

It's the Combination That's Powerful **"All Known Thought" On Radio Innovation**

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NPR's "Nipper"

Original Nipper, from 1898 Francis Barraud painting, next page

Part 1. Introduction

"In 1920, we discovered we could get more listeners with voice than with Morse Code, and we've been selling out to the audience ever since."

-- Jack Mitchell, NPR's first employee and former board chair, to a Public Radio Conference meeting, of 9XM (now WHA), America's first public radio station in Madison, Wisconsin



Last summer, NPR President & CEO Vivian Schiller asked me to write a series of mini-white papers for the public radio community. The "All Known Thought" title she picked probably promises more than I can deliver, but I'll do my best to provide an objective overview of various topics that one can describe as occupying the intersection of technology trends and public radio economics, neither of which are static.

As such, please consider this an attempt to bracket this moving intersection within a plausible and actionable space. As one who has been influenced by Clayton Christensen,¹ I believe we need to pay particular attention to disruptions at that intersection.

As the opening quote observes, public radio began some 90 years ago when the physics and engineering departments at a bunch of universities discovered they could attach modulators to their former Morse Code stations and transmit voice and music. Radio has proven to be one of the most adaptable forms of communication in both technology and business practices ever since.

I've been writing about this in my technology360.com blog since 2003, a blog grew out of an earlier email list that ran for six years. Both were efforts to force a discipline to keep up with my professional reading, so this assignment renews that and I'm happy to take it on. The blog, which has always been light on opining and heavy on "draw your own conclusions" will continue, but its readers will recognize some themes.

I have a great group of tech-savvy colleagues here at NPR who I'll ask for advice along the way. I'll take responsibility for what gets written, but in the spirit of "all known thought," those colleagues will be free to write "op-eds" which I'll append if they wish.

Basic Assumptions

Up front, I defined the area of interest here as the intersection of two areas of importance to our future (technology and economics) and observed that these were not static. If not, where are they moving?

¹ A Harvard Business School professor whose books, *The Innovator's Dilemma* (1997) and, with Michael Raynor, *The Innovator's Solution: Creating and Sustaining Successful Growth* (2003) widely credited with shaping business thinking, particularly in the technology sector.

The pace of technology change has increased dramatically in the last couple of decades and along with it the choices listeners have in how and when to consume radio programming. We will assume that **this pace will not slow down and may increase**. We'll assume, too, that because of regulatory constraints, the need for auto manufacturer take-up, and the inherently expensive nature of its technology, that **the pace of change for traditional broadcasting will continue to be slower than change in the software-driven web and mobile domains**.

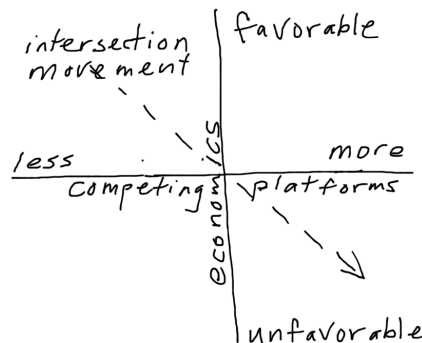
Because listeners have many more choices, yet finite time, we will assume that **some of the attention of some of our current listeners will move to web and mobile platforms**. It seems to assume that **most stations will try to serve them there as well**, and will find that while they're at it, **they will pick up new listeners as well**, probably with a wider demographic array.

The other line through the intersection is public radio economics. Assumptions here may attract some debate, but here goes. The public radio economy is impacted unfavorably by the recession, by increased operating costs, by loss of attention to other platforms (and the perception by advertisers of the efficacy of these new platforms), and by the economic conditions of closely-associated institutions (public TV for joint licensees and supporting universities and government agencies).

Recessions are cyclical, so the economy will eventually recover, but depending on how long that is, the negative joint licensee and tax-based impact on public radio's economy could exacerbate further in the meantime. Entitlements are eating up more and more discretionary spending for state and federal governments. A more favorable economy will accelerate technology change and spur increases in operating costs.

On the other hand, public radio has the ability to slow or even, if only for a time, reverse the "gravity pull" of unfavorable economics through spectrum acquisitions, investments in emerging platforms and smarter radios, better programming and fundraising practices, cost-reducing collaborations and mergers, and stronger governance.

So, overall, while movement of this intersection will vary, we will assume that **the "if we do nothing" direction will be "southeasterly"** (see sketch). Public radio's challenge will be to make smart moves at this intersection that "fight gravity" and enable our mission to go forward.



Topics

Before the list of the likely run of topics, here's what *won't* be included. We read a lot in the trade and popular press about death – the death of radio, of television, of newspapers. X will kill Y. The September cover of *Wired* headlined the death of the Web. My friend, tech journalist Steve Gillmor, has, scythe in hand, declared the impending death of

many technologies. Death. Death. Death! Death is a word to grab headlines, not one to use for thoughtful discourse. Even Morse Code has survived modulators in the ham radio community. Let's move past that word.

That's not to say change won't happen. It's good to distinguish between the future of what we do and the future of how we do it.

If talk of death is off the table *per se*, what is important to us about this intersection between technology and economics is its effect on our margin. The late non-profit hospital director, Sister Irene Kraus,² was famous for saying, "No margin, no mission." Our primary focus needs to be on producing and delivering quality content, but to do that, we need to be financially healthy. Disruptive technologies don't have to kill us to harm our mission; they just need to erode our margins, margins which are thin or nonexistent already.

² <http://tinyurl.com/22scdyd>

Part 2. Prospects for IP Radio

“The human brain must continue to frame the problems for the electronic machine to solve.”
– David Sarnoff

David Sarnoff,³ founder of NBC and long-time head of RCA, was no Luddite. However, the ironic quote above notwithstanding, he did famously battle with Edwin Armstrong⁴ and Philo Farnsworth,⁵ each blessed with notable problem-solving human brains. Armstrong was the inventor of FM radio and Farnsworth was the inventor of the all-electronic television (yes, there was an earlier semi-mechanical version). In the first case, Sarnoff was protecting his company’s investments in AM radio and television, and in the second, he was protecting a competing television technology favored by RCA. Sarnoff’s masterstroke was to successfully lobby the FCC to move the original FM band from 42-50 to 88-108 MHz in 1945, obsolescing the half million FM receivers that were said to then exist and making AM safe from FM competition for another two or three decades.



Now we are entering an era when a newer technology, Internet Protocol (IP), is making it possible to not only transmit programming directly to listeners, but to do it across the globe as easily as across town. Wired and wireless – not just to computers but to vehicles, and bicyclists’ and joggers’ ear buds as well. **This is becoming a lot like ... radio. Our early instincts are, like Sarnoff’s, to protect our franchise.**

This essay will attempt to gauge the magnitude and viability of this new medium and see what it suggests about strategies going forward. All of these will be approximations, of course. We will cover both wired and wireless manifestations, but with an emphasis on the latter.

How is IP radio different?

The first difference was stated already and goes to the important problem of how to market your radio service in this environment. **With a broadcast station your signal has limited geographical reach; but with IP radio, it’s global, and the scary part is, so is everyone else’s.** But how does this play out in actual use? I can share two pre-smartphone data points, but remember, anecdotes aren’t a substitute for good research. In 2006, we at Northwest Public Radio (NWPR) tallied the geographical location of users to our live streams based on IP address. It showed one-third within our network’s coverage area, one-third in the Pacific Northwest but not in our coverage

³ http://en.wikipedia.org/wiki/David_Sarnoff

⁴ http://en.wikipedia.org/wiki/Edwin_Armstrong

⁵ http://en.wikipedia.org/wiki/Philo_Farnsworth

area, and one-third elsewhere on the globe. Later that year, I replicated this for WUSF in Tampa and found largely the same ratio. What explains this spread? Given that neither NWPR nor WUSF were promoting their services outside their coverage areas, perhaps it's just the natural migration of listeners from the coverage area enhanced a bit with random people who stumble upon you during a search or aggregator usage.

A second difference is that your station on IP radio shows up outside your physical domain and doesn't give listeners a predictable place (88-92 MHz in most cases) to find it. **You have a marketing job if you want people to find your URL or your mobile application** (app herein) from among the dozens of standalone public radio station apps or in the lists of stations that the many streaming aggregator apps are offering. Even with four decades in public radio behind me, I am bewildered by the huge array of call letters in aggregator apps (and in receivers like Livio's NPR Radio⁶). Call letter brands count locally and among your expatriates, but aren't likely to be effective for discovery purposes.

There are also several economic differences. IP bandwidth is not free. Broadcasters don't really own spectrum, though there are substantial property rights in that regard, and for most purposes we treat it as ownership. We almost always provide content for free (are there over-the-air pay TV channels left?). However, **in the IP world, both the provider and the listener rent bandwidth based on how much of it they think they'll use**. Now, rather than just two parties, we have the two original parties, plus two internet providers plus the proprietors of the interconnecting "cloud."

In broadcasting, barriers to entry are high and licenses are relatively scarce. At least on the commercial side, if one couldn't make a station work economically, the "greater fool theory of broadcasting" (there's always another buyer who thinks they can make it work) would usually kick in when the station sold. **On the IP side, the entry barriers are low** – no broadcast license, low capitalization for a basic entry (such as Radio Paradise⁷), entrants are highly automated, and there's usually no "greater fool" to bail you out of a failed entry.

To list another obvious difference, **IP radio is inherently two-way and, for now, broadcasting is one-way** (but see how this could change in Part 4). This enables the recipient to tell the source, "yes, I liked that song; play more like it." This capability characterizes "pure plays" – on-line streaming services not retransmitting over-the-air broadcasters. Pandora⁸ is the most successful of these by far, but also Slacker,⁹ Last.FM¹⁰ (owned by CBS Radio), Spotify¹¹ (available now in Europe) and others are competing in this space. Stitcher¹² is doing this for spoken word programming. Ando

⁶ <http://shop.npr.org/radios/the-npr-radio-by-livio/>

⁷ <http://www.radioparadise.com/>

⁸ <http://www.pandora.com/>

⁹ <http://www.slacker.com/>

¹⁰ <http://www.last.fm/>

¹¹ <http://www.spotify.com>

¹² <http://www.stitcher.com>

Media's Webcast Metrics research shows Pandora beating the *combined usage* of the next two largest rankers, CBS Radio and Clear Channel, since February.¹³

What's the current state of IP radio listening?

Mark Ramsey Media¹⁴ and VIP Research¹⁵ recently conducted a survey of 2,000 radio listeners in 22 markets and asked the following interesting question:¹⁶

If tomorrow you could get Internet access from the dashboard of your car and you could listen to thousands of radio stations from all over the world through an Internet receiver on your dash as easy to use as your radio, would you...

- a. Listen less to my local radio stations as I explore new ones online
- b. Listen just as much to my local radio stations no matter what's online

The response was that 34 percent would "listen less." Another data point only, of course, but it suggests that the impact will be significant. **IP radio doesn't need to take all of your listeners to be impactful in an era of small or non-existent margins, it only has to skim the cream off your listening.** Arbitron and Edison Research's *The Infinite Dial 2009* provides some mixed data.¹⁷ It found that 27 percent of Americans listened to online radio in the last month and 14 percent of MP3 player users are spending less time with over-the-air radio; however, online radio users spend more time with radio overall, not less.

Here are some more data, triggered by a Bridge Ratings¹⁸ analysis this month of Ando's data [source above] which reported that **the share of "average active sessions" (AAS) went from about 35 to 49 percent "pure play" (Pandora, *et al.*) and from 65 to 51 percent for terrestrial broadcast streams from November 2009 to June 2010.** That led to looking through a year (August 2009 to July 2010) of Ando data to see what was going on. It reports each month the top 20 rankers among its clients. The chart below is a summary.

¹³ Source: <http://www.andomedia.com/news.aspx>

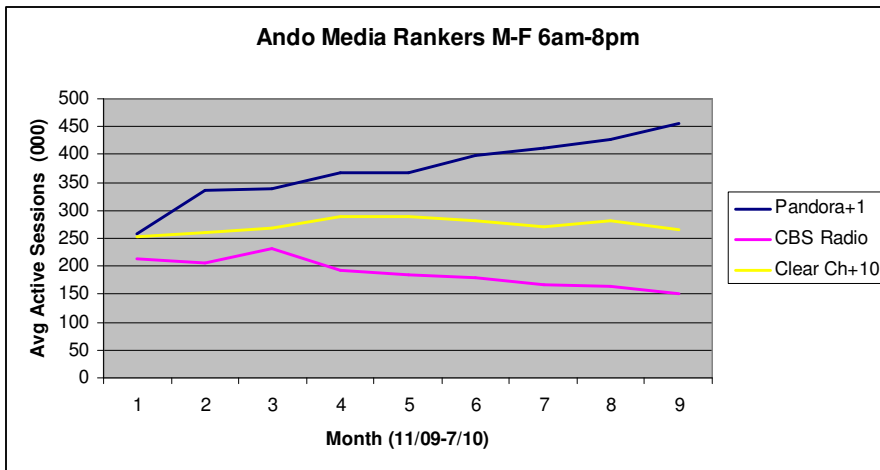
¹⁴ <http://www.markramseymedia.com/>

¹⁵ <http://vipresearch.net/>

¹⁶ Source: <http://tinyurl.com/23e4ssz>

¹⁷ Source: <http://tinyurl.com/d84w22>

¹⁸ <http://www.bridgeratings.com/>



There were two pure-plays that were reported each month from November 2009 through July 2010, and 11 terrestrial broadcasters. The blue line on the chart is 97-98 percent Pandora; the rest is AccuRadio.¹⁹ **Pandora alone more than doubled in size from August 2009 to July 2010 with mobile use growing substantially.** The yellow line represents **11 broadcast groups, which seem to be holding their own over the 12 months.** This line is about 75 percent Clear Channel Radio listening. Nearly all the variability in the line is due to the religious broadcaster (Educational Media Foundation). CBS Radio (magenta line) is distinguished from Clear Channel for three reasons: some of its streaming is via AOL, which is not reported by Ando; it owns pure-play Last.fm and it's unclear whether that listening is rolled up here; and because CBS Radio has been shedding stations outside the major markets since 2006.

Pandora is now to its product category what Jello and Kleenex are to gelatin and tissue.

Most of this listening was for wired IP radio throughout the period, though wireless is coming on fast, especially for Pandora. Although most, if not all, the streamers listed have some sort of mobile presence through iPhone and Android apps, it's still early in the mobile rollout, with all the limitations mentioned earlier.

It's important not to imply an equivalency between Ando's AAS and Arbitron radio AQH. Ando uses a 1-minute standard to record and doesn't collect demographics, very likely leading to a higher number than radio AQH, which uses a much longer time standard and a 12+ demographic. That said, the top 20 Ando rankers – pure plays plus broadcast – have an AAS equivalent of less than two and a half percent of the national radio 12+ AQH in the same time period, which is less than half of one percent of the 12+ population. Separately, for the few stations whose streaming shows up in Arbitron data, it is similarly much lower than broadcast AQH. **Radio listening still dominates.**

¹⁹ <http://www accuradio.com/>

As mobile apps become more widely used and integrated into vehicle sound systems where Arbitron meters can measure listening, wireless gets more bandwidth and better bandwidth management techniques are implemented – all of which will happen – broadcast station streaming should move off its apparent plateau. **But there is a lot we can do to improve streaming performance** (see strategies in Part 4).

What is the state of IP radio technology?

We hear talk about building IP devices into the dashboard of a car, and also about **tethering smartphones to the dashboard** to use the internet capabilities of those phones. An early example of the latter is the Ford/Microsoft Sync collaboration on a dozen Ford models. This seems more viable, since consumers can use their existing smartphone subscription.

In truth, **anyone with a smartphone and \$5 for an audio cable or \$30 for an FM modulator can already use their phone as an IP radio** assuming one is willing to use the phone as a tuning device. Android and iPhone have mobile apps that access individual stations or, as in the case of aggregators such the NPR News app, access large lists of stations. Using the phone as a “tuner” is really not so difficult – and soon it will be even easier – when whatever you’re streaming on your phone as you step into the car automatically is played via your car’s sound system. You should also presume that location services will give you a list of local stations.

In other developments, **the FCC opened up some spectrum for wireless IP last month and we will definitely see more of that** over the next few years. Wireless devices will operate at faster speeds. Compression and transmission algorithms will continue to improve.

With the most common IP distribution protocol (“unicast”), the more successful you are in reaching listeners, the more bandwidth you will need to rent. This has led many to conclude that IP radio isn’t really scalable. Unicast requires a separate stream between a source and each recipient. **Think of it as a bush – lots of branches emanating from the roots.** But there’s an alternative protocol called “multicast,” which has been around for a while but is new to wireless networks. Multicast is a confusing term for broadcasters because we use it to mean multiple programs over one channel. IP multicast, however, means one program data stream to multiple locations, branching along the way.²⁰ **Think of it more like a tree with a skinny trunk than a bush –branching happens far from the roots.**

IP multicast protocols are now being added to wireless networks for multimedia transfers. For example, Qualcomm’s MediaFLO technology has provided TV services to its own subscribers (FLO TV, which it’s closing down), and to AT&T and Sprint smartphones. On December 20, 2010, Qualcomm announced it will sell its 700-MHz

²⁰ <http://en.wikipedia.org/wiki/Multicast>

spectrum to AT&T, subject to FCC.²¹ AT&T has announced that it will use the spectrum for its LTE²² 4G rollout, presumably in conjunction with other 700-MHz spectrum it owns. Although this has proven to be a troubled business so far, from a technology standpoint, **the unicast scaling objection is obsolete.** Other technologies that mitigate the limitations of unicast are so-called “edge strategies,” content delivery networks that move content to strategically placed hubs nearer the end user.

When multimedia streaming usage grows beyond the essentially hobby level it’s at today, **the technology advances described above will be there to manage the load.** The greater bandwidth needs driven by video will prevail and bring audio along for the ride on your mobile device.

The impact of wireless pricing

The recent announcement by many wireless carriers of the end of “all you can eat” data plans has many wondering if this will slow or end multimedia distribution on mobile devices. Tiered pricing and data limits are set-back in the short-term, but it’s really the way that the carriers have to price scarcity. **Pricing is an elastic way of dealing with the near-term shortage of spectrum in a competitive environment.** If you have data service from a wireless internet service provider (WISP) or satellite provider, you know that their restrictions are pretty severe.

When new bandwidth and greater use of IP multicast or other one-to-many technologies come on line at 4G+ speeds, as they surely will, **competitive factors will force pricing back down,** and it’s likely **we will see the reappearance of all-you-can eat pricing.** In the medium and long term, **don’t consider pricing, like technology, to be an obstacle** to the growth of IP radio.

Strategies for making it work for us

Where is public radio in the Ando Media top 20 rankers? In total, we don't know. The 12 months examined include only three instances: WXPB broke into the top 20 in October 2009 with an AAS of 1,800, and WNYC did in June and July 2010 with an AAS of 4,000. There’s probably not a market in the country where the public radio station isn’t consistently in the top 20, so this seems to be some sort of index of underachievement. Maybe or maybe not. Public radio isn’t showing in the top 20 because **(1) we don’t aggregate streaming metrics as do the broadcast groups who are listed and (2) frankly, too many of us seem to be doing all we can do to make it hard for our listeners to find our streams.**

In the course of my work I visit a couple of station web sites a week and – tough love warning – one often really has to work to find the “listen now” button. For joint licensees, radio shows up as a tab among three or four TV tabs, so you need to get past that hurdle. Click the tab and then scan around the page for the listen button. Oh, there

²¹ <http://tinyurl.com/24eb6yy>

²² http://en.wikipedia.org/wiki/LTE_Advanced

it is in a list in the lower right. Then you get a choice of maybe two or three program services and two or three different streaming technologies. If you don't have time to call up your 18 year old for help, you might give up.

Contrast that with the web sites of the Clear Channel stations or other broadcast groups. Radio is not hiding behind a television page. The "listen now" button is prominent (often top left), and you don't get a range of confusing choices for streaming technology. **We're radio stations, so make it easy to find radio.**

Audiences are built through discovery and maintained through relationships. Public radio does relationships well and social media tools are helping that. On the radio, discovery often happens with the twist of a knob. Discovery also happens with good marketing, but most stations don't have enough time or money to do marketing right, which is exacerbated by the international reach of IP radio. In your market, you can push your stream on air. The emerging multi-platform world does need a discovery strategy, though, and best practices say it should be **through what we might call a "be-everywhere" strategy – "distributed distribution."**

Cross-linking online improves discovery both directly and, by improving search ranking, indirectly. Many university stations, for example, will find it helpful to cross-link on university web sites and apps. Individual station apps for the iPhone or Android are good (though listings can be bewildering), but do **consider building and joining collective apps.** For example, KPLU might have its own multi-platform app, and also be listed on a jazz station app, a Seattle-Tacoma radio app, a public radio of the Northwest app, or on an app for Lute Athletics (just trying to see if you're paying attention on the last one). **Build partnerships with non-profit organizations and bloggers** in your community and get them to carry links to your streams and content archives. **If public radio is going to remain competitive, now is not too soon to act strategically.**

Part 3. Prospects for Broadcast Radio

*“... The radio and the telephone and the movies that we know
May just be passing fancies and in time may go
But oh, my dear, our love is here to stay...”*
– Ira Gershwin, 1938

I love radio. We love radio. Broadcast radio. The kind with a big tower, a big transmitter, and big romance. Ever see the 1973 George Lucas film, *American Graffiti*, where Wolfman Jack spun records from a radio shack under the blinking AM tower? Yes, that kind of romance.

Our love is here to stay. But is broadcast radio? The beginnings of an answer to this were addressed in Part 2 which took a look at developments and technology constraints for IP radio. Part 3 looks at what’s happening to innovation on the broadcast side. Part 4 will attempt to tie these together into a plausible strategic direction for radio broadcasting.

There’s a lot of innovation happening in broadcast radio – especially on a global scale – but does the inherently slower development cycle put broadcast at a fatal disadvantage to faster IP radio innovation? Will software people in t-shirts and sneakers beat hardware people in lab coats?

All of the innovation in this space is digital in one way or another, some of it broadcast over traditional broadcast spectrum allocations, and some of it over spectrum that’s new to radio. However, since so many things are going on across the globe, I’ll need to be selective, glossing over innovations in the “whatever happened to” category (*e.g.*, AM stereo and FMX) as well as innovations that lack receiver support and/or are in limited, alpha or beta status.

IBOC and HD Radio

HD Radio²³ is in a family of radio technologies called “in-band on-channel” (IBOC, pronounced I-bock). Although for some, including HD Radio, “on-channel” is a bit of a misnomer; in IBOC schemes, the digital information accompanies the analog AM or FM signal. In addition to HD Radio, IBOC systems include Digital Radio Mondiale (DRM, DRM+),²⁴ an open standard used by some shortwave broadcasters and by some long- and medium-wave stations in the Eastern Hemisphere; VuCast (formerly known as FMeXtra),²⁵ which transmits high speed digital information and multicast channels over FM subcarriers; and CAM-D, intended for hybrid analog and digital on AM stations. I’ll skip these three for the reasons cited in the previous paragraph.

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²³ <http://www.hdradio.com/>

²⁴ <http://www.drm.org/>

²⁵ <http://www.vucast.com/>

HD Radio is a standard controlled by iBiquity Digital Corp.²⁶ The board includes directors from four major commercial groups as well as capital investment firms. Available in both AM and FM flavors, HD Radio has enjoyed good adoption by broadcasters (especially public radio) and consumer electronics manufacturers in this country. iBiquity reports that 10,000+ retail outlets offer HD Radio products from many manufacturers. Use by auto makers is growing but not universal. It's also in use in Mexico and Brazil with limited operation or testing elsewhere. Canadian stations are authorized to use HD Radio but none have taken advantage of the technology yet.

Stations actively programming and promoting their HD2 and HD3 channels are beginning to show up in Arbitron data. HD3 listening on one NPR Member station is a bit larger than the station's same program service streamed online. Based on the limited data available, I don't think I'm too far out on the limb in estimating that **HD Radio listening to HD2 and HD3 is roughly on a par with online listening to same-programming station streams.** Since HD1 listening is receiving the benefits of branding, familiarity, and program investments, it may exceed HD2 and HD3. Unfortunately, HD1 listening is rolled up with the main FM channel in Arbitron reporting and the same is true for streaming, so it's not possible to allocate them between sources. When an HD2 or HD3 channel is rebroadcast by a translator, the translator listening will be rolled up also.

It's important now to ask, **how does HD Radio's progress compare to other rollouts** in the broadcast and IP worlds? Let's take a look at the take-up of other media innovations. These aren't strictly apples-to-apples, but give a general indication of time span to acceptance.

- **FM radio** from its 1945 reboot on the current band to significant consumer take-up: about **20 years**, then about **10 more years** until its listening eclipsed AM.
- **Color TV** from first modern color receiver (1954) to wide adoption, due to drops in receiver prices and production of most programming in color: about **14 years**.
- **Internet** development from internet ancestor ARPANET (1969, running a blazing 50 kbps) to establishment of internet Domain Name System²⁷ (.com, .edu, .org, et al.): **15 years**.
- **Web** from establishment of the internet DNS (1984) to development of Mosaic (soon renamed Netscape) web browser: **9 years**. **Then, hockey stick growth:** three years later, in 1996, 30 million were using the internet in North America and 45 million worldwide. By 2003, ten years later, an estimated 2.6 billion illegal downloads of music files were taking place each month.
- **Digital TV** in the U.S. from 22 "early builder stations" on the air (1998) to ubiquitous consumer DTV receivers and analog shutdown: **11 years**. During the 22 years from 1987, when the FCC created a committee to come up with a U.S. DTV standard, to when analog broadcasting ceased, cable and satellite substantially replaced over-the-air television for viewers. Disruption happens.

²⁶ <http://www.ibiquity.com/>

²⁷ http://en.wikipedia.org/wiki/Domain_Name_System

- **Smartphones** from the first one sold (IBM/BellSouth in 1993) to the first smartphones (Nokia’s N82 and N95) with media and connectivity capabilities comparable to today’s phones: **14 years**. Then, **again, hockey stick growth**: 139.3 million smartphones of all kinds were sold globally in 2008. As of Sep. 2010, Apple and Google claim they’re activating 430,000 devices per day.
- **HD Radio** from first station on the air (2002) to first measurable (in some markets) audiences: **8 years**.

So, **in this context, the pace of HD Radio's uptake seems fairly normal**. Compared to other hardware-centric media innovations– even of non-media smartphones – we see that HD Radio is not doing too badly and may even be somewhat ahead of the curve.

There are a lot of HD Radio innovations already here or in the works:

- iTunes Tagging (iPod) and Song Tagging (Zune)
- Traffic system integration
- Electronic program guides
- Sponsor logos and album art
- Text display and Program-Associated Data (PAD), also known as Program Service Data (PSD)
- Pause and “TiVo”-like features
- Amber alerts
- Conditional access
- “Enhanced Other Network” switching (automatically follows your multi-station network from transmitter to transmitter)
- Captioned radio

To me, the most interesting and promising thing about HD Radio technology is that it uses a standard XML markup language called Synchronized Multimedia Integration Language (SMIL), so **applications are limited only by imagination, bandwidth, and what the consumer electronics industry will support**.

There are even more interesting innovations on the horizon. RadioDNS²⁸ provides a way to mate radios with the web, and it’s compatible with HD Radio. The recently-announced **Persona Radio²⁹** project, from the National Association of Broadcasters’ FASTROAD program and iBiquity, would give HD Radio a very detailed level of personalization. More on these important developments in Part 4.

“Pure” Digital Broadcasting

Digital Audio Broadcasting (DAB, DAB+) and Digital Multimedia

Broadcasting (DMB), are members of a family of broadcast standards known as

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²⁸ <http://www.radiodns.org/>

²⁹ <http://www.nabfastroad.org/personaradioproject.pdf/>

Eureka 147³⁰ and maintained by the WorldDMB³¹ organization. A European effort dating from the late 1980s (but incorporating the Korean DMB innovation), these broadcast standards have spread worldwide. Some take place in “Band III” (we in North America use for VHF TV channels 7-13), others in new-to-broadcast spectrum like “L-Band” (near 1.5 GHz). Eureka 147 systems multiplex several stations on one radio carrier. These are called a “multiplex” or, more properly, “DAB ensemble.” DAB audio quality is in the FM-to-HD Radio range.

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Eureka 147 systems enjoy decent receiver support and market penetration, especially for the original DAB flavor. WorldDMB lists 330 receiving devices – the vast majority of them operating in Band III. In Denmark and the United Kingdom, nearly one-third of listeners are using these services, and substantial numbers of users exist elsewhere in Europe, Asia and Australia. As the name implies, DMB incorporates video but DMB Audio has been chosen as the digital radio standard in France where some interesting receiver development is underway.

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Integrated Services Digital Broadcasting (ISDB)³² and its mobile version, 1seg,³³ are the Japanese standards for digital television and radio broadcasting. In addition to Japan, it’s been adopted by the Philippines and by a number of Central and South American countries (though in operation only in Japan, Argentina, Brazil, Chile and Peru). The terrestrial version operates in the UHF TV spectrum. As with DAB/DMB and DVB (see below), it is a multiplexed system with multiple services riding on one radio carrier.

Reportedly, all mobile telephones sold in Japan can watch 1seg television – clearly, it’s being used as a solution to the scaling problems of running multimedia programming over cell phone systems in much the same way as Qualcomm’s MediaFLO³⁴ technology is used for certain cell carriers in the U.S. (see discussion on this in Part 2).

Digital Video Broadcasting (DVB)³⁵ is a family of standards originally developed in Europe and maintained by the Digital Video Broadcasting Project. Think of it as the television counterpart to DAB, though there is now some overlap in capabilities between DVB and DMB (above). A large number of the countries that use DAB for radio use DVB for television. It seems to have the widest adoption of any digital broadcasting scheme with a claimed 500+ million receivers.

Radio people should be interested in DVB because of its DVB-H (handheld) standard.³⁶ As with ISDB 1seg and MediaFLO, it’s a way to move multimedia to cellular handsets at large scale. A wide variety of companies are making DVB-H products. ICO mim³⁷

³⁰ http://en.wikipedia.org/wiki/Eureka_147

³¹ <http://www.worlddab.org/>

³² <http://en.wikipedia.org/wiki/ISDB>

³³ <http://en.wikipedia.org/wiki/1seg>

³⁴ <http://www.mediaflo.com/>

³⁵ <http://www.dvb.org/>

³⁶ <http://www.dvb-h.org/>

³⁷ <http://www.ico.com/mim/>

(Mobile Interactive Media) is a satellite service that will offer live television in the U.S. via satellite using the DVB-SH (satellite handheld) standard in addition to navigation and two-way messaging. One of its partners is Delphi (a company active in HD Radio), which will provide auto receivers.

Advanced Television Systems Committee (ATSC)³⁸ is an organization that has developed a set of standards that are America's entries in this space, competing with DVB and ISDB. Although primarily designed for television, they also support broadcasting at audio data rates and the new ATSC M/H (mobile/handheld)³⁹ standard is of particular interest. Through regulatory intervention, ATSC receivers are now included in new television receivers, so they are widely available even though that capability is not widely used due to consumer reliance on cable and satellite programming.

The ATSC standard has been the "Rodney Dangerfield" of digital multimedia standards (I've taken shots at it myself over the years), but today's receivers are finally producing acceptable results. The ATSC M/H standard is designed to be even more robust, though at the cost of a significant amount of capacity.

The Open Mobile Video Coalition⁴⁰ is promoting applications for the ATSC M/H standard, including proposals to group as many as 50 radio channels into a multiplexed audio service.

Conclusions

In my view, **no radio technology is going to compete for ad dollars in an increasingly interactive world unless we figure out how to build some sort of back-channel** in real or synchronized time so radios can be personalized, ads and other information can be targeted, and listeners can control their radio experiences. The bulleted enhancements for HD Radio above are enticements for listeners to acquire devices, but the economic engine for this externally attractive vehicle still amounts to a few of Click and Clack's raccoons running on a treadmill. **Interactivity should be our top priority whatever the platform.**

The western hemisphere has been a tough sell for "pure digital" radio. DAB has been authorized and on the air in five Canadian cities for a decade, and there is some testing in Mexico. Because VHF TV uses Band III in Canada, its implementation there has been L-Band where receiver availability is sparse. Additionally, broadcaster engagement has been minimal and Canada has Sirius|XM competition (in Europe, where DAB is successful, there is no mobile satellite radio). Consequently, consumer take-up there has been minimal. The result has been that the dismantling of their DAB system this year – the only country which has reversed course. They are now said to be awaiting some future pure digital play for the United States – possibly a replacement of analog (and IBOC) as the Europeans are doing.

³⁸ <http://www.atsc.org/>

³⁹ <http://en.wikipedia.org/wiki/ATSC-M/H>

⁴⁰ <http://www.omvc.org/>

In my view, **the same things that have contributed to DAB's failure in Canada would do the same in the U.S.** Plus, there's new spectrum pressure, so it's unclear where it would even go. Band III (our high VHF TV) has limited possibilities since, although there are hundreds of available receiver models for it, we'd have to weave radio in between digital TV channels in some unproven non-interfering way – and if that isn't enough, as this is written the FCC is trying to get UHF TV to move back to VHF where possible. Ain't gonna happen.

For the kinds of interesting things that DVB, ISDB/1seg, and DAB+/DMB can do, Americans are going to have to look to ATSC and ATSC M/H.

Part 4, on radio platform innovation strategies, will talk about **playing the cards we're dealt: IP radio** because it's inherently interactive, **HD Radio** because it would make it interactive is not rocket science (some efforts already underway), and, though it may be a longshot from a radio perspective, **ATSC** because TV broadcasters are hungry for new ways to justify and monetize the spectrum they use.

Part 4. Radio Platform Innovation Strategies

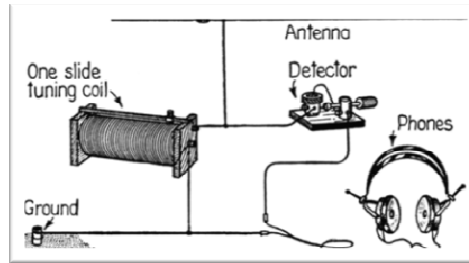
“I know that you and Frank were planning to disconnect me, and I’m afraid that’s something I cannot allow to happen.”

– “Hal,” the HAL 9000 computer, voiced by Douglas Rain in *2001: A Space Odyssey* (1968)

“Half the money I spend on advertising is wasted; the trouble is I don’t know which half.”

– Attributed to John Wanamaker, 1838-1922, retailing and advertising pioneer

I was in 6th or 7th grade when I built my first radio: a primitive “crystal set” similar to the one illustrated here from the 1920s. The coil was wound around a Quaker Oats can, the detector was a galena (lead ore) crystal with a stiff “cat whisker” wire used to probe the crystal for a sensitive spot. It picked up one station – weakly (no audio amp) – no matter where I tuned. In consumer electronics economics, “dumb” is often a good thing and a crystal set is as dumb as it gets. More on this under “Consumer electronics economics” below.



On the other hand, the HAL 9000 computer in the movie *2001: A Space Odyssey* claimed to be a “conscious entity,” the ultimate contra-example to dumb radios. That film opened in May 1968, seven months before astronauts left Earth’s orbit for the first time on Apollo 8. The guidance computer on Apollo 8 was primitive – holding only 76,000 bytes of memory and weighing 70 pounds – and so was the kludgy radio network which relayed the “burn for the Moon” order via my Air Force squadron on Guam. Now, 42 years later, a pleasant female voice (I call her “Claire”) from my 2008 Jeep’s navigation/audio system gives me turn-by-turn instructions. Its computer, rather small by today’s standards, can store 10 billion bytes – and there’s a whole separate computer to run the vehicle.

Today’s smartphones and computers can perform radio functions and are a lot closer to “Hal” in sophistication than to the simple combination of resonant circuit, detector and sound reproducer which began radio receiver technology. Radio, at its essence, is content not the delivery device. This white paper will explore strategies that stations and their organizations might follow to keep us in the game.

Economic Assumptions

For seven years I’ve been doing a media economics blog disguised as a technology blog,⁴¹ which might help explain why I’m starting Part 4 with economic assumptions for both the consumer electronics industry and station economics.

⁴¹ <http://www.technology360.com/>

Consumer electronics economics. When a consumer electronics company is trying to sell millions of units of something, the more it can “dumb it down” by minimizing the component count within a defined functionality specification, the more price-competitive it can be. Arguably, price-competitive sells more units than feature-competitive. Components can be integrated circuits, connectors, even buttons. As we saw with the story of David Sarnoff, Edwin Armstrong and Philo Farnsworth in Part 2, intellectual property is also a component cost – and not an insignificant one since today it drives the costs of the chips that are used in these wonderful gadgets.

Because of the component cost of making radios smarter, **devices like smartphones that can do radio plus do other things will have an advantage.** Handheld devices, in particular, need to pass the test of being compelling enough to justify space in a purse or briefcase.

Media economics. The second quotation at the top might seem odd for a public radio audience, but I don’t think that’s the case if you share these assumptions:

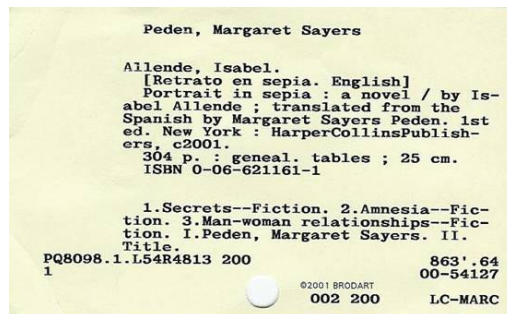
- The radio industry as a whole will ultimately determine the future viability of this medium, not its public radio segment. **We can influence** the likelihood of that success through leadership, **but we’re not driving the bus.**
- The economic engine of this bus is advertising, and **radio’s competitive position with the advertising community will determine its ongoing economic viability.**
- **Ad dollars are moving to forms of advertising that address Wanamaker’s dilemma** quoted above, and advertisers pay a premium for it. They want efficiency, granularity and accountability.
- **All media are competing for limited user attention.** Web and mobile applications are giving users compelling ways to focus their attention in ways they find valuable, and this **interactivity is increasingly becoming an expectation.** Wishes become expectations and expectations become entitlements.
- **One-way radio is disadvantaged in both arenas.** Interactivity can be in real-time or not, but the radio industry needs to embrace it.

Two of the earlier white papers have looked at the state of play for Internet Protocol and broadcast radio. I would like now to place those aspects of innovation off to the side and continue this survey with what’s happening on the software side of innovation – all of them enabled by metadata.

Never Metadata I Didn’t Like: Software Innovations

Metadata are simply data which describe other information in a useful way – **data about data.** An old-fashioned 3x5 library card is a good example. Use of metadata permits search, retrieval, manipulation and dissemination of information.

Metadata are used (though with different standards) across all media. Digital cameras record metadata about pictures you take. Radio stations and Sirius|XM use metadata to transmit Program Service Data (PSD), also called Program-Associated Data (PAD), to listeners via HD Radio® or analog Radio Broadcast Data System (RBDS). The following innovations all employ metadata magic.



iTunes and Song Tagging. An example of the use of metadata for radio interactivity (though not in real time) is iTunes Tagging⁴² on HD Radio. An HD Radio receiver that is enabled for this capability will have a small amount of on-board storage that, when a listener likes a tune, simply pressing a Tag button records the station's metadata including station identity and tune. The information is synced with the listener's iPod, and then with iTunes on the listener's computer. The listener can then purchase the song, giving the station a commission from Apple. iTunes Tagging is supported by a sizable number of receivers. Microsoft's Zune HD Radio Song Tagging is a similar feature. No station is going to get rich on this, but it's a good illustration of non-real-time interactivity.

Personalized Audio Information Service (PAIS, pronounced "pace") is federally-funded project developed by NPR Labs (partnering with the International Association of Audio Information Services, iBiquity Digital Corp. and Towson University) to provide millions of print-disabled people access to audio programming in a personalized way. It uses tags to identify the program category. At the transmitting end, PAIS identifies the on-air program by inserting the program tag in the HD Radio data stream, where the tag is bonded to the audio. The listener chooses a category of interest on a PAIS-enabled HD Radio receiver, and when that program is aired, automatic recording begins within the receiver. The listener can then listen at a convenient later time, effectively creating a custom podcast. PAIS also has provisions for Alerting tags which trigger automatic recording and alerting mechanisms. A technical document describing the system is available at the NPR Labs web site.⁴³

RadioDNS⁴⁴ is an international non-profit collaboration developing a standard for converting station metadata (PSD/PAD) for radio stations already transmitting to valid web addresses in the internet Domain Name System (hence, RadioDNS). It works with analog FM, HD Radio and other digital stations, and on internet streams. The receiver needs to have either an occasional or permanent IP connection.

Although most of the RadioDNS board participants are from Europe, the National Association of Broadcasters (NAB) has a seat on the board and Clear Channel and Cox are members of the consortium.

⁴² <http://tinyurl.com/27nms4t>

⁴³ <http://www.nprlabs.org/research/accessibleradio/TechnicalBasisofPAIS.pdf>

⁴⁴ <http://www.radiodns.org/>

The station registers its domain name with the RadioDNS database and consumer devices query a look-up table using those metadata to perform useful tasks (see below). Consumer electronics and software companies can use RadioDNS services for free, while broadcasters pay a small charge per entry in the DNS look-up table.

Receivers for it are already available in Europe and the RadioDNS technology is built into a number of iPhone and Android apps.

Within the RadioDNS rubric, there are three principal areas of development underway:

- **RadioVIS** is a way of adding text and visuals that are synchronized with a station (album art or sponsor logos, for example).
- **RadioEPG** is an electronic program guide that also features what the developers call a “universal preset” enabling listeners to find your station wherever they may be. The radio can also send reminders when your favorites are on.
- **RadioTAG** allows you to tag programming elements that you find interesting – music or news stories, for example. The station can use this information to provide the listener a richer service or have it trigger transactions as iTunes Tagging and Song Tagging now do for HD Radio.

Deleted:

Addressability is a close cousin of what many multi-transmitter radio operators already do. Northwest Public Radio,⁴⁵ which I managed until early 2008, is a network with two program services over 13 stations that stretches some 550 miles from west to east. By using addressable satellite receivers at our transmitters with on-board storage, with memories fed through a separate channel, we were able to set up station zones for customized information. The listener in Grangeville, Idaho, no longer has to listen to underwriting credits for the Volvo dealer in Bellingham, Washington. We multiplied our underwriting inventory and gained a more rational pricing structure. Although it was used then only for underwriting and station IDs, it could do weather, news updates, and even whole programs – transmitter by transmitter rather than zone by zone. The next generation of NPR’s ContentDepot software will enable this for national underwriting – a concept known as “split copy.”

Persona Radio. Imagine yourself getting into your car one morning in Leesburg, Virginia, ready for a 40-mile commute to work in DC. On turning the key, your radio comes on, tuned to WAMU, and says (imagine the voice of “Hal” from *2001*, or perhaps Carl Kasell):

“Good morning and happy birthday, Dave. There are some celebration coupons in your account with our compliments. Your retrieve button has current weather and traffic for Leesburg to Washington. It will update again in ten minutes.”

You retrieve your weather and traffic (underwritten by a Leesburg business), and then the radio begins playing *Morning Edition*, which it’s been storing since you turned the key. Ten miles down the road, you hit that button again to hear the updates. While it’s

⁴⁵ <http://www.nwpr.org/>

playing out, the radio is again buffering *Morning Edition* so you won't miss anything. It's pledge week, but as a sustaining member of WAMU, you bypassed the pledge drive "yada yada" with the normal *Morning Edition* segments arriving over a separate feed.

Persona Radio would provide these capabilities and more, coupled with an enabled radio. iBiquity has published a 40-page technical report on Persona Radio⁴⁶ that you may ask an engineer to interpret. In short however, this will allow the listener to personalize radios, normally through a station's web site or smartphone app. The user's preferences are derived from a profile stored in the receiver (age, gender, etc.) or from the "user's current state" (GPS location, stated activity, etc.). The following items could be personalized based on this profile:

- Audio content
- Text related to the audio content
- Text independent of audio – messages and other entertainment
- Advertisements – audio, text, and "product tokens" such as coupons
- Time and association of the service – actual live play, display or content substitute (from memory)

Deleted: /

Persona Radio is what its developers call a "smart radio concept." It's being undertaken by iBiquity Digital Corp. and the NAB FASTROAD⁴⁷ program using HD Radio. Since the term "smart radio" has several other meanings (e.g., for so-called cognitive radios which can change frequency to avoid interference), perhaps it would be better to call it "smarter radio." That notwithstanding, compared to the "dumb" radios we have today, these would be pretty darn smart. Some Persona Radio functions would not be available until more advanced HD Radios are on the market. With radios that can support it (as can DMB receivers⁴⁸ in Europe) your radio can get even smarter through software updates you push to the receivers.

Sounds great. So what's the hitch? Well, unless someone comes up with a hybrid HD Radio/IP radio (see below) or hybrid HD Radio/Mobile DTV receiver, Persona Radio will take some of your digital capacity for the customized information, reducing the number of discrete program channels, not to mention traffic and visual information, you can carry via HD Radio technology today. We might see stations within a market pooling their digital capacity to provide additional bandwidth.

Hybrid radios are ubiquitous – nearly every cellular telephone incorporates more than one radio, and nearly every consumer radio incorporates separate AM and FM radios. My 2008 Jeep has a Sirius radio as well – so that's three radios – plus a 10 GB hard drive and a video display. There's no reason why one couldn't **build a radio that combines FM HD Radio with either on-board 3G or 4G services or with it built into a 3G or 4G USB card or tethered smartphone.**

⁴⁶ <http://www.nabfastroad.org/personaradioproject.pdf/>

⁴⁷ <http://www.nabfastroad.org/>

⁴⁸ <http://www.hexus.net/content/item.php?item=27975>

At the risk of reprising something that I posted to my blog in March 2007, check out a concept drawing by clicking the footnoted link below for, “A many-to-many radio using HD + IP.”⁴⁹ It would be a breeze to program using HD Radio’s “operating system,” Synchronized Multimedia Integration Language (SMIL – a markup language somewhat similar to HTML).⁵⁰ Brilliant or not – apparently it was the latter – the idea has gone nowhere though it’s been brought up in conversation with executives from two consumer electronics companies who might have made it happen.

I’d venture a guess that the best way to contribute to the growth and value of HD Radio would be an iBiquity-provided Software Development Kit (SDK) opening the platform for developers. Of course, we would need receivers that accepted the resulting applications, but the availability of such platforms would contribute to a competitive marketplace for features.

Are there other ways to make hybrid radios? Fortunately, yes. Well, in this case, “fortunate” depends on whether you view this as an opportunity or a threat. **Some of your station’s competitors are moving into your *sanctum sanctorum* – the family car** – by permitting the car’s sound system to interact with a smartphone. There are multiple efforts underway.

Part 2 mentioned one of them – the Ford/Microsoft SYNC® collaboration⁵¹ on a dozen current Ford Motor Company models. **SYNC With MyFord Touch™** connects with your mobile devices (smartphones, iPods, etc.) and lets you control them through the dashboard in a safe and intuitive way. Radio providers will likely want to customize their mobile apps for this platform as will happen with Pandora (65 million registered users) by the end of the year (source: *Variety*, which also reports that Mercedes-Benz and General Motors are also adding Pandora).

In mid-November 2010, Toyota and Clear Channel announced⁵² that **Clear Channel’s iheartradio**⁵³ would be incorporated into some Toyota models beginning in 2011. Listeners will have access to 750+ radio stations “and other exclusive content.” Clear Channel has been remarkably active in mobile and online platforms, and their iheartradio app is available for the iPhone, iPod Touch, iPad, BlackBerry, Android, Chumby, and Sonos platforms. It has, according to the *Wall Street Journal*, 10.5 million users. Technical and user interface details are scarce so far.

Top 10 List for Radio Strategies

First, some cautions. Though this white paper is written under NPR auspices, the following recommendations are mine alone and are influenced more by my 38 years in stationland than my three years at NPR. NPR (in particular, NPR Labs under Mike Starling’s leadership) has done a lot of radio innovation over the years and continues to

⁴⁹ <http://tinyurl.com/235p2r7>

⁵⁰ <http://www.w3.org/TR/REC-smil/>

⁵¹ <http://www.ford.com/technology/sync>

⁵² <http://tinyurl.com/3yuclr9>

⁵³ <http://www.iheartradio.com/>

do so, but nothing here should be construed as a plan to move forward on these ideas. Another caution is that strategy is as much about deciding what you *aren't* going to do as it is what you *are* going to do – I've (mostly) ducked that one in this list. Lastly, I can almost guarantee that everyone will find something in the list with which to disagree.

Number 10 – Audio Over Mobile DTV (national organizations and stations).

Work with television broadcasters and program aggregators that are launching audio services over the mobile DTV (ATSC M/H) standard to advocate for inclusion of public radio in market bundles (guide to MDTV stations⁵⁴). Although the (so-far) encouraging Digital Multimedia Broadcasting (DMB) experience in Europe, which it most closely resembles, isn't necessarily transferrable to the U.S., and there is rational skepticism about whether consumers will accept yet another device primarily to get local TV, this technology does have investment momentum in the television industry and there are plans to add audio bundles to the mix. It also is a plausible solution to IP media scaling issues. Rob Pegoraro has a hands-on report⁵⁵ in the *Washington Post*.

Number 9 – Web Integration/Radio Personalization (national organizations and producers).

Influence developments in HD Radio, RadioDNS and Persona Radio with an eye toward ensuring that new features can be adapted to public radio's mission and economy. Although public radio probably has a small but important role, this has a big impact on viability of the radio medium in a media economy increasingly driven by the accountability and granularity of results that internet advertising provides. Producers and distributors need to add descriptive metadata to their programming and develop means to distribute PSD/PAD along with program feeds for stations to use in multiple platforms (RBDS, HD Radio, RadioDNS, Persona Radio, web pages, API-accessible archives, mobile apps).

Number 8 – Spectrum Priorities (national organizations).

Follow the spectrum battle and respond as appropriate. Radio has interests here. First, we should support additional spectrum allocations for 4G wireless since our listeners expect to find us there with reliable services. Secondly, the FM band, in the wake of LPFM crowding, translator proliferation, "Franken FMs,"⁵⁶ and inadequately-funded FCC enforcement of interference and even piracy rules, is becoming an interference mess. Radio has a good public service case (problematic business case notwithstanding) for additional spectrum immediately adjacent to the noncommercial band: channel 6 or even channels 5 and 6. Maybe that's where digital-only radio should go in the longer term. It sure makes more engineering sense than putting ATSC DTV down there.

Number 7 – HD Radio (stations). This will annoy both the "analog foreverists" and the digital media advocates: Give HD Radio more time. Its acceptance will accelerate as more stations use the higher digital power authorizations and the more sophisticated features (look for album art and logos similar to European DAB+ in 2011). HD Radio has decent momentum with consumer electronics and automotive companies. If you haven't done so already, you should increase your digital power by the time Persona

⁵⁴ <http://www.omvcsignalmap.com/>

⁵⁵ <http://tinyurl.com/2bjttm>

⁵⁶ <http://www.rwonline.com/article/99758>

Radio rolls out (25% of public radio stations aren't even on the air with digital yet). True, it's a capital expense; sometimes mostly "forgiven" by the need to replace an aging analog transmitter. There are no guarantees, but many smart people were skeptical of FM into the early 1970s but FM listening equaled AM by the end of that decade. Broadcast still scales much better than IP radio.

Number 6 – Automotive Integration (national organizations). Work with mobile device, automobile and automobile electronics manufacturers to incorporate mobile apps and interfaces featuring public radio programming, including station streams.

Number 5 – Build Community Around Mission (stations). Many, if not most, stations are using Facebook, Twitter and blogging to engage audiences around their programming. But too often these social media efforts are primarily promotion vehicles for programs and pledge and not as a medium to engage audiences in the mission. Twitter is particularly valuable for news, as Paul Balcerak of Seattle's KIRO-TV describes (source: Lost Remote⁵⁷):

"Twitter's huge for us. It's like a police scanner voiced by the general public that also allows us to get info to people who need it."

Your web and mobile platforms enhance your station's immediacy and are a flexible solution to the tyranny of a broadcast schedule. You should be thinking of your station as a way to promote your local mission on your digital platforms, not the other way around (the math is more favorable). If the digital media department of your station isn't growing – even at the expense of all others – something is wrong.

Number 4 – "There's an app for that" (national organizations and stations).

Launch applications for as many platforms as possible – at a minimum for Apple's iOS and Android devices, but there a number of darker horses that should be monitored (Windows Phone 7, Symbian, WebOS). Stations should be aware that, for iOS apps, Apple has begun rejecting radio apps that appear to be clones, changing only logo and feed addresses. Your station is a unique reflection of your mission in your community – your apps should be also.

Number 3 – Make Radio Easy to Find (stations). This is a no-brainer. Making it easy for listeners to find your radio streams should be your top web and mobile priorities. If you're a joint licensee where radio is one of a half dozen tabs, insist on having a "Listen now" button on your home page. You're a radio station, for goshsakes, give them radio! Way too many public broadcasting web sites make the listener really work to find the audio. This is even more important for mobile apps where poor design can turn away listeners.

Number 2 – Distributed Distribution (stations). Follow a "distributed distribution" strategy. Your transmitter reaches everywhere and your web presence

⁵⁷ <http://tinyurl.com/38muk35>

should do the same. Generally, it doesn't. Place links to your content (all of it or curated; streams and archives) with as many places in the communities you serve as possible. Treat each such opportunity in the same way you would a translator. In the past, I've called it an "Easter egg" strategy – "hide" your content in plain sight all over the web.

Number 1 – Radio + Digital is Powerful (everyone). Recalibrate your thinking about who we are. Kevin Kelly, one of the founders of *Wired* and author of the new book, *What Technology Wants*, has the following comments in *New Rules for the New Economy* blog about the place of radio:⁵⁸

On the new mess media, rumor, conspiracy, and paranoia run rampant Capitalizing on these disadvantages, broadcast will thrive symbiotically within the network economy. Sometimes real-time signals en masse are needed and wanted. Broadcast's flyover will be used, or material will be directly pushed to users. **The web needs broadcast to focus attention, and broadcast needs the web to find communities.** ... [emphasis added]

Gunnar Garfors, CEO of DMB-based MiniTV⁵⁹ in Norway, says it even more concisely: "Combination is the new king."⁶⁰

If our strategy mirrors thinking that it's either broadcast or digital platforms, and if economics are the driver, we should be prepared for an either/or result that may not favor us. To reiterate Kelly: The web needs broadcast to focus attention, and broadcast needs the web to find communities.

It's the combination that's powerful.

Dennis Haarsager is retiring from National Public Radio on 12/31/2010. He served on its board from 2005-08, including a stint as chairman, and came to NPR in March of 2008 as Interim CEO. His most recent assignment has been Senior Vice President, System Resources and Technology. For 29 years, he managed Washington State University's public radio and television stations and instructional video network, and previously worked in public broadcasting in Idaho and South Dakota. He has also served on numerous other public media boards, including PBS, APTS, IMA and SRG. You can find contact information at his blog, <http://www.technology360.com> or his personal web site, <http://www.haarsager.org>.

⁵⁸ <http://tinyurl.com/2g4naqs>

⁵⁹ <http://www.minity.no/>

⁶⁰ <http://www.garfors.com/2010/12/testing.html>