

MilesTek

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Aerospace and Defense Applications Drive Connector and Cabling Innovation

An Interview with Mark Hearn, Product Manager - MilesTek

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1. Are you seeing a trend toward smaller-size connectors and cables, higher density, and more I/O options – or other trends, such as fiber optics – in aerospace & defense systems?

We are seeing a trend toward the use of fiber optic, IP rated copper Ethernet and high frequency coaxial connectors. For our business these are not necessarily multi-pin, high density style connectors but higher throughput and higher frequency designs than previously used by the Mil/Aero industry. The driver for this is the industry's requirements for high-performance connectors that are faster, lighter and capable of higher throughput compared to their predecessors. Many military and aerospace applications today require extensive use of imaging as well as high speed data transfer that legacy connectors and cables cannot provide. In many cases our customers have been requesting at least gigabit, and sometimes multi-gigabit capable connectors and assemblies.

Some popular connector types our customers are specifying into their designs are fiber LC (both Multimode and Single mode), Fiber MTP, multi-core styles, and IP67 and IP68 rated RJ45 copper assemblies for use in Ethernet systems. Also there is still a need for coax high frequency RF connectors like 3.5mm and 2.92mm types, which are still used in many new designs. Another driver for the use of these types of connectors by our customers are the environmental conditions the connectors will be used in. With today's systems and vehicles being exposed to high levels of heat, shock, vibration and other factors, the need for rugged, sometimes IP rated, connectors is a requirement for many. For instance we offer a series of Fiber ST connectors/assemblies that feature a twist lock connection along with a reinforced, beefier, spring compared to standard ST fiber cables that will withstand major shocks and vibration that are often found in combat and field operations. Other popular connector styles include screw down M8, M12 and IP68 rated circular threaded RJ45 connectors and assemblies.

Across all or certain A&D applications?

We are seeing these connector trends across a variety of Mil/Aero applications. For applications involving ground based vehicles and seagoing vessels we are seeing the continuing trend toward fiber optic interconnects and copper based gigabit Ethernet connectors and assemblies. In aerospace applications we are seeing a trend towards lighter cables with higher temperature ratings. And in all of these scenarios we still see the requirement for low smoke zero halogen cable jackets and secure connectors, with either threaded screw on, such as M12, latching, like fiber LC connectors or twist style connectors, fiber ST for example.

How are you meeting these demands?

We are meeting our customers' demands for these types of interconnects by offering a wide variety of off the shelf connectors and cables that will handle the extreme environments, meet high frequency and high bandwidth requirements and satisfy the small form factor requirements many of our customers have. We have been adding to our product portfolio with products that are normally custom orders that can take weeks or months to receive from other suppliers. One example is our IP68 Ethernet assemblies which we stock for same day shipping. In addition to our off-the-shelf offering we also see quite a few requests for custom interconnect solutions to address a varied range of applications. Whether the custom requirement be a length variation on an existing assembly or a completely new design from the ground up it is really all application specific.

2. What is the hottest connector/cable innovation or application area right now? What will the future hold?

Right now, and for the extended future as far as I can see, fiber optics is becoming more and more desirable in Mil/Aero applications. This is for many reasons including its immunity to EMI/RFI and EMP which is a major consideration in theatres of war as well as fiber's high bandwidth handling capabilities which far exceed any copper based solution and its flexibility, small size and light weight make it a perfect choice when designing new aerospace and military communications systems. We even offer crush-proof tactical fiber cables that you could drive a vehicle over without causing damage to the cable. Also, fiber is a true future-proof technology since it can handle Terabits of throughput even over a single core. Although previously a big cost concern, the optical transceivers used in fiber based systems continue to decline in price making fiber optics an even more attractive choice for newer designs.

Any advice to offer engineers when selecting connectors/cables?

The first consideration or question to ask is, what is the environment and the specific application the connector/assembly will be used in? Again determining environmental factors such as shock, vibration, presence of chemical and liquid exposure will lead you toward a connector /cable design that meet those specific requirements. Another consideration is bandwidth and throughput requirements now and for the expected life of the platform the connectors/cables are being used in, considering potential future technology upgrades etc. Some of these military communications platforms have a service life of 20 years or more. One more thing to think about is using interconnects that are standards based with wide availability and limited servicing requirements.

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