



UK CHAPTER NEWSLETTER

February 2024

The opening pages cover the main AOC event of 2023 and are by a guest contributor...

The Board of the Chapter asked Chris Howe MBE to report on the AOC 2023 International Symposium on behalf of the UK Chapter, particularly because he was receiving a prestigious award at the event. Chris' report follows:

AOC 2023 International Symposium and Convention

60th Anniversary - December 2023

Now being in my 52ND year working in the world of Electronic Warfare, it was a great pleasure to attend at the 2023 AOC International Symposium and Convention as it marked the 60TH running of the show. Also, as we approach the start of the 60TH anniversary year of the start of the AOC. The 2023 AOC event took place over the period 11 – 13 Dec in the Gaylord Convention Centre, National Harbor, MD.

Having attended, more often as an exhibitor, at this annual AOC event over 20 times in the past 35 years, I am happy to say that on this occasion my reason for attendance was a different reason altogether. I was to be presented with the AOC top award, namely the Silver Medal. It was a most humbling presentation for me to attend and also a chance for me to respond to an audience of well over 1500 members. Humbling and of course an honour, because this was recognition from the global EW community, my peer group for my entire working life.



Attending the event also provided me the opportunity to meet up with many old friends from years of attending at such AOC events, not just in the USA, but Europe, Asia, and Australia. Something that really did strike me as different from the last time I had attended in 2016, was the quality and diversity of papers being presented and also the varied defence companies displaying their products and services in the very large exhibit hall. This all made for a truly successful and most memorable trip and return to this annual AOC event.

The theme of the symposium was 'Advancing EMS Superiority Through Strategic Alliances and Partnerships', indeed a most relevant theme in today's climate of asymmetric warfare. The event had some very notable Keynote Speakers, and to name but a few:

- Lieutenant General Matthew G. Glavy, Deputy Commandant for Information, USMC
- Rear Admiral Darryl L. Walker, Deputy to the Commander, Joint Force HQ-Cyber (Navy) TENTH Fleet
- The Honourable Carlos Del Toro, US Sec of the Navy
- Vice Admiral Stephen T. Koehler, Director for Strategy, Plans and Policy, J5

The great Keynotes were then followed by prominent session moderators for the 3 days of the event, notably on day 3 our very own International Region 1 Director, Erik Bamford, Col NOAF. With such guidance and control, the various papers that were delivered made for one of the most interesting and varied AOC events in a decade and many thought perhaps the best ever. The show was attended by over 2,800 persons and over 180 exhibitors, this was definitely the largest and most attended AOC national event to have taken place. Well done AOC for the organisation that goes into planning and executing such an event.

In summary, this is a re-cap of the event from the JED Editor, John Knowles:

"The symposium offered leadership, operational and technical perspectives from 86 keynote speakers, panellists, presenters, and session moderators who collectively addressed the theme, 'Advancing EMS Superiority Through Strategic Alliances and Partnerships.'"

Specific topics included the Russo-Ukrainian War, cognitive EW, JADC2, Electromagnetic Battle Management, open system architectures, space EW, multi-national EW partnerships and much more.

In the exhibit hall, the dynamic nature of the EW and SIGINT industry was on display. Attendees could learn about new technologies and new types of EW services, from cognitive EW systems and the AI technologies that underpin their performance, to compact digital receivers and novel antenna technologies. With 34 more exhibitors than last year, small companies offering new ideas and approaches contributed significantly to the energy in the exhibit hall.

Mark your calendar for next year and AOC 2024, same dates (Dec. 11-13) at the same location.

I would like to take this opportunity to thank the UK Chapter Board for nominating me for this top award and to the AOC for accepting the nomination. It was certainly a big surprise after what has been my pleasure to have been an AOC UK Chapter Officer for nearly 20 years, including 12 as VP and 3 as President. I wish all our members and readers success for the future, and I hope to still see many of you at future EW Events.

Thank You.

Chris Howe MBE

UK Chapter Xmas Dinner 2023

The main event for the UK Chapter in 2023 was held a day or two before the AOC Convention started. Consequently, some of our 'stalwart' supporters were unable to attend due to their travel plans. However, we were still able to gather a significant number of our members at the RAF Club for a splendid dinner. I was very pleased to see some friends and former colleagues at the event and to meet some new people. I really enjoyed the event. Many thanks are due to Phil Davies for all the arrangements he made on our behalf.

My wife and I were delighted to attend the Dinner, many years after our last visit together, which was when John Clifford OBE awarded me my certificate of Induction into the AOC Technology Hall of Fame. This year's event was therefore made even more memorable for me because I was able to 'square the circle' and award Jane Clifford with a certificate for her Outstanding Contribution to the AOC's UK Chapter. The portion of my President's Address that is relevant to this was as follows:

"For a long period of the Chapter's recent history, the leader of our EW Community was John Clifford. We all know what he did to formalise the NATO understanding of EW and to support individual members of the AOC. Until the recent AOC Europe Conference in Bonn, I had not really met his wife, Jane. Once I had, I saw how highly she was regarded and warmly greeted by so many members of the AOC from Chapters and Roosts across Europe and the USA. In discussions after the Conference, it was clear that Jane had contributed a lot to the successful running of our Chapter and to the excellent reputation that we had across the world. Consequently, the Board of the Chapter have decided that we should recognise Jane's contribution by awarding her a Commendation."

The rest of my Address was a summary of the EW-related events that had occurred in the World in the last few years and a look forward to some of the things that I hope we can achieve for the UK Chapter of the AOC.

(I will put a copy of the speech on the website for those who are interested to read it.)

EDITORIAL - Countering mini- and micro-UAV

Part 2 - Detection and Situation Awareness

In the first part of this Editorial, I set out that mini- and micro- UAV were affordable, available and could be customised to perform various operations against a range of targets beyond those normally associated with the battlefield with a focus on unusual types of direct attack and their use to create panic and confusion (e.g. by spreading some form of powder, or simply by landing in the middle of the crowd at an event).

Detection and localisation of UAV;

Detection and situation awareness could obviously use radar technologies. However, detecting small UAV by radar is more difficult than for fast-moving aerial targets because their relatively slow speed makes some of the conventional Doppler processing ineffective (although the relatively large rotors may exhibit recognisable Doppler characteristics). Some aspects of the behaviour and RCS fluctuations of the very small UAV are similar to the returns from birds and some effects of the surface of the sea, so conventional air defense radars are likely to reject small UAV as "false alarms". Another observation is that many radars use pulse compression techniques; as a consequence, the minimum range for the optimal performance of such radars may be in the order of a kilometer or two; this means that radars using these techniques may need to be located some distance from the immediate area that might be attacked. Despite these issues, a radar system would provide a good sensor capability and examples of radars with novel processing are being offered specifically to detect small UAV platforms.

There is little doubt that LIDAR systems offer an alternative form of detection and ranging of small UAV. Most of the internet information on UAV and LIDAR is related to the use of LIDAR carried by UAV to conduct area mapping and surveillance. As is always the case, it is only a relatively simple task to turn the technology to the task of detecting small UAV at the required ranges. A few Internet sites are rather coyly suggesting that this is something their products can do.

For situation awareness at specific points (e.g. an event with a VIP present) the small size of the UAV presents a real challenge because they are almost invisible to the naked eye at ranges of around 500m, so any action would be taken very close to the event. Consequently, the basic sensor for early detection at some sites (particularly urban-type environments) would be video-cameras with augmented video analytics based on dimensions and kinematic features typical of a micro-mini UAV; such a system is capable of reacting very quickly to the presence of a threatening micro-UAV. The human eye, augmented by EO and acoustic devices for cueing and analysis, might be another option where fully autonomous operation is not an option. The type of combined passive/active EO/laser systems used in DIRCM systems would undoubtedly be effective as a sensor system and most are already integrated with laser capabilities.

The situation awareness around specific points could be further augmented by using acoustic sensors (these could be passive-only). Acoustic technology is obviously affected by the background noise of the environment, so in urban area its performance might be inadequate.

Detection and localisation of the datalinks

As discussed in Part 1 of this Editorial, the majority of current 'hobby' UAV and their derivatives currently transmit on a downlink, even if the operator is not actively controlling the flight. The signals can be detected by ELINT/ESM techniques and rapid location of the UAV would be possible, particularly if multiple receiver stations are used. The RF environment in the frequencies of interest will be congested, but spatial discrimination is possible using directional receivers because the UAV will normally be flying at an altitude that would allow its signals to be extracted from the background.

Situation Awareness Considerations

It is no surprise that the detection and localisation of the UAV itself can be performed by the same types of sensors as are used against other air threats. Perhaps the main issue is that the cost/benefit analysis for protection of a large area would probably suggest the use of a lot of cheaper sensors, rather than a few expensive highly capable systems which would themselves become targets for swarm attack by micro-UAV.

Clearly, it would be beneficial if data from sensors would be collected, distributed (wireless or wired) and centralised in a Control facility for tactical picture compilation and decision support. In an urban environment, the existing infrastructures may also facilitate this.

In the case of protecting fixed sites, a static installation for the sensors would be desirable. This option would allow the optimisation of sensor deployment assuring full protection coverage to the concerned area. The protection of large urban areas may also be provided by fixed sensors, although these may need to be integrated in a covert way into other infrastructure of the urban area (e.g. mobile phone masts or high buildings). An installation using existing civil infrastructures presents some interesting options for networking of data and for bi-static RF location techniques (or even a modern variant of the original Chain Home radar system). Clearly, a mobile installation may be required in other scenarios; in this case, the requirements for power supply and interconnection with other assets become more demanding.

Localisation of the position of the UAV controller

ELINT is possible to localise the source of a remote UAV controller station if an uplink is employed. It would be necessary to implement a network of Direction Finders capable of searching the various Wi-fi and GSM-radio frequencies used by UAV. It is likely that the option of a laser link must be considered as the command link could be operated in the laser bandwidth. Therefore, a sensor capable to detect laser transmissions may need to be considered to 'future-proof' the solution.

It would be beneficial for the siting of these ELINT stations to have a wide field of view and to be sited in locations that have line-of-sight to likely operating positions of the controller (a number of software tools are already available to assist in the process of determining these positions and are in use with various agencies). The DF equipment could be small and could be deployed in ways that are not obvious; this may be an advantage except where the presence of an obvious deterrent is beneficial to public confidence.

Identification of datalink characteristics

The characteristics of the datalinks can be predicted by conducting research into the systems provided for COTS hobby UAV and by careful analysis of the various chip sets used in COTS components. Maintaining a database of these would be an important task for detection and counter of UAV. In order to maximise the value of the data for countermeasure and spoofing purposes, the investigations need to consider and understand the protocols and message types transmitted on the links.

In the final part of this Editorial, I'll look at some of the options and consideration for countermeasures or destruction of mini- and micro- UAV.

Calling all speakers! *The RAF Museum needs you...*

The Royal Air Force Museum has announced its call for speakers for its 2024 lecture series. The museum is planning a series of lectures, covering the whole gamut of air power, to take place throughout the year. The lectures will be held online and throughout the United Kingdom. The museum has sites in London, Wolverhampton in the West Midlands and Lancaster in the north of England.

Proposals for lectures are sought from postgraduate students, early-career and established researchers. The objective of the lectures is to share new research being undertaken in air power, aviation history and histories of air forces. This includes the Royal Air Force's, and air power's, use of the electromagnetic spectrum. Proposals in diverse, related fields and their relationship to the RAF and air power will also be considered. These fields can include, but are not restricted to, archaeology, law and ethics, museology, international relations and strategic studies. Papers relating to the future direction of air and space power are particularly welcome. The lectures enable those interested in these fields share knowledge and highlight interdisciplinary approaches and research methods.

Those interested in responding to this call for papers should send a 300-word abstract outlining their idea along with a 200-word biography, both of which should be written in English and sent to Dr. Megan Kelleher, the RAF Museum's historian and academic access manager by 1st March Email: megan.kelleher@rafmuseum.org

Latest EW News Roundup

(Kindly supplied by Dr Thomas Withington – Writer and analyst, editor of the Armada International EW webpage and newsletter)

Lockheed Conducts AI-Commanded Electronic Warfare Mission

In September Lockheed Martin announced that it had performed a test during which Artificial Intelligence (AI) technology was used to direct piloted aircraft to provide jamming support during an air-to-ground mission. The fascinating account of this experiment is chronicled in this article:

https://www.thedefensepost.com/2023/09/19/lockheed-ai-electronic-warfare/?expand_article=1

ADAN Intel Allows Israeli Units to Destroy Hamas Cells in Minutes

Details on how the Israeli Defence Force (IDF) uses Signals Intelligence (SIGINT) to assist targeting, particularly during land manoeuvre, seldom come to light in the public domain. This article in Forbes is a rare exception, providing a fascinating glimpse of how the IDF uses SIGINT to shorten its sensor-to-shooter times.

<https://www.forbes.com/sites/ericteglar/2023/11/14/adan-intel-allows-israeli-units-to-destroy-hamas-cells-in-minutes/>

Soviet-Era M-55 Spy Plane May Support The War In Ukraine

An insatiable appetite for signals intelligence may have prompted Russia to revisit its shadowy M-55 Mystic-B reconnaissance aircraft as an intelligence gathering asset as this article in The Drive explains. One wonders how many other erstwhile Soviet platforms maybe revitalised and rerolled to assist Mr. Putin's 'special military operation'?

<https://www.thedrive.com/the-war-zone/soviet-era-m-55-spy-plane-may-be-headed-to-war-in-ukraine>

NYPD faces backlash as it prepares to encrypt radio communications

The New York Police Department is planning to encrypt its radio communications. According to reports, the service has transmitted en clair since 1932. Encrypting law enforcement radio traffic has its proponents who cite the need to ensure communications are secure to avoid assisting law breakers. Likewise, as this report indicates, encryption also has its detractors who flag concerns about police transparency and accountability.

<https://www.theguardian.com/us-news/2024/jan/03/new-york-police-encrypt-radio-nypd-transparency>

Military briefing: Russia has the upper hand in EW with Ukraine

The drone battle in Ukraine is the most ferocious it has ever been. Electronic warfare is central to defeating these uninhabited aircraft with both sides racing to adopt whatever electromagnetic advantage they can. However, unless Ukraine's allies significantly increase their supplies of effective counter-drone systems to Ukraine, it is difficult to see how Russia's drone power can be effectively weakened.

<https://www.ft.com/content/a477d3f1-8c7e-4520-83b0-572ad674c28e>

Air Travel is Not Ready for Electronic Warfare

Air travel can be miserable at the best of times. Crowded terminals, endless delays and angry passengers all increase the discomfort, but electronic warfare may also add to this mix. Global Navigation Satellite Signal (GNSS) vulnerabilities are an increasingly problem. Commercial air traffic now routinely experiences issues with in GNSS jamming 'hotspots' like the Baltic and eastern Mediterranean. This article in New York Magazine delves further into the challenges of GNSS jamming for commercial aviation.

<https://nymag.com/intelligencer/2024/01/air-travel-is-not-ready-for-electronic-warfare.html>

Membership: Who are we now?

In the last Newsletter, I presented some information about our membership, under the title of "Where are we now?". I have completed the next type of analysis which I have titled "Who are we now?", in which I tried to understand something about who employs us in order to understand what we do. It's been a little harder to do this than I expected, but some interesting information emerges.

The big headlines are:

- **58%** of our members are employed by **Industry**;
- **22%** of our members are employed by **Government or Armed Forces**;
- **8%** of our members are **Retired**;
- **2%** of our members are from **Academia**;
- *10% of our members have not stated their employer or employment status.*

A number of Companies hold Corporate Membership of the AOC. This results in some Chapter members being classified as 'industry members' alongside other people in the same Companies being classified as 'individual members'. In total, the members associated with these Companies account for 31% of our membership. 9 Companies hold Corporate Membership with their formal point-of-contact being a UK Chapter member: CRFS; ESROE; L3Harris; Leonardo; MASS Consultants; Mercury Electronic Warfare; STEATITE; TMD; Ultra Electronics. A number of Companies are Corporate Members, but we do not apparently have a formal UK-based point-of-contact. These are: Allen-Vanguard; ATDI; Chemring Group; Keysight Technologies; Microwave Products Group; NSI-MI Technologies; TCI International; Teledyne; VIAVI Solutions; W L Gore and Associates.

We have a lot of 'individual members' employed by other Companies, most of which are relatively small and do not have Corporate Membership. However, it is surprising that 12% of our 'individual members' are from larger companies including: BAE Systems, Babcock, Draken, MBDA, QinetiQ and Thales for which we do not have designated "industry members" in the UK (I recognise that some of these Companies might hold Corporate Membership in other countries). I believe it would be beneficial for some of these Companies to take Corporate Membership for their UK-based organisations, so I will be trying to establish contact with them.

After completing this analysis, I had a really useful conversation with Dr. Sue Robertson where her perspective as a former member of the AOC Board (International and UK) and as current Chair of the UK EW SME Working Group ("EWSMEWG") allowed me to understand more about what the analysis meant. In particular, it has crystallised my thinking about the differences between - and the implications of - the two interpretations of the acronym "SME" ("Small-to-Medium sized Enterprise" and "Subject Matter Experts"). The key point is that one is associated with businesses and the other with individuals. In terms of the engagement of businesses with Government and the Armed Forces, it seems that the combination of the existing links with larger Companies and through the EWSMEWG to smaller companies provides an effective method of engagement and information sharing at a business level. However, it does

not necessarily bring together all of the expertise held by individuals.

One of my stock phrases has been "Not all SME are employed by SME". Obviously, some of them are in big companies, some are in Government Agencies, some are in Academia and many are in the Armed Forces. In fact, some of them may have spent parts of their career in different areas. I think this is a key to what the AOC and the UK Chapter represents - it is a group of individuals, all of whom are Subject Matter Experts in at least one aspect of EW. So, perhaps the next steps in this analysis is to find out "What do we know now?" and then "How can we share and build on our knowledge and expertise?". In fact, I hope that I could use a new stock phrase in future: "All SME are members of the AOC"! (*I leave you to decide if I mean both types of SME...*)

AOC UK Chapter Awards

HMS Kent's EW department was awarded the **Fleet EW trophy 2023** for their outstanding EW contribution in what was, an extremely busy year. Predominantly under national tasking for excessive periods, KENT has constantly contributed high quality intercepts into the Joint Electronic Warfare Operational Support Centre (JEWOSC) ensuring that associated data bases remain at the forefront of global mission data. Although short notice tasking has seen the EW department given little time to prepare, products produced by the team were of the highest standard demonstrating their extreme professionalism which has also seen them receive praise from senior leaders within the Royal Navy for their support to wider strategic issues.

The EW department of HMS Kent alongside HMNB Portsmouth



UK Chapter AGM

The AGM of the UK Chapter will be held in the near future. We have not had an 'in-person' AGM for some time, having adopted the use of Zoom for many meetings, particularly since the COVID-19 Pandemic. The Board Members have discussed whether we could revert to a meeting outside cyber-space for 2024 or later years. I have been trying to find a way to get an on-line questionnaire set up to gather your responses but have decided to fall back on using the Newsletter and an email. I am hoping that you will respond and let me know your views on the following:

- 1) Would you attend the AGM by Zoom or other online virtual meeting method?
- 2) Would you attend the AGM in person if it were at a suitable time and venue?
- 3) If so, which (if any) of the following venues might be suitable for you:
 - a. central London?
 - b. somewhere near Lincoln?
 - c. somewhere near Southampton?
 - d. somewhere near Bristol?

Future Events/Visits

- **AOC Europe 2024** – Oslo, 13 - 15 May 2024
 - <https://www.aoceurope.org/>
- **EW Technology Conference 2024** - Shrivenham, 4-6 June 2024
 - <https://www.cranfield.ac.uk/events/symposia/ewtc>
 - N.B. Call for papers by **March 15th**.
- **AOC 2024** - USA - 11 - 13 December 2024

Bottom Line

I had a busy period at the end of 2023 and 2024, including going to meetings regarding the current state of the EW Enterprise in the UK and NATO. I learnt a lot about a number of areas that have been of great interest to me for many years. These include positive developments in Air Platform Protection (and Protection against Air Platforms). It has been encouraging to see and hear the involvement of new partners in NATO. The mainstream press is showing a lot of interest in EW, which is great (if sometimes creating a little stress for me when it is over-simplified). I think that it is really important that we connect all the SME (Subject Matter Experts) with those who are responsible for maintaining and grow the EW capabilities of the UK. I am pleased to report that I know that there are people in positions of influence who feel the same and are taking action.

Steve Roberts

AOC UK Chapter - President - Email: steve.vespasian@gmail.com

Keep Checking out the UK Chapter website at: www.ukaoc.org