EW’s New Frontiers: How Russia-Ukraine Conflict Reshapes Europe’s Defense Strategy

Thanks to everyone who was able to join us in Rome for AOC Europe 2025. Below is a recap of the keynotes and some quotable moments that happened throughout the event May 6-8. AOC Europe saw more than 2,000 attendees who spent the week in Italy discussing this year’s theme: “EMO in Transition – Learning from the Russo-Ukrainian War.” Thanks for reading, and we hope to see you next year in Helsinki! – *JED Staff*

“In the 1990s … the prospect of a large-scale nuclear exchange seemed quite remote. So, there was a bit of a dearth of research in the open-source community, at least not policy implications of EMP and the effects of it and what it might do to our critical national and critical international infrastructure. But EMP is very much back on the agenda. It is a renewed concern amid the strategic tensions we find ourselves experiencing these days, vis-à-vis Russia, vis-à-vis China.”

– Dr. Thomas Withington, Writer and Analyst, Armada International Electronic Warfare Newsletter, France

AOC Europe Day 1

The first day of EW Europe kicked off with a symposium keynote from Lieutenant General Angelo Gervasio, Technical Advisor to the Chief Head of Defence, Italian Armed Forces Joint Staff, who discussed EW lessons from the Russo-Ukrainian War and provided an excellent perspective on the many technical and policy challenges facing Italy (and many other European governments) as they develop new capabilities in Electromagnetic Operations (EMO).

General Gervasio described the significant role that EW has played in the Russo-Ukrainian War. He said that both sides have relied on EW to disrupt communications, satellite navigation systems and drone operations. “Russia has deployed a range of advanced electronic warfare systems to disrupt Ukrainian communications and navigation systems like the R330-Zh Zhitel capable of jamming GPS, the Krasukha jammers that disrupt Ukrainian drones and artillery targeting the Leer-3 that disrupted cell phones and SMS with UAVs [and] the Murmansk jammed long-range communications. These jamming efforts made by Russia have forced Ukrainian drone operators to rely on visual landmarks for navigation as GPS signals are often unreliable due to interference.” On the Ukrainian side of the electromagnetic contest, he said, “Ukraine has accelerated the development and deployment of its own electronic warfare systems – for example, the nationwide Pokrova system. … With this system they distort satellite signals and mislead the navigation of enemy drones and missiles.”

After discussing the role of EW in the Russo-Ukrainian War, General Gervasio covered several technical and policy challenges for EMO. One area was spectrum congestion and government divestment of important spectrum bands. “The complexity of electromagnetic spectrum control grows with the growing complexity of the technology and evolves accordingly,”

he said. “The growing number of services creates spectrum congestion, which is managed by the adoption of sophisticated techniques like the spread spectrum modulation. Military services need to be harmonized with civilian emerging band and service demand, like the 5G network that interferes with military bands. Also in Italy, we had to give to the civilian authorities portions of our dedicated military band for the 5G service. New communication services, like GPS communication satellite networks, introduce new vulnerabilities, like jamming and deceiving, that need to be properly addressed and confined.”

He also addressed the influence that new technologies will have in EMO. “The broad availability of high tech equipment and systems introduce new possibilities for the adversary to modify their defense capabilities and adapt countermeasures. New technologies like quantum computing and artificial intelligence bring new capabilities, but also new threats. They also introduce ethical and legal issues that are not completely clear but need to be addressed in order to ensure that the use of these new technologies doesn’t disable the human control of the conflict.”

At the policy level, he also discussed the importance of recognizing the EMS as a warfighting domain. “Finally, the complexity of the modern operations demonstrated that modern warfare is more and more multi-domain. And this is even more true with the introduction of the cyber and space domains which are for their nature shared by all the other three domains – classical three domains. To this regard, the electromagnetic spectrum is a strong candidate to be considered as a new domain of operations. But anyway, it is true that electromagnetic spectrum interconnects the domains and therefore contributes strongly to multi domain operations.”

"So what's next? I can't leave this topic area without talking a little bit about 'Star Trek' and particle beams and phasers. And particle beam weapons are a directed-energy weapon. It uses high-energy beams or neutral particles to damage a target. And they can be used to penetrate very deeply and deposit their energy in a very narrow comb, causing immediate or severe damage such as an explosion. And, they're used for anti-missile defense and many of these capabilities are doing research for electron microscopes, cancer treatment, and x-rays. And the phasers, there really is a multi-mode directed energy armament system called MDS. It's an ultra-short laser pulse. It's used to create an ionized channel, and the entire focus here is to directly work with heating a target and disrupting its molecular structure. So what I always say when I get to see things like this that are under prototype or longtime science investment, it's just we're trying to boldly go where no other commercial DEW research capability has gone before."

— Dr. Shawana P. Johnson, CEO, Global Marketing Insights, Inc, USA

AOC Europe Day 2

The second day of AOC Europe opened with a briefing from Commander Malte von Spreckelsen, Deputy Branch Head for Strategic Planning within the Cyber and Information Domain Service of the German Armed Forces. In his talk, he discussed some of the lessons European nations are taking from the Russo-Ukrainian War, as well as providing more details about

the Electromagnetic Warfare Capability Coalition established in April by the Ukraine Defence Contact Group (UDCG).

Commander Malte von Spreckelsen

Commander von Spreckelsen said the Russo-Ukrainian War has shown the value of Electromagnetic Spectrum Operations, especially with regard to drones; EW protection from jamming; emitter targeting; and missile defense operations that include GNSS jamming.

On the other hand, Ukrainian Forces have also learned hard lessons about electromagnetic fratricide and the need to coordinate EW operations between units operating on the front lines. The electromagnetic fratricide issue is due in part to the number of commercial drone technologies employed by both Ukrainian and Russian forces that often use the same limited sets of frequencies. Thus, jamming a Russian drone can sometimes affect Ukrainian drones operating in the same areas.

Commander von Spreckelsen said another problem for Ukrainian Forces has been EM interoperability, which stems from the variety of EW, communications and radar systems provided to Ukraine units from other countries. “A lot of companies, lot of nations, donated EW systems, donated capabilities which are

good," he explained. "They are brought to the front line; they get used; they have a purpose. However, a German system might be not interoperable with a Swedish system, [or] with an Italian system. This is a challenge we have, as well, in NATO – to try to bring a multinational EW force under the umbrella of NATO or the EU together and have interoperability on the first day – it will not match."

Commander von Spreckelsen also provided more details about the EW Coalition established under the UDCG. Ten nations signed the joint letter of intent that established the EW Capability Coalition, with Germany acting as the lead nation and coordinator in the group. He emphasized that Ukraine is not the "receiver" of the group's activities, but rather that all 10 nations are equal partners, and Ukraine is an active participant that is sharing its first-hand knowledge and experience from the front lines, as well as testing and evaluating new systems in "live fire" conditions. He also explained that the EW group is a "coalition of the willing" and is open to adding new members among the 50 nations participating in the UDCG.

The EW Coalition is initially focusing its efforts on three priorities, with each of these falling under a "sub-working group." The first priority is aimed at rapidly procuring new EW capabilities for Ukrainian forces. The sub-working group for this priority is discussing the EW capabilities already identified by Ukraine in a white paper. It will use this discussion to identify specific EW systems that the coalition members can provide to meet those capability needs. For example, he said, one of the top priorities Ukraine identified is defending drones against jammers.

A second sub-working group is addressing EW training and education. "They don't need to train in the basics of EW," he explained. "They are very good at it. They don't need to [receive] an awareness briefing that when you switch on your cell phone you might get hit by a shell." He said the

Ukrainian forces are already very good at “frontline EW.” Instead, he continued, “What they need is training of leadership – is education on an academic level. They want to train and develop expertise for EW because, as I said before, they want to enhance their innovation cycle. They want to be in the position to push forward, to work, to invent their own [EW solutions] which [are] fit for purpose. And they need access to our universities, to academia, to all of us to gain knowledge to sustain [themselves] in this conflict.”

The EW Coalition’s third sub-working group is focused on policy and doctrine. “The capability coalitions are not just made to support ad hoc problems – to deliver materiel. This is an ongoing thing, a long-term thing, because if this conflict ends one day – hopefully soon – they want to involve [themselves in EW] further. They want to know how to integrate the EW forces into brigade level, corps level. They want to know how to [conduct] EW command and control, how to [support] electromagnetic operations like [other European nations]. They want to be interoperable with us. They want to have at the end, in peacetime, very capable EW forces. For this they need our help.”