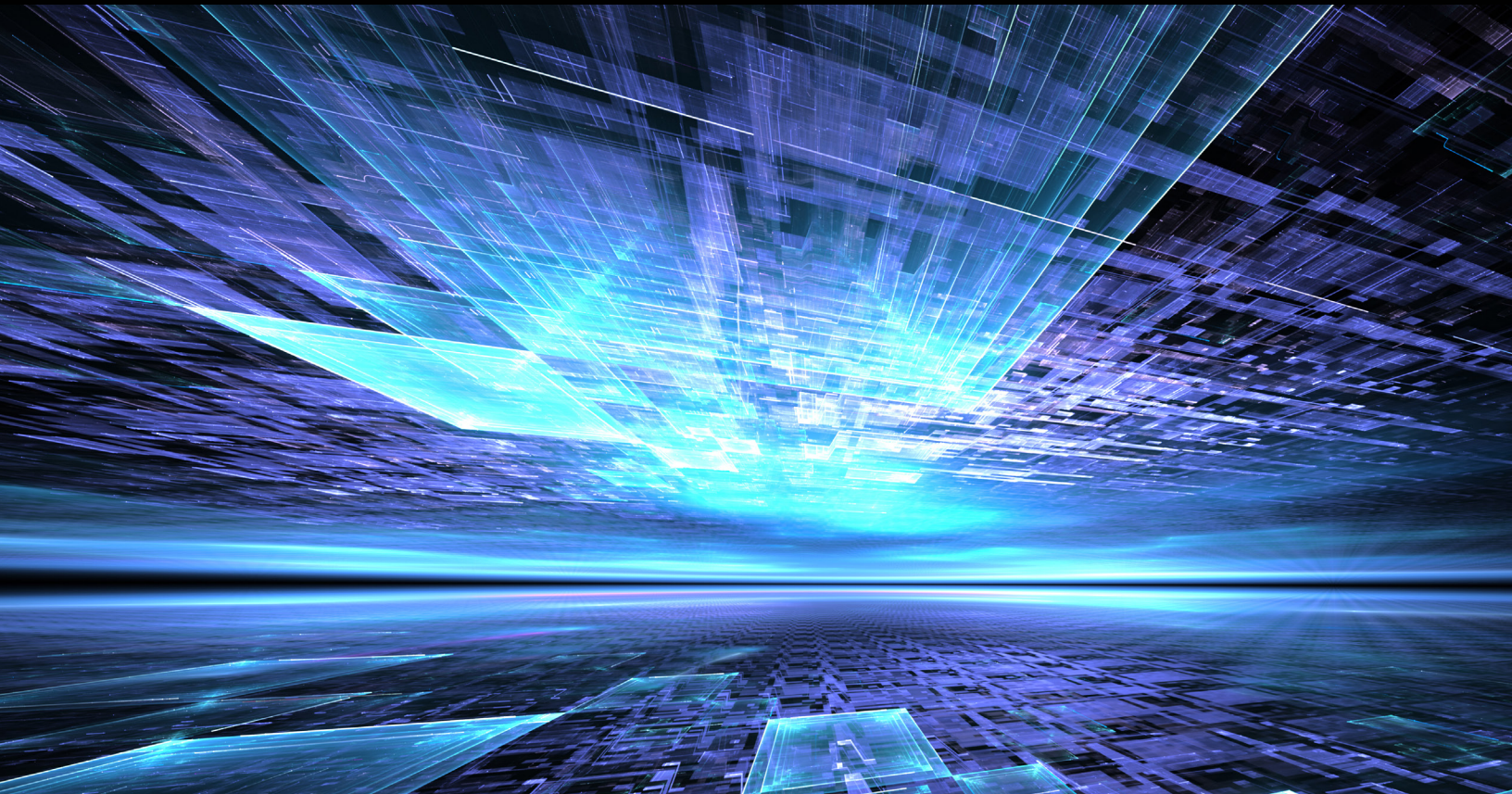


NATIONAL ASSOCIATION OF BROADCASTERS



BROADCASTING A CYCLE OF INNOVATION

Always On. Always There. Always Moving Forward.



BROADCASTING

A CYCLE OF INNOVATION

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Local radio and television broadcasters are part of the communities they serve, providing Americans with investigative stories, local news, emergency warnings, entertainment and sports they rely on every day. Unlike cable, satellite or streaming services, broadcast radio and television are free – you just need a device and an antenna. Through over-the-air (OTA) broadcasts, digital apps, social media and new technologies, broadcasters are innovating to enhance the delivery of the content and services their communities value, ensuring listeners and viewers are always connected, informed and entertained.

LOCAL RADIO AND TELEVISION: A HISTORY OF INNOVATION

From the first broadcast of a radio signal over a hundred years ago to the thousands of choices provided by HD Radio today, radio continues to innovate and offer free choices to listeners. HD Radio delivers crystal clear sound and additional channels of music, talk and foreign-language programming on 2,300 stations. FM stations are also utilizing hybrid FM radio technology that combines a spectrally-efficient over-the-air broadcast signal with enhanced broadband services on mobile devices. That means combining a dependable signal with an interactive experience listeners want.

Local television stations have also come a long way since the first commercial TV stations went on the air in the 1940s. When TV stations transitioned from analog to digital in 2009, it revolutionized free, local TV viewing, providing viewers more choices than ever. Digital TV allows stations to transmit more free channels, such as foreign language programming, all-weather, all-sports, favorite classic shows and more. As local TV broadcasters get closer to the realization of Next Generation Television, viewers can look forward to ultra-high definition TV, which provides spectacular images and immersive sound, as well as interactive, personalized services and greater mobility.

From the very beginning, radio and television broadcasters have been investing in new technologies and expanding their content across new platforms. No matter the device, broadcasters are at your fingertips – any time of the day – delivering the breaking news and emergency information you rely on and providing the music and shows that you love most.

Innovation in Radio and Television Broadcasting



1894
Guglielmo Marconi demonstrates first wireless communication.

NBC
1926
NBC, first permanent national network, is formed.



1933
Edwin Armstrong introduces Frequency Modulation (FM).

1958
First airborne virtual television studio (helicopter).



1984
First satellite newsgathering vehicle for local news.



1993
U.S. FM stations begin using Radio Data System (RDS) to deliver program-associated data.



1995
First TV station streams over the internet.



2003
First commercial HD Radio digital broadcast.



2005
HD Radio stations begin offering multicast channels.



2013
Hybrid radio broadcasting begins in the U.S.



2016
First public demonstrations of Next Gen TV broadcasting.

1920
KDKA in Pittsburgh goes on the air as first U.S. licensed commercial broadcast station.



1927
Philo Farnsworth transmits the first all-electronic television image.



1953
First commercial color TV broadcast.



1961
• First FM stereo broadcasts.
• First time radar was superimposed on maps to show breadth of a hurricane.



1994
First radio station streams over the internet.



2004
First local TV mobile application.



2006
First mobile TV channel launched.



2015
Drones first used to capture TV footage.



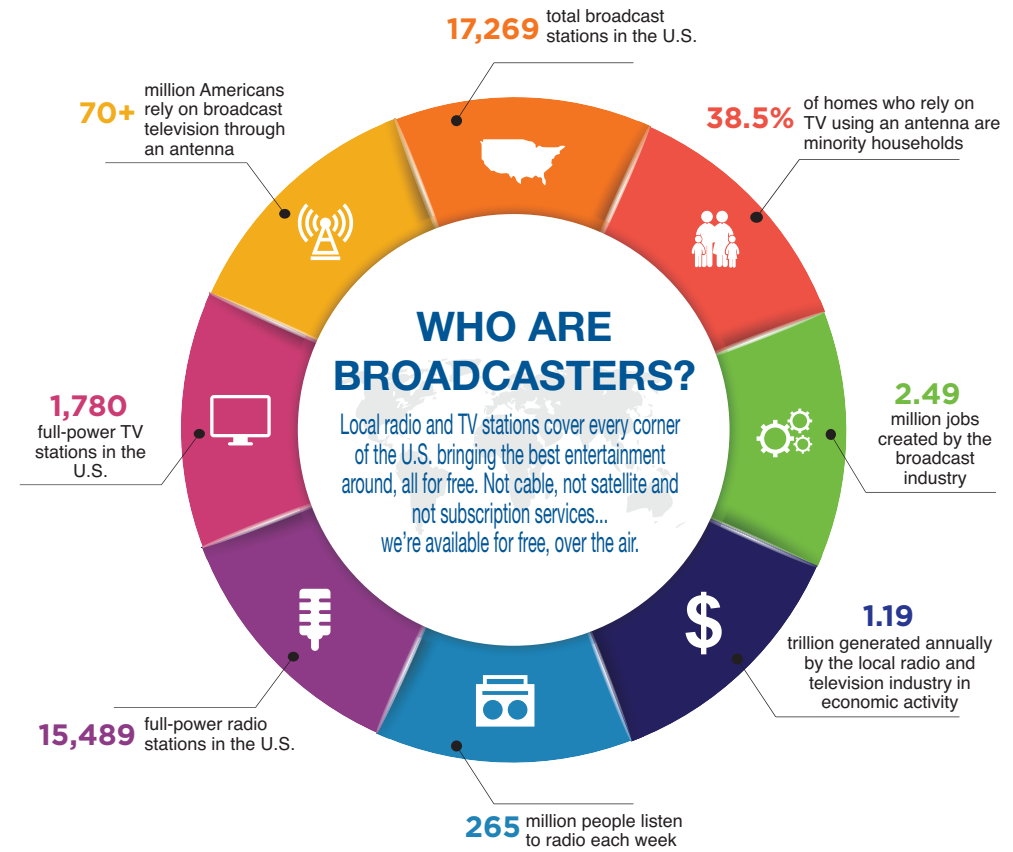
1996
First U.S. broadcast of HDTV.

2009
Full-power U.S. TV broadcasting completes digital transition and switches off analog broadcasting.





Broadcasting's Impact



Broadcasters' locally-focused service is uniquely tied to the communities they serve, committed to innovation and dedicated to serving the public interest. And when the power goes out and other communications systems are down, your local stations are always on. Broadcast radio and TV stations also

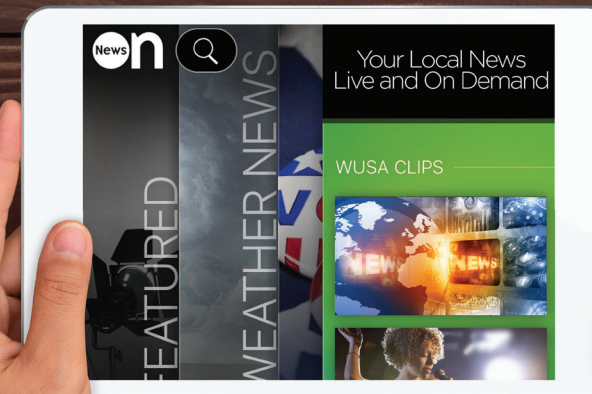
fuel our nation's economy, providing much-needed jobs for our communities. Broadcasters are excited about the future and are committed to innovating to better meet the needs of listeners and viewers and make a positive impact on their communities.

BRINGING BROADCAST INNOVATION TO LIFE

PILOT, a coalition of innovators, educators and advocates, is an organization dedicated to advancing broadcast technology and cultivating new media opportunities. It provides a platform for innovation, an engine for incubation, a venue for testing new technologies and a forum for broadcaster education. Following are just a few examples of technologies and initiatives that this innovation engine is supporting to propel broadcasting forward.

Hybrid FM: Radio on Your Mobile Phone

NextRadio is the only app currently providing listeners with a hybrid FM experience. Using the receivers built into virtually all smartphones, listeners can tune into their favorite local radio stations and use less battery and data than internet streaming. In case of emergencies and when cell towers are down, consumers can stay connected to over-the-air broadcasts on their phone.



NewsOn: News and Weather Updates on Every Platform

Broadcasters provide important local news and weather information through multiple platforms, including iPhones, iPads, Android phones, Roku, AppleTV and more. NewsOn is a lineup of live and on-demand newscasts from TV stations across the U.S., giving viewers instant access to local station news on any device.

PopeCast: Multicast All-News Radio Station

Created by KYW Newsradio when Pope Francis visited Philadelphia in 2015, PopeCast, a 24-hour radio station channel, was an innovative use of programming during this important community event. PopeCast was available over the air and online. The station covered papal events and provided related information, such as traffic, housing and logistics for citizens.



Enhanced Emergency Alerts

In 2015, Sinclair Broadcasting Inc. and KSNV-TV successfully transmitted High Dynamic Range (HDR) 4K Ultra HDTV over the air using the proposed Next Gen TV standards. In 2016, Sinclair conducted the first Next Gen TV advanced emergency alert broadcast to highlight its lifesaving technology.



Home Gateway by PILOT

The PILOT Home Gateway device provided early demonstrations of the capabilities enhanced by Next Gen TV (ATSC 3.0), such as a rich viewing experience that combines over-the-air reception with broadband connectivity to enable interactivity and enhanced emergency alerting.



Next Gen TV: Broadcasting with ATSC 3.0

In 2016, WRAL-TV became the first commercially-licensed television station to broadcast using Next Gen TV standards. WRAL launched the new station with a 4K/UHD documentary followed by the WRAL live news. WRAL also broadcast the 2016 Olympics in 4K.

Augmented Reality for Weather

Local TV stations like WLS-TV in Chicago, Ill., and WTVD in Raleigh, N.C., have recently begun experimenting with augmented reality for weather forecasts. This allows viewers to visualize weather in more engaging and informative ways.



Ultra HDTV 4K Olympics Coverage

NBC Olympics' coverage of the 2016 Games from Rio included production and distribution of selected events in stunning Ultra HDTV. The UHD coverage of the Opening Ceremony included 4K, HDR video and 11.1-channel immersive audio. This technology produced a richer and more realistic television experience.



SHAPING TOMORROW

As we work to accelerate innovation in broadcasting, the National Association of Broadcasters (NAB) is fighting for legislation and policies that promote stations' ability to serve their local communities and shape a bright future for radio and television.



Next Generation TV Platform

Broadcasters are working to further develop new technology platforms that will expand the quality and delivery of viewers' favorite content. In 2016, the National Association of Broadcasters, Consumer Technology Association, America's Public Television Stations and the Advanced Warning and Response Network Alliance filed a joint petition with the Federal Communications Commission (FCC), requesting permission for local TV stations and television receiver manufacturers to adopt a new transmission standard that sets the stage for the next generation of broadcast television. Next Gen TV can deliver ultra-high definition TV,

along with interactivity, personalized services, mobility and more, providing spectacular images and immersive sound to enhance the TV viewer experience. Broadcasters are urging the FCC to move quickly to approve Next Gen TV, which will better align broadcasting's broadly-deployed, spectrally-efficient and free service with an increasingly IP-based world. Unleashing broadcast innovation will enhance the viewer experience, enable easier integration into a wide array of popular devices, and drive competition with other video and data providers, all to the benefit of consumers.



FM-Enabled Smartphones and Other Connected Platforms

Virtually all smartphones are manufactured with hardware capable of receiving free FM radio signals. Yet, despite a ready audience of more than 265 million radio fans, only a few phone carriers provide U.S. consumers access to the FM radio in their handsets, allowing customers to listen to free, local broadcast radio stations. An FM radio signal is delivered on these devices through apps, such as NextRadio, with the use of earbuds or headphones acting as an antenna.

Additionally, numerous radio stations are streaming online. For example, iHeartRadio provides a free, streaming radio and digital music service giving listeners access to thousands of live radio stations across the country. Broadcasters are working with phone carriers and others to ensure radio is accessible on all mobile devices and that it remains a primary function of the automotive dashboard of the future with the interactivity consumers seek.

Drones for Newsgathering

Drones – or unmanned aerial systems – will expand the possibilities for capturing informative and engaging images, delivering vital information to millions of Americans. Broadcast use of drones will permit safer, less expensive and more in-depth journalism. Drones will provide television stations in smaller markets, otherwise constrained by more limited budgets and resources, with an unprecedented opportunity to offer aerial coverage

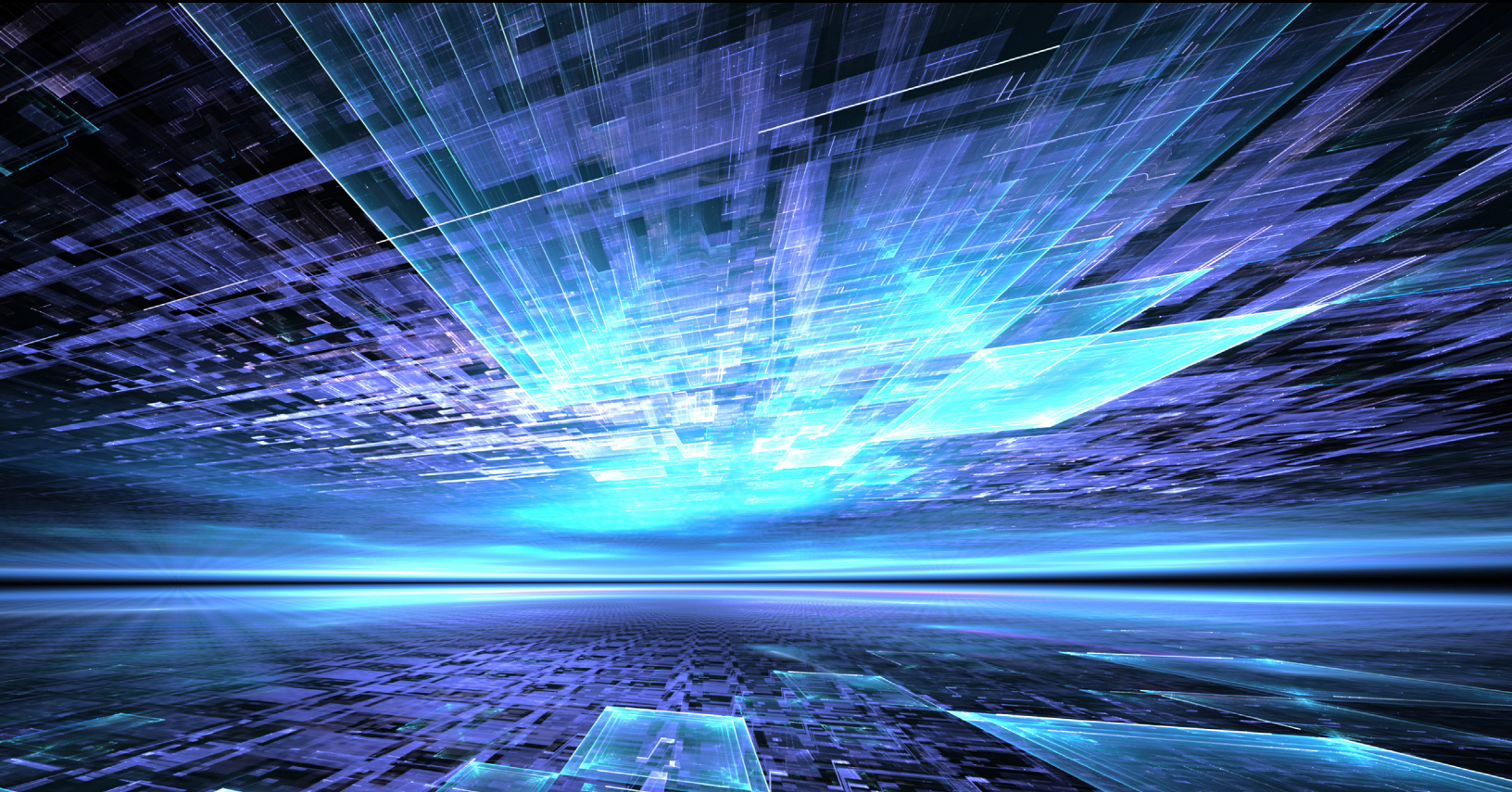
while also allowing stations in larger markets to supplement, or even replace, their current aerial capabilities. By traveling places that helicopters can't, drones can better enable journalists to inform the public and alert government first responders. Broadcasters will continue to advocate for a legal framework that permits the safe operation of drones so that we can continue to better inform our audiences and the communities we serve.



LOOKING TO THE FUTURE

Broadcasters will continue to invest in new technologies and support policies that allow them to enhance the delivery of the news, emergency information, sports and entertainment that viewers and listeners seek each day. Through innovations that improve their services, America's local broadcasters are keeping sight of their purpose: keeping communities safe, informed and entertained for generations to come.

For more information on how local TV and radio stations are innovating to expand the delivery of their highly-valued content to listeners and viewers across emerging of platforms, visit nabpilot.org.



The National Association of Broadcasters is the voice for the nation's radio and television broadcasters. As the premier trade association for broadcasters, NAB advances the interests of our members in federal government, industry and public affairs; improves the quality and profitability of broadcasting; encourages content and technology innovation; and spotlights the important and unique ways stations serve their communities. Learn more at nab.org.



PILOT is a coalition of innovators, educators and advocates dedicated to advancing broadcast technology and cultivating new media opportunities. By providing a platform for innovation, an engine for incubation, a venue for testing and a forum for education, PILOT is helping broadcasters see further into the future. Learn more at nabpilot.org.

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