executives from throughout Virginia who are committed to propelling the Commonwealth's logistics and supply chain position to new heights through innovation, collaboration, and engagement. The BAC serves as a vital asset to CCALS, playing a pivotal role in ensuring long-term success and driving synergistic experiential opportunities between industry, students, and faculty.
- b) Members of the BAC bring diverse perspectives and expertise from various sectors, providing valuable insights into the challenges, opportunities, and emerging trends within their businesses. BAC engagement is key as CCALS strives to not only support and advance the evolving and dynamic needs of the logistics and supply chain ecosystem in Virginia, but also enhance experiential learning and employment opportunities, identify research opportunities, and deliver indispensable insights on related policy and processes.

Continuing Initiatives

1) CCALS and Port of Virginia Research Partnership

- a. CCALS is in the eighth year of an ongoing research relationship with the Port of Virginia (POV). The POV delivers opportunity by driving business to, and through, the Commonwealth. The underlying mission of the port is to foster economic development and job creation. The POV is indirectly responsible for one in 10 jobs in the Commonwealth. That means making Virginia the location of choice for those individuals and companies that utilize maritime facilities as a part of their ongoing businesses, regardless of whether they are cargo owners, supply chain and logistics firms, transport companies, or storage and distribution facilities. Therefore, part of the job is to make it in others' economic interest to locate in the Commonwealth. The CCALS/University of Virginia (UVA) project underscores risk and resilience, advanced logistics trends, security and trust, asset management, prioritization, and capital infrastructure improvements as defined in the POV 2065 Strategic Master Plan so the Port can better understand the new marketplace and develop plans and procedures that will succeed in that marketplace by bringing new business to the Port and jobs to Virginia.
- b. This project supports research for an intermodal port community ecosystem with the POV, including collaboration with the office of the VDOT/VTRC Director of Research and Innovation and the Virginia Freight Advisory Committee for advanced technology solutions and opportunities for data sharing synergy for logistics mobility of service and

modal convergence. This project improves operations and management of the POV through modeling and simulation by analyzing the port truck reservation system, terminal turn times, vessel berthing assignments, pro-forma, and resilience to disruption at the main POV terminals to meet key performance metrics.

- c. The research team studied the electrification of port vehicles, developing simulation models to guide investment in new equipment over a five-year horizon. Supply-chain disruptions were a foremost consideration.

***Partners:** Port of Virginia, University of Virginia, in collaboration with VDOT/VTRC
Director of Research and Innovation, Virginia Freight Advisory Committee*

2) Port of Virginia Cyber Internship

- a) The Port of Virginia (POV) set up a new cyber security operations center (SOC) with FEMA funding. A cyber internship, with funding from Commonwealth Cyber Initiative (CCI), focused on developing a workforce pipeline for the SOC. As part of the internship, an Old Dominion University (ODU) faculty team developed a suite of experiential learning modules to be used as the blueprint to deploy the SOC. The modules were used to train six cybersecurity interns at the Virginia International Gateway Terminal. During the internship, the students participated in a summer internship project on cyber risk management or operational technology/information technology networks for resilient port operations under the supervision of Rich Ceci, Senior Vice President Technology and Projects at Virginia International Terminals; Mark Thorsen, Chief Information Officer at POV; and Randy Plotkin, Information Security Manager at the Virginia Port Authority. Participating students were from Old Dominion University, Longwood University and Virginia State University.

***Partners:** Port of Virginia, Old Dominion University, Longwood University, Virginia State University*

3) Virginia Transportation Research Council (VTRC)

- a. Partners are performing on a VDOT contract for Data Analytics and Resilience of Transportation Plans with Emergent and Future Conditions. This is a five-year technical assistance effort ending in 2025. This effort continues to develop and enhance various methods of data analytics that support transportation planning, performance measurement, trends analysis, project prioritization, travel demand modeling, corridor studies, investment evaluation, corridor management, and data sharing platform.

- b. The results will support resilience of transportation plans in terms of policy, business processes, practices, methods, and tools. The latest effort is on Safe Routes to School which is Project Task 3.1 and Best Practices for Disruptions, Project Task 3.3. Primary tasks continuing in this period have focused on Truck Travel Time Reliability Forecasting (Project Task 2.1) and development of Volume Delay Function Parameters (Project Task 2.2) with ongoing support for VDOT Pathways for Planning data hosting and development of training modules (Project Task 1).

Partners: Virginia Department of Transportation, University of Virginia

4) Transition to Sustainable Aviation Fuel (SAF) in Virginia

- a. CCALS is supporting a feasibility analysis for “Supporting the Transition to Sustainable Aviation Systems in the Commonwealth of Virginia.” There is growing urgency for technology and supply-chain innovations that will contribute to decarbonizing the aviation sector. Many flights, including long haul routes, will continue to rely on liquid fuels, but will transition to those derived from renewable resources rather than petroleum.
- b. In Washington, the recently introduced *Sustainable Aviation Fuel Act* seeks to incentivize sustainable aviation fuel (SAF) production via establishment of an aviation-only *Low Carbon Fuel Standard*. The first FAA certification of a drop-in aviation biofuel was achieved recently. The major commercial airports of Virginia will require ready access to SAF to remain competitive. US military installations of the Commonwealth will also contribute to SAF demand.
- c. It is therefore of interest to explore: (1) What are the leading pathways for supplying SAF at scale and what infrastructure does Virginia need to put in place to ensure a supply of SAF to both commercial and military facilities? (2) What is the economic potential for Virginia to capture some of this production market for SAF? (3) What tradeoffs could a Virginia-based SAF sector introduce to food, water, land, and other environmental systems?
- d. The University of Virginia/CCALS is meeting with top officials of the US DOT and US DOE on a SAF federal funding opportunity in Fall 2023.

Partners: Virginia Department of Aviation, University of Virginia

5) Collaborative Research with National Science Foundation (NSF) – Center for Hardware & Embedded Systems Security & Trust (CHEST)

- a. CCALS and the University of Virginia (UVA) transform advanced logistics systems for market-ready solutions, a robust network that provides value through metrics-based problem solving for today's real-world challenges. One of the challenges for advanced logistics systems is security and trust for cyber security and IoT. That is why CCALS is one of the original industry members of the NSF-sponsored Center for Hardware and Embedded Systems Security and Trust (CHEST) through the UVA site.
- b. The NSF CHEST is the largest NSF IUCRC and our go-to center for researching and developing security, assurance, and trust strategies to meet Virginia's commercial economic needs for supply chains. CHEST coordinates university-based research with needs of industry and government partners to advance knowledge of security, assurance, and trust for electronic hardware and embedded systems. We will achieve natural growth by continuously providing high quality security, assurance, and trust strategies for cyber-physical systems and the IoT. CHEST research has informed discussions on COVID-19 vaccine supply with the Virginia Department of Emergency Management, as well as work with the Port of Virginia.
- c. The NSF CHEST Industry Advisory Board (IAB) approved 2023 funding for the latest tranche of projects including analysis of the disruption of semiconductor supply chains by environmental change and by losses of access to critical materials. Seven UVA faculty are involved in CHEST projects in this period, with the CCALS vote being essential to obtaining these awards.

***Partners:** National Science Foundation – Center for Hardware & Embedded Systems Security & Trust, University of Virginia*

6) U.S. Army Corps of Engineers Engineering Research and Development Center Support

- a. CCALS and UVA are consulting on a five-year project with the U.S. Army Corps of Engineers (USACE) for modeling and data analysis to improve resilience of complex systems that are in the purview of the US Army Corps of Engineers. This fundamental research (National Security Defense Directive 189) will be performed by UVA with recognition of the needs of current missions of the Engineering Research and Development Center (ERDC)-USACE.
- b. The key deliverables are reports, software, databases, demonstrations, and technology transfer in the form of peer-reviewed publications. The expected results will extend the

capabilities of the USACE-ERDC in network science, resilience and scenario analysis, cyber-physical systems resilience, supply-chain resilience, resilience metrics and quantification, social and psychological factors, and automation of tools for resilience analysis. The proposed effort will develop and demonstrate methods, metrics, and databases.

- c. A proposal for the next five-year decision support effort was submitted in support of 2021 BAA: W912HZ-21-BAA-01 Amendment 002. Decision Analysis (EL-41). This decision support can be provided in the form of a deliberate method for making a decision, for considering how best to incorporate different types of evidence into an existing decision framework, or for creating a mathematical tool to help clients to effectively manage complex dynamic systems. Specific applications include Multi-Criteria Decision Analysis (MCDA), Weight of Evidence, Portfolio Analysis, and Value of Information Analysis.
- d. The latest effort is supporting USACE and USAID Iraq by providing models of the disruption of infrastructures by water scarcity and climate change.

Partners: *U.S. Army Corps of Engineers Engineering Research and Development Center, United States Agency for International Development, University of Virginia*

7) Virginia State University and the University of Virginia MS/PhD Cohort of Graduate Students

- a. As part of the continuing University of Virginia (UVA)/CCALS Diversity, Equity, and Inclusion (DEI) effort, four Virginia State University (VSU) undergraduate students are pursuing a fully funded (tuition, medical insurance and stipend) graduate degree at UVA School of Engineering and Applied Science (SEAS). Three students have prestigious U.S. Department of Education's Graduate Assistance in Areas of National Need (GAANN) fellowships. This program assists graduate students with excellent academic records who demonstrate financial need and plan to pursue the highest degree in a field designated as an area of national need.
- b. Three students are pursuing a graduate degree in systems engineering and one student is in the civil engineering degree program.
- c. Two VSU-sourced students received M.E. degrees in this period, en route to their Ph.D. degrees.

Partners: *Virginia State University, University of Virginia*

8) Virginia Department of Emergency Management State Hazard Mitigation Plan

- a) The University of Virginia (UVA) joined with Old Dominion University (ODU, lead PI) to support the Virginia Department of Emergency Management (VDEM) in updating its State Hazard Mitigation Plan per a requirement of the US DHS. A research publication was submitted with a Virginia State University alumnus student as the lead author.
- b) This is a signature collaboration of the ODU Modeling, Analysis, and Simulation Center with CCALS and UVA in 2022-23.

***Partners:** Virginia Department of Emergency Management, Old Dominion University, Virginia State University, University of Virginia*