EDITOR'S NOTE

Science Fiction Becomes Reality
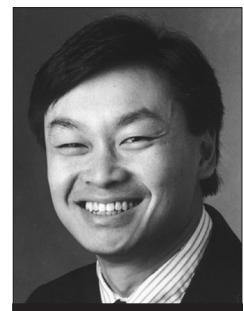
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Apple introduced its iPad earlier this year. There have been tablet computers before, but most had desktop operating systems adapted to accept pen inputs. The iPad was designed specifically with a simpler natural and responsive multitouch interface. Having used one for a few weeks, I would say that it feels like holding the future of computing in your hands.

Several observers have noticed a remarkable similarity between the iPad and tablets seen in the 1960s *Star Trek* television series (and the later *Star Trek* series as well). I did not know until recently that the tablet computers in *Star Trek* had a name — personal access data display (PADD). Futuristic multitouch computers have also appeared memorably in the movies *Minority Report*, *Iron Man*, and *Avatar*. In science fiction literature, Arthur C. Clarke described a handheld "newspad" for receiving and reading electronic newspapers in his 1968 novel *2001: A Space Odyssey*.

Apple's CEO, Mr. Steve Jobs, acknowledged inspiration from science fiction in his June 7th presentation of the new iPhone 4. Referring to the new FaceTime video calling feature, Mr. Jobs said he grew up watching *The Jetsons* and *Star Trek* and dreaming about the technology. In particular, *Star Trek* has helped to popularize the ideas of handheld communicators (much like cell phones today) and two-way videoconferencing. The large viewscreen on the ship's bridge was often used to videoconference with aliens or other ships. *Star Trek* was an inspiration for the famous AT&T Picturephone demonstrated at the 1964 New York World's Fair, an invention apparently ahead of its time.

Science fiction has a history of influencing popular culture and inspiring engineers to turn ideas into reality. Many communications technologies we use today were first imagined in science fiction [1]:

• Mobile phone: Robert Heinlein mentioned a "pocketphone" in *Assignment in Eternity* (1953) and a portable phone fitting in a pocket in *Space Cadet* (1948). In real life, the radiotelephone appeared in 1964 but was much bigger than a pocket (more like a shoebox).

• Wireless ear pieces: Philip Frances Nowlan described wireless communication by means of a "pair of ear discs" with noise cancellation worn over the ears in *Amazing Stories* (1928). Today noise cancellation is a common feature in mobile devices and headsets.

• Ear bud radios: Ray Bradbury described "seashells" — thimble size radios fitting in the ear for playing tranquil music and nature sounds in *Fahrenheit 451* (1953).

• Wireless wrist radio: a two-way radio worn as a watch was described by H. G. Wells in *Things To Come* (1936) and popularized in the Dick Tracy comics (starting 1946). Dick Tracy's wrist radio was upgraded to two-way wrist video in 1964.

• Public wireless access point: A network of publicly accessible stations for power and wireless communications was depicted by H. G. Wells in *Men Like Gods* (1923).

• Video calls: The idea of calling with the capability to see the other person has appeared many times in science fiction including the "telephot" described by Hugo Gernsback in *Modern Electrics* magazine (1911) and the "phonotelephote" in Jules Verne's *Year 2889* (1889).

• Networked answering machine: H. G. Wells wrote about a device for recording phone messages and replaying them remotely on demand in *Men Like Gods* (1923). Frederik Pohl thought of an automated personal assistant, called a Joymaker, to help access, list, and play back messages in *The Age of the Pussyfoot* (1965). Telephone answering machines had already been invented long ago; even Thomas Edison had thought of a "telescribe" to record phone calls (though without automatic answering), and Valdemar Poulsen patented a "telegraphone" to automatically answer and record calls (1898). Voicemail was offered commercially by IBM starting around 1980.

• Information highway or World Wide Web: A vision of an automated, globally accessible, catalogued repository for all human knowledge was proposed by Paul Otlet in the 1910s and H. G. Wells in *World Brain: The Idea of a Permanent World Encyclopedia* (1937). Otlet was interested in using electronic technology for his "Mundaneum" but was limited to the technology of his day, which was mainly microfilm. Wells wanted to modernize the traditional encyclopedia into a growable, coordinated technological system to

allow "any student, in any part of the world, to be able to sit with his projector in his own study at his or her convenience to examine any book, any document, in an exact replica." Wells' vision sounds surprisingly modern.

- Geosynchronous satellites: In *Wireless World* (1945), Arthur C. Clarke famously proposed a system of three artificial satellites orbiting the Earth at a height of 22,300 miles, just the distance to maintain a 24-hour orbit and appear stationary from the perspective of someone standing on the earth. The three satellites could provide television and microwave coverage to the entire planet. The first geosynchronous satellite was NASA's Syncom 2 launched in 1963.
- Networked white boards: Frank Herbert imagined "transmit-paper" in *The Godmakers* (1972) as a device that automatically received transmissions from a remote pad of paper and reproduced the writing on that pad in real time.
- Automated translation: The idea of a "universal translator" device has become common in science fiction, starting with Murray Leinster's *First Contact* (1945).
- Personalized news feed: Long before RSS, Robert Heinlein talked about a "newsbox" receiving and filtering news articles on the basis of words in the content in *Methuselah's Children* (1941). Arthur C. Clarke described the use of a "personal interest profile" (PIP) in *The Fountains of Paradise* (1978). A computer used a PIP to search global news publications for articles of interest.
- 3D television: Robert Heinlein imagined three-dimensional television in *Stranger in a Strange Land* (1961).

Some novel ideas for communications have been imagined in science fiction but not implemented yet. Perhaps in the future we can look forward to:

- Free telephone calls: J. G. Ballard foresaw a future of free phone calls that were supported by advertisers in *The Subliminal Man* (1963).
- Surveillance video combined with television: In *Nineteen Eighty-Four* (1949) George Orwell depicted a society with ubiquitous "telescreens" acting as television in one direction and surveillance video in the other.
- Personalized television: Ray Bradbury imagined a technology that changed television programs to make them appear to speak personally to each viewer in *Fahrenheit 451* (1953). Philip K. Dick dreamt of a future television with the capability to let viewers adjust the contents of televised speeches depending on the viewer's political preferences in *The Simulacra* (1966).
- Solar-system-wide communication network: George O. Smith described a Venus Equilateral Relay Station situated on an asteroid orbiting around the sun, serving as the backbone for interplanetary communications in *QRM — Interplanetary* (1942).
- Faster than light communications: Albert Einstein's theory of special relativity seems to deny the possibility of information transmission faster than light, but anything is possible in science fiction. Faster than light communication has been a favorite recurring idea in science fiction. Einstein himself raised the possibility in a 1935 paper with Boris Podolsky and Nathan Rosen about entangled particles that appear to interact instantaneously over any distance, a phe-

nomenon that Einstein famously called "spooky action at a distance." Einstein further provoked the idea of faster than light travel — not actually going faster than light but cheating in a way: traveling a distance more quickly than light by a shortcut through space via an Einstein-Rosen bridge or "wormhole." E. E. "Doc" Smith mentioned faster than light "ultra-wave" communication in *Triplanetary* (1934), and Lester del Rey called it "hyperwave" in *Habit* (1939). Isaac Asimov referred to faster than light ultrawave in *Foundation* (1951). James Blish described a Dirac transmitter that could communicate anywhere in the galaxy instantaneously in *Cities in Flight* (1957).

- Implants for communications: Philip Frances Nowlan described "chest discs," a voice activated radio device in *Armageddon: 2419 A.D.* (1928). Robert Heinlein imagined a small radio device ("audio relay") implanted behind the ear in *The Puppet Masters* (1951). Frank Herbert wrote of an implanted two-way transceiver capable of teleconferencing between three people or eavesdropping on a conversation in *The Godmakers* (1972). Jerry Pournelle and Larry Niven imagined the use of implants to mentally communicate with a computer in *Oath of Fealty* (1981).
- Sensory immersion in the Net: Vernor Vinge described a "portal" for connecting a human's senses into a computer network in *True Names* (1981). Perhaps more famously, William Gibson described users "jacking" their central nervous system directly into the virtual immersive environment of the Net in *Neuromancer* (1984).

What do you think the future network will be like? As always, I welcome your feedback or questions at tom_chen@yahoo.com.

Reference

[1] Technovelgy LLC, http://www.technovelgy.com.