OLD DOMINION UNIVERSITY

Office of Enterprise Research and Innovation

60,000 sq ft Tri-Cities research facility

10 conference rooms

100 faculty, scientists, and support staff

11 research labs

OLD DOMINION UNIVERSITY

The ODU Office of Enterprise Research and Innovation unifies and focuses the advanced research of six distinct and diverse multidisciplinary applied research centers.

ODU Office of Enterprise Research and Innovation (OERI)

The Virginia Modeling, Analysis, and Simulation Center (VMASC) is ODU's longstanding center of excellence in modeling, simulation, and analysis.

The Virginia Digital Maritime Center (VDMC) combines the capabilities of ODU's very successful Maritime Industrial Base Ecosystem and digital shipbuilding programs into an interdisciplinary research center supporting Virginia's maritime enterprise to advance the maritime workforce, foster collaborative partnerships, and drive economic growth in Hampton Roads.

The Virginia Institute for Spaceflight & Autonomy (VISA) aims to create interdisciplinary research opportunities that grow the spaceflight and autonomous systems industry.

Center for Secure and Intelligent Critical Systems (CSICS) focuses on research in computational modeling and analysis leading to safe, reliable, and resilient critical systems.

Institute for Coastal Adaptation & Resilience (ICAR) leverages ODU faculty's disciplinary depth and interdisciplinary breadth in leading research, education, and community partnerships to develop practical solutions to challenges faced by coastal communities.

Center for Mission Engineering (CME) is an interdisciplinary applied research center focused on advancement in designing, analyzing, integrating, and improving the ability of engineered systems to deliver desired effects.

Virginia Modeling, Analysis & Simulation Center (VMASC)

About VMASC

VMASC is the largest research enterprise with eleven research faculty and eight project scientists and focused on advancing the field of Modeling & Simulation.

VMASC researchers span multiple disciplines such as data science, operations research decision analysis, social science, applied mathematics, instructional systems design, computer science, and modeling and simulation.

VMASC
OLD DOMINION UNIVERSITY

Dr. Michael Robinson,
Executive Director

Virginia Modeling, Analysis & Simulation Center (VMASC)

Strategic Initiatives

Community Resilience: Developing theoretical and computational advances that address local and global communities experiencing conflict, natural disasters, and/or climate change.

Norfolk: Partnering with local municipalities to purse funding related to assessing and addressing public health issues with respect to equity and vulnerable populations.

Global and Social Challenges: Advancing M&S and data science methods to contribute knowledge to pressing issues including forced migration, poverty & development, and religion & terrorism.

Research Student Pipeline: Identify students with multidisciplinary interests for training in M&S and data science techniques to gain knowledge and skills that further advance the discipline of M&S.

Building University Partnerships: Deepen and develop new national and international research collaborations - Montana State University, University of Agder (Norway), Universidad del Norte (Colombia), York University (Canada).

Virginia Digital Maritime Center (VDMC)

About VDMC

The **Virginia Digital Maritime Center (VDMC)** works at the local, state, and federal level to support the urgent goal of strengthening the Hampton Roads' economy by optimizing its maritime industrial base.

RADM Mark Whitney, USN, ret., Executive Director

Virginia Digital Maritime Center (VDMC)

VDMC Vision

To be a valuable partner in Virginia's maritime enterprise, contributing to the resolution of Naval sustainment challenges, and the emergence of Hampton Roads as a national standard of maritime excellence.

VDMC Mission

Our mission is to support Virginia's maritime enterprise by leveraging applied research and cutting-edge technology to advance the maritime workforce, foster collaborative partnerships, and drive economic growth in Hampton Roads.

VIRGINIA DIGITAL MARITIME CENTER

Virginia Institute for Spaceflight & Autonomy (VISA)

About VISA

The **Virginia Institute for Spaceflight & Autonomy** is chartered to grow the spaceflight and autonomy sectors in the region, and across the Commonwealth. The Institute will be the hub to leverage Virginia's world-class assets in space launch, autonomous systems, modeling and simulation and data science to solve real-world problems.

Through industry, academic and governmental agency partnerships, VISA's vision is to create an environment of research, technology, commercialization, and educational opportunities to grow the spaceflight and autonomous systems industry.

VISA

VIRGINIA INSTITUTE
FOR SPACEFLIGHT
& AUTONOMY sm
at Old Dominion University

Dr. Yiannis Papelis,
Executive Director

Virginia Institute for Spaceflight & Autonomy (VISA)

Strategic Initiatives

- Grow a sustainable cube-sat/small-sat business model in partnership with NASA WFF and Va Space/MARS
- Establish leadership in maritime autonomous systems through development of a Maritime Autonomy Capabilities Research Lab (MACRL)
- Establish the Commonwealth and the region as a leader for Advanced Air Mobility
- Establish a more robust ODU/ESCC (Eastern Shore Community College) workforce pipeline to accommodate the growing aerospace ecosystem on the Eastern Shore
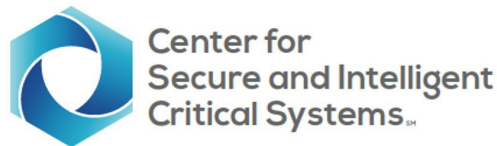

VISA
VIRGINIA INSTITUTE
FOR SPACEFLIGHT
& AUTONOMY.sm
at Old Dominion University

Center for Secure & Intelligent Critical Systems (CSICS)

About CSICS

With a focus on cybersecurity and secure communications, the **Center for Secure and Intelligent Critical Systems (CSICS)** conducts research that delivers innovation, knowledge, products, and best practices for the development of secure and intelligent critical systems.

CSICS supports communities and industry through knowledge transfer, creating theoretical, applied, and industrial and educational impact.

Center for
Secure and Intelligent
Critical Systems℠

Dr. Sachin Shetty,
Executive Director

Center for Secure & Intelligent Critical Systems (CSICS)

Strategic Initiatives

Build partnerships and enable collaboration between centers of excellence to perform funded research projects in the following focus areas:

- Trustworthy Artificial Intelligence
- Secure and Intelligent NextGen Infrastructure
- Critical Infrastructure Resilience Metrics
- Cyber Spectrum Security

Leverage nascent technologies in the following areas:
- Cyber Risk Assessment
- Cyber Resilience Metrics
- Blockchain for distributed systems security

Center for
Secure and Intelligent
Critical Systems ℠

Institute for Coastal Adaptation & Resilience (ICAR)

About ICAR

ICAR is a national center for the science and practice of coastal resilience at ODU. Launched in 2018, ICAR builds on years of investment and commitment by Old Dominion to leadership in coastal adaptation and resilience.

Dr. Jessica Whitehead,
Executive Director

INSTITUTE FOR COASTAL
ADAPTATION & RESILIENCE℠

Institute for Coastal Adaptation & Resilience (ICAR)

Vision

ICAR catalyzes the action needed to build vibrant communities, strong economies, and healthy ecosystems across the Commonwealth of Virginia despite natural hazards and climate change.

Mission

ICAR advances the practice of coastal resilience and adaptation by engaging with communities, organizations, and businesses to develop and deploy solutions based on integrated, innovative, and applied research.

Center for Mission Engineering (CME)

About CME

The Center for Mission Engineering (CME) is an interdisciplinary applied research center focused on advancement in designing, analyzing, integrating, and improving the ability of engineered systems to deliver desired effects.

Dr. Thomas C. Irwin,
Executive Director

Center for Mission Engineering (CME)

Strategic Initiatives

- Develop transformative tools (models and simulations) to rigorously define and facilitate the practice of mission engineering. The models are the first of their kind and will advance the state of the art in mission engineering.

- The initial application of this strategy is a system dynamics model that can be used to simulate strategies for Defense Manufacturing Readiness and help decision-makers ensure the availability of products and services to support the warfighter in accomplishing defense missions.

VIRGINIA DIGITAL MARITIME CENTER

Mission

Support Virginia's maritime enterprise by leveraging applied research and innovative technology to advance the maritime workforce, foster collaborative partnerships, and drive economic growth in Hampton Roads

Focus

- Technology Insertion: integrating innovative technology into shipbuilding, repair & modernization
- Digital Analytics: applying data science and digital tools to optimize efficiency
- Workforce Development: expanding opportunities and designing engaging training delivery

Capabilities & Expertise

- Naval engineering, modeling & simulation, training & curriculum development, & data science
- Over $15M in funded projects since 2021

VDMC

OLD DOMINION UNIVERSITY

VIRGINIA DIGITAL MARITIME CENTER

Current Projects

Workforce Development & STEM Outreach
- Maritime Entry-to-Employment (MEET)
- Marine Trades Training (MTT)
- Maritime Skilled Trades Alignment (MSTA)
- Middle School Maritime Exploration (MSME)
- Joint Professional Military Education Course Support

Digital Analytics
- Contribute, Approve, Curate, Hyper-Distribution Engine (CACHE)
- Operationally Direction Instructional Network Engineering Library (ODIN-EL)
- Trusted Decision-Making System (TDMS)
- Surface Combat Systems Training

Digital Ship Challenge

OLD DOMINION UNIVERSITY

VIRGINIA DIGITAL MARITIME CENTER

Pending Projects

Technology Insertion

- MEP Manufacturing Technology Insertion Program (MTIP)
- NSRP Shipbuilding CoBot Alliance
- Navy SBIR Naval Shipyard Technology Integration

Digital Analytics

- Shipbuilding Energy Use Optimization
- Submarine Module Construction Project

Workforce Development

- Dept. of Energy SMART Manufacturing Accelerator
- Schools Harnessing Innovative Industry 4.0/5.0 Processes & Systems
- SIB Registered Apprenticeship Initiative
- SUPSHIP Training Enhancement

VDMC

OLD DOMINION UNIVERSITY

VIRGINIA DIGITAL MARITIME CENTER

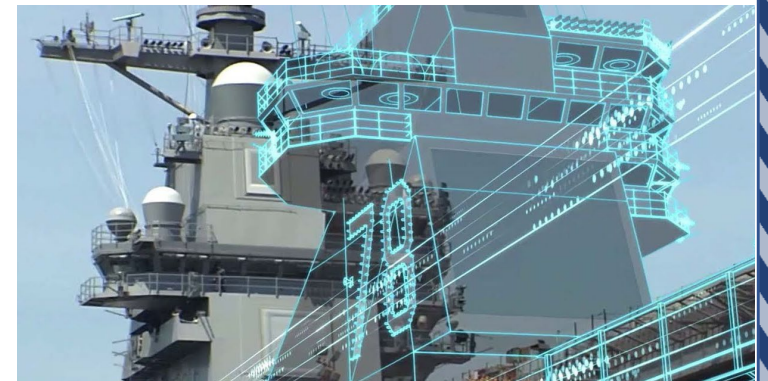## Where we're headed…

Technology Insertion
- Expand capability to enable technology insertion decision making more broadly into Navy ship repair/building, AUKUS, and maritime industry

Digital Analytics
- Digital twin for shipbuilding & risk analysis
- Data-driven, competency-based trades training
- Analysis of environmental impact of shipbuilding

Workforce Development
- Multimodal, simulation-based training
- Cognitive and knowledge engineering
- Streamlining K-Gray education and training curriculum pipelines

VDMC

OLD DOMINION UNIVERSITY