AOC 2022 Spotlight Q&A with Chris Johnston of Keysight's Radar & Electronic Warfare Solutions

Chris Johnston is Director of Keysight's Radar & Electronic Warfare Solutions, where he leads a highly experienced team of solution planners and business development managers. Chris began his career at Keysight (then Agilent Technologies) in 2000 working as a field engineer on strategic defense and component accounts. He moved into his current role in March 2021. Chris has a BS in Electrical Engineering from the University of Cincinnati, and he is an AOC member belonging to the Mile High Country Crows Chapter.

JED: What are some of the major EMS Operations (EMSO) trends that you are seeing and how are they driving the types of test equipment that Keysight is offering for the EW market?

Johnston: From a test perspective, we see EMS operational requirements mapped directly to test and evaluation and those requirements go well beyond the capabilities of a single spectrum analyzer, arbitrary waveform generator, or oscilloscope. Diminishing are the days of testing with a "box" used for one single type of test. It is a much more solution-oriented approach, which requires the integration and combination of many legacy and emerging test ideologies that drives our business today. Our government and industry customers require us to help to integrate complex test solutions that incorporate next-generation technology, while including importer tools and compatibility with legacy solutions, to not lose years of engineering work. This is an important requirement. Otherwise, we are placing the burden of integration on them, which slows down their core business –

creating the protection and countermeasures systems and algorithms necessary to protect the warfighter.
It is the leverage of multiple traditional test assets, or their associated IP, collated to create a more comprehensive solution, which is now the norm. This includes the drive to develop multi-domain (frequency and time) measurement tools to address more complex test needs to test mixed RF and digital devices. Parallel to improving the hardware, there is high demand on the software modeling and simulation environment required to control – and replicate – both the simple and complex scenarios of an entire A2AD environment. Recognizing as the A2AD becomes more complex, we must challenge our R&D teams to provide more SWaP-C optimized test solutions, as well.

JED: As Keysight began to focus on the EMSO market, what types of software and hardware did you develop that enabled you to scale COTS test equipment into solutions that simulate large, complex EMS operating environments?

Johnston: Keysight has been focused on the EMSO market for decades. What has changed, as we all know, is the complexity of the threat environment due to the rapid advancement digital COTS technology, which can be exercised very fast and flexibly. I think it is the fact that Keysight touches every major technology market, and every major technology evolution worldwide, that puts us in a unique position to address EMSO.
The same proprietary technology that went into our standard test products for semiconductor suppliers, telecommunications operators, advanced R&D centers and universities (the starting point of the A/D digital revolution) are what we leveraged into the products we use today for our EMSO solutions portfolio. This has allowed us to advance our solutions so rapidly to address the complexity EMSO faces today – and we are just getting started.

JED: How does your focus on EMSO testing and simulation fit your products and solutions for other Aerospace and Defense

markets, such as spectrum monitoring and signal analysis, communications, radar, avionics, and space. How do you create synergies, both in terms of hardware and software products, across these markets?

Johnston: As I mentioned earlier, we can flex R&D investments for multiple market test needs into our EMSO solutions. Just this year, we had a defense customer mention a requirement in casual conversation about a test challenge their program office was presenting to them. Without going into details, we were able to quickly incorporate part of our wireless-market test capabilities into our overall EMSO solution and demonstrate it on the customer's widget within three months. This was both a software and hardware integration, followed by the onsite demonstration hooked up to the device under test. We also do this for other parts of our A/D solutions portfolio, including Space, comms, radar and avionics, but the core test and measurement technology is at the heart of all our solutions. Keysight's decades of engineering experience is utilized to bring to market industry-leading solution platforms that are used across multiple industries. One example is Keysight's dedication to provide design and test solutions for electronically steered antennas, which are used in many different industries including wireless comms, signals intelligence and earth observation applications.

JED: What are some of the product areas where Keysight is focusing on new offerings for the EMSO and spectrum monitoring markets?

Johnston: As the environment becomes more congested and more contested, our test solutions must provide more capability at less cost and size than previous generations. Our business is like the warfighter in that we are SWaP-C driven. As the digital domain continues to be more flexible and adaptive, companies like Keysight need to provide analysis and insights faster – without human intervention. More emphasis on modeling and simulation will continue to grow using, for

example, digital twins, but we will not lose sight of other requirements to transduce software into very high fidelity, metrology grade RF signals the warfighter can trust.