



January 2026



This Issue:

- CEMA Capture the Flag Winners!
- 2026 scholarship application process started
- UAS, AI, and Quantum

Scholarships Applications

Our Chesapeake Bay Roost awards scholarships to local high school students annually. The process for 2026 has begun. Submissions are due April 12, 2026. Please spread the word to any potential college-bound Science, Technology, Engineering, and Math (STEM) candidates that would be interested. The application can be found at <https://www.microwavejoe.com/aoc/>

2026 Upcoming Events



Technical Talks

January 22: Over-The-Horizon Radar at 11:30-1PM, courtesy of Rohde & Schwarz.



February 19: The Elephant Cage: HF Direction Finding, courtesy of Mike Washvill, Cold War Museum



Social

February 12: Let's get out of the cold and warm up for a post-holiday **no-host** social! Join your fellow crows at Reckless Shepherd Brewing in Columbia for an impromptu happy hour to catch up and slow down after the holiday season rush. Hope you can join us!



8895 McGaw Rd, Columbia, MD 21045

Chesapeake Bay Roost Newsletter

Thanks to Our Chapter Sponsors!

Our chapter provides scholarships to local youth and chapter events for EW professionals. These activities quickly exceed what the chapter can achieve simply on AOC national chapter funds. We are truly thankful for Axillon Aerospace (previously Parker Meggitt), Annapolis Micro Systems, and Keysight Technologies for contributing financially in support of these endeavors. Please consider working with them for your product needs.



<https://www.axillonbaltimore.com/>

Previously Meggitt Baltimore, Inc.

3310 Carlins Park Drive, Baltimore, MD 21215



<https://www.annapmicro.com/>

190 Admiral Cochrane Dr Ste 130, Annapolis, MD



www.keysight.com

1900 Garden of the Gods Road, Colorado Springs, CO

We are seeking financial sponsorship to support our club activities and scholarship benefits we provide to the community. Please contact the board at AOC.ChesapeakeBay@gmail.com for reasonable rates.

Chesapeake Bay Roost Newsletter

Note: The content of articles is taken directly from open source, unclassified materials cited below each article for the purposes of stimulating relevant EW discussions between chapter members.

Technologies to Watch: UAS, Artificial Intelligence and Quantum

An opinion of the top three technologies to be concerned about was identified in the 2025 Generating Effects with Cyber and Electronic Warfare conference of the Air & Space Forces Association where Col Larry Fenner Jr, Commander 350th Spectrum Warfare Wing, Col Eddie Gutierrez, Deputy Commander, Space Electromagnetic Warfare's Mission Delta 3, and Col Marckenson Dieujuste, Commander 867 Cyber Operations Group stated the three technology areas that keep them up at night.¹

1. Unmanned Aircraft System (UAS) / Drones

The concerns of the evolutionary impact of UAS/Drones is being played out in the Ukraine conflict, where low cost flight vehicles are being modified to support fiber optic cable based guidance, promoting resilience against EW and RF link jamming, as well as making the devices undetectable in the electromagnetic spectrum.



Photo from <https://defense-studies.blogspot.com/2024/12/four-types-uas-are-being-introduced.html>

These systems have also been modified to carry munitions, and have even been brought into Russia by Ukraine for a surprise air base attack with Operation Spiderweb, where multiple units were launched resulting in large damages to Russian aircraft.



Photo from https://www.youtube.com/watch?v=8JjC_119WUA

Currently, drones account for 70-80% of the Ukraine conflict casualties, making the UAS quite lethal vs traditional large expensive armaments.

2. Artificial Intelligence (AI) / Machine Learning (ML)

AI/ML is expected to bring more rapid analysis capability, with algorithms sifting through large volumes of data for threat detections and make rapid actionable decisions. Software Defined Radios (SDRs) can provide vast amounts of spectrum data to an algorithm that performs Electronic Surveillance (ES) functions to rapidly prioritize signals for the operator. Algorithms also provide the ability to force multiply existing surveillance collection points by aggregating data. AI/ML supports autonomous systems, something that can then be added to the UAS/drone concern, by taking the need for a human/link out of the loop.

L3 Harris is currently designing cognitive EW subsystems to respond in real time to unknown signal waveforms. The modules L3 Harris has designed are compact, self-contained signal-detection units that include a digital receiver, digital radio-frequency memory, and digital signal processor capable of identifying signals from a database of known waveforms, classifying unknown waveform signal collection, and producing jamming recommendations based on the signal parameters. Lockheed Martin's Advanced Technology Laboratories (ATL) has worked closely with DARPA to develop and demonstrate the capabilities of a cognitive EW system that can dynamically counter adaptive threats to communications. One demonstration involved the use of DARPA's Behavioral Learning for Adaptive Electronic Warfare (BLADE) program for almost instantaneously detecting, characterizing, and countering jamming signals meant to block or interfere with wireless communications systems.^{2,3}

3. Quantum Mechanics

Quantum technology already is a part of commercial technology, impacting semiconductor, lasers, MRI machines and used in Quantum Computers. Unique quantum properties of entanglement, superposition, and uncertainty will most certainly lead to future advantages. It has been applied to navigation, sensing, computing, and processing.

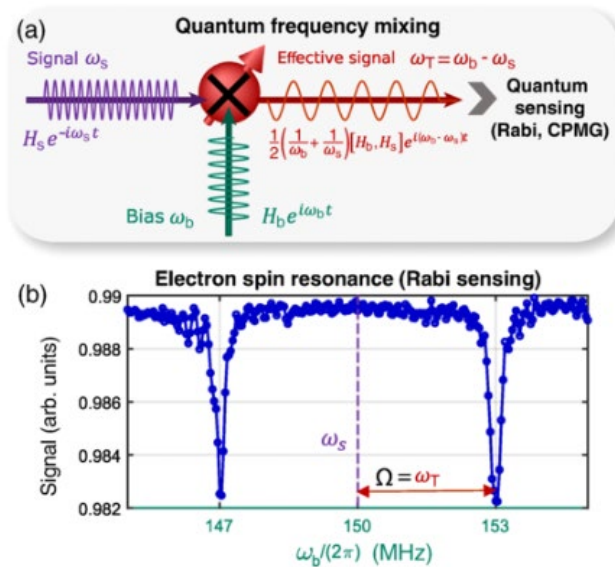
Quantum has been used to combat the risks of GPS guidance loss by making quantum compasses, allowing position estimation without the need for GPS. The UK Royal Navy recently demonstrated trials using 'Un-Jammable' Quantum Navigation Technology on HMS Pursuer.



HMS Pursuer, Photo from (4)

“The success of the HMS Pursuer trials also suggests broader applications of cold atom technology beyond military navigation. In addition to enhancing submarine and air operations, cold atom technology could benefit civilian applications in fields where GPS reliability is compromised, such as autonomous vehicles and commercial aviation in remote areas”⁴

Quantum has been applied to RF sensing, providing detection of signals at any frequency, eliminating the limitations of traditional electronics by providing wideband electric field quantum sensing via motional Raman transitions.^{5,6}



Quantum Sensing, Figure from (5)

Quantum computing is another area that could revolutionize processing, where the qubit has significantly more computing capability than a traditional electronic binary computer. The qubit has a computational multiplier as it can hold an infinite number of states compared with binary. This power has the ability to break through encryption schemes.⁷ Atom Computing and IBM currently lead the processing field with processors with over 1000 qubits. While theoretically this large number should exponentially improve computing power, there is loss due to noise, decoherence and error detection.

“Quantum radar, ... doesn’t just send out a generic signal; it sends out quantum entangled signals that are intrinsically linked to a reference signal kept at the receiver. Because of this special link, a quantum radar can know if a faint return signal is indeed from its own transmitter or just random noise, potentially allowing it to detect targets that would be lost in the noise by a classical radar.”

“Because it can separate a target’s weak echo from overwhelming background noise, a quantum radar theoretically might detect even a “nearly invisible” stealth plane. Media outlets have speculated that quantum radar could render stealth technology obsolete by picking up the tiny returns that classical systems miss. In practical terms, a quantum radar scanning the skies could notice the quantum-correlated photons returning from a stealth jet and distinguish them from the ambient thermal photons, effectively spotting a needle of a signal in a haystack of noise. This capability is why China’s reported quantum radar tests – claiming detection of targets at 100 km – caused a stir, with some dubbing it a potential “stealth buster.” If an operational quantum radar could indeed track fighter jets or stealth bombers at long range, it would be a game-changer for air defense.”

“Perhaps the biggest limitation is **range and power**. Classical radar can simply crank up the transmit power or use large antennas to see farther; quantum radar cannot easily brute-force its way to long range because the fragile quantum states don’t survive a high-power long-distance journey. Paradoxically, quantum radar excels at low-power situations – it’s almost a “low-SNR specialist.” But if you try to use it in high-SNR regimes, classical radar already does fine and there’s no advantage to gain. Some experts argue that for long-range detection (tens to hundreds of kilometers), a well-designed classical radar (using techniques like pulse compression, coherent integration, MIMO arrays, etc.) can perform as well as or better than a quantum radar, without the hassle of cryogenics and entanglement. In fact, a [2020 MIT Lincoln Lab feasibility study](#) flatly stated “Quantum radar does not have the potential for long range standoff sensing (>10 km) at radio frequencies” with current technology. They cited not only hardware limits but also the problem that to detect a target at long range with quantum illumination, you might need to integrate (collect signals) for an impractically long time – one analysis suggested up to years of data

collection for a single pulse's return in certain scenarios. Clearly, no one can wait years to detect a speeding aircraft! The U.S. Defense Science Board was similarly unconvinced, concluding in 2019 that quantum radar "will not provide [an] upgraded capability" to the Department of Defense in any foreseeable timeframe.

All that said, the current status is not static. Researchers are actively looking for solutions to these challenges. For example, there's work on better **quantum sources and detectors** that operate at higher temperatures, on **quantum memory** devices that might store microwave photons (using exotic approaches like spin ensembles or mechanical resonators), and on integrating quantum radar concepts with classical radar infrastructure to get the best of both. There's also exploration of alternative quantum radar architectures that might be more practical. One idea is using pre-squeezed or pre-entangled states in a clever way that doesn't require storing the idler for as long, or using entanglement swapping so that the idler and signal are compared through an intermediary step. Another approach is to leverage optical frequencies (where generating entanglement and detecting single photons can be done at room temp with existing tech) and only convert to microwave at the last moment for transmission – this was the 2015 proposal and remains a promising route if conversion efficiency improves. On the hardware side, companies are miniaturizing quantum photonic components. There's talk that the first portable quantum radars might actually operate at shorter range but find niche uses like covert perimeter surveillance or near-distance security scanning, as hinted by some reviews.

In summary, as of today quantum radar is a technology in an embryonic stage: proven to work in principle on the lab scale, but facing a steep climb to become broadly useful. No military has an operational quantum radar yet (despite any unverified claims). The major players are continuing research, with China seemingly pushing hardest for a strategic system and others content to support lower-level R&D for now. The coming years will likely see incremental improvements – e.g., a prototype that works over, say, 100 meters, then 1 km, perhaps in a closed environment – rather than a sudden deployment of a stealth-detecting super-radar. But given the pace of quantum tech development, surprises can happen. The field remains a vibrant intersection of cutting-edge physics and engineering, with the current status best described as "promising, but not yet game-ready."⁸

1. <https://www.youtube.com/watch?v=W8wBOyLIWJE>
[Generating Effects with Cyber and Electronic Warfare | 2025 Air, Space & Cyber Conference - YouTube](#)
2. <https://www.mwrf.com/markets/defense/article/21848321/cognitive-ew-provides-computer-powered-protection>
3. <https://www.usni.org/magazines/proceedings/2023/august/implement-ai-electromagnetic-spectrum-operations>
4. <https://theasialive.com/uk-royal-navy-successfully-trials-un-jammable-quantum-navigation-technology-on-hms-pursuer/2024/11/06/>
5. <https://isn.mit.edu/quantum-sensors-electromagnetic-signals-any-frequency>
6. <https://www.nature.com/articles/s41567-024-02753-0>
7. <https://www.nasa.gov/wp-content/uploads/2024/07/quantum-communication-101-final.pdf>
8. <https://postquantum.com/quantum-sensing/quantum-radar/>
[Quantum Radar: The Next Frontier of Stealth Detection and Beyond](#)

Chesapeake Bay Roost Newsletter

CEMA Capture the Flag Winners!

The AOC Cyber Electromagnetic Activity (CEMA) Capture the Flag (CTF) event was held October 27, 2025, at Aberdeen Proving Ground (APG). It had been delayed from earlier in the year due to the government shut-down. The CTF event was a jeopardy-style competition open to all cyber professionals, covering topics such as binary exploitation, reverse engineering, web exploitation, cryptography, forensics, and security. Teams were limited to four participants, and there was a good showing of competition that made the event a success. It was a fun and challenging environment that showcased outstanding cyber skills and collaboration. All enjoyed the event and had the opportunity to connect with others across the community.

Official Results:

Academia Category

- 1 1st Place: UMGC PowerShells – University of Maryland Global Campus
- 2 2nd Place: CTRL-S – University of Delaware
- 3 3rd Place: Fighting Owls – Harford Community College (Bel Air, MD)

Government / Military / Industry Category

- 1 1st Place: VTable Fuze – Johns Hopkins University Applied Physics Lab
- 2 2nd Place: The Final PwnTier – Viasat
- 3 3rd Place: H@ckstr33t B0yz – CACI / C5ISR

Congratulations to all the winning teams! 🎉



Figure 1. Capture The Flag Event at CEMA 2025

Thanks to Charles Lepple and Elizabeth Cornejo for providing event updates and photos above.

Chesapeake Bay Roost Newsletter

Upcoming Technical Lunch & Learn Talk

January 22, 11:30AM

Topic: Understanding Over The Horizon Low Frequency Radar, by Rohde & Schwarz



Abstract:

The session will review the principles of long-range HF propagation, the sources of interference and ionospheric effects. We will highlight operational OTH radars including the US Relocatable Over the Horizon Radar (ROTHR) and the Australian Jindalee Operational Radar Network (JORN). The session will conclude with an overview of the challenges of OTH radar from a Research, Development, Test & Evaluation (RDT&E) viewpoint, modelling and simulation tools, channel sounding, coherent transmission and calibration, the use of COTS power amplifier and coherent reception.

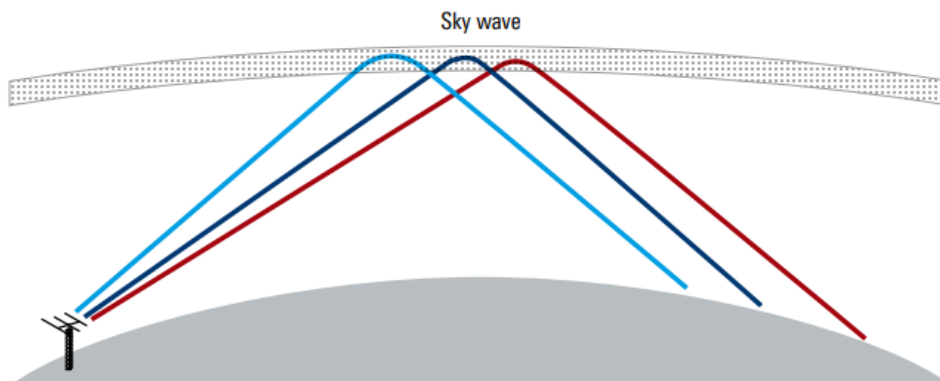
Johns Hopkins University APL 11100 Johns Hopkins Rd, Laurel, MD Kossiakoff Center KC7/8 Rooms

RSVP for in-person by Evite, so we can order enough pizza!

<https://evite.me/PjfKqnm7uf>

Also on Zoom:

<https://jhuapl.zoomgov.com/j/1617685640?pwd=zyK0or0wndfGssMBA16C9YRQNV0rSp.1>



Agenda:

11:30-11:50 Lunch for those onsite
11:50-12:00, Chapter News
12:00-12:45 Technical Talk
12:45-1:00 Q&A

Chesapeake Bay Roost Newsletter

Upcoming Technical Lunch & Learn Talk

February 19, 11:30AM

Topic: The Elephant Cage: HF Direction Finding, courtesy Mike Washvill, Cold War Museum



<https://coldwar.org/>

Abstract:

In the 1960s, the US Air Force and US Army constructed eight huge antenna systems, each the size of the Pentagon, to conduct HF Direction Finding and intercept operations.

The FLR-9 antenna systems, sometimes referred to as the "Elephant Cages", were Circularly Disposed Antenna Arrays (CDAAs), or Wullenweber antennas.

The eight Air Force and Army FLR-9 systems formed the IRON HORSE HF/DF and intercept system. Sixteen US Navy CDAA systems, the FRD-10, of a different design but of a similar scale and complexity were also deployed around the world in the BULLSEYE system. These systems supported National Security Agency (NSA) SIGINT missions for decades

The talk will explore the evolution of the CDAA technique, and the technology inside these impressive systems

Johns Hopkins University APL 11100 Johns Hopkins Rd, Laurel, MD Kossiakoff Center KC7/8 Rooms

RSVP for in-person by Evite, so we can order enough pizza

<https://evite.me/U5jQCknchv>

Also on Zoom

<https://jhuapl.zoomgov.com/j/1619287926?pwd=t0HZSBnfiPx7Ua89WCkyE8w2l5884N.1>



Agenda:

11:30-11:50 Lunch for those onsite

11:50-12:00, Chapter News

12:00-12:45 Technical Talk

12:45-1:00 Q&A

Advertise Your Company Here!

Did you know as of 12/1/25 this Chesapeake Bay Roost has over 450 current members in its database?

Our membership represents major EW centers in this area, including:

- Axillon Aerospace
- BAE Systems
- Boeing
- Booz Allen Hamilton
- CACI
- CEA Technologies
- Johns Hopkins Applied Physics Laboratory
- Multiple branches of the Department of Defense
- Northrop Grumman Corporation
- Rohde & Schwarz
- Raytheon
- Textron Systems
- WGS Systems
- And many others!

We are seeking sponsorship to support our club activities and scholarship benefits we provide the community.

Space is available here to target your advertisement/announcements to our select membership!

Please contact the board at AOC.ChesapeakeBay@gmail.com for reasonable rates

Advertise Your Company Here!

Chesapeake Bay Roost Newsletter



ASSOCIATION
of OLD CROWS



Follow the Chesapeake Bay Roost



<https://www.facebook.com/profile.php?id=61551521264680>



www.linkedin.com/company/association-of-old-crows-chesapeake-bay-roost



<https://twitter.com/AOCBayRoost>



<https://www.instagram.com/aocbayroost/>

Chesapeake Bay Roost Representatives

President:	Jon R Ward
Vice President:	Jane Gilligan
Treasurer:	Niels G. Eegholm
Secretary:	Joseph Sluz
Outreach:	Sarah Willenbrink
Awards/Scholarships:	Paul Kennedy
Directors:	Sunita Bhatia, Niels G. Eegholm, Chris Farrier, Joseph Sluz

AOC.ChesapeakeBay@gmail.com

AOC Events

March 10-12, 2026
Collaborative EW 2026
Point Mugu, CA