

Dr. Tim Schoechle, CO4ST Virtual Town Hall, Feb 17, 2021

Brief history of cell phones--1G, 2G, ..5G--type and differences

Radio spectrum/frequencies vs. wavelength (both are inverse function of 300,000,000 m/sec
Low 600-1000 MHz bands (1G–4G phones, microwave ovens, radar, smart meters, etc.)
Mid 1000-6000 MHz (1-6 GHz)—WiFi, cordless phones, WPT, gadgets, etc.)
High <6 GHz up to 70 GHz [millimeter waves]—5G mobile data services, 6G..etc.)

Cellular wireless telephony

Analog and digital
voice and data

1G – 1980s (1983) — analog (Frequency division multiplex) phones the size of a brick

2G – 1990s (1991) — digital (CDMA, GSM)

3G – 2000s (2001) — digital (CDMA); texting (GPRS)

4G LTE– 2010s (2010) — digital (GSM/EDGE fast data rates, UMTS/HSPA high speed data)
“LTE” ironically means “long-term evolution”

“long-term” means until we can sell you something new

5G – 2020s (2020) — digital (3GPP) add-on to 4G for data/video; millimeter wave 14-79 GHz

Why 5G requires so many towers, so close together

Millimeter waves limit range, line-of-sight, penetration/absorption problems (rain, moisture, leaves, glass, walls)

Why no (real) 5G?:

NR standards not finished, cost, lack of equipment, network equipment limitations—anti-Huawei/China politics

So—5G morphs into excuse/cover for 4G antenna densification

Because 4G works better with more cells with fewer users..

What this all means...proliferation of devices, ubiquity of use, loss of privacy, loss of local control, device dependency (Dafna to expand under legal/political)

Rhetoric about IoT, med/surgical, autonomous cars, factory automation, and other futuristic hype
Google’s invention—searching for the improved search engine— c. 2000

Our personal data has become a commodity for new IT business model

Advertising takes over the Internet—controlled by Google

Basis of Facebook—captive audience; influence

Facebook, Amazon, Microsoft, embrace the commercial surveillance model

Behavioral modification—commercial, then political (e.g., *Cambridge Analytica* scandal)

Smartphones become a data collection device; FIRST purpose is surveillance data

Internet-of-Things (IoT) is about commercial surveillance and data collection FIRST

Fit-Bit, cars, watches, Samsung/LG TVs that watch you, EVERYTHING

—All data goes to *Google & Facebook* FIRST

It's not just land-based towers--we now have satellites bombarding us too

Elon Musk, *SpaceX* (Starlink™) 12,000 satellites radiating
Also Sir Richard Branson, *Virgin Galactic* (Virgin Orbit)
Jeff Bezos, *Amazon* (Blue Origin)

Thousands of satellites (space junk and pollution)
Vastly inferior service compared to optical fiber
Dependency on satellite and wireless for Internet—based on hype; and a regulatory gap
Private interests colonizing our public commons (our upper atmosphere and space)
Government subsidy for SpaceX \$\$\$

There is an alternative--FTTP (Longmont has it)

Optical fiber concept – a glass light pipe, the size of a strand of hair,
Fiber already runs the Internet— all over the world

All cell sites get their data from fiber network

Why not you...?

Longmont's NextLight™ part of Longmont Power & Communications

1 Gigabit per second for \$50 per month—Fiber-to-the-Premises

Basic public utility, like water, sewer, streets, etc.

Chattanooga, TN—"Gig City"

The first big muni fiber city

New study shows \$2.7 billion economic benefit from the system

This is about mining of our data..."SMART" equals surveillance capitalism

The Age of Surveillance Capitalism:

The Fight for a Human Future at the New Frontier of Power, 2019 (691 pages)

By Prof Shoshana Zuboff,

Harvard Business School

Berkman Center for Internet & Society, Harvard Law School

