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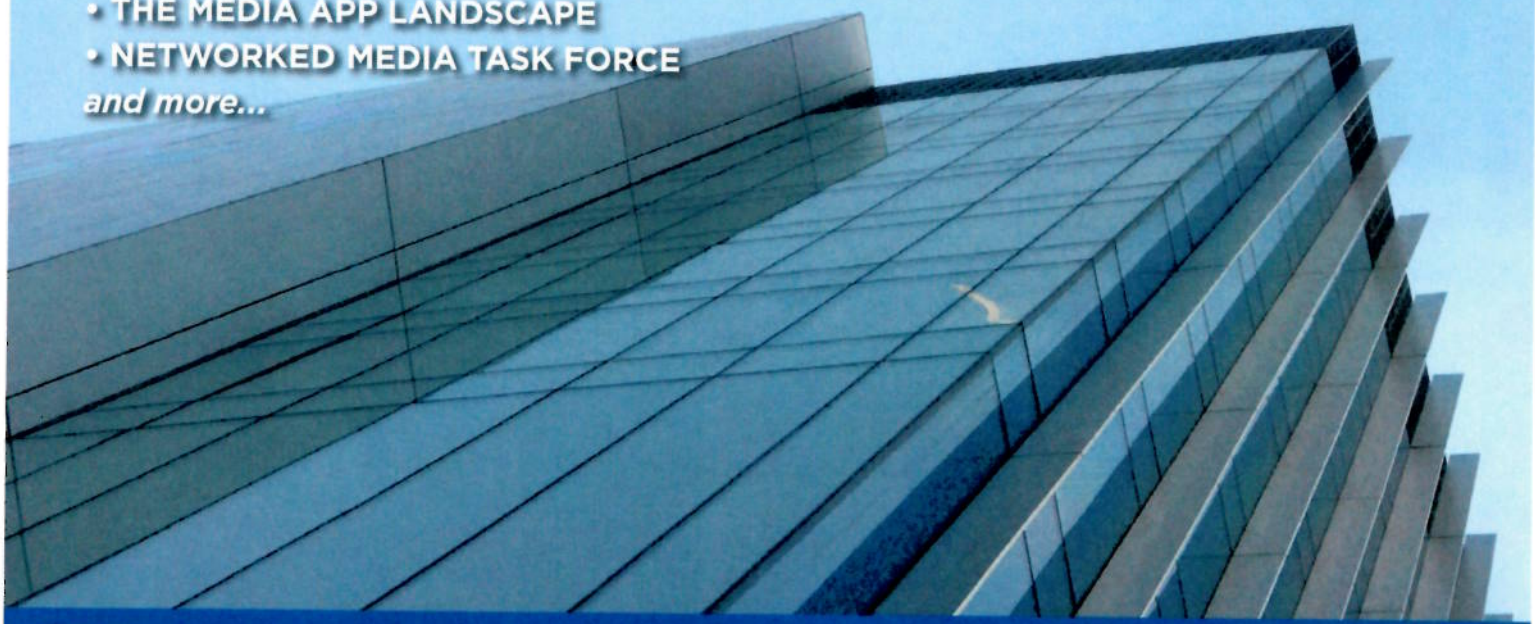


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The future of the AM bands

MOST OF US CONSIDER AM BROADCASTING A THING OF THE PAST. AT THIS YEAR'S DIGITAL RADIO SUMMIT, **NIELS DREIJER** AND **JENS CHRISTIAN SEEBERG** (TERACOM) WONDERED IF WE MAY HAVE OVERLOOKED SOMETHING.

A modern 100 kW AM band transmitter can fit in the same 1 m² space as a 10 kW DAB unit, and its technology is every bit as advanced. The real question is if the AM band transmitter will be relevant in an all-digital world.

COST/COVERAGE

Contrary to the FM, DAB and TV bands, signals in the AM bands are not limited by the 60-75 km to the horizon from a transmission tower. AM band signals will follow the earth's curvature or jump to the sky and back, or both.

By covering a contiguous distance of 300-600 km rather than 75 km, a single AM band transmitter has 4-8 times the range but distributes to an area 16-64 times larger. The relative merits of the different bands in terms of transmitter sites are shown on the diagram, assuming that only one audio channel needs to be transmitted and that useful ranges are AM 300 km, FM 75 km and DAB 38 km.

Obviously DAB can carry 10-16 audio channels (or more) as compared to one, but all else being equal we may conclude that the relative cost per km² of the first audio channel with AM band transmission is 2-6 percent at maximum range.

DIGITAL BACKUP

If emergency power for a major radio and TV transmitter site fails during a blackout, all terrestrial coverage may be lost over a large area unless an AM band transmitter within range can fill the gap. Cable fires are not that uncommon, and neither is flooding of infrastructure. Such events can result in a prolonged loss of all locally transmitted services.

Transmitter synchronism is vital for digital single frequency networks such as DAB and when lost, large interference zones with no reception are created.

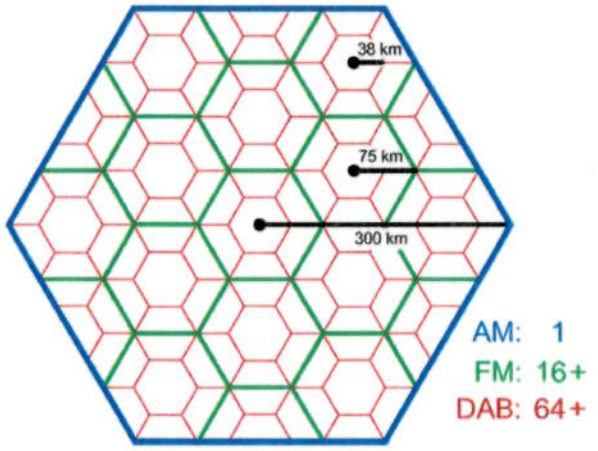
When and if the robust FM transmitter networks are closed, the lowest-cost replacement for emergency and backup transmissions would be an AM band solution that can be received by a large proportion of car and portable radios.

POWER EFFICIENCY

If the AM bands are only used for occasional network backup with no regular programming, they are unlikely to be found on future receivers. So to make AM transmitters a credible backup, they must remain on air.

Reduced or time-slot transmission can yield immediate cost savings, but so can modern technology. The operating efficiency of a modern AM band transmitter often exceeds 90 percent. For analogue operation, modern signal processing allows AM band transmitters to output high power levels in the "sidebands" and give the same useful range with less carrier power.

NUMBER OF TRANSMITTERS REQUIRED FOR AM, FM AND DAB BANDS TO COVER A 300 KM RANGE WITH AT LEAST ONE AUDIO CHANNEL



Considering the 60-70 percent efficiency of legacy transmitters and a 4-5 dB sideband power increase, this translates into a 3-5 times saving in electricity costs and transmitter size. Electricity savings, unmanned operation and the lower price of a small AM band transmitter operating in analogue mode can combine into a payback time of less than two years.

With this transmitter migrating to a robust DRM digital mode in the future, further power savings are possible. Alternatively, useful range can be increased by utilizing the full digital power of the frequency permit.

MERGING SITES

Although modern AM band transmitters may be power efficient, can cover large areas at low cost and have become very compact, their long wavelengths still mean large antenna systems. However, they do not require special transmitter sites if you are creative and can accept some compromise.

Early in the Cold War, the RIAS covered the entire GDR from West Berlin with a simple wire antenna from only 31 m high antenna masts. Or why not move that wire to an existing FM, DAB or digital TV tower? It will have to slope upwards from the ground, but it works and costs next to nothing. Taken one step further, one may "shunt feed" the existing tower with the sloping wire and use the grounded tower as the antenna.

Economic pressures dictate lower distribution costs. But by automatically concluding that this means giving up AM band transmitters and their digital potential, we may indeed overlook something.

Presentations from the EBU Digital Radio Summit 2013 can be viewed at http://tech.ebu.ch/drs2013.

JENS CHRISTIAN SEEBERG WITH A MODERN 50/100 kW SERIES AM BAND TRANSMTTER CO-SITED WITH DAB AND DIGITAL TV.

