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NO SCRIPT PROVIDED

Virtual Institutes for Cyber and Electromagnetic Spectrum Research and Employ (VICEROY™)

Pioneering Mission-Focused Cyber-Spectrum Education for the DoD Workforce

Chester "CJ" Maciag
Director, Cyber Technologies and Academic Outreach
Integrated Sensing and Cyber
OUSD(R&E), OASD(CT), D(AT)

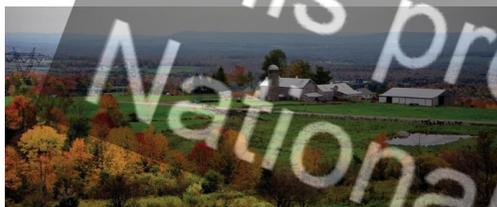
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A Little About Me...



- NY Native – 50 years; DC Transplant – 4 years so far...
- Education
 - BS-EE Rochester Institute of Technology
 - MS-FCM Utica University
 - Air War College
- 30 years at AFRL Information Directorate (“Rome Lab”)
 - Chief Engineer of First Top-Secret to Secret Cross-Domain Solution
 - Launched DFRWS and Influenced digital forensics standards
 - Pioneered and commercialized live-box forensics using memory scraping
 - Co-authored 12 papers on communications and network security
 - Cyber Ops Technology WG Lead for OSD Cyber Community of Interest
- 4 years at OUSD(R&E)
 - Director of Cyber Technologies and Academic Outreach
 - VICEROY / P3I / UC2 (Education & Research Programs)
- 21 years at Utica University as Adjunct Professor
 - Computer and Network Security, Open Source Cyber Intelligence, etc.

This presentation was given at the 2023 National Cyber Security Education Colloquium



Purpose



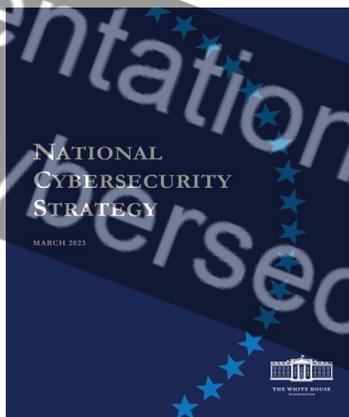
- Cyber Talent Pipeline Challenges and Program Motivation
- VICEROY Mission and Objectives
- Current program activities and success stories
- Questions and Discussion

This presentation was given at the 2023 National Cybersecurity Education Colloquium



Cyber Workforce Strategic Drivers

America Faces ~700,000 Open Cybersecurity Positions¹



- Need to create and prioritize new skill-based pathways to cybersecurity jobs
- Build pipelines for historically untapped talent pools

We must...build a robust and diverse cyber workforce, embrace security and resilience by design, strategically coordinate research and development investments in cybersecurity..."

"There is a recognized shortage of skilled cyber personnel that could potentially impact operational readiness across the Department and put national security at risk."

DCWS

Four human capital pillars:

- **Identification:** Find the best and brightest students
- **Recruitment:** Open doors to DoD careers for identified talent
- **Development:** Provide education and training in leadership, teamwork, DoD missions, and operational skills
- **Retention:** Build an engaged network of alumni and continue to empower them as their careers progress



USD(R&E) Interest in the Cyber Talent Pipeline

USD(R&E) = Department of Defense Chief Technology Officer

- Innovate and Modernize DoD Capabilities in Support of the NDS
- Ensure the Technology Supply Chain (14 Critical Technology Areas)
 - Tech Ideas + Laboratories + **Talent Pipeline**
 - DoD STEM Office; SMART Scholarship Office



Integrated Sensing and Cyber

- Cyber Ops and Tech
- Electromagnetic/Spectrum Ops
- Sensors that inform cyberspace
- Communications

Cyber Technologies and Academic Outreach - Congressional Interest Items

VICEROY – Virtual Institutes for Cyber and Electromagnetic Research and Employ

Mission:

- Establish academic cyber institutes at institutions of higher learning, to develop foundational expertise in critical cyber operational skills for future military and civilian leaders of the Armed Forces and the Department of Defense, including such leaders of the reserve components



P3I – Pacific Intelligence and Innovation Initiative

Mission:

- Become a critical enabler for Hawaii and INDOPACOM to meet the skilled workforce demand for DoD's evolving and emerging requirements in IT, Cyber, Intelligence, Electronic Warfare (EW), and Data Science
- Change current paradigm of bringing talent to HI, to building talent locally in HI.



UC2 - University Consortium for Cybersecurity

Mission:

- Build and maintain a consortia of academic institutions to advise the Secretary on the needs of academic institutions related to cybersecurity and research conducted on behalf of the Department
- Serve as focal point for closer collaboration between academia and the Department of Defense (DoD) on cybersecurity matters





Public Law 115-232

Section 1640 of the NDAA for FY2019



PROGRAM TO ESTABLISH CYBER INSTITUTES AT INSTITUTIONS OF HIGHER LEARNING

*Authorization: The Secretary of Defense may carry out a program to establish a Cyber Institute at institutions of higher learning selected ... for purposes of **accelerating and focusing** the development of **foundational expertise in critical cyber operational skills** ...*

*... for future **military** and **civilian** leaders of the Armed Forces and the Department of Defense ...*

*... including such leaders of the **reserve components**.*

Appropriation(s):

Senior Military Colleges - NSA / CYBERCOM

- Focused on enhancing the ROTC programs of the six Senior Military Colleges

VICEROY - USD(R&E) Defense-Wide RDT&E

- Focused on enhancing the ROTC and civilian cybersecurity educational curricula of schools, not to exclude the SMCs

Increased quality and quantity of civilian and ROTC graduates having the skills to succeed on day one



VICEROY Vision, Mission, and Approach

Vision

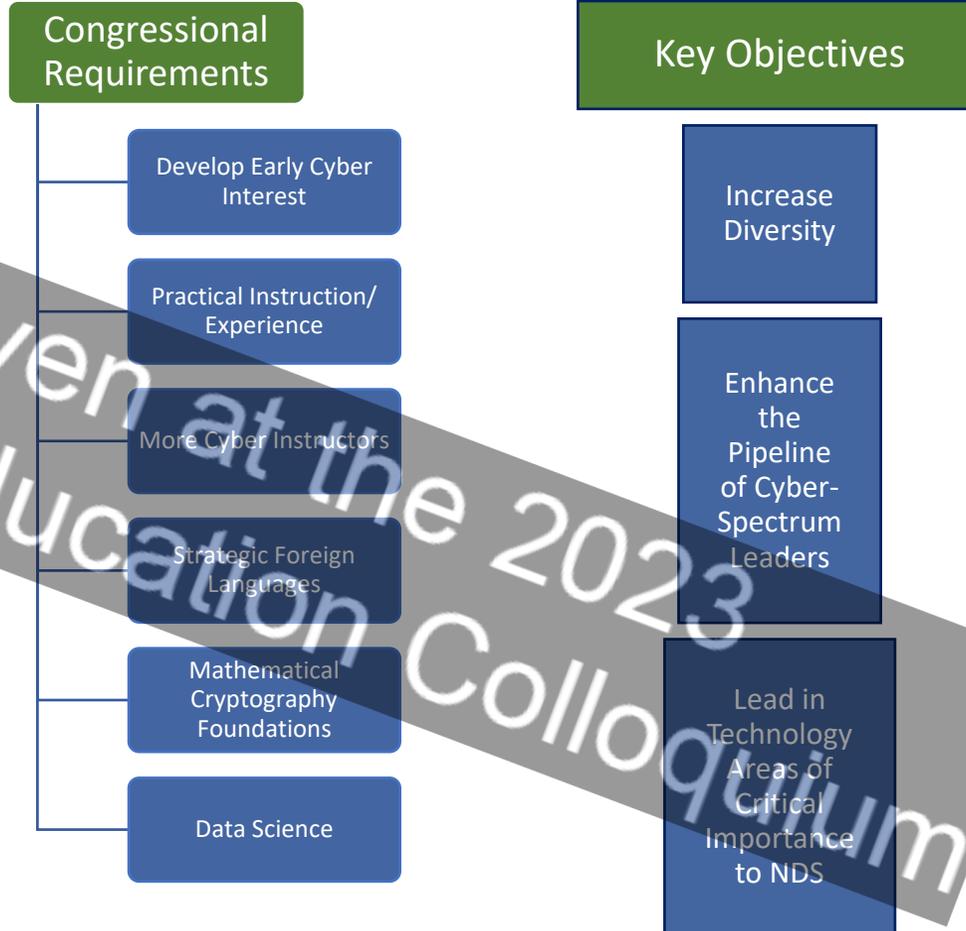
Recognized by DoD as the leading mission-focused experiential cyber-spectrum operations education and internship pipeline producing job-ready leaders in military, civilian, and industrial base sectors.

Mission

Establish academic cyber institutes at institutions of higher learning, to develop foundational expertise in critical cyber operational skills for future military and civilian leaders of the Armed Forces and the Department of Defense, including such leaders of the reserve components.

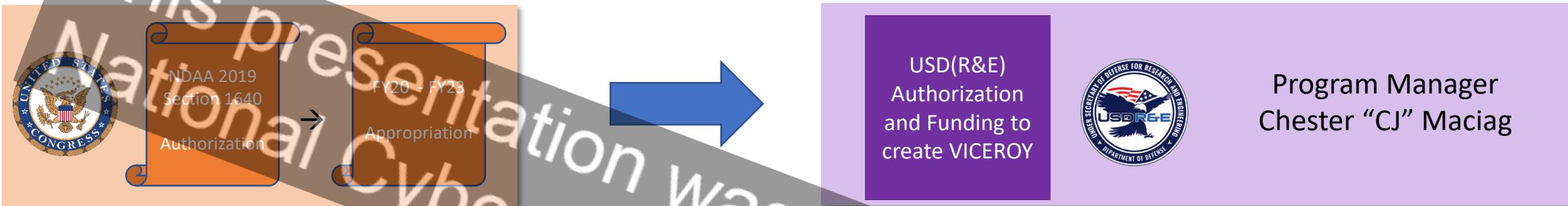
Approach

Augment traditional college curricula by providing hands-on, experiential learning and internship opportunities uniquely tailored to match the critical cyber-spectrum workforce demands of the Armed Services, Department of Defense, and our Defense Industrial Base partners.





VICEROY Organizational Relationships



Program Manager
Chester "CJ" Maciag

DoD Performing Organization
Administers Partnership Intermediary Agreement for Technology Transition, and establishes norms for Legal, Public Affairs, Contracts, etc.

Air Force Research Lab



Program Manager
Sonja Glumich

Partnership Intermediary Organization
501c(3) to administer the VICEROY program Awards contracts, monitors and reports on performers, administers internship program

Griffiss Institute



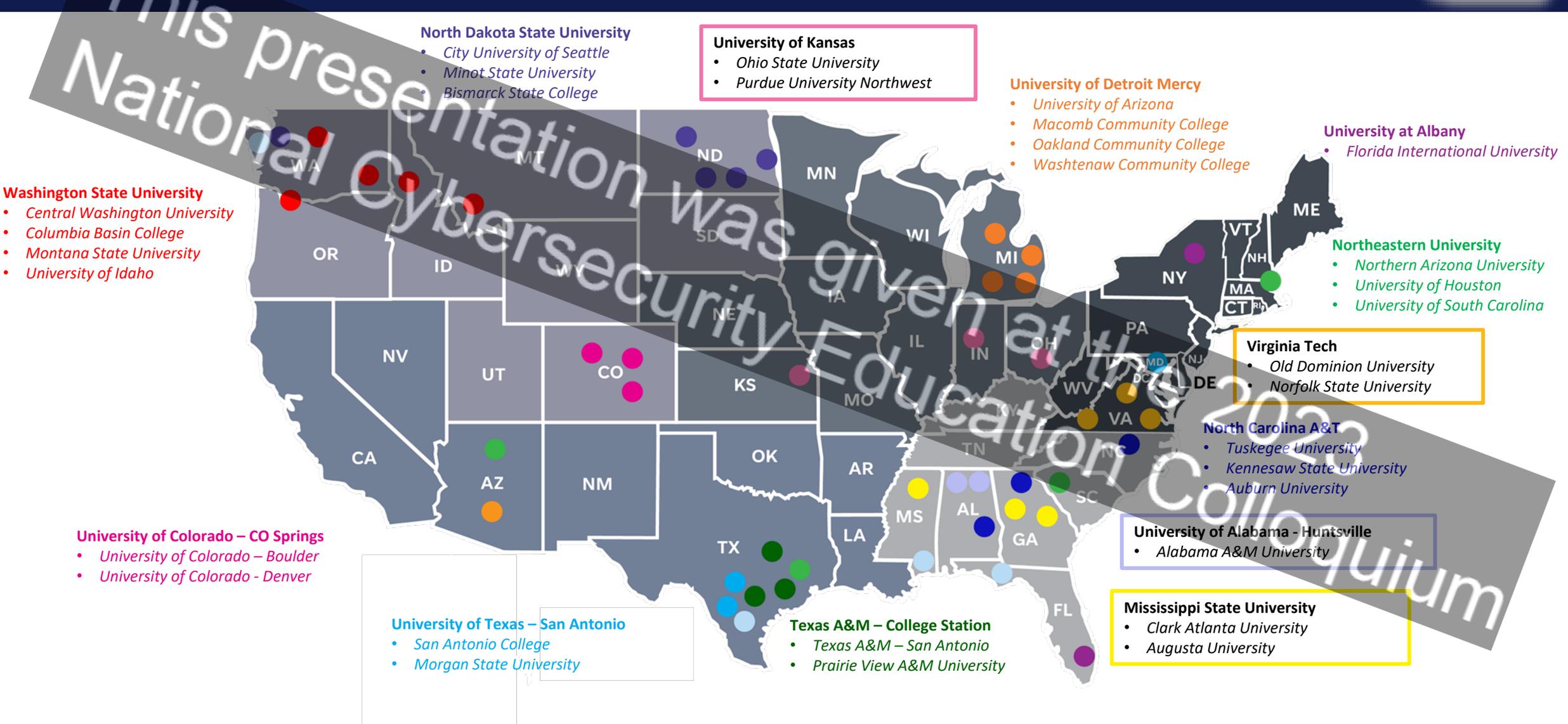
Project Management

VICEROY Performer Organizations
Create and execute local academic programs to meet the intent of Section 1640 and the Special Notice



FY23 VICEROY Regional VIs and Partners

Slate Blue - Operational Internship Sites with MOAs: Keyport, JBSA, Keesler, and Eglin





VICEROY Virtual Institutes



- Faculty-led, multi-institution, multi-year research endeavors that specifically target cyber and electromagnetic spectrum operations (EMSO) challenges of interest to the DoD
- Develop new or augment existing cyber coursework leading to specializations, degrees, or industry certifications
- Provide scholarships and stipends for student participation
- Sponsor cyber research projects of interest to the DoD for VICEROY students
- Hold cyber seminars, workshops, and competitions
- Report progress and share lessons learned at the annual VICEROY Symposium



Mapping the DCWS to VICEROY Activities

Leveraged Scholarship Programs at Bottom



Education Pathway

VICEROY Activities

Leveraged Scholarship Programs

Secondary Schools

Undergrad & Graduate Education

Summer Experiential Internship

Follow-Up DoD Internships

DoD Employment

13 Consortia / 44 Academic Institutions

NSA-sponsored GenCyber K-12 program

DEI-sponsored K-12 programs

VICEROY Outreach Programs

JROTC Programs



VICEROY MAVEN

VICEROY Operational Internship

VICEROY Research Internship

DoD Internship Programs



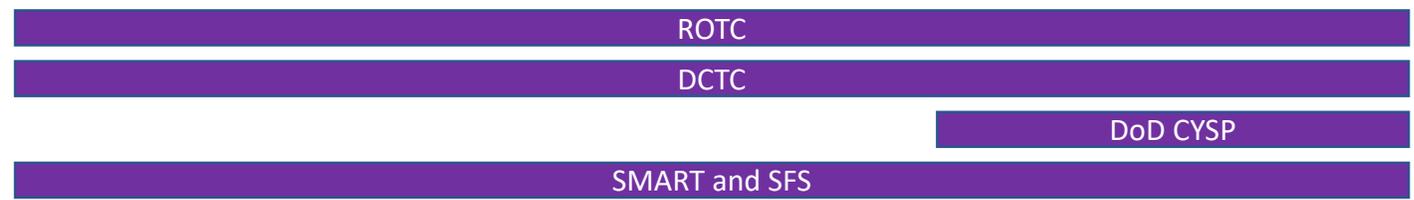
DoD Civilian Employment

Commissioned Officer

Retained Civilian or Officer

Graduate School Program (PALACE ACQUIRE)

Defense Industrial Base





Mapping the DCWS to VICEROY Activities

VICEROY-Unique Activities Denoted in GREEN

Education Pathway

VICEROY Activities

DCWS Pillars

Secondary Schools

Undergrad & Graduate Education

Summer Experiential Internship

Follow-Up DoD Internships

DoD Employment

Develop early student interest in challenging DoD and National Security problems sets

Enhance the pipeline of cyber and spectrum students at the secondary school level

Harness summer camps, JROTC, and dual-enrollment

DoD Mission Focus - Augments traditional college curricula with hands-on, research-based, operationally-focused experiential learning opportunities for ROTC and civilians

Increases the number of cyber and spectrum instructors at secondary and collegiate levels

MAVEN 8-week internship hones student competencies in **DoD leadership and culture, teamwork, and oral and written communications**

Financial assistance through stipends to overcome obstacles, **increase retention, and enhance geographic mobility**

Provide exciting internship experiences hosted by engaging and supportive mentors, leading to permanent employment within DoD

Travel and housing stipends to promote geographical mobility and Quality of Life to promote student satisfaction and success

Internship Network helps match students to employers for follow-on internships and permanent jobs

Bridge Hiring Program provides temporary hiring mechanism to ensure graduating student is retained while they are awaiting completion of final OPM hiring processes

IDENTIFICATION & RECRUITMENT

RECRUITMENT & DEVELOPMENT

RECRUITMENT & DEVELOPMENT

DEVELOPMENT AND RETENTION

RETENTION

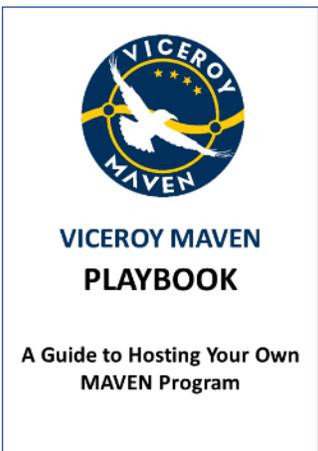
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2023 VICEROY MAVEN Summer Internship



- Pedigree and Focus
 - Leverages 20+ years of experience from running the Advanced Course in Engineering Cyber Security Bootcamp (ACE)
 - Leadership, community service, writing, public speaking, research, career day, capstone, bluing trips, and graduation dinner components
- When: 12 June - 4 August 2023 in Rome, NY
 - Standard 8-week program, with 10-week option available
 - 43 first-year interns / 6 graduate assistants (average intern GPA 3.57)
- What's New
 - Air Force / Space Force mission and electromagnetic spectrum (EMS) emphasis
 - Blue Book® cyber vulnerability assessment of a mission system
 - Hands-on cyber and EMS exercises; IEEE conference-style paper
- FY24 Plans - Expanding to Army and Navy in FY24
 - Engaging at Service HQ and organizational element levels





MAVEN 2023 Distinguished Graduates



1st
Turner Woodward
1st Year VICEROY, Intern - 2023
Oakland Community College
Junior • Software Engineering



2nd
Guinevere Fish
1st Year VICEROY, Intern - 2023
Washington State University
Sophomore • Computer Science



3rd
Benjamin Rosenberg
1st Year VICEROY, Intern - 2023
Oakland Community College
Junior • Computer Information Sciences



4th
Yasmin Chambers
1st Year VICEROY, Intern - 2023
Mississippi State University
Sophomore • Computer Engineering



5th
Alexander Hagood
1st Year VICEROY, Intern - 2023
Washington State University
Sophomore • Computer Science



6th
Elijah Gartrell
1st Year VICEROY, Intern - 2023
Old Dominion University
Sophomore • Cyber Security

This presentation was given at the 2023 National Cybersecurity Education Colloquium



What our VICEROY Interns are Saying...

"As a graduate of the 2022 VICEROY program, I was honored to have experienced the internship in its inaugural year. The mentorship and hands-on experience I received has proven invaluable as I continue my studies in the Computer Science field."



Jacob Lebovich
1st Year – VICEROY, Intern - 2022
2nd Year – VICEROY, GA - 2023

"Previously, my interests lay within artificial intelligence and data science, but VICEROY cultivated my passion for cybersecurity. I got to craft technical reports, learn new programmatic concepts, and perform research under a mentor. This program gave me lessons in leadership, an expansive network, and various core experiences."



Aailya Jakir
1st Year – VICEROY - 2022
2nd Year – ACE - 2023

"This internship, facilitated by VICEROY, has allowed me to not only demonstrate my knowledge and skills but also make a significant impact. Additionally, I have been offered an amazing chance to be a part of a select few to instruct and shape future cyber warriors for the Air Force, which I'm truly excited about."



Justin Pettiss
1st Year – VICEROY - 2023
Keesler Air Force Base
336 TRS/TRR

"I have thoroughly enjoyed the VICEROY summer internship. Wavelength is at a pivotal moment of innovation for creating Air Force software. It has been an awesome experience and I'm grateful to have been a part of this program. I hope many others get to pursue this opportunity as it has been a wonderful exposure."



Morgan Hardy
1st Year – VICEROY - 2023
Joint Base San Antonio
WAVELENGTH

"The first year of VICEROY I saw as a transition from academia to the workforce, and this summer is the application of those skills we learned last summer in a real work environment. Overall, I feel this summer has adequately prepared me for future employment opportunities and I highly recommend this experience to those with interest in radar and the DoD."



Morgan Jones
1st Year – VICEROY - 2022
2nd Year – VICEROY - 2023
Eglin Air Force Base- 350TH

"My experience with Wavelength as a software development intern has been mind-opening, exciting, while being challenging. I work in a group of three, so we were able to learn and discover a lot from each other. Teamwork is an aspect that I enjoy doing during this internship, as we get along with each other well."



Timothy Truong
1st Year – VICEROY - 2023
Joint Base San Antonio
WAVELENGTH

"My experience this Summer as a VICEROY Intern for The Naval Undersea Warfare Center Division Keyport, has been incredible. I have fostered many connections in my short time at Keyport and I am eager to continue supplying the government with my growing cybersecurity knowledge."



Benjamin Price
1st Year – VICEROY - 2023
Naval Undersea Warfare Center Division Keyport

"During my VICEROY summer internship, I have had the ability to network and learn with my peers. Ultimately, I have garnered a valuable experience and have taken an important first step toward a future in the DoD."

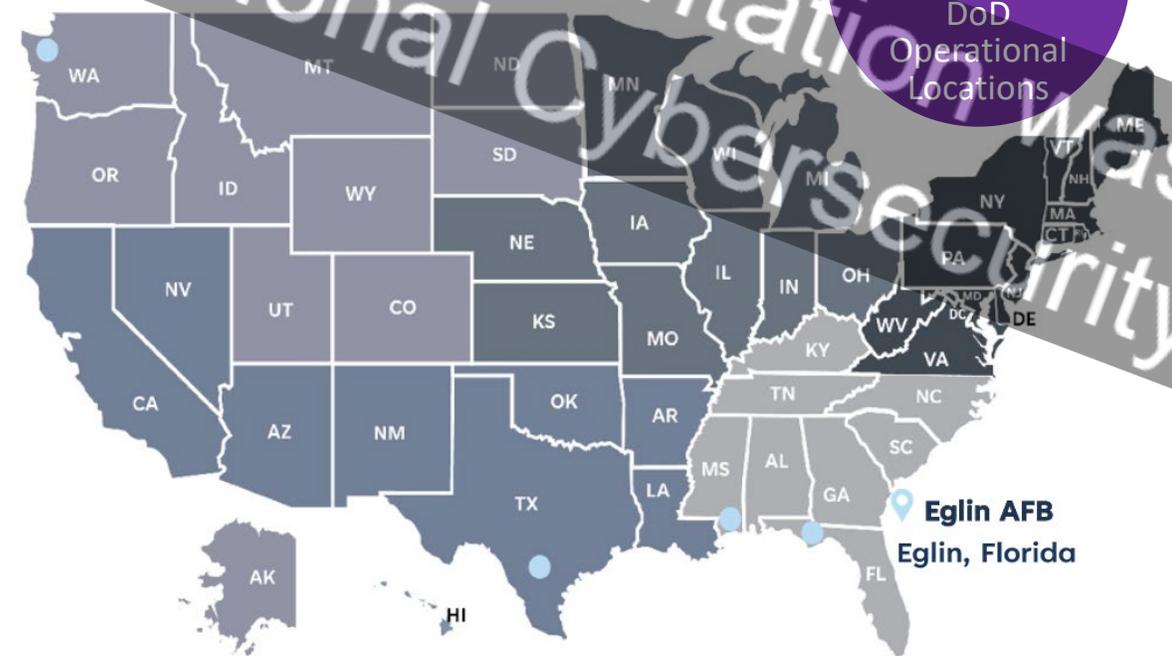


Ryan Silvus
1st Year – VICEROY - 2023
Joint Base San Antonio
WAVELENGTH



Summer Internship Host Site Locations (Post-MAVEN, or alternative to MAVEN)

34
Second Year Internships at DoD Operational Locations



Naval Sea Systems Command
Keyport, Washington

Joint Base San Antonio
San Antonio, Texas

Keesler AFB
Keesler, Mississippi

Eglin AFB
Eglin, Florida

MOA



U.S. AIR FORCE

MOA



MOA



U.S. AIR FORCE

EPA



Eglin, Florida

"The 96th Test Wing executes developmental test and evaluation enabling the warfighter to put weapons on target in all battlespace media while also providing support for all other Team Eglin missions as the installation host wing. Eglin deploys combat ready forces while delivering full spectrum support to the DoD's second largest test and training complex. Today, Eglin tests and evaluates non-nuclear munitions, electronic combat systems and navigation/guidance systems."

[Click to learn more.](#)

San Antonio, Texas

"The Air Force is the lead agency for Joint Base San Antonio, comprising three primary locations at JBSA-Fort Sam Houston, JBSA-Lackland and JBSA-Randolph plus 8 other operating locations and more than 200 mission partners. JBSA services more DOD students than any other installation, more active runways than any other installation, houses the DOD's largest hospital and only level one trauma center, supports more than 250,000 personnel."

[Click to learn more.](#)

Keesler, Mississippi

"Keesler trains more than 28,000 students annually with an average daily student load of more than 2,700. The 81st TRW is a lead Joint Training Installation, instructing not only Air Force, but Army, Navy, Marine Corps, Coast Guard and civilian federal agency personnel. Keesler's mission is enduring. We provide a wide array of capabilities in over 160 career field specialty training courses from 8 operating locations in the continental United States. Our mission is not only to technically train warfighters, but to develop and inspire them."

[Click to learn more.](#)

Keyport, Washington

"Keyport provides technical leadership, engineering expertise, and unique facility complexes that serve to ensure sustainment of undersea warfare (USW) superiority for the United States. As one of two divisions of the Naval Undersea Warfare Center, Keyport's mission is focused on developing and applying advanced technical capabilities to test, evaluate, field, and maintain undersea warfare systems and related defense assets. These advanced technical capabilities directly support the full spectrum of Navy undersea programs."

[Click to learn more.](#)

This presentation was given at the National Cybersecurity Education Summit



Support to Interns – Breaking Down Barriers to Summer Employment

Housing

- Housing for First Year Interns is provided nearby Griffiss Institute
- Housing for Follow-up DoD Host Site Interns is provided nearby each DoD host site

Pay

- Graduate Assistants are paid \$29/hr
- Follow-up DoD Host Site Interns are paid \$24/hr
- First Year Interns are paid \$22/hr



Travel

- Interns that live greater than 50 miles from their placement site will receive travel reimbursement up to \$1500 for airfare or mileage
- Daily transportation is provided to/from Griffiss Institute for interns in Rome, NY

Quality of Life

- All travel and housing is facilitated by Griffiss Institute
- Interns can meet one another digitally before start dates to build rapport
- We ensure interns have a quality environment where they can thrive



VICEROY – Future Plans



- Fall 2023 – Conduct national VICEROY mission-focused competition
- Fall 2023 – Partner with scholarship, retention, and excepted service programs
 - Engaging DCTC¹ Program through Virginia Tech and U of Arizona (already VICEROY consortium members)
- Spring 2024 – Expand number of internship host sites
 - Interest from NIWC-PAC and STRATCOM, among others
- Summer 2024 - Expand MAVEN internship program to Army and Navy
 - Interest from NRL, NIWC-PAC, and ARL-Adelphi
- Ongoing – Identify VICEROY sustainment funding beyond FY24
 - Conducting discussions with Services and installations to identify cost-sharing strategy



VICEROY

Thank You!



VICEROY MAVEN Flag Bearers at the 2023 Honor America Days at Ft. Stanwix, Rome NY

VICEROY Landing Page: <https://adobe.ly/3pwEGaV>



Mr. Chester "CJ" Maciag
Director, Cyber Technologies and Academic Outreach

ASD(CT), Integrated Sensing and Cyber
Office of the Undersecretary of Defense for Research and Engineering
Chester.j.Maciag.civ@mail.mil // (571) 969-0692



Back-up

*This presentation was given at the 2023
National Cybersecurity Education Colloquium*



MAVEN Curriculum Elements

Category	Description
1. Service and DoD Careers	DoD stories of service, career fair
2. Domains/Missions	Immerse in mission-mindset through mission and mission system lectures, Blue Books®, and capstone event
3. Mission Systems	Satellites, UAS, Cyber-enabled Munitions, SCADA, mIoT
4. Core Cyber	OS and Network Fundamentals, CIAAAA, OCO, DCO, AI/ML and cyber
5. Core EMS	Signal generation, transmit/receive, offensive and defensive techniques
6. Leadership and Teamwork	Writing, public speaking, Blue Book®, and research teams
7. Assessment	Writing and speaking rubrics, peer assessment, pre- and post-test



By the numbers... Subset of our 30-month Accomplishments



FAST FACTS

In 2022, America Faced
~ 700,000
Open Cybersecurity
Positions*

Over
\$19 Million
Awarded to Universities
Through VICEROY

112
ROTC
Students
20
DoD Mentors

13
New
Undergraduate
Courses

48 2023
MAVEN Interns
15 2023
DoD Interns
Apr. 25, 2023

56
Department of
Defense-Driven
Research Projects

1
Master's
Degree
Program

498
Students
in the VICEROY
pipeline

42
Universities
Part of a
Consortium
As of June 2023

62
Students
from
an
HBCU/MSI

142
Women
122
Students of Color

VICEROY Will Grow from
Air and Space Force
and Expand Into Army and Navy

Programs of Study

- 13 New Undergrad Courses
- 9 Seminars

Academics

- Multitude of Cyber Certification Track Courses Developed and Awarded

18 DoD Participant Employers

- AF – Keesler, Fairchild, Eglin, JBSA, AFRL
- Army – Ft. Gordon, GVSC
- Navy – NUWC Keyport

*whitehouse.gov -July 19, 2022

2021-2023 data