ASSOCIATION OF OLD CROWS

Chesapeake Bay Roost Newsletter

May, 2025

This Issue:

- Third session of series of EW Environment Generation Tech Talks completed March 20
- Passive radar sensing using transmitters in the environment
- Local scholarship applications received and in review

Upcoming Events

Please mark your calendars for our upcoming events:

May 29, 11:30AM: Topic: Generating Outdoor RF Scenes in the Laboratory, Syncopated Engineering
Johns Hopkins University APL
11100 Johns Hopkins Rd, Laurel, MD
Kossiakoff Center KC7/8 Rooms

RSVP for in-person by Evite:
https://evite.me/ce3BbceZyH

Also on Zoom:
https://jhuapl.zoomgov.com/j/1616864438?pwd=CHFVluPambmrE4VNI1ZvK3zJIZOxFE.1

July 24, 11:30AM: Topic: TBD, BLT Inc
Same location as May 29th event, above

RSVP for in-person by Evite
https://evite.me/NUEQZT6Qt1

Also on Zoom:
https://jhuapl.zoomgov.com/j/1602611546?pwd=bPJsjkyOeoWPcYDbeYBRxnIsPCCagE.1

Aug 14, 11:30AM: Topic: A Review of Electronic Enclosures & Thermal Management, nVent Schroff

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.

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.

Radar without a Connected Transmitter

Websites like Crowdsupply and KickStarter provide rich innovator incubators for technology development. A team submits a proposal to make a cool thing, and first backers get an opportunity to be on the ground floor of receiving a brand-new cool thing. KrakenRF had a proposal for an OpenSource direction finding unit. This unit was further developed and now these are widely commercially available.[2]

The user selects an RF signal to geolocate, and by driving around, the unit develops the location of the transmitter on an application on a Smart Phone. The system uses five antennas to form an interferometer in order to sense the angle of arrival of the signal of interest.

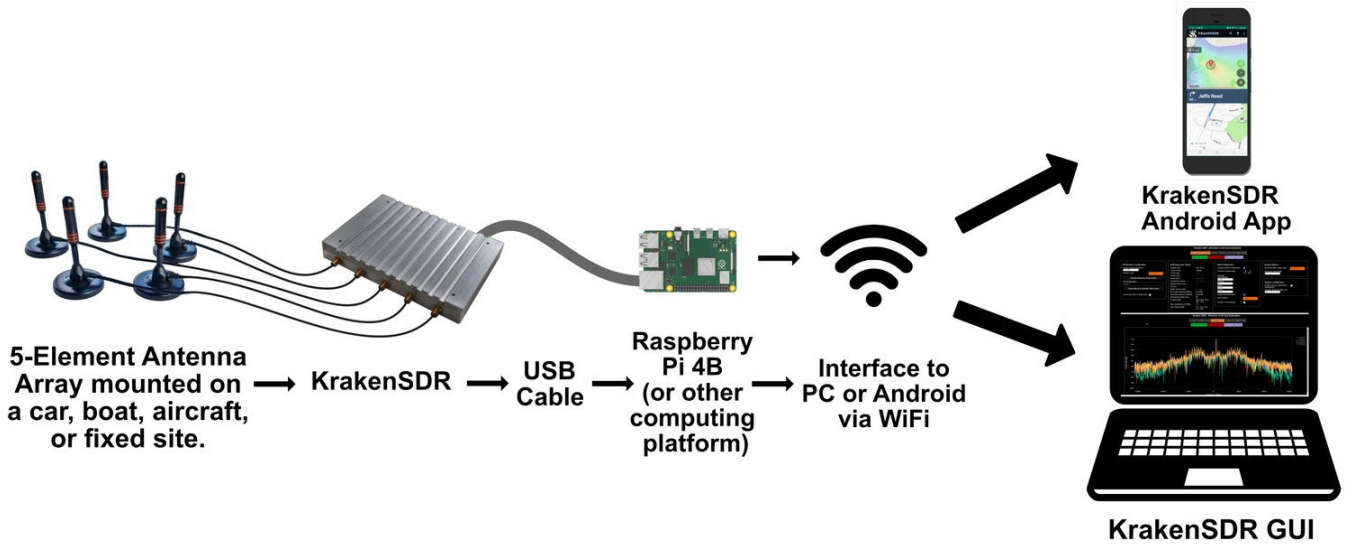

Figure 1. KrakenRF Geolocation Hardware Set-Up from (2)

Whereas a typical 'active' radar is coordinated and synchronized with its own transmitting source, a '*passive'* radar uses transmitters in the environment, such as FM radio and TV station signals. In Electronic Warfare passive radars can be very advantageous, as an active radar on the platform can serve as a beacon for adversaries. By not transmitting and using transmitters already in the environment, the platform gains an element of stealth while still obtaining ranging information about targets in the environment.

Passive radar is not a new concept; in 1935 Sir Robert Watson-Watt did an experiment using the BBC Empire shortwave transmitter at Daventry to detect a Handley Page Heyford bomber. Processing technology in the 1990's has really promoted the efficient realization of passive radar functions.[1]

The passive radar architecture provides detection of targets in the scene by using multiple local radio and TV stations as transmitter sources, while having its own multiple receivers. The high-power requirements typical of a radar shifts to transmitter sites already providing large high power RF illumination over a wide coverage area. The distributed nature of the transmitters also makes the architecture more difficult to jam compared to an active radar using its own single transmitting source.

In addition to passively geolocating transmitters via an interferometer technique, KrakenRF in its early software release added a feature to make the unit also act as a passive radar, where transmitter signals that are in the environment are used to develop radar tracks on objects.

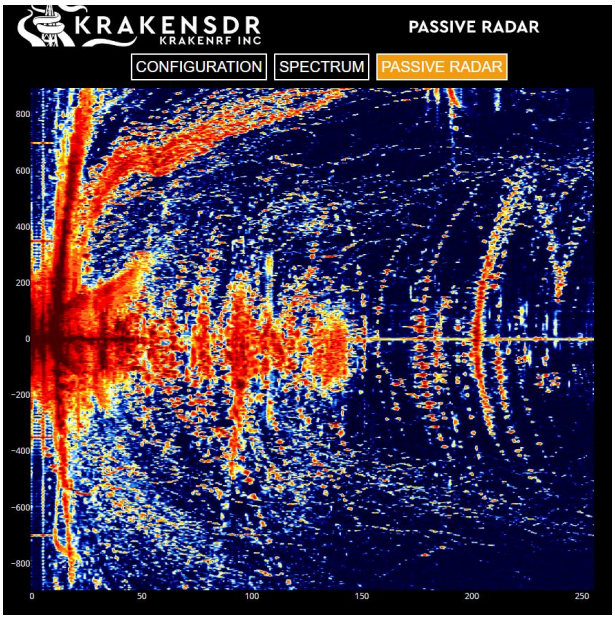

Figure 2 The now prohibited software originating from KrakenRF's crowd source campaign

Passive radar has been a sensitive item due to its ability to locate the enemy without transmitting any signals out on the air. In fact, the 'Open Source' nature that KrakenRF offered caught the attention of the US State Department, and all this capability had to be rapidly deleted and scrubbed away, as such a capability crosses the threshold of sensitive export technology laws.[3]

These passive systems have always been of interest by government agencies. "The main proponent of the system in the US was Lockheed-Martin, but similar systems had been exploited 25 or 30 years before that time by Sylvania and others, for use overseas for intelligence purposes targeting foreign missile trials, using shortwave broadcast radio signals as radar energy sources."[4]

Lockheed Martin produced the Silent Sentry II leveraging these principles.[5]

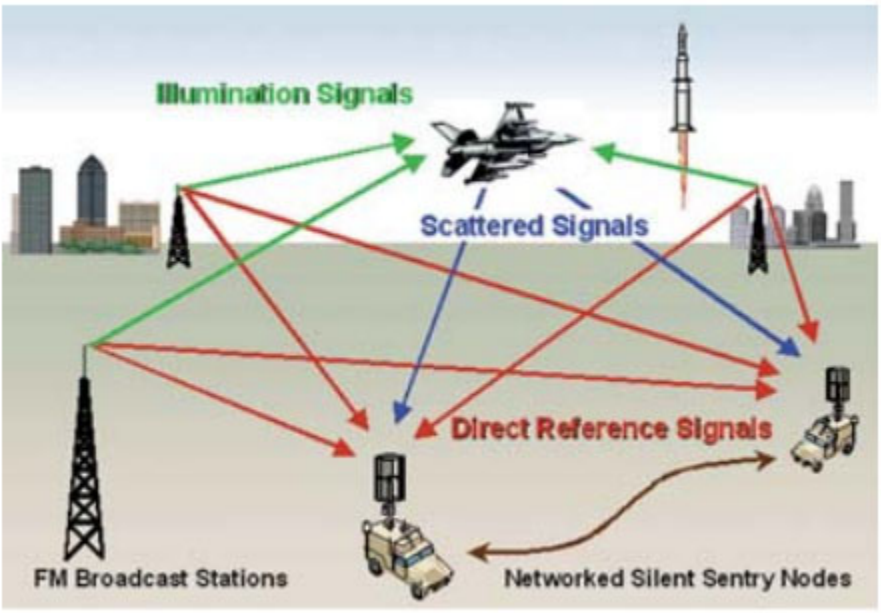

Figure 3. Silent Sentry Architecture from (5)

European countries were already testing similar systems, including Russia, France, Britain, and the Ukraine (there it was called Kolchuga)."[4]

Figure 4. Kolchuga Passive Sensing System from (6)

In 2002 the U.S. State Department accused Ukraine of selling Kolchuga to Iraq, based on recordings of the then Ukrainian president Leonid Kuchma supposedly made by Mykola Mel'nychenko. These recordings were known as the "Cassette Scandal". This was followed by political steps from United Kingdom and the United States. However, no material confirmation has been found in Iraq.[6]

"Most of the Ukraine systems had been supplied to Russia or the Ukraine military, and three radar stations were sold to the Ministry of National Defense of Ethiopia in April 2000. Ethiopia provided the end-user certificate through an intermediary firm in Israel. Ukrainian

officials said the remaining four Kolchuga systems had been sold to China, but the experts said they did not have access to documents confirming this statement.

Experts say that the Kolchuga would be an attractive system for the Iraqis because unlike traditional radars, it emits no signals. U.S. and British aircraft patrolling the two "no-fly" zones over Iraq use HARM anti-radiation missiles which follow radar signals back to their source and destroy the radar antenna."[7]

In 2022 Ukraine announced an upgrade program for its Kolchuga, including improving its sensitivity.[8]

(1) https://en.wikipedia.org/wiki/Robert_Watson-Watt
(2) https://www.krakenrf.com/
(3) https://hackaday.com/2022/11/19/open-source-passive-radar-taken-down-for-regulatory-reasons/
(4) "Radar on Television – Well, Sort Of" Ed Lyon, Radio Age, March 2022, www.maarc.org SEE NOTE A
(5) https://mobileradar.org/Documents/Silent_Sentry.pdf
(6) https://en.wikipedia.org/wiki/Kolchuga_passive_sensor
(7) https://www.graphicnews.com/en/pages/14547/military-stealth-detecting-radar
(8) https://defence-blog.com/ukrainian-army-to-upgrade-its-kolchuga-passive-detection-system/

NOTE A:

Ed Lyon is an editor of Radio Age, the monthly journal of the Mid-Atlantic Antique Radio Club (MAARC). AOC members and anyone interested in the history and mystery of old electronics are invited to join MAARC, even if only to get the journal each month.
See https://maarc.org/membership/ if interested

Chapter Scholarship Update

As part of our local chapter duties, we provide scholarship to local youth pursuing technology degrees. This year we are awarding two $1000 scholarships. The application process has just closed, and we received 33 applications that are now being reviewed by the independent review organization, with winners announced in April.

Third Session in Series of EW Environmental Generation Engineering Series of Technical Talks Held on March 20th

Chapter members enjoyed pizza and learned the details of high bandwidth RF recording and playback. The talk included a live demonstration showing how signal post-processing algorithms, in software (e.g., Matlab) or hardware (i.e., FPGA) can be applied to bulk storage of recorded data. A Machine Learning Model was used to identify emitter properties from the live streaming IQ data being recorded. This was the third in a series of technical talks provided courtesy of Rohde & Schwarz held at Johns Hopkins University/APL in Laurel, MD.

Duncan d'Hemecourt of Rohde & Schwarz discusses RF Recording & Playback with a live demonstration during a Lunch & Learn on March 20

Please join your chapter for the next technical talk on May 29th by Syncopated Engineering.

ROHDE&SCHWARZ
Make ideas real

Attend the Next Technical Talk:
Emulated RF Scenes for Dynamic Spectrum Testing and RF Machine Learning Training By Syncopated Engineering on May 29th

Bring your lunch and enjoy this technical talk!

Agenda:
11:30-11:45 Chapter News/Updates
11:45 Technical Talk
12:30 Q&A
12:45 Wrap Up

Abstract:
The RF environment is a harsh and highly dynamic environment that includes both congested and contested spectrum. Typical testing lifecycles include initial simulations, then laboratory testing in simulated noise environments with a few channel impairments, followed by outdoor testing in unpredictable RF environments under challenging unknown channel characteristics and unintended interference sources. The large leap from predictable laboratory testing to unpredictable Over-the-Air (OTA) testing makes it difficult to evaluate and quantify the actual performance. The use of emulated RF environments or RF scenes provides greater insight into system performance in challenging and dynamic environments, while also enabling agile iterative performance improvements to fine tune the system. This presentation describes the creation of realistic RF scenes to emulate RF environments that include a variety of narrowband and wideband signals and random traffic patterns. We will also describe a RF learning approach that assimilates the spectral and temporal characteristics directly from actual RF environments, enabling the creation of RF scenes that mimic the actual RF environment and enabling cost-effective repeatable test scenarios with the same complexity and rich expressiveness of actual operational RF environments. RF learning also enables the cost-effective generation of the massive RF data sets required to train, validate and test new innovative RF Machine Learning (ML) algorithms.

Join us at
Johns Hopkins APL, Kossiakoff Center KC7/8, 11100 Johns Hopkins Rd, Laurel, MD

RSVP for in-person by Evite:
https://evite.me/ce3BbceZyH

Remote Zoom link:
https://jhuapl.zoomgov.com/j/1616864438?pwd=CHFVIuPambmrE4VNI1ZvK3zJIZOxFE.1

Advertise Your Company Here!

Did you know as of 03/09/24 this Chesapeake Bay Roost has over 447 current members in its database?

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

- Axillon Aerospace (formerly Parker Meggitt)
- 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!

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:	Mike Ream
Treasurer:	Niels G. Eegholm
Secretary:	Joseph Sluz
Awards/Scholarships:	Paul Kennedy
Directors:	Sunita Bhatia, Niels G. Eegholm, Chris Farrier, Joseph Sluz

AOC.ChesapeakeBay@gmail.com

AOC Events

June 3-4
Cyber/Electronic Warfare Convergence
Charleston, SC

July 23-24
First annual EMSO Research Conference (EMSO ReCon)
Atlanta, Georgia,