Virginia State University
College of Engineering & Technology
Talent Pipeline

Keith M. Williamson, Ph.D.
AMIE 2015 National Conference
• Total enrollment 5,400
• *U.S. News & World Report* twice acknowledged VSU as the top, public, master’s level HBCU in America. We are one of Virginia’s two land-grant institutions.
• 236-acre main campus, with more than 50 buildings, including 16 dormitories and 17 classroom buildings, and a 416-acre agricultural research facility.
College of Engineering & Technology

Dept. of Mathematics & Economics

Economics
BS & MS
(65 majors)

Mathematics
BS & MS
(75 majors)
College of Engineering & Technology

Dept. of Engineering & Computer Sciences
- Computer Engineering (135 majors)
- Manufacturing Engineering (60 majors)
- Computer Sciences
  - BS & MS (150 majors)

Dept. of Technology
- Mech. Engr. Tech (55 majors)
- Electronics Engr. Tech (60 majors)
- Information Logistics Tech (160)
College of Engineering & Technology

Core Competencies:

a. Unmanned and Autonomous Technology
b. Sensor Networks/ Cyber Security
c. Friction Stir Welding
d. Machine Learning & Inference Algorithms
e. Big Data Analytics & ERP Systems
f. Game Theory and System Optimization
A New Model for Collaboration

Key Attributes of CCAM and CCALS

- Industry-driven
- Multiple Universities
- Global Corporations
- Government Members
- Translational Research
- Workforce Development
- Enabler of Federal Funding
- Focus in Major Economic Sectors for Virginia

CCAM: Commonwealth Center for Advanced Manufacturing

CCALS: Commonwealth Center for Advanced Logistics Systems

CCAM: Founded in May 2010

CCALS: Founded in December 2012

Public-Private Partnership
CCAM Membership
Industry Driven Workforce Model

**Key Features**
- Industry-driven
- Industry recognized certifications
- Stackable credentials
- Industry-ready experience
- Globally relevant

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CCAM/AMIE Partners

globally relevant
VSU’s Talent Pipeline Model

Talent Transitions:
C21 = Freshman Talent Function $f_{FT}(A, PM, T, CR, SPS, CR)$
C32 = Sophomore Talent Function $f_{ST}(A, PM, I, IM, URE, T, SPS)$
C43 = Junior Talent Function $f_{JT}(I, URE, IM, PM, SPS, A)$

Attributes:
$A$ = Advising, $PM$ = Peer Mentoring, $IM$ = Industry Mentoring, $CR$ = Calculus Readiness, $T$ = Tutoring, $SPS$ = Student Professional Societies, $I$ = Internships, $URE$ = Undergraduate Research Experiences.
Key Attributes that Foster Movement Along the Pipeline

- Peer Mentoring
- Research Experiences
- Internships
Our workforce vision in context

We compete in a capability space. Programs deliver outcomes/capabilities for a workforce.

Our key capabilities in context are as follows:

a. ERP Systems (SAP, PLM, ArcGIS, Orbis, CCALS)
b. Unmanned Vehicles (Drones partnership with Hazon & Dominion VA, CCALS)
c. Big Data, machine learning, IoT, cyber-security (CCAM)
d. Game Theory and Workforce System Optimization (CCAM)
Goal 1: Integrate Value Mapping into various stages of the Manufacturing Execution Sys (MES) through OMPS/SAP Integration
Goal 2: Use simulation to visualize the value chain
Goal 3: Integrate value mapping throughout Design, Analysis, and Manufacturing

Analysis of stress

Analysis of Energy
Demonstrate data-to-decisions along the value chain
Demonstrate OMPS/SAP, PLM Capabilities through the SAE Formula Car Competition

1. CNC Mill and Lathe – PLM/OMPS/SAP
2. FEA, CAD, CAM, 3D Print Rapid Prototype
3. Fabricate components for the suspension
4. Install components and test during competition
Drone Technology: I-o-T Demonstration

- Adaptive control for obstacle avoidance and system health
Va. Power tests drones to inspect power lines

Camera-equipped devices could replace helicopters

BY JOHN RAMSEY
Richmond Times-Dispatch

Small aerial drones equipped with high-tech cameras soon will begin flying missions to inspect high-voltage power lines for Dominion Virginia Power.

The utility, which has been testing the unmanned aircraft at its Chester training facility since last year, sees the drones having the potential to replace helicopters currently used to inspect transmission lines.

Their first test around live wires is scheduled for next month in the Northern Neck.

"When you look at a drone in the air versus a helicopter, we look at that as a safety gate for Dominion," said Steve Henricks, Dominion Virginia Power's manager of electric transmission business and line services.

"We're hoping to be able to provide these small unmanned devices on the line and connect them ahead of time," he said.

Federal regulations require the drones to fly no higher than 200 feet and always within 200 feet of the pilot's line of sight. Dominion Virginia Power is working with three vendors that already have Federal Aviation Administration approval to fly drones for commercial use, including Hampton Roads-based Hazen Solutions of Virginia Beach.

Each 25- to 30-pound drone is flown using a two-person team, with one controlling the flight and the other scanning the area for any safety concerns and operating the camera. They typically hover 6 to 15 feet from the transmission towers, where their cameras can zoom in on enough precision to read the name plates on individual insulators.

Deborah Hiday said Dominion Virginia Power eventually hopes to use drones after storms to determine exactly where and how lines are damaged before sending in repair crews. Sensors eventually could be added to the drones to provide more data to the company, she said.

Dominion Virginia Power, the state's largest electric utility, has about 8,400 miles of transmission lines, which typically are strung along metal towers and carry electricity over long distances. Testing has shown the drones can capture photos and video at angles that would be nearly impossible from a helicopter or from a line worker.

Drones have been used for years by the military for bombing and surveillance missions. Companies have started exploring their use in commercial settings, which unlike recreational uses currently are banned by the FAA, except for the companies such as Hazen Solutions that have been granted special waivers.

"The FAA is working on miles expected to be released by the end of the year to help balance innovation with safety," David Calter, CEO of Hazen Solutions, said the drones' ability to offer in various business sectors are myriad, especially if federal regulations become less stringent and allow drones to become more commonplace.

"The only limitation is going to be our imagination in the future," Calter said.

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A two-person team would fly each drone, with one controlling the flight and the other operating the camera.
Thank You !!!