

Talking young professional broadcast opportunities with [Jon Montalbán](#), assistant professor at the University of the Basque Country

Question: You're co-chair of [the new IEEE BTS Young Professionals committee](#). What are some of its goals?

Montalbán: The chair helps monitor the Young Professionals programs and activities on a daily basis. Another role is developing programs and activities to help provide members with career assistance.

Currently there's a generation gap in the IEEE Broadcast Technology Society. The membership isn't balanced age-wise because broadcasting professionals typically join only when they've achieved a solid career position. Very few join early on in their career.

That's our main objective: bridging the gap. We need to show the younger professionals all of the tools and values that the BTS has to offer. There are programs and activities to keep up with regulatory issues, and to develop their technical skills, such as distinguished lectures, workshops and conferences. Joining the society also gives them access to networking, mentoring and counseling opportunities that they otherwise wouldn't have. For example, we have a vast network of senior broadcasters, people at the top of the industry.

Question: How did you choose a career in broadcast and mobile technology?

Montalbán: When I was a bachelor student, wireless communications drew my attention from the very beginning. I always thought that the process of wireless data transmission was kind of magic, so I wanted to know how it works: the coding, the modulation, the air transmission, the information theory, all of that was interesting to me.

I kept following that path in my postgraduate studies and my internships such as the one at the Communications Research Centre in Canada. Those were opportunities to work with some of the most important researchers in the field and I've learned a lot from them. These experiences are another reason why I believe the BTS mentoring opportunities are so valuable for people who are starting their careers.

Question: The broadcast technology profession has a severe skills shortage. How might your committee help encourage more people to consider a career in broadcast technology?

Montalbán: Broadcasting is a horizontal technology, a one-to-many transmission. So some people associate broadcasting with old-fashioned technologies. This is not true. For instance, the latest digital terrestrial television (DTT) standard, [ATSC 3.0](#), is IP based, which enables a plethora of new applications. We just need to show young people that broadcasting is filled with these kinds of cutting-edge technologies.

Question: A lot of your research over the past two years has been around ATSC 3.0. How will this technology help stations drive more revenue, compete with streaming services and leverage the cord-cutting trend?

Montalbán: I think that ATSC 3.0 should be understood as a valuable tool that goes further than a traditional DTT standard. Of course, it does cover the traditional broadcasting use case with

linear television demand. But in that particular use case, it provides a substantial upgrade when compared with the previous model.

For example, its PHY layer includes several new, unique features, including the latest LDPC codes, Nu-QAM schemes, [LDM](#) multiplexing schemes and bootstrap. These capabilities can make the broadcasting business more profitable.

The LDM technology makes it much more efficient to merge mobile/indoor and stationary service in the same pipe, so broadcasters can target different audiences in a more effective manner. It also enables spectrum to be used up to four times more efficiently. Theoretically it's even capable of operating two adjacent transmitters in the same RF channel, within 2R distance instead of the classical 4R distance. Otherwise, it can also offer 4K UHD transmissions, which are now broadcast in Korea.

The adoption of OFDM will allow the implementation of single frequency networks, an approach that has been used in Europe for several years. OFDM also offers more efficient planification procedures. It's also helpful for improving the Local Service Insertion over SFN thanks to the LDM. This could be a way to introduce targeted advertisement or other local content in a more efficient way.

As the only IP-based broadcast delivery standard, ATSC 3.0 is designed to anticipate and enable new use cases. For instance, it will make easier for broadcasters to integrate with OTT services and support enriched emergency alert systems, datacasting, targeted advertisements and even autonomous vehicles, where stations could send out targeted map and traffic data or provide large, fleet-wide software updates. IoT and telemedicine are a few more potential applications.

Some people consider ATSC 3.0 to be a competitive broadband pipe. It also will allow a potential convergence with 5G or other broadband technologies. In fact, DVB is also working on an initiative to bring together broadcast and OTT television. The aim is to bridge those two worlds with standards that will apply equally to both pure OTT and a hybrid use case known as DVB-I.

Question: A lot of your research over the past two years has been around 5G. What are the aspects you're focused on, and why those?

Montalbán: [5G](#) was presented as a new paradigm. Therefore, from the PHY perspective, many new promising techniques were studied: NOMA, new modulations, new error correction algorithms, new multiplexing schemes, new waveform and so on. We have to try to keep an eye on all of them and study the more interesting ones in depth.

Apart from that, we thought from the very beginning that broadcasting will have an important role to play in this ecosystem. So we have been focused in understanding the principles of what is expected from 5G in broadcasting or one-to-many uses cases. Most recently, we have started studying how the technologies might cooperate. In our opinion, in order to fulfil all the requirements associated with 5G, convergence with broadcasting operators will be necessary.

Eventually, it must be considered that the pure 5G broadcast modes will not be standardized within 5G at least beyond 2020. There are good chances of NR-Mixed Mode being standardized in Rel-17, and NR-Terrestrial Broadcast will not happen before Rel-18.

Question: The repack is the latest example of how valuable TV spectrum is to other services, particularly cellular. Between that and rising broadband penetration, is there a point where

it makes sense for networks such as CBS to sell off their licenses and serve viewers entirely via satellite, cable and broadband?

Montalbán: This is a difficult question to answer for an academic person. It really depends on the way CBS wants to handle its business. There will be always some services where broadcasting will be required, especially when large audiences are required for linear services due to its efficiency: There will be no pixilation, buffering or freezing.

Maintaining good coverage in rural areas is also something that must be considered. Another is the robustness of the broadcasting operation against natural disasters for public warning services. So I think that the most logical path to move forward will be if not convergence, then at least cooperation between mobile and broadcast technologies.