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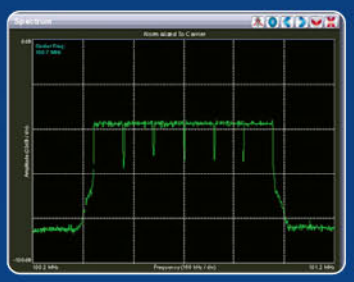

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World Digital Radio

Paul McLane
Editor in Chief

Digital radio has been around a long time. It's time for a status report.

The first DAB station in the world launched in 1995. The first DRM specification was published in 2001. The FCC approved IBOC HD Radio in 2002.

Where are digital technologies well established? What countries are next to adopt digital radio standards? What is the state of the receiver marketplace?

What role will these digital platforms play in the era of the connected car? What strategies should broadcasters adopt in light of the transformation of the car dashboard?

This Radio World ebook provides insights from leading digital radio proponents and other experts about the uptake of technologies as well as the advanced services and features that these platforms enable.

Ashruf El-Dinary of Xperi, Jacqueline Bierhorst of WorldDAB and Ruxandra Obreja of the DRM Consortium take our questions about the state of HD Radio, DAB+ and Digital Radio Mondiale, respectively. And adding their perspectives are Roger Lanctot of Strategia Now, Benjamin Poor of the European Broadcasting Union, Nick Piggott of RadioDNS, John Whyte of Nautel, Peter Passian of Telos Alliance, Yann Legarson of Radioplayer and Ray Miklius of GatesAir.

This is our 120th ebook since we launched the series 12 years ago. Several of those ebooks have visited the topic of digital radio. How may we serve you better? Email me at radioworld@futurenet.com.

THIS ISSUE

El-Dinary expects further uptake of HD Radio

In the U.S., the technology "is woven into the fabric of listener engagement"

Ashruf El-Dinary is senior vice president, digital platforms at Xperi Inc. He oversees the company's HD Radio systems engineering teams, manages certification and quality control processes, and represents HD Radio technology standards at ITU and international regulatory discussions. He has spent more than two decades working on digital radio programs and has earned several patents on digital radio solutions. Earlier in his career he developed science instruments in support of space research and launched solutions on several satellites.

It has been 22 years since the FCC approved in-band on-channel digital broadcasting in the United States. How would you assess the state of the HD Radio rollout here?

Ashruf El-Dinary: HD Radio had a robust and extensive rollout in rated markets around the U.S. and the automotive industry. Currently with 105 million cars on the road and counting, HD Radio is now woven into the fabric of listener engagement with over-the-air radio. It has elevated radio with peer-level features (images, song titles, etc.), compared to satellite and streaming competitors.

We always anticipated that HD Radio adoption would happen in multiple stages. Initially, the hybrid analog/digital transition would occur in major markets, as we have seen. The next milestone is to increase HD Radio station rollout in secondary and rural markets. The final stage would be full adoption by stations of digital services.

> **"HD Radio [in the U.S.] is now woven into the fabric of listener engagement with over-the-air radio."**

What is the state of HD Radio in Mexico and Canada, and what is the outlook for broader use there?

El-Dinary: HD Radio continues to grow in Canada and Mexico.

The recent announcement from Innovation, Science, and Economic Development Canada (ISED) formalized the technical specification for HD Radio in Canada. This document removes the experimental status, clarifies the country's system parameters, and gives the broadcast industry confidence that HD Radio is the solution for the market. In 2023, over 50% of new cars sold in Canada included HD Radio. With the recent ISED publication, we expect this to grow in the coming years.

In Mexico, the technical specification has been in place with regulatory approval for 13 years. Since then, the market has grown, servicing more than 51 million people. Upcoming frequency auctions in Mexico will grow the number of HD Radio stations in the next few years.

Xperi has said that 58% of new cars that ship in North America come with HD Radio. What will it take to get that number toward 100%?

El-Dinary: We believe that more stations on the air, and more content unique to radio, such as more local content on HD2/HD3/HD4, as well as broader adoption of digital emergency alerts, will drive more listeners for both entertainment and local/safety information. This, in turn, will help drive the auto industry to quicken the pace of adoption.

Common wisdom is that the percentage of U.S. FM radio stations that have adopted HD Radio here has held relatively steady for quite some time. Is that accurate?

El-Dinary: Over the past several years, we have seen continued growth with an increasing number of digital channels and new transmissions.

What would it take to get more small- and medium-market stations to make the jump?

El-Dinary: The small- and medium-market stations have strong potential for going digital. We see several interesting initiatives that could help drive greater adoption in these stations.

Left
Ashruf El-Dinary received the NAB Radio Engineering Achievement Award in 2022. He's shown with NAB's Sam Matheny, left, and Curtis LeGeyt.

First, continuing to increase the number of HD Radio receivers and car products across those markets. This will ensure that there are listeners for the new services.

Second, focusing on ROI for broadcasters. This is critical, and among the innovative programs Xperi has worked on to support this is visual advertising, which has proven to be a primary driver of new revenue.

Third, streamlining the implementation process. Our software teams are working with the equipment manufacturers to lower the bar for adopting digital broadcasting as well as to reduce implementation costs.

The combined impact of these initiatives provides an excellent foundation for greater adoption by small- and medium-market stations.

What's your prognosis for when the U.S. FCC might proceed to allow the formula change that would permit more FM stations to increase digital power and/or use asymmetric sidebands?

El-Dinary: FM stations have been allowed to increase digital power and use asymmetric sidebands since 2014, with experimental authorization. The proposed rules would formalize the methodology for setting those power levels and eliminate the experimental designation.

The aviation industry has expressed some concerns that digital power levels at 107.9 MHz might have an impact on navigational aids, so we are working closely with them and the NAB to support any technical and test details they require.

In what other countries or regions is HD Radio starting to grow?

El-Dinary: We see a lot of growth potential in South America, so that is where our next expansion in the Americas will be. International broadcasters invest in visiting the NAB Show every year, because they see the impact that HD Radio has had on the North America market. In the past few years, many broadcasters from South American countries have approached us to inquire about field testing and regulatory policy.

India represents a large potential market. Where does the FM decision-making process stand and what do you hope will happen next?

El-Dinary: India is a large, developing market for digital radio. We have been talking to broadcasters across the country about the benefits of HD Radio services. Both government radio (All India Radio) and private broadcasters

see the potential for transforming the last analog service to digital. That would represent over 800 transmitters across the country, and future frequency auctions.

The Telecom Regulatory Authority of India has stated that radio stations can use their current spectrum authorization for digital services. This year we anticipate a more comprehensive Digital Radio Policy for India outlining more technical and regulatory details.

Can you cite good examples of non-U.S. broadcasters that have embraced HD Radio and its various features?

El-Dinary: Pattison Media, Canada's largest Western-based media company, has been very enthusiastic about HD Radio technology. They are running logos effectively and have leveraged multicasting to reposition their analog station formats.

Stingray has added Rapid Quu to CFRQ (Q-104) in Halifax, representing a great example of a station leveraging HD Radio's metadata capability.

Meanwhile, Red FM CIRV 88.9 in Toronto has developed a format that provides South Indian content — Hindi, Urdu, Tamil, Punjabi — on their multicast services. This has successfully opened the market for diverse content and voices.

Below
An HD Radio web page highlights its use in Canada. Ashruf El-Dinary said the recent formalization of the technical specification for HD Radio in Canada will give the broadcast industry confidence that HD Radio is the solution for the market.

Why is there not a meaningful consumer marketplace for portable or tabletop HD Radio receivers?

El-Dinary: The availability of tabletop radios has been declining at retail over the last several years. This organic decline of radio receivers across national retailers has also impacted the availability of HD Radio tabletop products, but we continue to work with manufacturers to ensure HD Radio tabletop receivers are available nationwide. Currently, consumers can purchase HD Radio tabletop receivers from a selection of products available at Amazon as well as Best Buy.

What are your organization's priorities for the coming year?

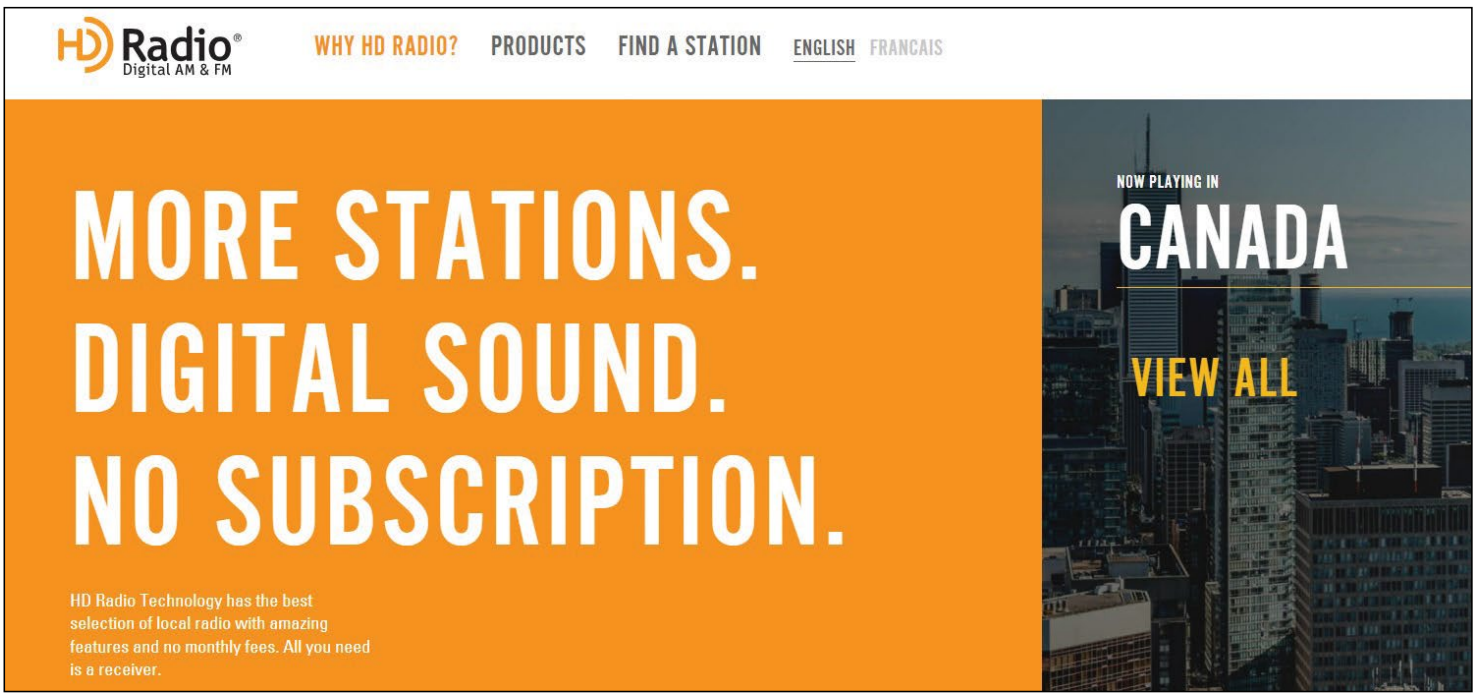
El-Dinary: We are always looking to advance and improve HD Radio's technology and services, such as new service modes for FM or multicasting for AM. We also want to see HD Radio grow across small and medium markets. Our focus will be to continue to grow ROI opportunities add capabilities and reduce implementation costs for our customers.

What do you think is the most important technical trend on the broadcast hardware side?

El-Dinary: We have seen much innovation in broadcast hardware over the past years. It's remarkable that, while we are in our fifth-generation product, we have seen costs significantly drop over a 15- to 20-year period. Today, manufacturers are looking at HD Radio in SaaS architectures, where the modulation is done in the cloud and some hardware costs are eliminated. This type of innovation benefits the industry and opens up HD Radio broadcasting to many more stations.

WorldDAB has described DAB+ as "the core future platform for radio in Europe and in other regions." Would you accept the characterization for Europe?

El-Dinary: Europe's on-going commitment to



DAB+ is extremely strong. The European Electronic Communications Code has helped ensure radios are available in new cars in the EU, and now it is incumbent on broadcasters to take full advantage of what the technology offers. DAB+ is a robust technology that offers a wide range of services that can serve the needs of European commercial and public service broadcasters if deployed and supported correctly.

What are the implications of the hybrid broadcast systems like DTS AutoStage that incorporate IP connectivity and expanded features via non-OTA channels?

El-Dinary: DTS AutoStage begins with broadcast radio and is designed to enhance both analog and digital broadcast services. Broadcast is the foundation. DTS AutoStage provides broadcasters a platform to offer their audiences additional IP-only audio services, ensuring their listeners stay with broadcast content, even if they leave the broadcast environment.

Will the sunsetting of FM accelerate around the world?

El-Dinary: FM stations are facing competition from the rise of streaming services, podcasts and other platforms. However, FM stations have local reach, free access to information across socio-economic groups, and efficient emergency alerting services. And consumers are still wanting radio to anchor their in-vehicle experience. According to the "Connected Car Entertainment Trends" report released by DTS Inc. this month, AM/FM radio is the most popular form of audio entertainment for music listening (69%), compared to music streaming (53%) and satellite radio (30%).

That said, there are regional differences in radio operations. In Europe, we have seen stations transitioning from FM to DAB+ operations. Government initiatives for national broadcast networks have driven must of that transition. Radio in the Americas is different as it has many more independent stations.

So while some regions may see a reduction of FM operations, it would not be universal.

What future do you see for all-digital on the AM band in the United States? There has been no significant uptake other than a very small number of stations that have tried it out.

El-Dinary: AM all-digital has a growth opportunity in the coming years and, to that end, we have focused on upgrading our technology to support many of our FM features, such as multicasting and Artist Experience. Today, stations can now provide two audio programs and logo/images on their AM stations, but we are now ensuring that all upcoming receivers can support the multicast option for AM. As this expands in the car markets, we expect radio stations to expand all-digital operations and look at new services and formats.

> **Upcoming frequency auctions in Mexico will grow the number of HD Radio stations in the next few years.**

Speaking broadly, does broadcast radio have a strong future, in light of the many alternative forms of audio distribution? What are your grounds for optimism?

El-Dinary: Despite the proliferation of alternative audio distribution channels, broadcast radio continues to hold its ground. In fact, AM/FM radio is the most important (59%) entertainment option for consumers when considering their car purchase, according to that DTS connected car report.

Radio stations foster a sense of community by providing local news, weather updates and events. This localized content remains relevant, even in the digital age. It is free and accessible to everyone, regardless of socioeconomic status. It doesn't require an internet connection or subscription fees.

During emergencies, radio remains a vital communication tool. It can disseminate critical information even when other channels fail.

While digital alternatives are on the rise, broadcast radio's unique qualities ensure its continued relevance.

What other areas of interest in digital radio technology should we be following?

El-Dinary: Monetization and improved user experiences for listeners. More and more stations across North America are delivering their logos via HD Radio's Artist Experience feature and getting dynamic with Now Playing artwork for both music and talk programming. Stations are delivering metadata — images and text — to enhance the listening experience with more visuals. In addition, stations across North America are generating new revenue streams through client logos paired with their spots.

I think the key areas will be innovations around revenue through digital broadcasting as well as localized information services for different markets. The U.S., Canada, Mexico, Philippines and India all have different market needs and ways of engaging with media and radio stations. I expect each market will create their own unique flavor based on local opportunities.

WorldDAB's president: "The dashboard is critical to our future"

At least 96% of new cars sold across Europe now come with DAB+ as standard

Right
Jacqueline Bierhorst

Jacqueline Bierhorst was named president of WorldDAB in 2023 and has been involved with the organization since 2015. She has launched and led successful commercial television and radio channels in the Netherlands and Belgium, as well as the rollout of the DAB+ network for the commercial broadcasters in the Netherlands. She is project director of Digital Radio NL, a collaboration of public and private broadcasters and the Ministry of Economic Affairs. She works with the Flemish government and broadcasters on the introduction and adoption of DAB+ there and is country manager for Radioplayer Netherlands.

In June she delivered the opening address to the WorldDAB Automotive event in Prague. This is an excerpt.

It is fantastic that throughout the years, this event grew to be THE gathering place to exchange the latest updates, growth and importance of digital broadcast radio throughout the globe. We know everything gets connected, but due to the characteristics of the various infrastructures — broadcast and IP — we also know how important it is that broadcast always stays easily accessible, and how the internet linked to digital audio broadcast can optimize the user experience. But for now and the coming decade, it cannot replace digital audio broadcast. …

Last time I was here was for Radiodays Europe 2023, when we were celebrating 100 years of Czech Radio.

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> **In 2023, cumulative DAB+ receiver sales in the U.K. broke through the 50 million barrier; Germany is now over 25 million, and Italy over 10 million.**

This anniversary is a great example of what the U.K. media consultant and DAB operator Matt Deegan called "radio's relentlessness." Radio is a PROFESSION — we have many industry professionals in our audience today, who are creating great content every day. We are really good at it, and our stations are strong. And in turn, what this means is that radio reaches 84% of European citizens every week, who listen for over two hours a day — and also three-quarters of the youth population listen each week.

But we can't be complacent. We can't rest on our success.

The dashboard is critical to our future. And that's why we are here — to unite the automotive and broadcast sectors.

A core part of WorldDAB's work is that we bring everybody together.

We stand UNITED around the world, working with our friends at European Broadcasting Union, the Association of European Radios, the Arab States Broadcasting Union, the Asia-Pacific Broadcasting Union and the Southern African Digital Broadcasting Association.

And we're delighted to also have April Carty-Sipp from the National Association of Broadcasters in the United States with us here today. ...

Our amazing Working Groups have been hard at work too — they are a great way of bringing together people from right across all our sectors. To give a couple of examples — they've done valuable work on updating User Experience guidelines. And we've just published guidance on how best to handle phonemes and aliases — it's all available on the WorldDAB website.

Status report

In the last 12 months, the rapid global growth of DAB+ has continued.

In France, new transmitters have grown coverage to 60% of the population.

In Germany, the second national multiplex added eight new transmitter sites in six federal states at the start of this month. And next month a further site will be added in Bavaria, bringing coverage to over 70% of the population.

Next week, we're excited that Austria launches a new national multiplex carrying 14 stations, as well as five regional muxes.

And in Spain, in February, I was delighted to attend the launch of DAB+ by the public broadcaster RTVE.

It launched with broadcasts in Madrid, Barcelona, Valencia, Seville, Murcia and Bilbao. In a sign of their commitment to DAB+ digital radio, they are adding new cities every month. Last month, a new transmitter was switched on for Tenerife. They've chosen this as a strategic location for foreign tourism ahead of the summer season — many rental cars already have DAB+ receivers.

They recognize that digital is the future — and that the European Electronic Communications Code directive in 2021 means that DAB+ is now in at least 96% of new cars across Europe. They estimate that this means they already have 3 million receivers on the road across Spain.

By the end of the year RTVE will have 60% of the population covered. We are so pleased to have them in our DAB family.

And it's not just a European story.

I was pleased to be part of an online seminar with the team at RRI Indonesia last month, working with them as they develop DAB+ following regulations published last August.

Just last week, the regulator in Thailand — NBTC — published a report on the successful DAB+ trial, and is now consulting on a frequency plan and specifications for transmitters and receivers.

And in Australia, the market is well-established. ABC and SBS launched DAB+ coverage on the Gold Coast last month, and audiences are growing — including amongst younger listeners.

The first ratings of 2024 show 4.7 million listening to commercial radio on a DAB+ device — and listeners aged 10–24 were up by 5% to 899,000, bucking trends from other analog-led markets. So DAB+ works.

Across Africa, in the last 12 months, we've seen the launch of the trial phase of DAB+ in Ghana, covering Accra and Kumasi; and a pilot project in Uganda, covering Greater Kampala — AND interest from many others.

Just this month, Senegal launched its DAB+ pilot, with 32 stations broadcasting across two multiplexes from Dakar.

And in the Arab States, we also welcomed the Saudi Broadcasting Authority launching DAB+ in Riyadh, Damman

and Jeddah, with six stations on air. It's expected that DAB+ will be available in all regions of the Kingdom in the fourth quarter of this year.

And Bahrain officially also launched DAB+ services last August, with 10 stations on air.

Over 125 million DAB+ devices have been sold to date. In 2023, cumulative DAB+ receiver sales in the U.K. broke through the 50 million barrier; Germany is now over 25 million, and Italy over 10 million.

And we know that at least 96% of new cars sold across Europe now come with DAB+ as standard. It is likely to be very close to 100% but there are a small number of makes and models that we don't hold data for.

So there is now an installed base of cars with DAB+. And there is a wonderfully rich range of radio stations available to listeners in so many countries. Many more than on FM. And that number of countries is increasing.

And we know listeners are using their DAB+ radio in cars ... As one example, the latest audience research from the U.K. released last month showed that DAB's share of in-car listening has reached a record high of 57.5% — up seven percentage points in just one year.

So we have to make absolutely certain the quality is the best, day in, day out! ...

[W]e know that drivers LOVE radio. [Edison Research] found:

- Radio is the most listened-to audio platform in the car
- Drivers say radio is an integral part of the in-car experience
- Car buyers expect broadcast radio to be standard in their next new car ...

Many of you know of our "5Cs" that are vital for driving the growth of DAB+ in new and developing markets around the world. I'd like to highlight one this morning: COMMUNICATION.

Communications and marketing are very close to my heart ... The communication of the benefits of DAB+ to drivers, and to all listeners, is critical for the growth of DAB+. I know many countries are doing great marketing campaigns, and I can only urge you to keep up that work.

And DAB+ allows cool ideas such as this — in the U.K., last week Capital launched a pop-up station dedicated to Taylor Swift. It's called Capital (Taylor's Version), to celebrate The Eras Tour coming to the U.K.. It's the first time in the U.K. that a national DAB+ radio station has been dedicated to a single artist. This just isn't something you can do on a crowded FM band.

So I should also emphasize COLLABORATION: This is a regular theme of ours and I make no apologies for repeating it again today.

We all have to pull together to ensure that DAB+ remains at the heart of the dashboard in the best quality possible.

If we do this, then the radio that listeners love so much — both here in Czechia, and around the globe — will be here for another 100 years!

Above
The Žižkov Broadcast Tower in Prague includes DAB+.

"The latest audience research from the U.K. released last month showed that DAB's share of in-car listening has reached a record high of 57.5% — up seven percentage points in just one year."

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- Outputs via analog, AES-digital, Dante AoIP.

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Bierhorst highlights the role of metadata and voice control

"We are working to assure easy access to radio, in the highest possible quality"

Following Jacqueline Bierhorst's keynote speech at the WorldDAB Automotive conference in June (page 8), we asked her to expand on her themes.

Do you have a key takeaway from that event?

Jacqueline Bierhorst: I'm proud of the collaboration being done to keep radio in the forefront of the car.

The atmosphere was fantastic, the location in Prague was great, and antenna manufacturers, chip manufacturers, the EBU, private stations, OEMs, Radioplayer, Xperi, Edison Research all participated, along with many people who joined us virtually from all over.

We are working to assure easy access to radio, in the highest possible quality. We're all doing our best to get to keep our beautiful medium — which is used by 84% of the Europeans for at least two hours a day — at the heart of the car.

The European mandate that new cars include DAB since the end of 2020 has been a critical part of the success of DAB+. What additional regulatory steps would you like to see?

Bierhorst: Yes that has been a major step. We also see legislation being considered outside of Europe, as in some Arab states. Our steering board is considering whether we should push for additional actions such as encouraging DAB+ in commercial vehicles. But we're happy to have more than 96% of new cars equipped.

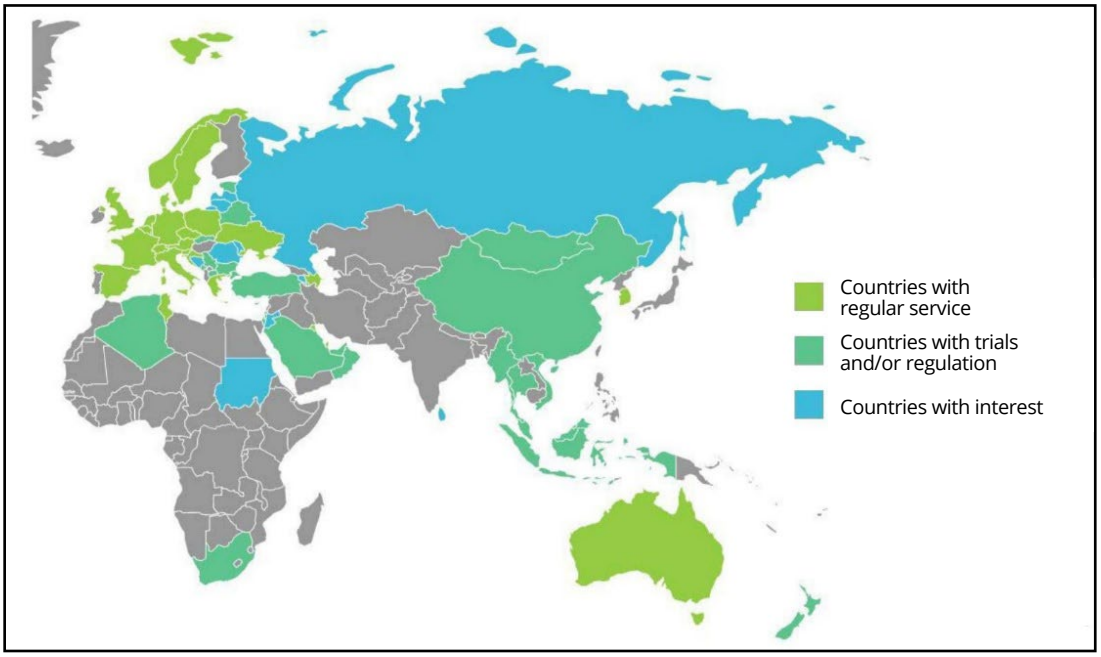
What's the next important milestone you'd like to accomplish? How will you measure success?

Bierhorst: It used to be that a country's digital switchover was the mark of success, but now it's broader than that. Success stories also have to do with adoption by listeners and the joy they find in the digitization mix.

In the U.K. for example, DAB's share of in-car listening has reached a record high of 57.5% — up seven percentage points in just one year.

DAB+ is an exciting new form of distribution, and communicating those success stories is one of the goals of my presidency. AM is being switched off in many countries, and FM is being succeeded by a combination of IP and DAB+. Now we see commercial broadcasters using DAB+ as extensions of their brands, like Capital in the U.K. launching a national DAB+ popup station called "Capital (Taylor's Version)" to celebrate Taylor Swift tour coming to the U.K. And as we've seen in the Netherlands and Belgium, DAB+ can bring a new elan. Digital radio offers a new distribution method compared to the older formats of AM and FM. It brings new possibilities.

Below
DAB status in key markets.



www.worlddab.org

The revolution in car infotainment screens feels like a threat to the presence of broadcast radio. How should broadcasters respond?

Bierhorst: They should be aware of the importance of metadata. They should explore hybrid technologies like RadioDNS or, for dynamic metadata, Radioplayer or Xperi.

Within WorldDAB we seek

to bring different, sometimes competing organizations together in our working groups to address issues like metadata, phonemes and aliases. Metadata is so important, whether you listen to the radio, or via an app that you accessed through IP, which may also connect you to broadcast service combined with IP.

We all need to talk and work together. That's why I'm on the barricades.

Why are aliases and phonemes important?
Bierhorst: There is increasing use by listeners using voice commands to navigate radio stations, particularly as the list of stations is becoming much longer. Smart speakers and virtual assistants use voice recognition and voice reproduction. Voice recognition is to understand what is said to them; voice reproduction is to confirm choices and results to users in natural language.

Many typical words and phrases can be represented by plain text. But two situations are more difficult: when listeners ask for a radio station by something other than its exact official name, and when a station name isn't said the same way as it's written down in text.

Aliases and phonemes help listeners find radio stations. WorldDAB has produced guidelines for broadcasters and manufacturers, available at www.worlddab.org/dab/phonemes.

There was some news coverage in the United Kingdom a few months ago about "millions of DAB radio listeners" being "locked out" of stations that were moving from DAB to DAB+. How much of an issue is this?
Bierhorst: In some early DAB-adopting countries, particularly the U.K., some mostly pre-2014 receivers didn't incorporate the more efficient DAB+ codec.

The U.K. regulator, Ofcom, conducted research on this last year. They found it only affected a minority of sets in use. They estimated that 66% of in-home DAB owners could access DAB+ on their current radio set, and said this will increase as new units enter the market, particularly in cars.

Ofcom said that without regulatory intervention, some broadcasters are already migrating their services from DAB to DAB+. They noted that Classic FM, owned by Global, would be upgrading from DAB to DAB+ across the country starting in January 2024 and that Absolute Radio Country and Absolute Classic Rock, owned by Bauer, would be launched on DAB+ last fall. It said that industry-led initiatives like these would be the best route in the near term, with businesses making the decisions of what would help their listeners.

So clearly it's not impacting on the stations, who have weighed the considerations and moved to the newer, more efficient codec.

What should we know about "small-scale DAB"?
Bierhorst: We're describing these as "new approaches to DAB+" because, although the term "small-scale DAB" is widely known, it was coined in the U.K. for a specific solution for a more local tier of DAB than the existing national and county-wide multiplexes. Ofcom is rolling out this new tier with more than 80 multiplexes licensed and approximately 50 already on air, with a further two rounds of licensing under way.

But the new approaches more broadly complement existing DAB+, and don't have to be smaller by definition. We see it as being about developing and implementing wider new approaches, which could help increase the availability and diversity of broadcast radio services by reducing barriers to entry.

I'm curious how you feel about the instances of the sunsetting of FM.
Bierhorst: I don't see it as a goal; it will happen organically. Parts of Bavaria been switched off, as have areas in the north of Italy. Schleswig-Holstein will be switched off. Norway has switched off.

But you don't force it on people. FM will become less important in more countries. In the Netherlands, 70% of listening is through digital devices, and we only started marketing DAB+ in 2014. But we still have FM too.

Can you name a few other broadcast organizations that are embracing the possibilities of digital radio?
Bierhorst: Joe in Flanders is one. DAB gave DPG Media Group a boost towards growth; their digital strategy embraces both DAB+ and IP. Another is LBC in London, a local news and talk station that was able to go national thanks to DAB+. There are good examples in Germany too, where national radio didn't exist for decades after World War II; now you can have national multiplexes and national radio services, helping revive or generate fresh interest in radio.

Some people perceive radio as becoming less important, given the popularity of platforms like Spotify; but more than 80% of people listen to radio on a weekly basis. It is different from streaming music, it is much bigger. I like podcasts, but those are something else as well.

Linear radio is a profession. It's also a friend. It gives you a reason to smile. I've been working in it for 37 years, and I just love radio. If I'm alone and I switch on my radio, there's somebody there who connects with me and touches my heart.

WorldDAB's automotive resources, including Edison research, User Experience guidance and Metadata information are available at www.worlddab.org/automotive.

Useful Guide
WorldDAB has published "Establishing DAB+ Digital Broadcast Radio," a guide to the regulatory, technical and commercial aspects of establishing a DAB digital radio service. Find it here.

Futuristic concepts are turning into reality as carmakers rethink the dashboard. The author sees opportunity for radio.

Getty Images

Digital radio: go big or go home

Large screens represent a huge opportunity for radio

Writer

Roger Lanctot

Founder, StrategiaNow

Big screens are coming to dashboards in Europe, North America, China and just about everywhere else in the world. Bigger screens with higher resolutions are the rule, reflecting the onset of video in the dash as well as the desire to dazzle drivers and passengers.

I am more than a little skeptical of this trend, given the sorry, sordid history of distracted driving and the annual toll of 1.2 million highway fatalities. The good news, though, is that that real estate represents a huge opportunity for the least distracting form of media in the car: radio.

Radio has always represented the distraction-mitigated solution for driver and passenger engagement. With the onset of digital radio, the opportunity to convert the lean-back, audio-only experience to a visual event is transformative.

Digital radio in all its forms is creating precisely the kind of customer engagement experiences that carmakers are seeking. Carmakers are looking to enable new advertising and marketing experiences; turn on in-vehicle and from-vehicle commerce and transactions; and integrate generative AI for content management and safety applications.

Digital radio brings metadata to audio, converting it into a visual medium. Digital technology also enables the creation of search and recommendation engines driven by voice or cloud-based or even on-board algorithms.

Even more essential, digital radio sets the stage for advertising conversion and attribution. Xperi has demonstrated from its own anonymized data collection how listening can be localized geographically and by daypart. No doubt advertising, too, can be evaluated and correlated to destination data.

With more in-dash real estate to manage, in-car digital radios are expanding the process of discovery — from content to stations. The technology is also setting the stage for delivering song lyrics, local concert and artist information, and even ticket ordering.

Just as auto makers are introducing so-called pillar-to-pillar displays, advertisers are taking note of the

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potential of digital radio to enable a synchronized in-dash graphic display of broadcast advertising content. Already demonstrated at trade shows and in proofs of concept by Xperi — mainly with streaming text — advertisers are envisioning full-screen, full-color ads.

A study just released by Cumulus Westwood One's Audioactive Group, based on an annual survey of 300 marketers and media agencies, found a steadily increasing awareness and interest in visually enhanced and synchronized radio ads. Those same respondents further indicated a willingness to pay, on average, a 16% premium for the privilege of placing such ads, up from 12% in 2021.

Notably, the study did not ask about interest in interactive radio ads such as those that might include QR codes or similar devices. This technology, too, is enabled by digital radio.

The arrival of digital radio is helping to introduce vital connective tissue between streaming audio and broadcast content sources. The stage has been set for fully integrated in-car content management systems capable of blending advertising opportunities.

This renaissance for radio arrives just in time, as video in all its forms is filtering into cars all over the world. Carmakers such as Tesla, BMW, Volkswagen and Mercedes-Benz have shown or already introduced cars that support front-seat video consumption — normally associated with killing time which charging an electric vehicle.

It is clear, though, that these automakers have introduced or will introduce front-seat video game play, streaming video, video conferencing and social media access. Carmakers will be looking to the broadcast industry to raise its level of competitiveness with new digital tools to enhance and expand the presence of radio in the car.

The recent WorldDAB event in Prague, Checkia, was roiled by word of two low-end electric vehicles — one from Renault/Dacia and one from Stellantis — with no radios, offering app-based access to broadcast sources. Both carmakers had evaded the E.U. digital radio mandate (i.e. all car radios must be digital) by eliminating the radio altogether.

Carmakers at the WorldDAB event shared the concerns of broadcasters that the transmission of emergency broadcasts would be compromised. The recent flooding in Germany was cited by several as a powerful justification for a radio in every dashboard.

WorldDAB

Above
Roger Lanctot, right, listens to fellow panelist Lindsey Mack of the BBC during WorldDAB Automotive 2024 in Prague.

These sentiments were further reflected in the legislative backlash unfolding in the United States. Bipartisan legislation is moving through the Congress to mandate the integration of AM radio mainly for its emergency broadcast value proposition. A representative of the National Association of Broadcasters attending WorldDAB indicated that the legislation was moving forward with a better-than-50/50 chance of passage.

Researchers presenting at WorldDAB, including Jacobs Media and Edison Research, noted the essential role that in-vehicle listening plays in both the U.S. and E.U. All agree that radio is a critical link to emergency communications. The task for the broadcast industry is to give carmakers the tools to deliver the radio industry into a future defined by visually enhanced in-car listening with interactive and geographically tagged advertising experiences. In the end, digital radio in the car has the potential to enable a new world of once-unimagined advertising attribution.

> **Digital radio in all its forms is creating precisely the kind of customer engagement experiences that carmakers are seeking.**

EBU's Ben Poor on how digital broadcasting expands choice

Radio, still appreciated in its various forms, is more than capable of adapting to new audiences and tastes

Writer

Ben Poor

Senior Project Manager for Radio, European Broadcasting Union's Technology & Innovation

For me, it is hard to believe that Europe's first — and so far only — digital switchover or DSO happened way back in 2017, the same year I joined the EBU. This was, of course, Norway, which had embarked on the journey in 2009. It seemed like an important moment in the evolution of digital radio.

The predications made at the time largely came to pass: an initial dip in listening followed by a recovery. Recent figures show that not only are commercial revenues up slightly compared to before DSO, but that both reach and listening are gradually increasing, against a backdrop of gradual decline as a whole across Europe.

Of course, this cannot be solely attributed to DSO, and it has been widely noted that the increased offering has the ability to pull back younger audiences to live broadcast radio, at least in some countries.

In Switzerland, where the EBU has its headquarters, there has long been a good choice of stations to listen to. Importantly, in a country where four national languages are spoken along with significant minorities of English, Portugues and Albanian speakers, a range of stations cater to different cultures and communities. A move to digital broadcast radio has allowed a space for stations broadcasting in all these languages — both from public and private broadcasters — that would arguably not be possible within the more constrained FM spectrum.

A similar flourishing can be seen elsewhere, particularly in the U.K., where the "small-scale DAB" initiative pioneered by the regulator OFCOM has added a rich new layer of local and community voices to the digital airwaves.

Again, none of this is as a result of the means of distribution, which is purely there to transport content to its audience. However, without a platform that can accommodate such a range of services, able to serve local, regional and national, it would be hard to imagine the same variety.

> **"Ironically, the expanding support of digital radio platforms like DAB comes at a time when audiences arguably care less and less about how they listen to radio."**

Embracing the benefits

Such opportunity is not exclusive to DAB, which is by far the most popular means of digital terrestrial broadcast across Europe. Both HD Radio in North America and DRM in India and other parts of the world show that digitization can bring benefits to audiences.

The EBU has long recommended its members look to digitize their radio services due to the benefits it can bring to both broadcasters and listeners. Indeed, my forebears at EBU Technology & Innovation were part of the initial work on standards (following the work of the now sadly departed Institut für Rundfunktechnik) and trials of the original Eureka-147 system. This was in anticipation of the advantages it brings: the more efficient use of spectrum (and thus energy, in most circumstances) and its additional functionalities.

Over the years that I have been involved with digital radio, the landscape of user device support has gone through many changes. Back in the mid-2000s, options for listening to DAB (the original MP2-encoded version, and not its more modern DAB+ variant) relied on tabletop radio devices valued in the 100s of euros. Now, I can easily find an equivalent at a fraction of this, and more than 125 million devices have been sold globally, according to industry figures as of 2023.

Most importantly, in Europe DAB has become mainstream in cars. The European Electronic Communications Code, which entered into force in 2018, mandates that any new passenger car from the start of 2021 onwards with a radio should be capable of reception of digital terrestrial radio. The importance of this cannot be overstated, and the EBU was a big part of the lobbying efforts before its adoption.

For many EBU members, the car remains the place where broadcast radio remains strong, despite challenges

from a host of new connected technologies.

In 2023, for 61% of European car users, FM/DAB/DAB+ radio was the most used audio source in vehicles. This is 44 percentage points more than for online music services. Other surveys have confirmed that drivers expect to have radio in cars, as a clear majority prefer this over other available sources of audio.

Ironically, the expanding support of digital radio platforms like DAB comes at a time when audiences arguably care less and less about how they listen to radio. It also comes at a time when audiences, particularly younger demographics, are increasingly consuming on-demand audio: either catchup services or podcasts.

A special place

To me, this is a sign of progress. Radio is still appreciated in its different forms and is more than capable of adapting to new audiences and tastes.

By making use of digital broadcast to expand choice, it finds ways of better serving its existing audiences and finding new ones. Broadcasters adopting a "digital-first" strategy can find great synergies with brands across their live broadcast offer and on-demand channel, expanding beyond pure audio into social media and video.

The focus for broadcasters then becomes more of prominence. For example, in the car we shouldn't be talking about FM versus DAB versus IP, we should be talking about having a clear and present button or option that is marked "RADIO." Radio has had, and must continue to have, a special place in the world of listeners above considerations of any particular distribution platform.

I'm very pleased to say that the EBU and its members are still providing leadership in this area, alongside the wider radio industry.

One way we are doing this is with our "Connected Car Playbook" initiative, whose goal is to give a voice to broadcasters' own requirements for the user experience of radio. Regardless of whether the eventual distribution is FM, DAB, IP or any other means, radio should be prominent and easy to use. This initiative is for the global industry, not just public broadcasters in Europe. It reflects that, regardless of the means of distribution — analog or digital, broadcast or unicast — radio is something that listeners young and old continue to seek and value, and it deserves to have a prominent place. RW

The author is senior project manager for radio at the European Broadcasting Union's Technology and Innovation. He previously worked at a large commercial radio broadcaster in the U.K. in the creative use of technology for mobile listening and digital broadcast. He was involved in the early stages of Radioplayer and sits on both the RadioDNS and WorldDAB Steering boards.

Above
The EBU Connected Car Playbook is a call to action for ensuring how radio can — and should — be visible and easy to find in the car. It was produced in collaboration with members including Swedish Radio, ARD, BBC and Radio France.

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John Whyte: Digital opens a world of opportunities

Here's how we're innovating at Nautel to support digital's growth

Writer

John Whyte

Head of Marketing & Product Strategy, Nautel

As a company full of passion for digital radio, it has been wonderful for Nautel to witness and support the increasing worldwide adoption of digital radio transmission over the past couple of decades. We're excited to see opportunities for digital radio to serve listeners, broadcasters and nations in new ways around the globe. This passion has driven many innovation investments at Nautel that we believe will contribute to further digital radio growth throughout the world.

Reducing barriers to adoption

In many jurisdictions in the world, digital radio has been mandated — ensuring a critical mass of adoption — and we have witnessed the success of DAB+ in countries that have taken this path.

In other jurisdictions, with North America as the largest example, the migration has been evolutionary and voluntary but has been successful at protecting the existing FM band and increasing programming options for broadcasters and listeners. Adoption of HD Radio has attained a prominent status on the dial with offerings in virtually all markets in the United States, and with significant listenership in the key in-auto listener base.

Yet a significant portion of stations still have not adopted digital radio. To this end, Nautel is set on a path to help these stations with simpler, more flexible and cost-effective deployment options.

Years back, Nautel's Digidia team showed that DAB+ could be implemented as a 100% IP software-based solution, which has resulted in significant deployment flexibility and operational improvements. Nautel has had a similar dream for HD Radio for over a decade, and has now implemented that digital air chain in software that can be loaded directly inside our GV2 transmitters to vastly simplify HD Radio implementations.

We call it "Just Add Audio" because if you have content and an IP audio feed, you're set to get on air with digital using one of our GV2 transmitters. For the first time, all of the traditional fixed-box hardware devices are implemented in software, including Omnia for Nautel audio processing and the ability to eliminate FM-HD blend issues via Nautel's synchronization technology.

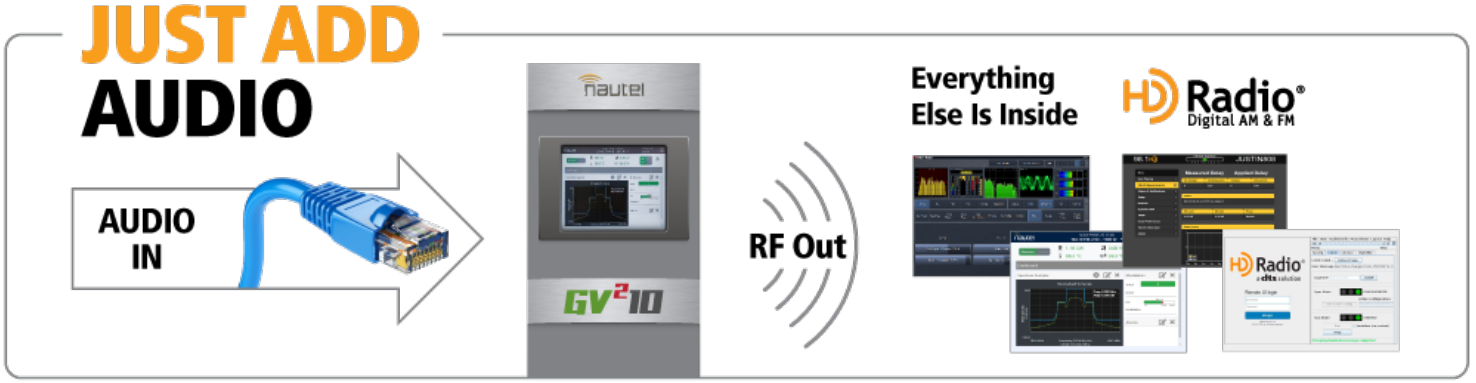
Our goal is to dramatically reduce the barriers to HD Radio adoption with simpler deployment options and by slashing digital deployment costs by up to 1/3 or more.

More content and languages

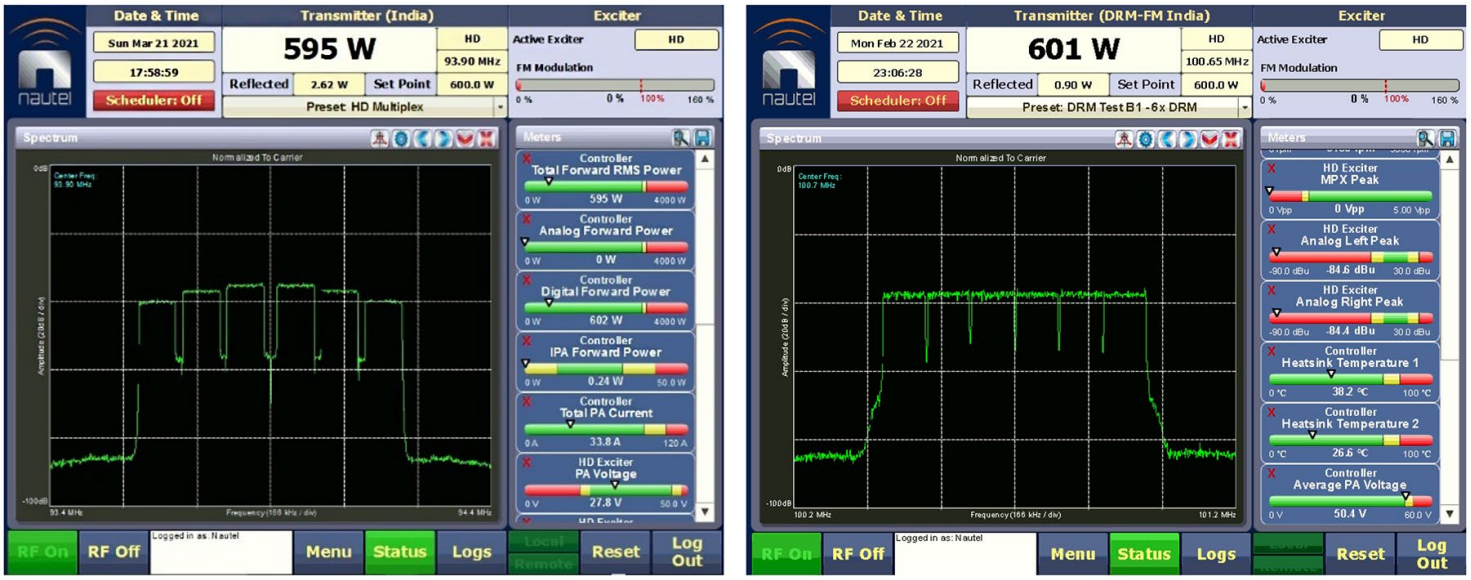
The DAB+ standard has clearly demonstrated the power of multiplexed signals for radio transmission. Jurisdictions can enable numerous content formats and/or languages to be broadcast in a manner that efficiently uses the spectrum made available for DAB+ transmission. But what option is there for geographies that would like to gain the benefits of multiplexing in the existing FM band?

To address that challenge, Nautel's engineering team invented a digital radio multiplexing technology that utilizes existing DRM or HD Radio standards. These patented Digital Multiplexing technologies, DRM MultiPlex and HD Radio MultiPlex, are helping to demonstrate the full potential of digital transmission.

The digital multiplexing concept makes it possible to combine multiple digital radio signals in the FM band, which are received via existing digital radio receivers.



Below
A promotional graphic for the "Just Add Audio" campaign



Above
Nautel's user interface shows digital multiplexing that combines multiple digital signals in the FM band using HD Radio, left, and DRM.

The ability to do this from one transmitter, one antenna and one location greatly reduces broadcasters' equipment needs.

On-air tests have successfully demonstrated the viability of operating up to six separate digital channels from one transmitter, each of which carries multiple HD Radio or DRM services. Similar to the DAB+ multiplex, each channel can be operated independently, allowing several broadcasters to use the same transmitter while maintaining control over their content and distribution.

Nautel's innovation is a suitable solution for nationwide rollouts of digital broadcasting, especially in applications where multilingual services are desired. The technology is also applicable to single-frequency networks, with some of the content remaining local or regional while other channels are sent nationwide.

Ensuring radio's prominence

One challenge and opportunity for all radio standards worldwide is to ensure its prominence in the face of a changing media landscape with streaming and podcasting competing for listeners.

Nowhere are these changes happening as rapidly as on the automobile dashboard. Nautel believes, as do many other broadcast organizations worldwide, that metadata such as station graphics, album art and even visual advertisements or infographics are a key to ensuring radio's visual prominence and listener engagement vitality. As I write this article, WorldDAB is holding its annual automotive summit, which showcases some of the most advanced thinking for promoting radio on the dashboard dial. Digital radio's advanced graphical and metadata capabilities are among the key tools available to broadcasters as they compete to avoid dashboard dilution.

As noted, many broadcasters in the FM band have yet to harness digital radio's tool set for an enhanced presence. That is why Nautel recently announced its Digital Radio Test Drive initiative for North American broadcasters.

Here, the goal is to make it easier for stations that have yet to test HD Radio in their markets to test the potential enhanced revenue, ratings and listenership in their particular market for six months, at minimal cost. This Test Drive requires a Nautel GV2 transmitter but there is no need to buy extra HD Radio equipment, and Nautel's software-based air chain fees are waived during the test period for eligible broadcasters.

We believe that as in many other markets around the globe, once broadcasters and their listeners have experienced the world of new options that have been opened through digital radio, there will be no going back.

Nautel is passionate about digital radio transmission and the promise it presents to broadcasters across the spectrum. This passion has driven much of our innovation for the past two decades and we can't wait to see what happens next. Join us on this exciting ride!

> **Our goal is to dramatically reduce the barriers to HD Radio adoption with simpler deployment options and by slashing digital deployment costs by up to 1/3 or more.**

Radio's evolution progresses, but we need to keep up

Voice control is a good example of why we need to think beyond audio

Writer

Nick Piggott

Project Director, RadioDNS

I recently presented at the WorldDAB Automotive Event on a subject that I don't think any station manager or technical manager would ever have considered just five years ago.

I started with a familiar opening: the evolution of radio from its first days in vehicles. How easy it was for broadcasters, who just needed to broadcast a single, mono, audio channel on an AM frequency. As technology has evolved, the capabilities of vehicles and broadcast radio have evolved: FM, stereo, RDS. Each step has moved the experience forward, kept up with listener expectations, and demanded more competency and coordination between broadcasters and manufacturers.

I noted that, sadly, more than 40 years after its development, some radio stations aren't able to use RDS correctly.

The arrival of digital radio demands more capability and competency: text information, album art, logos. These are baseline expectations, as fundamental as transmitting (stereo) audio without distortion. Connected vehicles are beginning to demand more again: larger screens, a larger array of media choices, personalisation, voice control.

Voice control was the subject of my presentation.

Think beyond audio

It's necessary to explain to both broadcasters and manufacturers why "out of the box" voice assistant functionality just won't work well for radio.

Listeners refer to their favorite radio station in ways the marketing team would never want to formalize; brand teams create radio station names that look clever, but completely confuse voice assistants ("NRJ"?).

The arrival of voice control into vehicles is an inevitability, as the complexity of vehicles goes beyond what can be delivered safely through a touchscreen interface. Will radio stations understand that they need to provide the right information to help voice assistants navigate drivers to their stations, or will they ignore (or try to abuse) it, as has been the case with technologies like RDS?

If a few stations miss the boat, the problem is theirs; if the industry misses the boat, everyone will lose listeners.

Voice control is a good example of radio needing to do more than "just audio."

"Just audio" is not even table stakes in this vehicle media environment. Stations need to make sure that every station is accompanied with deep, accurate, metadata, and that technical standards are followed properly. Nothing will annoy our colleagues in the automotive industry more than them investing millions in developing functionality to see radio stations misuse or disuse it.

There are no insoluble problems in this space. It needs stations to decide to act; any station can do really high-quality visual content, any station can get their station logos correct. The technical standards and off-the-shelf solutions exist. When deciding where to route investment, maybe a little less outdoor pays for a much better presentation in the vehicle?

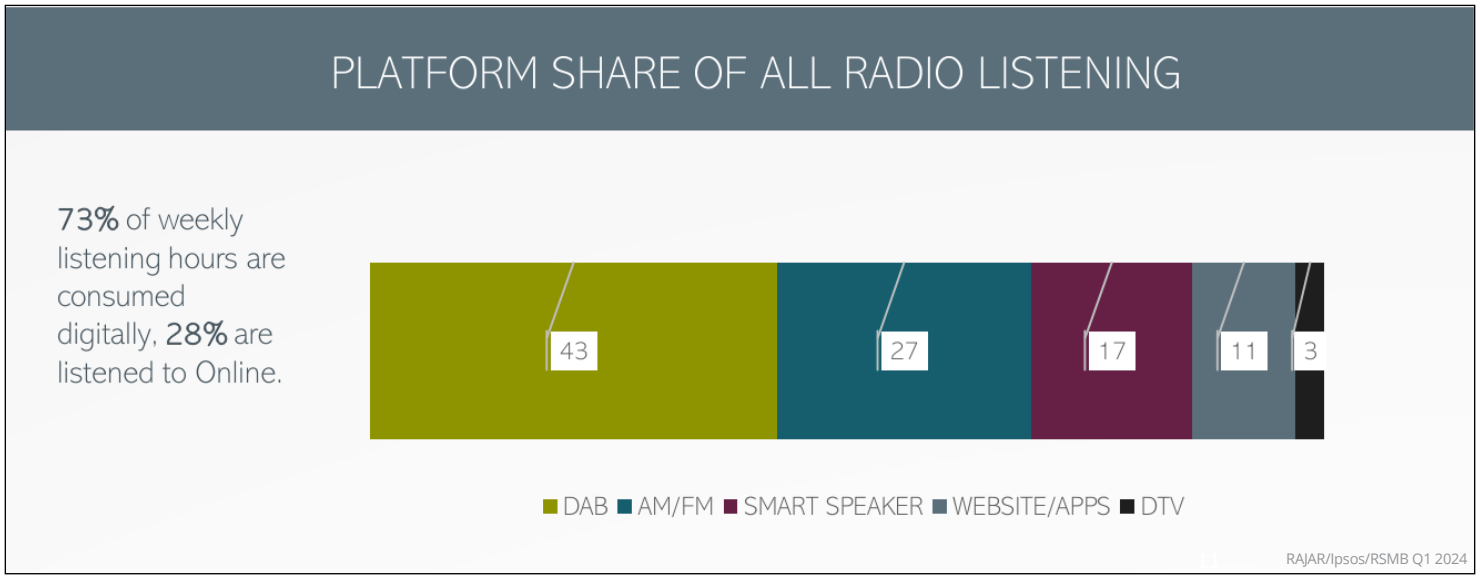
Voting with their dials

We must acknowledge that the automotive industry moves slowly. It can take a few years from committing to a new function to that function appearing in vehicles on the roads.

That's a difficult argument to make against the apparently instant returns of investing in apps and above-the-line-marketing. But it's strategically vital to protecting the vast amount of in-vehicle listening that happens in every market.

The digitization of radio is proceeding at different speeds in different markets. The E.U. and U.K. benefit from

> **"It's necessary to explain to both broadcasters and manufacturers why 'out of the box' voice assistant functionality just won't work well for radio."**



Above
Infographic on share of digital radio listening in the U.K.

> **New cost points are encouraging more countries to look at the benefits of digital broadcast radio, in Africa and Asia.**

governmental mandates that require DAB digital radio to be installed in all passenger vehicles, which in turn makes broadcasting digitally as attractive as any other format.

Listeners are voting with their dials; in the most recent U.K. audience survey, analog (FM+AM) share of listening was just 27%, continuing its decline. AM radio is nearly extinct in Europe, as stations previously on AM have found new homes on DAB.

The cost of broadcasting digitally is going down, through use of open standards and generic hardware. What used to cost £/€250,000 now costs £/€25,000, because that's what happens with technology. The success of "small-scale licensing" of digital radio in European countries shows what's possible.

Those new cost points are encouraging more countries to look at the benefits of digital broadcast radio, in Africa and Asia. Thailand's regulator, NBTC, has launched a nationwide relicensing plan based on DAB+, as a way of bringing more radio stations more reliably to the country. Ghana has launched trials of digital radio, adding another African country to the list of trialists and providers of digital radio on the continent.

Analog and digital radio will coexist for some time, in different proportions in each country. Hybrid radio is a part of both analog and digital radio now and is already being built into connected vehicles.

Beyond "service following"

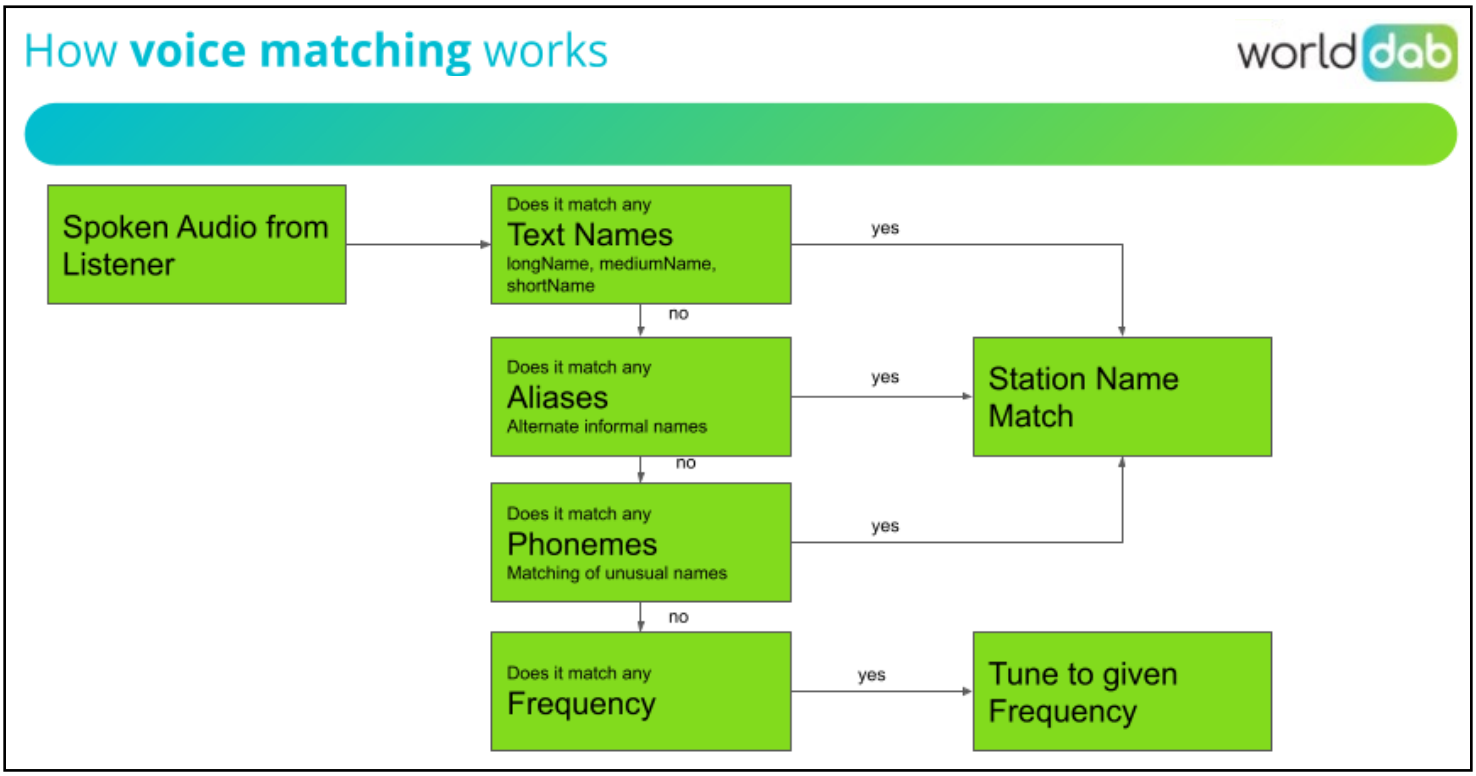
When we talk to people about hybrid radio, the feature that many radio people instinctively understand is the ability to switch audio automatically between broadcast and IP, allowing uninterrupted listening (almost) regardless of location.

It's easy to understand how that supports TSL. It's in production vehicles in Europe and North America today, from brands like Audi and VW, and it's quite remarkable how seamless the transition is.

But the "hybridization" of radio has far more value in it. As a direct result of putting in standards for hybrid radio, tens of thousands of radio stations now provide essential information in a standard format that any vehicle can use. That may not be as easy mentally to convert into TSL, but it does.

It's that information that keeps radio not just present but prominent in vehicles. It's one thing to have a radio built into millions of vehicles, but if nobody likes using it, it's a waste of time and money.

The vehicle dashboard has attracted the attention of Google and Apple. Drivers want to bring their digital worlds, which they have committed to their iPhones or Android phones, and Siri and Google Home and Alexa, into the vehicle. It's not yet clear how much territory automotive manufacturers will cede, and it's clear there's still ebb and flow happening, such as GM's announcement to pull back from both platforms.



Above Flowchart of how voice matching for radio stations should work in vehicles.

Regardless, broadcasters can provide "apps" for cars in the same way that they provide "apps" for phones. Those apps offer, demand or require the driver to "log in", and provide access to audio beyond just linear radio (even if that linear radio might be subscription based and ad-free).

Incumbent broadcasters would be smart to promote and push broadcast radio as the "gateway" to their app experiences. Even the busiest broadcast dial — more than 100 stations in some DAB markets — is significantly more navigable than an app store or generic streaming radio app. It's complex and continually expensive to secure prominence for apps in dashboards, either through marketing to listeners to help them find the app, or by having it pre-installed. Every vehicle will have a "Radio" app, we just have to make sure it's top-level and heavily used by listeners, which means making it good — really good. And that means getting the new basics right: the audio, the text, the logos, the visuals, the voice recognition.

The newest functionality being standardized by RadioDNS intends to provide a simple bridge between the "radio app" installed in the car and a broadcaster's own apps. It creates a logical and seamless journey for the listener from live radio into exploring on-demand content via broadcaster apps.

It's the first attempt at personalization for broadcast radio — "If you like this live radio show, then can we recommend you give these podcasts (on-demand audio) a listen?" It's a guided introduction, rather than being dropped into the deep end of exploration. It will prompt the listener to install the app on their first journey, and after that, the app stays installed. It's simply a great way to get your radio station app installed in a car, starting from the live radio station. All you need to do is provide the right information in the right standardized format.

All of this happens when radio stations prioritize more than just the audio output. It's not sufficient to leave it all to the techs to do. The pace of radio's evolution is set by the competing media that our listeners use every day, and we need to step it up. The standards, organizations and solutions exist to make it happen, but it has to start with radio stations deciding they want to stay the first choice for their listeners, not the least-worst.

"Nothing will annoy our colleagues in the automotive industry more than them investing millions in developing functionality to see radio stations misuse or disuse it."

On-demand and hybrid platforms will grow in importance

Embracing these technologies will increase listener loyalty and engagement

Above
Peter Passian

Peter Passian is senior director of sales for the eastern hemisphere for Telos Alliance.

In what areas is the company active in manufacturing for digital radio?

Peter Passian: Telos Alliance does not manufacture devices for the digital distribution of radio programs. However, we do manufacture devices that process and optimize audio for digital broadcasting. These include Omnia audio processors and Telos streaming audio encoders, both of which are essential parts of digital radio infrastructure.

What is the most important trend in digital radio technology that engineers and managers should be aware of?

Passian: One of the latest is hybrid radio, in which the signal of the radio program — FM, HD Radio, DAB — is seamlessly transmitted to listeners via an Internet connection such as WiFi, 3G, 4G, LTE, etc. What's cool is that this technology not only enables multimedia but also audience participation and interactivity with the broadcaster, which can increase engagement and listening time.

In what countries do you see digital broadcasting as most well established?

Passian: Aside from the United States, Australia, India and various European countries are leading the way in the distribution of digital radio.

Where are the various platforms strongest?

Passian: HD Radio has established itself in the USA, and India is now the largest market for DRM. Globally, however, DAB+ is the leading format.

When we consider other distribution platforms, it's immediately obvious that the acceptance and prevalence of internet radio plays a key role worldwide.

What countries are likely to be next to adopt digital radio standards?

Passian: Right now, China, the Russian Federation, Portugal, Latvia, Lithuania and countries in Central Africa are showing interest in digital radio, and especially in DAB+. Many countries have been operating a mix of analog and digital radio for years, but what's remarkable are the countries that have already switched off analog radio entirely, such as Norway did in 2017, or plan to do so soon like Switzerland, which is planning to switch off analog in 2026.

What is the state of the receiver marketplace?

Passian: I think it's very good. Most new cars nowadays have HD Radio or DAB+ receivers built in, and from what I've seen, the range of available mobile DAB+ devices is constantly increasing.

What strategies should radio broadcasters adopt in light of the transformation of the car dashboard?

Passian: Consumers have embraced on-demand content on nearly every delivery platform. Radio broadcasters know this, and many have ventured into on-demand programs. I think consumer affinity for on-demand will only grow, so it would be good for broadcasters to continue investing in on-demand programs and hybrid radio technology — especially since CarPlay and similar systems that seamlessly transfer audio content from smartphones to automotive media systems are becoming increasingly common.

How can radio improve its track record with visual display and metadata?

Passian: The end devices are changing. Even entry-level cars are outfitted with "media systems" instead of simple radios. Consumer behavior is also changing, with radio content consumed on mobile devices such as smartphones and tablets.

Visual presentation is, therefore, an increasingly important component of radio broadcasters' offerings, as visual metadata, or live content via "visual radio" with cameras inside the studios give users the immersive, interactive experience they've come to expect from entertainment channels.

Embracing and implementing these technologies will increase listener loyalty and engagement, which benefits the radio industry as a whole.

DRM emphasizes flexibility and quality of service

India and China are among the target markets for the consortium

The Digital Radio Mondiale broadcasting system is an open standard designed as a digital replacement for analog radio broadcasting in the AM and all VHF bands (I, II, III) including FM VHF band II. It can be operated with the existing channeling and spectrum allocations of a given country or market.

DRM can be used for wide-area coverage in the short-, medium- and longwave bands below 30 MHz, replacing amplitude modulation (AM). This version is sometimes called DRM for AM and can be tailored with four robustness modes to fit various circumstances including international service.

DRM can also be used for local coverage using VHF bands above 30 MHz, to replace analog frequency modulation (FM); this is sometimes called DRM for FM and has a dedicated robustness mode optimized for local and regional broadcasting.

The DRM Consortium, founded in China in 1997, is a not-for-profit organization; its members include broadcasters, network providers, transmitter and receiver manufacturers, universities, broadcasting unions and research institutes.

Above
A publicity campaign in India visited major car showrooms to highlight the presence of DRM receivers on which AIR medium-wave broadcasts are available.

We talked with Ruxandra Obreja, consortium chair since 2008.

How would you characterize the global progress of DRM?

Ruxandra Obreja: DRM is in a very good place, accelerating its progress both geographically and in receiver solutions. And COVID threw fresh light on certain aspects and benefits of DRM that I hope we'll talk about.

The latest DRM General Assembly was held in the United Arab Emirates in May.

Obreja: We've always said DRM is not only open technology, but global, the only standard that can cover all frequency bands. While we'd held assemblies in Europe, Canada and Malaysia, our meeting in Dubai was the first one in the Middle East. It was good to see the strength of interest across Asia on this occasion.

When some people think of DRM, they think of India; but there are important DRM developments in Indonesia, China, Pakistan, Nepal and New Zealand. And we've seen interest even in countries like Malaysia and Thailand, as

well as African countries like South Africa.

It's notable that we have diversified our receiver marketplace. At one point we had one receiver manufacturer in India and one in China; now there are numerous solutions, some global and some smaller agile companies, particularly in Asia.

It does seem fair to think of India as a flagship application so far. DRM is used by the public service broadcaster All India Radio; and recently Yogendra Pal, the DRM chairman in the country, wrote a commentary in the IEEE BTS publication about how India could deploy DRM on FM.

Obreja: To review: In India, terrestrial radio broadcasting is carried out in medium-wave at 526–1606 kHz, shortwave at 6–22 MHz and VHF band II at 88–108 MHz. All India Radio, the public service broadcaster, has a network of 742 transmitters, including shortwave, medium-wave and FM; its coverage in medium-wave and FM is 90% by area and 98% by population, whereas around 59% by area in the FM band.

Private radio broadcasting was introduced in 2000 when commercial FM stations were allowed to broadcast programs, mainly music, with local content but no news. There are 388 private FM stations at present and several community radio stations.

AIR has adopted nationwide digital radio services in the medium-wave and shortwave bands using the DRM standard; it has 41 high-power DRM medium-wave transmitters in use. Four transmitters — one each in four major city centers — are carrying pure DRM transmissions around the clock. Thirty-three transmitters are working in simulcast mode, with one hour in pure DRM. Other transmitters are yet to start service. The medium-wave transmitters cover roughly 900 million people with DRM broadcasts.

AIR is carrying two to three digital audio services from a single MW transmitter, along with the Journaline text service. AIR has tested Emergency Warning Functionality with DRM to alert the population during disasters.

Regular AIR digital transmissions in shortwave started in 2009 from a 250 kW transmitter in Delhi. Today a 500 kW shortwave transmitter at Bengaluru is carrying external service of AIR in DRM. Two more shortwave transmitters, 100 kW each, are expected to be operational soon in DRM. And over 6 million new cars fitted with DRM receivers are on the roads in India.

Now the consortium has expressed the hope that the Ministry of Information and Broadcasting will adopt DRM services for the FM band.

We've demonstrated the broadcast of as many as six individual DRM blocks or channels from a single transmitter and antenna. One DRM channel carries two to three audio programs, so on a single transmitter one could broadcast as many as 18 programs in pure DRM mode. In this

Left
Ruxandra Obreja

scenario each broadcaster, sharing the same transmitter and antenna, remains in full control of its broadcasts and energy consumption level and need not rely on an expensive third-party operator.

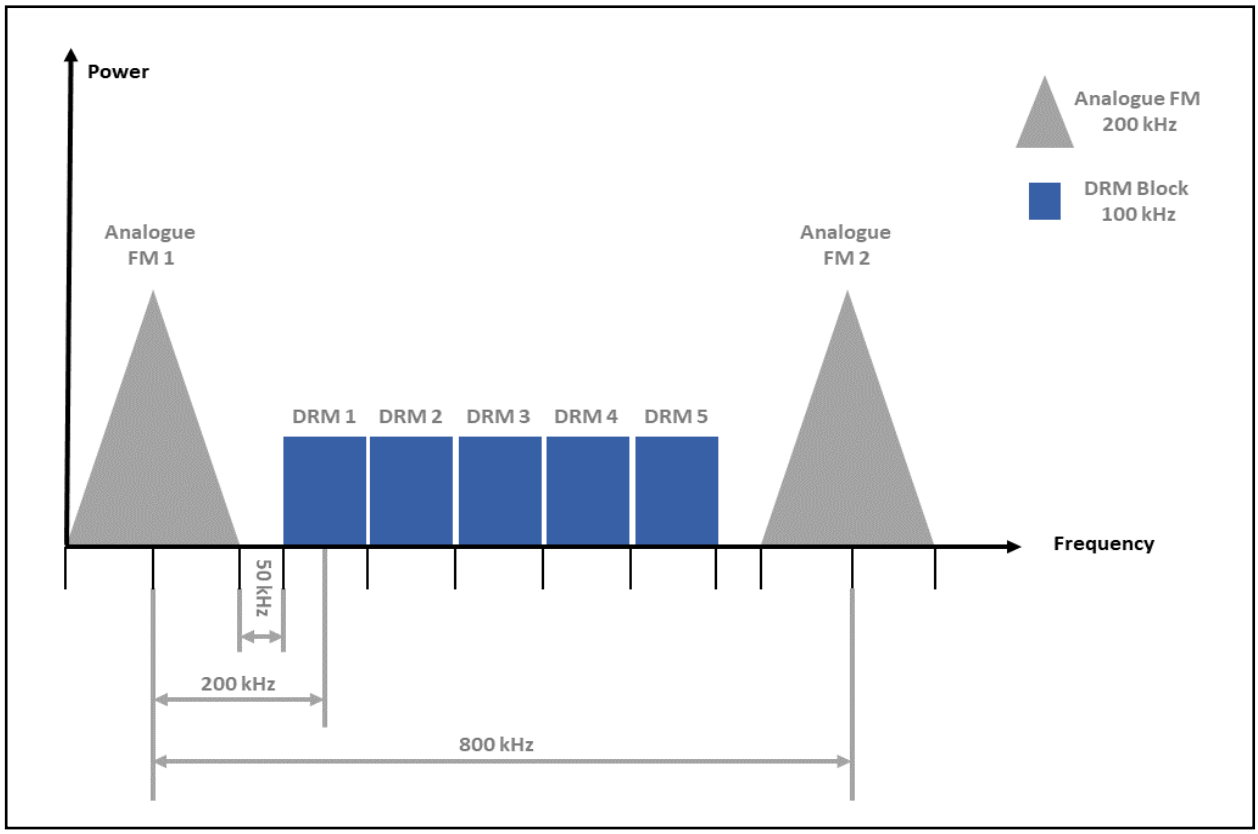
The DRM for FM decision is in the hands of the ministry after analysis of tests and demonstrations of DRM. We believe they're close to announcing what's going to happen with digitization of the FM band, though the national elections only recently concluded, and a new minister of information and broadcasting has been just announced.

Some commercial FM stations in big metros in India are quite profitable, and I expect the decision will involve not only AIR, which covers the country with medium-wave, shortwave and FM, but also the private stations.

As you know, in many countries successful FM station owners are not crazy about getting digital, because their business plans are quite profitable. But we hope to demonstrate real benefits — choice, energy savings and digital quality without interference — to get those stations on board.

India's process has been limited to DRM and HD Radio?

Obreja: Yes. The government requested analysis of the two standards for the FM band. We are hopeful that DRM as an open standard will be chosen, given its use in AM already; it would not make sense to go from one open standard to the other proprietorial one. It would be difficult and costly to create DRM+HD Radio receivers. I hope we'll be able to



Right
According to the consortium, India could roll out digital services in the FM band by adding a broadband transmitter in every city and town in unused white space of 600 kHz between existing analog transmitters. The transmitter's output can carry multiple DRM blocks occupying 100 kHz, each made up of three audio and one valued-added channel. DRM says it is possible to transmit up to five or six blocks in this white space from a single transmitter, for up to 18 audio and six data channels.

celebrate the announcement of DRM for FM soon, though I have no special insight into the announcement time frame.

The DRM website has a useful snapshot of where DRM is used or being considered. Are there one or two that stand out?

Obreja: In China, three important agencies last August endorsed DRM for domestic AM broadcasts and China Digital Radio for FM; and they recommended that cars sold there should support such platforms. The government is also requiring a strengthening of broadcast infrastructure because there's no point in putting receivers in cars if you don't have the broadcasts.

If India and China were both to embrace DRM, Digital Radio Mondiale would be without doubt the most important and widely used digital radio standard in the world — those countries alone have about 3 billion people.

Indonesia has adopted DRM for both medium-wave and FM, using DRM in VHF Band II (87.0–108 MHz) and Band III (174-202 MHz), with the rest of Band III allocated to DAB+.

Indonesia is important — there are 280 million people on 18,000 islands, and they're in the Ring of Fire, with its tsunamis and earthquakes. They are very interested in DRM, especially its emergency warning functionality.

Before COVID we might not have emphasized this angle so forcefully, but disaster warnings using digital radio have become quite important across the world, given the manmade and natural disasters we read about in the news.

We also see interest from African countries. Major institutions like the African Telecommunications Union have said that if countries wish to digitize radio, they should only consider DRM and DAB. South Africa has taken this approach, and we hope to see work starting to produce dual receivers.

A few DRM digital transmitters can cover an entire country or a large geographical area. We are keen to see any territory adopt DRM, but its advantages in covering very large areas is indisputable, and I think government regulators and broadcasters have taken that on board.

By the way, different broadcasters use DRM in different ways. Radio New Zealand uses DRM as a distribution platform to islands in the Pacific; although programs are broadcast in DRM, not many of their listeners have laptops

Right
Volunteers in India promote DRM for use along highways. channels.

Left
The DRM General Assembly met in Dubai in May.

with DRM accessories, so they reconvert the DRM signal back to FM to deliver news to those islanders.

What aspects of DRM support emergency alerting and information?

Obreja: Support for emergency warnings — audio as well as multilingual text — has been part of DRM's DNA from the start. The Emergency Warnings Functionality or EWF can transmit various levels of alerts over large, regional or small areas and in various languages simultaneously by using the embedded Unicode system. Alerts can be customized by region, to avoid unnecessary panic, localized to the disaster area.

This appealed to Indonesia, which has five DRM FM transmitters on the most populous island, Java, that can provide this kind of service. For them, being able to alert the population to natural disasters is crucial.

CML Micro has introduced a receiver module to enable consumer radio manufacturers to deploy low-cost, low-power DRM designs. It's sold through companies like Mouser, DigiKey and RFMW. Why is it notable?

Obreja: The DRM1000 module is an engineering building block allowing local manufacturers to create receivers for their home markets. It is a single component capable of delivering DRM in all bands, which is fantastic, and it supports features like emergency warning.

It is an antenna-to-speaker solution, and it has all DRM modes, codecs and licenses included. It is very small, about the size of a normal battery; and it is very energy efficient. Power consumption has been an Achilles heel for digital standards, as we all know.

During our General Assembly, a South African supporter of DRM took this module and created a very basic receiver using a 3D printer. It took him not more than an hour or two. So I think DRM1000 will be a game-changer, especially for markets that want inexpensive receivers.

What else should we know?

Obreja: An important possible application is distance learning. DRM can support education for people wherever they are in a country, even in remote areas — not only during a pandemic or disaster but whenever distance learning is required. The educational programs are free to air to anybody without the need for internet.

DRM receivers also are capable of caching information, like schooling documents, for download at any time. So, a receiver can save information, text, pictures and audio, and the information can be accessed by students on other devices, working almost like a small school library.

Our awareness of this aspect was raised during COVID when children couldn't go to school. Even now, the figures in Africa are horrendous. Distance learning can also support the work of nurses and health care professionals.

We hope that large organizations that prioritize these issues will not forget the potential of digital radio for education and health information. Even today, 30 to 40% of the world population has no access to internet. We want to show that you can bring information to children of the 21st century, even if they do not have internet connections or/and electricity.

DRM can also be used in public signage, for companies to advertise on large public screens. The Journaline feature enhances text content with designs and graphics, and the signage service supports emergency warning, too. DRM also offers data carriage capability. Digital radio will never beat the speed of internet, but you could use one or more of DRM's channels for carrying data securely.

Regulators and governments are looking at digitizing radio, they want to understand the technologies and they're willing to combine, whether that's DRM and CDR, or DRM and DAB. Having multi-standard receivers will help digitization of radio, and the various proponents of the standards will think more collaboratively.

But digital radio is here to stay. It takes time for important technologies to grow. Will one standard eventually prevail? Well, how many power plugs do you need when you travel the world? Territories are going to choose what's best for them and meets their specific needs.

“Shaping the future of radio unlike any other”

Yann Legarson discusses Radioplayer’s plans for growth

Right
Yann Legarson

Radioplayer is owned by broadcasters in 23 countries and brings together approximately 10,000 radio stations globally.

“Collaborating with automotive and tech leaders, we’re transforming radio for connected audiences,” it states. “Our goal is to empower radio’s future through innovation and strategic partnerships.”

Flagship products include hybrid radio integrations in cars, an app ecosystem and smart speaker integrations. “Through the Radioplayer Data Platform and Insight Dashboard, we help broadcasters optimize content and business strategies. Through global collaboration and advocacy, we uphold radio’s cultural significance and accessibility.”

Yann Legarson is the CEO.

What should someone who works in digital radio broadcasting know?

Yann Legarson: Radioplayer is a unique technology platform created by broadcasters, for broadcasters. Our mission is to keep radio simple and accessible while driving innovation.

We provide a suite of tools and services that help radio stations thrive in the digital age. This includes our cutting-edge hybrid radio solutions, which seamlessly combine traditional broadcast with internet-delivered radio and content to create a richer, more engaging listening experience.

For someone working in digital radio broadcasting, Radioplayer offers several advantages.

First, our platform ensures that radio remains a central feature in connected cars and smart devices. We work closely with the automotive industry to integrate radio seamlessly into the dashboard, preserving its prominence in an increasingly competitive audio landscape.

Second, our unique data platform provides valuable insights into listener behavior, helping broadcasters understand and engage their audiences better.

Finally, Radioplayer fosters a collaborative environment where broadcaster share knowledge, resources, and best practices, driving the entire industry forward.

What strategies should broadcasters adopt in light of the transformation of the car dashboard?

Legarson: That transformation presents both challenges and opportunities for radio. Here are a few strategies to consider:

1. Embrace hybrid radio; it is the future of in-car listening. By combining traditional broadcast radio with internet-delivered content, broadcasters can offer a more dynamic and interactive experience. This approach ensures that listeners have access to the best of both worlds, with reliable live broadcasts complemented by personalized content and on-demand features.
2. Leverage data insights. Understanding your audience is key to staying relevant. Radioplayer's data platform provides broadcasters with detailed insights into listener preferences and behaviors. Use this data to tailor your content, improve engagement, and make informed decisions about programming and marketing.
3. Focus on the in-car user experience, which should be seamless and intuitive. Collaborate with car manufacturers to ensure that your radio station is easily accessible and discoverable. This includes optimizing metadata, supporting voice commands, and integrating with car infotainment systems like Apple CarPlay and Android Auto.
4. Innovate and experiment. The digital transformation of the car dashboard is an opportunity to innovate. Experiment with new formats, interactive features and cross-platform integrations to keep your content fresh and engaging.

What are the key priorities for Radioplayer in the coming year?

Legarson: They revolve around several main areas:

Enhancing hybrid radio and voice integration — We are advancing our hybrid radio solutions and focusing on voice integration in-car. Ensuring accurate and contextual radio station voice search capabilities is crucial to enhancing user engagement and accessibility.

Advocating for radio's prominence — Radioplayer is committed to advocating for radio's central role in the media landscape. Unlike other media services, our focus remains on promoting radio's unique qualities and audience reach.

Global expansion — We are expanding our presence globally, including the appointment of a new U.S. country manager. We will continue to expand our global footprint, ensuring that radio remains a vital and prominent medium in all markets.

Driving innovation, which remains at the core of Radioplayer — We are exploring new technologies and trends, particularly in voice-activated systems for in-car environments, to ensure that radio remains relevant and accessible.

Above
Caroline Grazé, right, country manager for Germany, and Yann Legarson, center, promote Radioplayer during Radiodays Europe in Munich.

What else should we know?

Legarson: Radioplayer is more than just a technology platform; it's a global company and a community of broadcasters working together to shape the future of radio. Our collaborative approach ensures that we stay at the forefront of innovation while maintaining the simplicity and reliability that listeners love about radio.

We're committed to making radio accessible, engaging and relevant in the digital age. Our unique hybrid radio solutions, data platform and strategic partnerships with the automotive industry set us apart. We're excited about the future and look forward to continuing to drive the evolution of radio.

To sum it up, Radioplayer is here to ensure that radio remains a vital part of our daily lives, whether at home, on the go or in the car. We believe in the power of radio to connect people, inform and entertain. And with our technology and partnerships, we're making sure it does just that, in the most innovative and impactful ways possible.

> **"Radioplayer is here to ensure that radio remains a vital part of our daily lives, whether at home, on the go or in the car. We believe in the power of radio to connect people, inform and entertain."**

Miklius: Receiver availability has helped DAB+ uptake

Major FM infrastructure is still being built outside of western Europe

Raymond Miklius is vice president of technology at GatesAir, overseeing product innovation and strategic development of broadcast transmission and distribution technologies. He joined predecessor company Harris Broadcast in 2013 as director of television transmission and later was VP of EMEA Sales and Channel Programs. Prior to Harris he worked at Broadcast Electronics, Tellabs, Baxter Healthcare Corp. and Atlantic Richfield Co.

Ray Miklius

What is GatesAir's assessment of the state of the global digital radio broadcast marketplace?

Ray Miklius: DAB+ is being widely adopted outside of the U.S. market. We are participating in signal expansion in western Europe, which was an early adopter, with significant new licenses being issued in Italy and in the U.K. We are seeing adoption in new countries such as Saudi Arabia and Thailand. DAB+ provides a significant improvement in spectral efficiency, facilitating more content streams at lower transmitter powers.

In what areas is the company active in manufacturing?

Miklius: GatesAir has a full line of products supporting HD Radio mostly for the U.S. market. We also have a full lineup of DAB+ transmitters from 50 W to over 10 kW, both air- and liquid-cooled. The highest-power DAB+ transmitter we have shipped is 8 kW; power levels tend to be lower.

In what countries is digital broadcasting most well established?

Miklius: Western Europe was the first region to adopt DAB+. There are signal expansion efforts in multiple countries, more program streams and new licenses are being issued.

Where is HD Radio penetration strongest, where is DAB+ strongest, where is DRM strongest, what other platforms have found success?

Miklius: HD Radio has been mostly a U.S. play. The rest of the world seems to be settling on DAB+ primarily because receivers are readily available. We see very little DRM interest.

What countries are likely to be next to adopt digital radio standards?

Miklius: Currently, early DAB+ infrastructure buildouts are in the Middle East and South Asia.

How would you characterize the state of the receiver marketplace for digital radio formats?

Miklius: DAB+ receivers are readily available in multiple forms, both handheld and in the car. Most cars for the Middle East are imported from Europe, complete with DAB+ receivers.

Will the sunsetting of FM accelerate around the world? On what timetable?

Miklius: It seems as though FM sunsetting discussions are most frequent in western Europe where DAB+ provides an alternative. Outside of that region, we still see major FM infrastructure being built. We have multiple projects in Africa where FM signal expansion is robust. This mature technology still is one of the most cost-effective ways for broadcasters to reach the populace.