

# Making DAS more cost-effective

*TE Connectivity, Ltd. designs and manufactures highly engineered solutions that connect and protect data and power. The company serves customers in more than 150 countries in a variety of industries including automotive, data communication systems, consumer electronics, telecommunications, aerospace, defence and marine, medical, energy and lighting. At the Mobile World Congress Show in Barcelona, at the start of this year, the company showcased innovations in the distributed antenna system (DAS) and small cell space, with the promise that these significantly reduce the space, power and costs of DAS head-end deployment, explains Tony Lefebvre, the Director for Product Management, Outdoor Wireless Products, Network Solutions Business Unit at TE Connectivity.*

TE Connectivity was formerly part of Tyco International. The latter company was split in 2007, resulting in Tyco Electronics, along with Covidien, becoming separate, independently-traded public companies. The new independent company was initially known as Tyco Electronics but changed its name to TE Connectivity in 2011; the new name, the company said, felt more relevant to its position as a component and communications manufacturer.

Mr. Lefebvre started his professional career at ADC telecommunications, which was acquired by TE Connectivity (then Tyco Electronics) in 2010 to further its broadband connectivity exposure. ADC generated more than \$1 billion in sales in fiscal 2009, counting AT&T Inc. and Verizon Communications among its largest customers. Mr. Lefebvre has held a variety of business development and product management positions with the company including Program Manager for Distributed Antenna System (DAS)

products, and Senior Manager for IP Cable products. In his current role at TE Connectivity, he is responsible for product development initiatives for TE's outdoor wireless products and the business expansion into global markets.

Mr. Lefebvre emphasises that ADC, both independently and as part of TE, has pioneered Distributed Antenna System (DAS) products starting 15 years ago: "We were ahead of our time with this back then. We initially developed it because we were looking for a way to secure signal integrity over longer distances, facilitating longer transmission routes. Now, ever increasing bandwidth requirements have given the market for DAS a boost as the technology is well suited to deal with isolated spots of poor coverage; inside a large building, or in high density environments such as stadiums and airports." DAS can get a signal deep into a building when other technologies can't, he adds. "You can blast the signal into a building from the outside, but the deeper inside the building you go, the more difficult it gets as it has to penetrate windows, for example."

The way DAS generally works is through a network of relatively small antennas that serve as repeaters. This delivers enhanced coverage and capacity to subscribers in high-traffic locations. However, even with the efficiencies of TE's DAS, DAS systems still require a connection to the macro network through base stations requiring redundant RF processing and attenuation panels that need cooling and take up a lot of space. Both deploying and maintaining a DAS is generally seen as labour intensive and, as a result, expensive, but TE has





committed itself to making the technology's total cost of ownership considerably more cost-effective, and has introduced a number of innovations to that end.

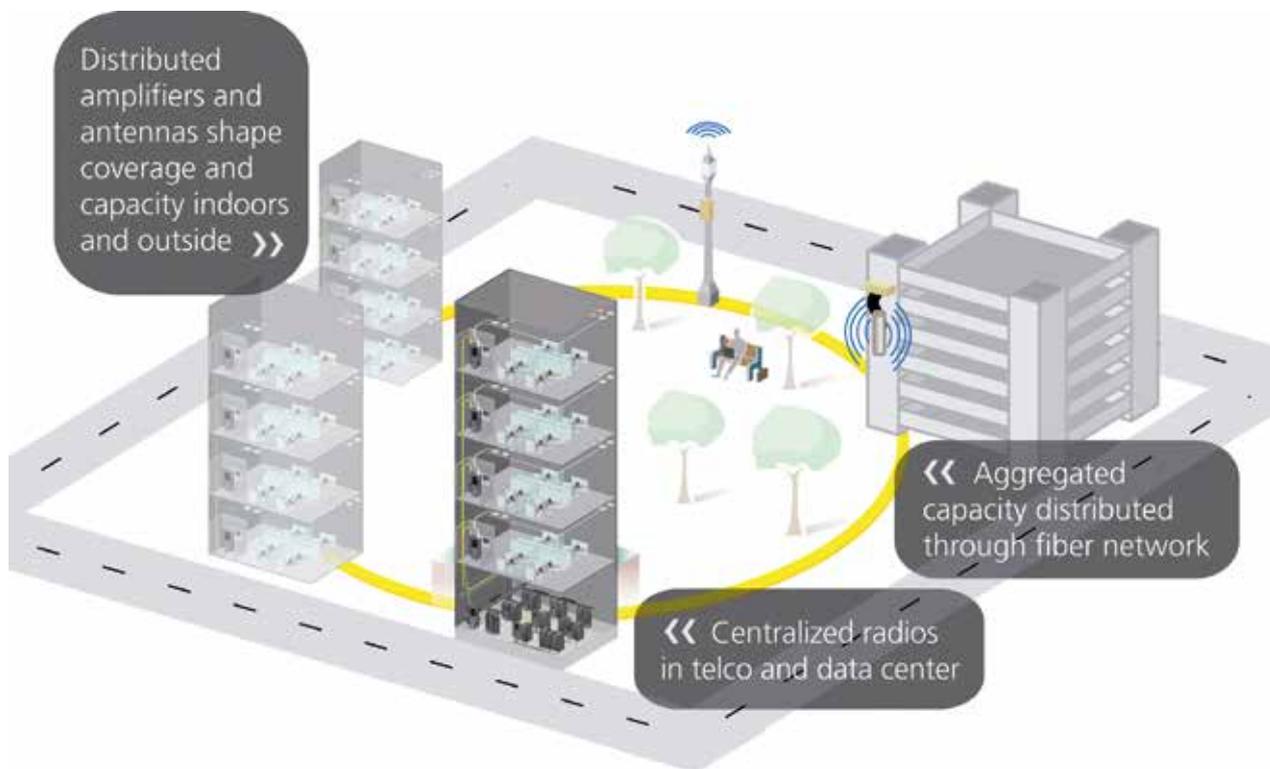
Mr. Lefebvre explains that TE's DAS systems facilitate multiple carrier service, which is obviously important in public buildings where people bring their own device. It is also important from a maintenance perspective, he points out. Conventionally, mobile networks rely on large, 'boomer' cell towers to broadcast the signal. By contrast, TE's DAS allows mobile operators to propagate the signal through a series of small cell sites. Important in that regard is that the new generation TE powered fibre cable system combines power and optical communications into one system. This eliminates the complexity of small cell installation, allowing small cell devices to be placed wherever they are needed for maximum 4G wireless coverage. The system incorporates everything needed to power and communicate with a small cell – including the power supply, a hybrid cable, and a remote powering unit that corrects for DC line loss to eliminate the need for electrical design engineering calculations. TE's shared base station 'hotels' make it possible to eliminate having to house the base station(s) at the DAS location. The DAS

head end can be situated in a central office or other facility and linked via fibre to the DAS antennas, which can be miles away.

TE's DAS approach also offers addresses non-technological concerns; aesthetics, for one. Ironically the generation of technology consumers that demands to be connected all the time does not like to see 'unsightly' antennas. With all wireless networks, there also is a fear of electromagnetic radiation (EMR), but

Mr. Lefebvre says that small cell architectures actually help reduce EMR because they put antennas closer to end-users. These antennas operate at relatively low power, and because they're closer to end user handsets the handsets themselves (the mobile network clearly closest to the user) can operate at lower power. As for aesthetics, he emphasises that DAS equipment is getting smaller all the time. "Recent advances doubled the number of frequencies a DAS could





cover, effectively shrinking the equipment size by 50 percent. This is being made possible with better amplifiers and multi-band, cross-pole antennas. Advances are also being made in remote power distribution and backup that enable reduction in need for remote battery backup equipment. Next, DAS equipment doesn't all have to be deployed on lighting or utility poles. In most cases, the DAS electronics can be hidden inside street furniture (bus shelters, kiosks, or utility-like enclosures) or in underground vaults, so only the antenna itself is visible."

At this year's Mobile World Congress, TE showcased its new generation fibre cable system, as well as their pre-integrated Common Public Radio Interface (CPRI) solution, which

eliminates the need for RF processing and attenuation panels on site, and which uses less power: both result in cost savings also in terms of both equipment and maintenance costs. The other TE innovation on show was the Active Integration Panel (AIP), which simplifies the interface between DAS head-end equipment and the carrier base station by eliminating the need for frequency attenuation panels. It also provides active monitoring of BTS power output. This solution again significantly reduces the space, power and cooling required for a DAS head-end.

The company will continue to invest in evolving DAS technology, says Mr. Lefebvre. "We're working towards making the system even smaller and less

obtrusive." This should also help address the 'who will pay for this' issue. TE generally sells DAS solutions to mobile network operators who use the technology to enhance service to their customers. But as TE continues to drive down the cost of DAS, it could also inspire companies to invest in their own DAS network. "The momentum of LTE network deployment is also a driver in the uptake of DAS," Mr. Lefebvre adds. "It's an exciting growth stage for the technology in general, and for TE in particular, as we've been on a journey with DAS for more than fifteen years."

#### *TE Connectivity at a glance*

TE Connectivity is a \$13 billion world leader in connectivity. The company designs and manufactures products at the heart of electronic connections for the world's leading industries including automotive, energy and industrial, broadband communications, consumer devices, healthcare, and aerospace and defence. TE Connectivity Ltd. is incorporated in Switzerland and has nearly 90,000 employees in over 50 countries. The company is independent, publicly traded with common stock listed on the New York Stock Exchange (NYSE) under the ticker symbol "TEL".



TE Connectivity  
1050 Westlakes Drive  
Berwyn, PA 19312  
USA  
Website: [www.te.com](http://www.te.com)