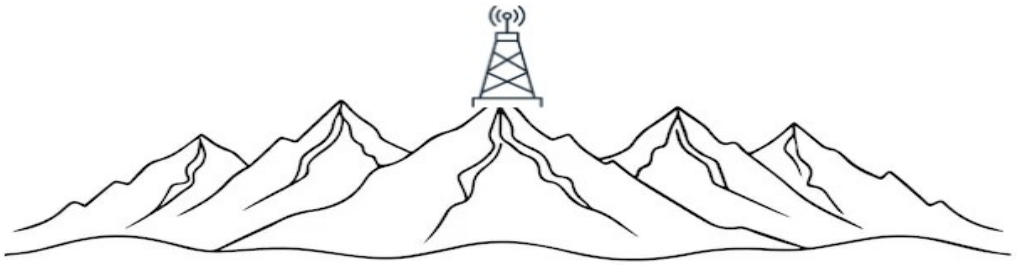
Cellular Technology



Amateur Operator Influence

Amateur radio operators directly influenced cellular phone and system technology through their pioneering work in VHF bands, portable transceivers, modulation techniques, antenna design, and propagation research.

Figures like Al Gross and Martin Cooper, both hams, applied their amateur radio experience to develop key technologies (walkie-talkie, pager, and cellular phone) that shaped modern mobile communications. The amateur radio community's collaborative, experimental culture provided a foundation for the cellular revolution, demonstrating the power of grassroots innovation in advancing technology.

Al Gross (W8PAL)

Walkie-Talkie (1938): Gross's invention of a portable, high-frequency two-way radio was a direct result of his amateur radio experiments. The walkie-talkie's portability and use of VHF frequencies influenced the design of mobile radios and early cellular handsets.

Citizens Band (CB) Radio (1946–1948): Gross's advocacy for personal radio services led to the FCC's creation of the CB band, which used frequencies near those later allocated for cellular systems. CB radios popularized mobile communication among civilians, setting the stage for cellular adoption.

Pager (1949): Gross's development of the telephone pager, using selective signaling, introduced concepts of targeted communication that influenced cellular network protocols.

Martin Cooper (WA9KKN)

DynaTAC Cellular Phone (1973): Cooper’s development of the first handheld cellular phone was inspired by the portability of amateur radio transceivers and the personal communication model championed by hams. His amateur radio experience likely informed his understanding of radio systems and spectrum management.

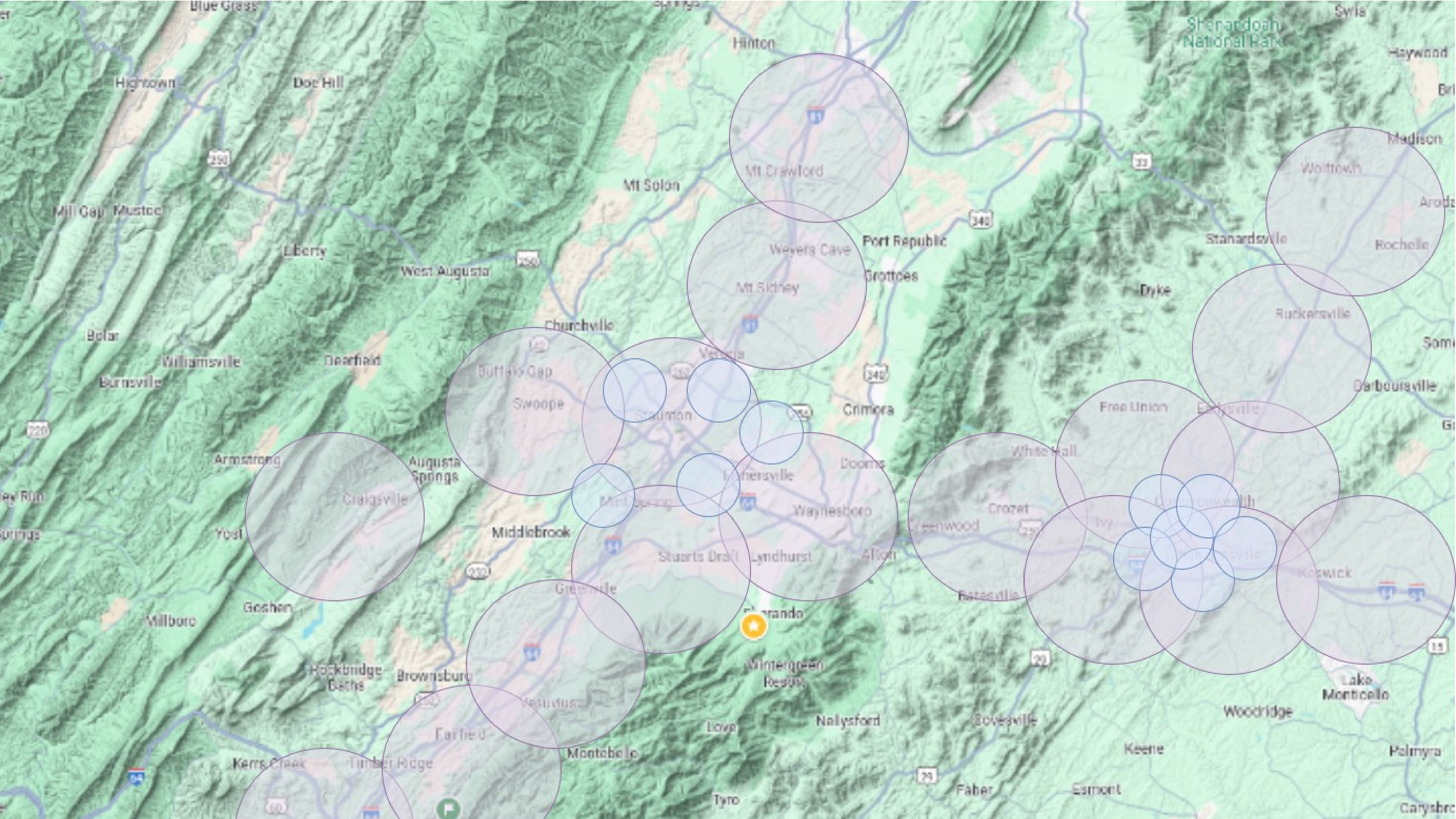
Cellular Network Vision: Cooper’s emphasis on personal, rather than vehicle-based, communication was rooted in the amateur radio ethos of individual operators communicating directly, a principle that shaped the cellular phone’s user-centric design.

Broader Impact of Amateur Radio Spectrum Advocacy:

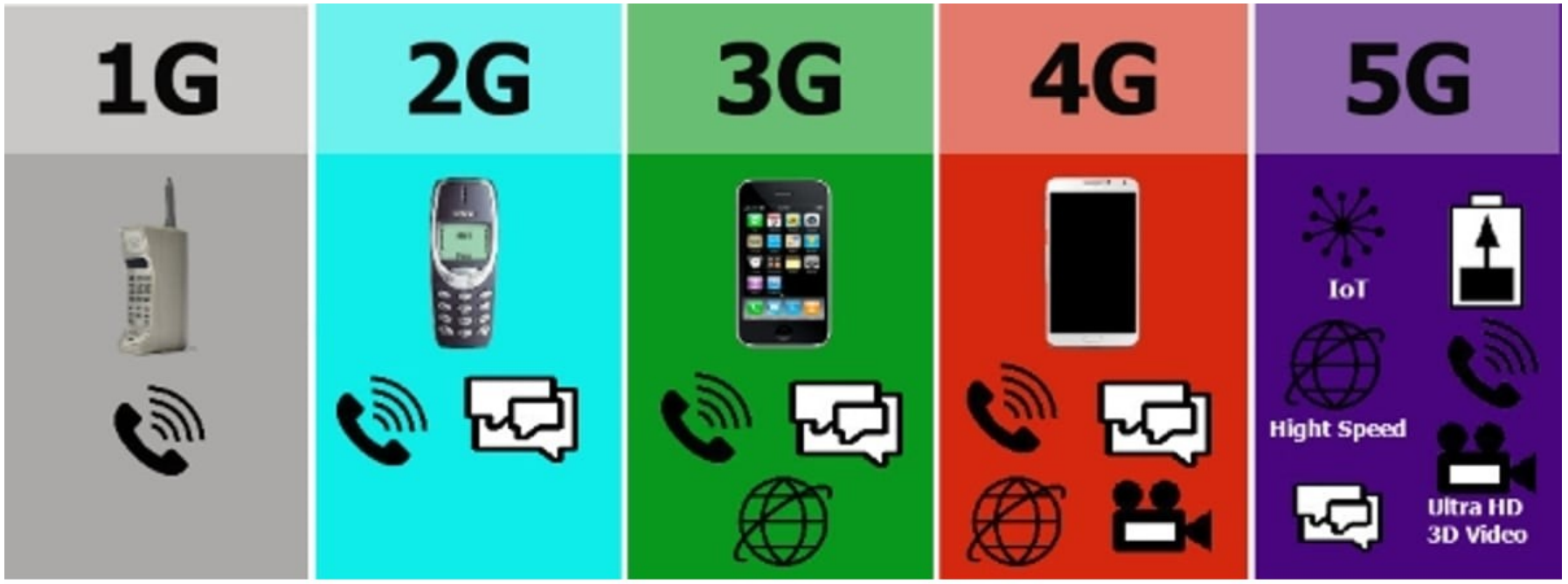
Amateur radio operators lobbied for spectrum allocations, influencing the FCC's decisions to reserve bands for mobile communications. For example, the amateur radio community's use of the 2-meter band (144–148 MHz) and 70-centimeter band (420–450 MHz) overlapped with early mobile radio experiments, paving the way for cellular frequency allocations.

Emergency Communications: Hams' expertise in setting up reliable communication networks during emergencies (e.g., natural disasters) informed the design of robust cellular systems capable of handling high-priority calls, such as those for public safety.

Technological Cross-Pollination: Many engineers at companies like Motorola and Bell Labs were amateur radio operators, bringing their practical experience to professional projects. The amateur radio community's innovations in transceivers, antennas, and modulation directly influenced cellular system components.


Blue Grass
Hinton
Shenandoah National Park
Haywood
Hightown
Doe Hill
Madison
Mt Crawford
Mt Solon
Wolftown
Mill Gap
Mustoe
Port Republic
Stanardsville
Rochelle
Liberty
Weyers Cave
Grottoes
West Augusta
Mt Sidney
Dyke
Churchville
Ruckersville
Bolar
Williamsville
Deerfield
Verona
Buffalo Gap
Burnsville
Swoope
Staunton
Crimora
Barboursville
Free Union
Earlysville
Armstrong
Augusta Springs
Dooms
White Hall
Craigsville
Fishersville
Mint Spring
Waynesboro
Crozet
Yost
Middlebrook
Greenwood
Ivy
Stuarts Draft
Lyndhurst
Afton
Keswick
Goshen
Greenville
Batesville
Millboro
Sherando
Wintergreen Resort
Rockbridge Baths
Brownsburg
Lake Monticello
Vesuvius
Woodridge
Nellysford
Covesville
Fairfield
Love
Montebello
Keene
Palmyra
Kerrs Creek
Timber Ridge
Faber
Esmont
Tyro

Modulation Versions

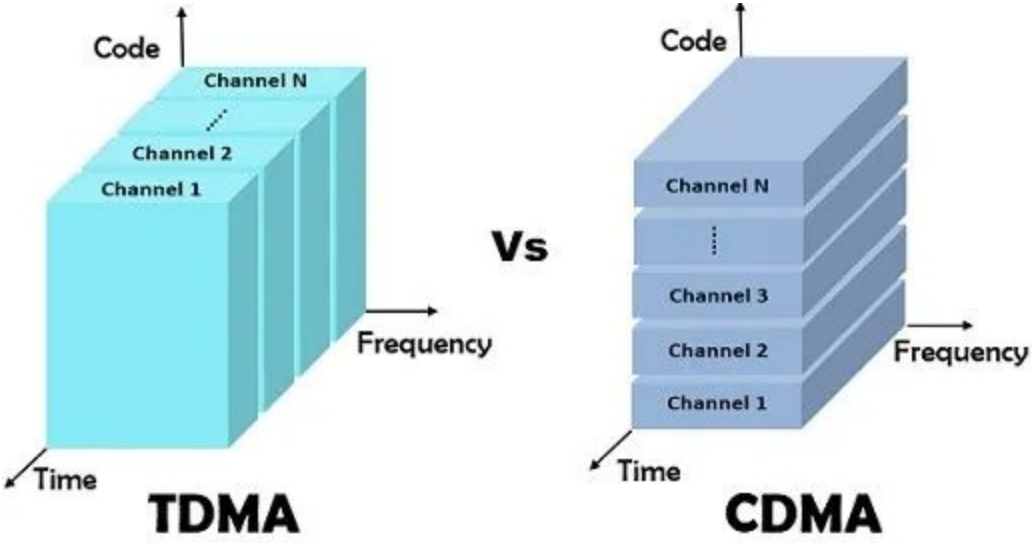


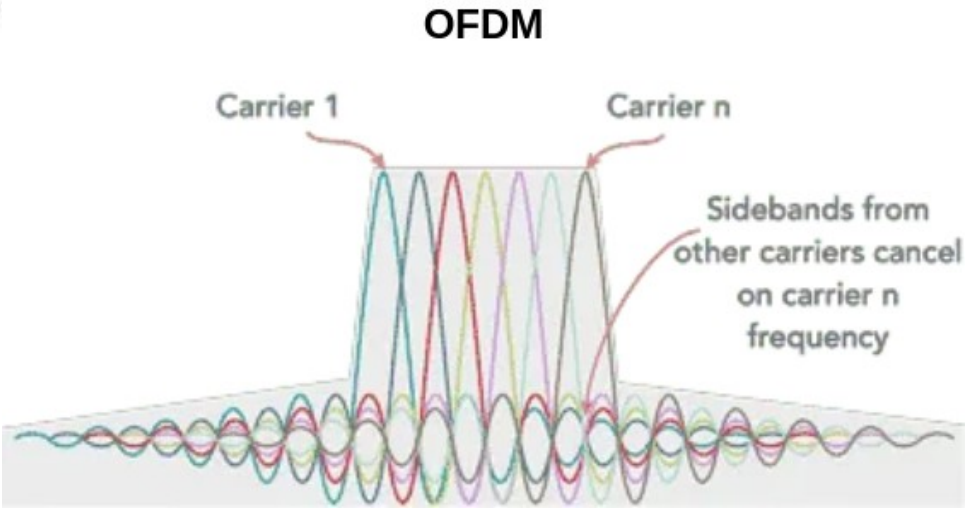
Analog

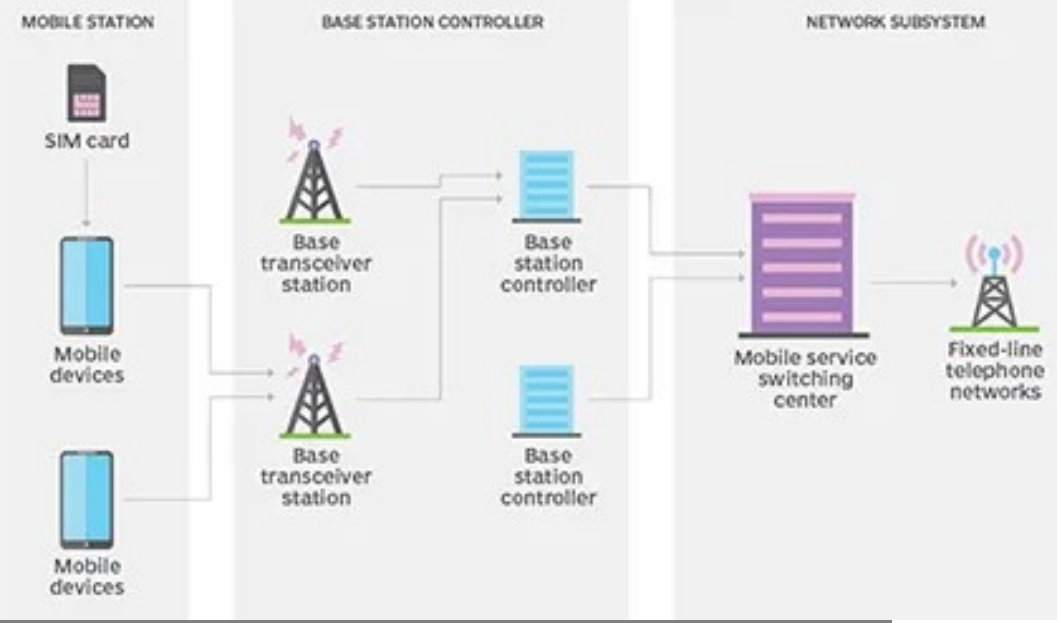
GSM
CDMA
TDMA

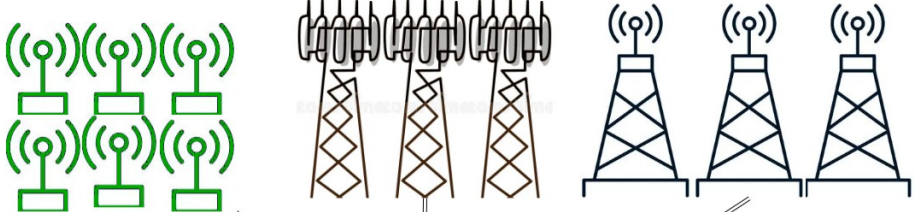
LTE
WiMax

Modulation Details









Transport:
T1, DS3, Ethernet, Microwave

Traffic Type:
Voice/Data traffic, site control, handoff messaging

Cellular Switch, Main office
Could be local, mainly regional today

Cell Site Controller

Controls Cell Sites
Signals phone handoffs between sites

Routes Voice to Voice Switch
Routes Data to Data Network

PSTN
Public Switch Transport Network
Connects Voice switches to each other and routes Voice Traffic

Voice Switch

Talks to other networks: SS7, Voice

Routes Voice

Tracks usage for billing
Authorization for usage

Data Network

Talks to other IP networks

Routes Data

Tracks usage for billing
Authorization for usage

Internet

SS7 Network
Specialized network that signals voice calls, User info, Phone location

User Database

Talks to other Databases: SS7

User info
Roaming Info
Authorization

User Database

User info
Authorization

SMS
Text Message routing

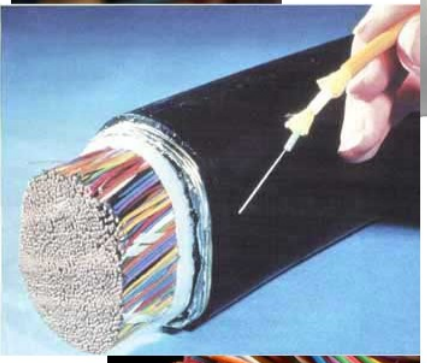
MMS
Picture Messaging
Group Messaging

SMS Providers

Short Code message
Intra Carrier messaging

MMS Providers

Picture messages
Intra Carrier messaging



4. **Colored Plastic Tape**

Each 25 pairs of cores are usually wrapped with different color ribbons to distinguish.