



CONNECTIONS *news*

www.telcomhistory.org

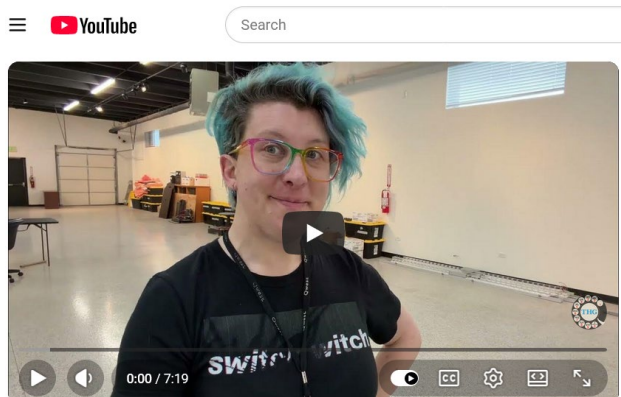
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Dave Felice, editor

A message from our director

Now that all the equipment and artifacts have been safely and successfully transported to our new building in Arvada, we are in full swing with the architects and museum designers to figure out how to use the "blank canvas" to its full potential.



What's happening with the new museum!?

THG wants to plan the space and contents deliberately, not ad-hoc. In a video at <https://tinyurl.com/Connections-Colorado>, Sarah points out that the THG team "may have been a bit too optimistic" about opening the museum this year.

The Connections team is working with Signal Architecture and Renate museum design. Signal specializes in developing the meaning of space beyond the design. Renate focuses on museum design and its relationship with the community. On-going work is aimed at determining best presentation practices, and what produces successful visits. "We

want to make this a real museum experience, not just a bunch of stuff in a room," says Sarah. The current schedule calls for a fall 2027 opening day.

In this newsletter, you'll read about traffic jams in space and a Supreme Court decision about telephone patent ownership. Veteran Denver volunteer Jack Bol has found interesting material on phones in the Grand Canyon. And John Swartley offers some historical insight into the tools of the trade. A long-time operator and trainer emphasizes confidentiality.

Broadcasters' Desktop Reference (BDR) offers completely free password generation software which meets the FCC's new stringent requirements. No account or server is required. You can download the software from <https://tinyurl.com/BDR-Security>.

Your comments and suggestions are welcomed and encouraged. Let us hear from you.

Renee Lang
Managing Director

Gratifying response to Challenge Grant

Telecommunications History Group members – old and new – have responded with enthusiastic participation in a Challenge Grant that matched contributions. Everyone at THG is grateful for the support, which exceeded our expectations.

Your ongoing financial support provides the essential funds to enable THG to continue its mission to preserve the living history of telecommunications. This direct involvement through a successful Challenge Grant means rare equipment and invaluable archives will be available to museum guests and researchers for many years to come.

The Telecommunications History Group, Inc. is a 501(c)(3) nonprofit organization that depends on the support of individuals like you. Fundraising covers operational expenses, publicity, and expenses related to organizing and preserving priceless and irreplaceable collections.

THG also appreciates and depends on volunteers for help with many tasks and projects. If you have time to donate in the Denver or Seattle areas, contact THG and we'll get you involved in an activity that matches your interests. You can contact the THG office by phone 303-896-1221 or e-mail telecomhist@aol.com.

THG also has a wide variety of telephone and communications equipment, memorabilia, and historical documents. If you think you have something worth donating to the Connections Museum in Seattle or Denver, contact the THG office to arrange an advance evaluation. That box in your garage might contain valuable artifacts.

Reconnecting: CBS Radio News Demise

An online reader of *Connections News* appreciates coverage of the end of CBS Radio News, but questions the description of the corporate structure. To clarify, here's a summary of which entities are involved:

- CBS Radio was not a separate entity owned by Audacy. CBS and Audacy were two separate companies. After merging with Audacy in 2017, CBS Radio operated as a brand, managed by Audacy.
- Audacy did not own the CBS Radio Network or CBS Newsradio.
- Based in New York City, Audacy originated in 1968 as Entercom Communications. In the 2017 merger, CBS sold its owned and operated radio properties to Audacy.
- CBS re-branded the network service as CBS News Radio.
- Paramount Skydance and predecessors own CBS News, which operated the radio network service distributed and managed by Audacy. CBS News Radio ceased operations in May 2026. Many stations started carrying ABC news broadcasts.
- Audacy emerged from bankruptcy in late 2024 as a privately owned company, with billionaire hedge fund manager George Soros as a controlling shareholder.
- Audacy owns 227 major radio stations in 27 states and 45 cities across the U.S.

Keeping track of corporate relationships has become increasingly difficult in recent decades because of mergers, acquisitions, alliances, partnerships, dissolutions, name changes, and other complex business arrangements. Sometimes even trying to describe these structures results in unintended confusion.

Bell heritage still prevalent

Two recent developments demonstrate the lasting legacy of AT&T and Bell Laboratories in research and technological advancement. A plan to put more communications satellites in earth orbit can be traced directly to the original Telstar satellite built by Labs in early 1960s. Another Area Code overlay for New York City shows the durability of the North American Numbering Plan to meet the ever-increasing demand for more phone numbers.

Satellites revolutionize communications

Starcloud, based in Redmond, Washington, seeks FCC authorization to build an 88,000 satellite constellation in low earth orbit. The start-up company intends to provide Artificial Intelligence data center services. Larger technology companies, such as Google, SpaceX, and Blue Origin have indicated they are also interested in operating data handling capabilities from satellites in the area between 100 and 1,000 miles above Earth.

British scientific writer Sir Arthur Clarke predicted satellite communications as early as 1945. Clarke adapted the 1929 theory of Austrian engineer Herman Potočník, and suggested three artificial satellites in high fixed position orbit to provide worldwide radio coverage. "A true broadcast service giving constant strength at all times over the whole globe would be invaluable," wrote Clarke. In his honor, the satellite geostationary zone at 22,000 miles high is now known as the Clarke Belt.

(<http://clarkeinstitute.org/wp-content/uploads/2010/04/ClarkeWirelessWorldArticle.pdf>)

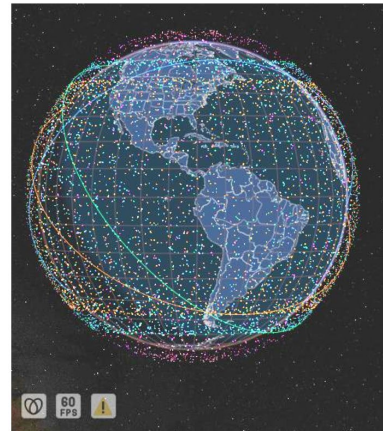
Clarke's prediction was partly realized in 1962 with the launch of Telstar 1, AT&T's first communications satellite. Over the next 56 years, 18 more satellites were launched bearing the Telstar name. The original Telstar 1, not now functional, still spins in higher elliptical orbit.

While the orbiting arrays of today are a huge advancement, they operate at a congested lower level and more of them are needed to provide similar geographic coverage.

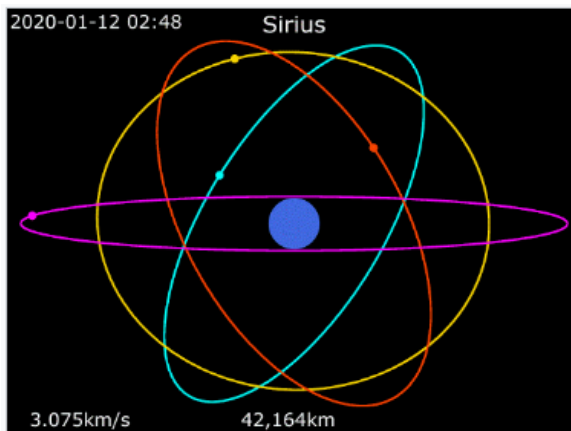
Some observers say space is already a junkyard and more satellites will compound the

overcrowding. The European Space Agency says 44,870 man-made objects currently circle the earth. Some objects, such as debris, are too small to track. According to ESA, there could be up to 1.2 million pieces of debris. The concern is that even a one centimeter fragment can have enough velocity in space to destroy a functioning satellite.

The Starlink internet and data network, operated by SpaceX, is currently the largest array with 10,413 satellites and almost all of them operational at about 340 miles high. SpaceX suggests it could ultimately have up to one million satellites in low-earth orbit. The



Current space objects tracking map from www.satellitemap.space



company's current satellites represent about three-quarters of the maneuverable orbital objects.

The widely known SiriusXM entertainment service operates from seven satellites in geostationary orbit 22,200 miles up, where they can remain fixed over a specific point above the earth.

Nation's largest city gets more phone numbers

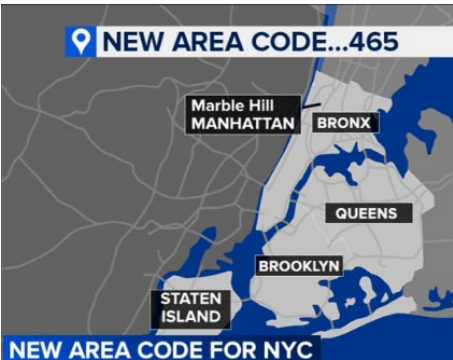
New telephone customers in the Bronx, Brooklyn, Queens, Staten Island, and the Marble Hill section of Manhattan are getting new phone numbers in Numbering Plan Area 465. This overlay is New York's eighth designation since 212 was first assigned in 1947. This is also the first New York area dialing code to contain the number five and first beginning with four.

The Public Service Commission estimates 465 will provide enough additional phone numbers for the next 11 years.

Getting another Area Code is not a new experience, but the change marks another erosion of identity for those who see the original 212 as a social badge. Much of Manhattan is not affected.

"There is an unspoken language...a subtle shorthand of cultural signifiers...instantly conveyed by three simple digits," says the online news service CommsTrader.com. "A unique brand of urban identity (is) woven into the fabric of the city's telecommunications history."

Area Code 212 was assigned to NYC when Bell Laboratories designed the North American Numbering Plan, implemented in 1947. The 79-year life of the original scheme, with only slight modifications, is testimony to the careful way AT&T planners approached their work.



	212	332	347	465	646	718	917	929
Bronx			O	O		O	A	O
Brooklyn			O	O		O	A	O
Manhattan	M	M			M		A	
Queens			O	O		O	A	O
Staten Island			O	O		O	A	O

Key: Manhattan only Outer boroughs All boroughs

Commercial demand brought about a second, now classic, 718 NPA in 1984, covering Brooklyn, Queens, the Bronx, and Staten Island. Area Code 917, the first citywide overlay, was implemented in 1992, followed by 646 in 1999 and 929 in 2011. NPA 347 was introduced in 1999 for all areas outside Manhattan; the overlay 332 covered Manhattan starting in 2017. The five boroughs of New York are one of the smallest geographic locations covered by multiple Area Codes.

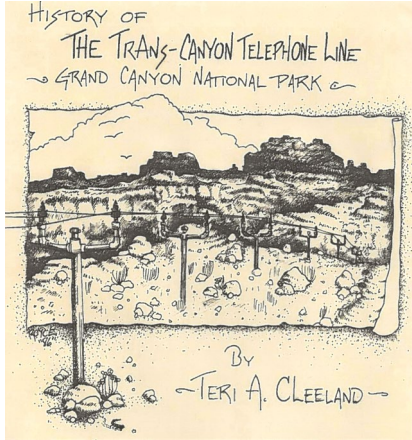
New York may have "Area Code snobbery," but other codes have social and geographical meaning. For example, "old" Denver is 303, downtown Chicago is 312, Area Code 206 is old Seattle, 505 used to mean New Mexico, and 808 is shorthand for Hawai'i. According to CommsTrader, holding a vintage Area Code is a signal "to a skeptical populace that you are a seasoned veteran who arrived long before the waves of gentrification and digital transience."

In the North American Numbering Plan, 10-digit dialing is standard for the U.S., Canada, and 18 other countries, excluding Mexico. Saint-Pierre and Miquelon, two islands off the eastern coast of Canada, are part of France and use the international dialing format (Country Code 508).

Original THG stories by Dave Felice, with material from multiple internet sources.

Wondrous phone service in hostile landscape

Although Arizona's Grand Canyon is a natural wonder, the 18-mile open wire phone line along the gorge is also amazing. The Trans-Canyon line, first built in 1922, is on the National Register of Historic Places, the first telephone line with the designation.



While working in the Telecommunications History Group Archives in Denver, volunteer Jack Bol has discovered a rare original document which provides a detailed history of a unique line. Mountain Bell commissioned historian Teri Cleeland to research and write the History of the Trans-Canyon Telephone Line in April 1986. Cleeland's documentation was the basis for the National Registry application.

The Civilian Conservation Corps used poles made of metal pipe in 1935 to upgrade the original line strung on rocks and trees. By 1986, much of the line had been replaced by Digital Subscriber Loop (DSL). Service now runs on Starlink satellite, but bits of the old line are still in use.

Cleeland describes the special galvanized iron poles as well-suited to the rugged landscape:

"The poles had to be permanent, inconspicuous, and easy to transport (by men or mules). Since the rocky terrain required drilling, a small diameter was desirable. Standard wood poles were too large, unwieldy, and subject to rot. [The pipe] Fulfilled all the requirements and was inexpensive."

The pipe poles came in four and eight foot sections which could be connected for varying height. Metal cross arms held the bare copper wires with welded sleeves. Most poles were about eight to ten feet high. Workers added upper cross arms on some poles in the late 30s.

In later years, nylon replaced the glass insulators, mostly Hemingray, on the arms.

While the phone line itself is a marvelous work of engineering, construction, and maintenance, it is dwarfed by the sheer magnitude of the Grand Canyon. Jack Bol says he was intrigued when he found the document: "(I) came across this piece of telco history that I hadn't read about before. The hand drawn cover caught my attention. Note the authors say that the study was funded by MST&T."

The Grand Canyon phone circuit was roughly parallel to the Bright Angel and North Kaibab Trails, from the rim to Roaring Springs, with a two-mile spur from South Kaibab to a place called Tipoff. As constructed in the 30s, the line had 592 metal poles. A Mountain States switch was located on the South Rim.

"The line runs from rim to river, descending nearly a mile from pine forest to desert," wrote Cleeland. "Most of the way, the terrain is rough and rocky, with many steep cliffs."

Lineman Marvin Hanchett





After the rebuilding in 1935, the single circuit designed for ten connections was overloaded with 22 phones. Government agencies and individuals competed and a five-minute call limit was imposed. An additional circuit meant three conversations could take place simultaneously. "Interaction between two balanced metallic circuits results in a third 'phantom' connection," explained Cleeland. "The third circuit did not go through Mountain States switching and allowed Park Service conversations to remain confidential."

Cleeland also noted that since telephone deregulation eliminated historic cross-subsidies, today's users of an open wire line would have to pay all prohibitive construction costs.



Cleeland cites interviews with THG co-founder Herb Hackenburg and canyon lineman Marvin Hanchett in her well-documented source notes. But Cleeland's work is not listed as a reference for the Wikipedia internet entry. Photographs are from the National Park Service Grand Canyon Study Collection. As published, Hackenburg's name is written as "Hackenberry."

The National Landmark El Tovar Hotel, opened in 1905, is situated on the canyon's south rim, adjacent to the Santa Fe railroad depot. The hotel was a "destination resort" featuring comfort and luxury within 20 feet of the canyon's edge. When the hotel got its first guests, there was already strong demand for phone service.

Cleeland's 27-page history of the telephone in the Grand Canyon is available as a PDF from the Denver THG archives.

Original THG story adapted from material compiled by THG Volunteer Jack Bol

Swartley's Stories: Line testing requires special equipment

Someone with a "butt set" hanging from a tool belt is most likely to be a telephone person. The device is like a badge designating the person's occupation.

More formally known as a lineman's handset, the device is also known as a "buttinski" or GOAT, an acronym for "goes on any terminal." Also now used by data technicians, the hand-held test set integrates many essential features needed to correctly install and test telephone lines.

AT&T introduced the renowned "1011A Hand Set" in 1937. Bell System Practices (BSP) 106-020-111 stated: "The 1011A Hand Set is to be used by outside plant forces in manual central office areas. The set consists of a soft rubber handle containing an F1 Transmitter, a P44E818 Receiver, a switch...for monitoring purposes, and a W2BT Cord." The 1011B, which replaced the original model, had a "pin dial" with small posts sticking up instead of finger holes so I could use my fingernail or pencil to dial.



I carried this 1011B test set and companion KS8455 test meter for most of my career. I could do a lot of field testing without calling the test board.

The cord on the test set had clips with three functions. We could connect to a terminal with end clips. Sharp pins, sometimes called "bed of nails," could clip onto a coated cable pair, and a single pointed pin allowed us to connect to an aerial drop, all without damaging the cable pair or drop line.



In the late 1940s, the test sets got full sized rotary dials. In a few years, smaller dials were installed. These smaller dials inspired the Trimline dial-in-handset consumer phone introduced in 1964. By the later '60s, test handsets got dual-tone multi-frequency (DTMF) pushbutton (Touch-Tone) dials which could switch to rotary pulse signals when needed.



The 1011G test set, with the widely-used 6A rotary dial, was for central offices. The cord had a 346A plug to access step switch jacks, along with a clip connector.

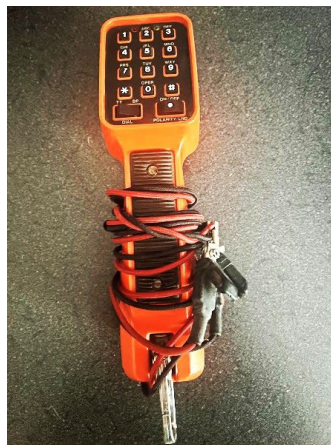
In small, un-staffed mechanical central offices, an alarm would sound if the switches were held up for a long time. Technicians would have to monitor the switch to see if someone were still talking. Mostly the alarms were from "ROH" (receiver off hook), but sometimes I could hear part of a conversation on the test set.



Something that was drilled into me in all my career was never repeat what I heard while tapping onto a line for testing!

The exact origin of the term "butt set" is disputed. We might never really know where it originated. The Buttinski story (butting into a line) is plausible but other people claim that the term

describes how the device hung on a worker's belt next to their "butt." In modern speaking, GOAT can be confused with the term meaning "Greatest Of All Time."

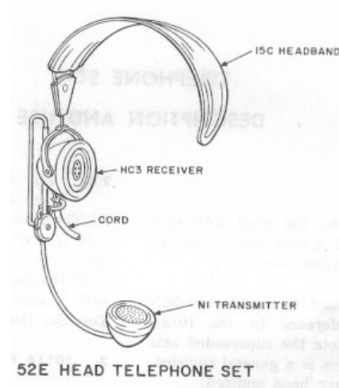


The *Connections Museum* has a large collection of these handsets from various eras and manufacturers, including the 1101A, and the ubiquitous and rugged 1013A (orange) and 1013B (blue). Official AT&T documentation refers to these simply as "Handsets For Outside Plant Forces." Inside plant versions have appropriate connectors for step-by-step or cross bar equipment.

The museum also has an obviously hand-made test set built from G-type (500 series) handset, with the dial mounted in an empty tuna fish can and attached to the back of the receiver.

In the late 60s, AT&T provided a two-piece testing arrangement for splicing personnel. The 52E Head Telephone Set (BSP 106-020-111) had a receiver and transmitter mounted on a headband, and cord with test clips. The companion 52A Test Set was a separate unit with a 6A dial and a belt clip.

With increasing demand for testing sophisticated electronic equipment, the Fluke Networks company has line of portable voice-data-video testing devices. As AT&T and other wireline providers continue to replace copper lines with fiber optics, the testing equipment gets more specialized. For example, Fluke has products for copper and fiber testing, data installation, and telephone testing. The new test sets usually have some kind of visual display.



Prominent telephone collector and historian Paul Fassbender, who provided the 1011G photo, has a well-documented display of handset pictures at <http://paul-f.com/weHandsets.html>.

Keep having fun. I am. —Swartley

John Swartley retired from Southwestern Bell, Mountain Bell, U S WEST, and ATTIS after 32 years. He has written over two dozen articles for the *Dial-Log*, now *Connections News*, starting in 2011. John lives in Springfield, Missouri, and is still writing for entertainment.

Your telephone story is important

Do you have a story to share, an idea for a story, or something you'd like to see?

Send e-mail to telcomhist@aol.com. Put the word Editor in the subject field.

Contact THG at telcomhist@aol.com for an advance evaluation of documents or artifacts you think might be worth donating to the Telecommunications History Group.