SUBSCRIPTIONS   SIGN IN

THE PAST, PRESENT, AND FUTURE OF TOUCH —

From touch displays to the Surface: A brief history of touchscreen technology

The beginnings of capacitive, resisitive, and multitouch screens.

FLORENCE ION - 4/4/2013, 9:00 AM

Aurich Lawson / Thinkstock

It's hard to believe that just a few decades ago, touchscreen technology could only be found in science fiction books and film. These days, it's almost unfathomable how we once got through our daily tasks without a trusty tablet or smartphone nearby, but it doesn't stop there. Touchscreens really are *everywhere*. Homes, cars, restaurants, stores, planes, wherever—they fill our lives in spaces public and private.

The Past, Present, and Future of Touch

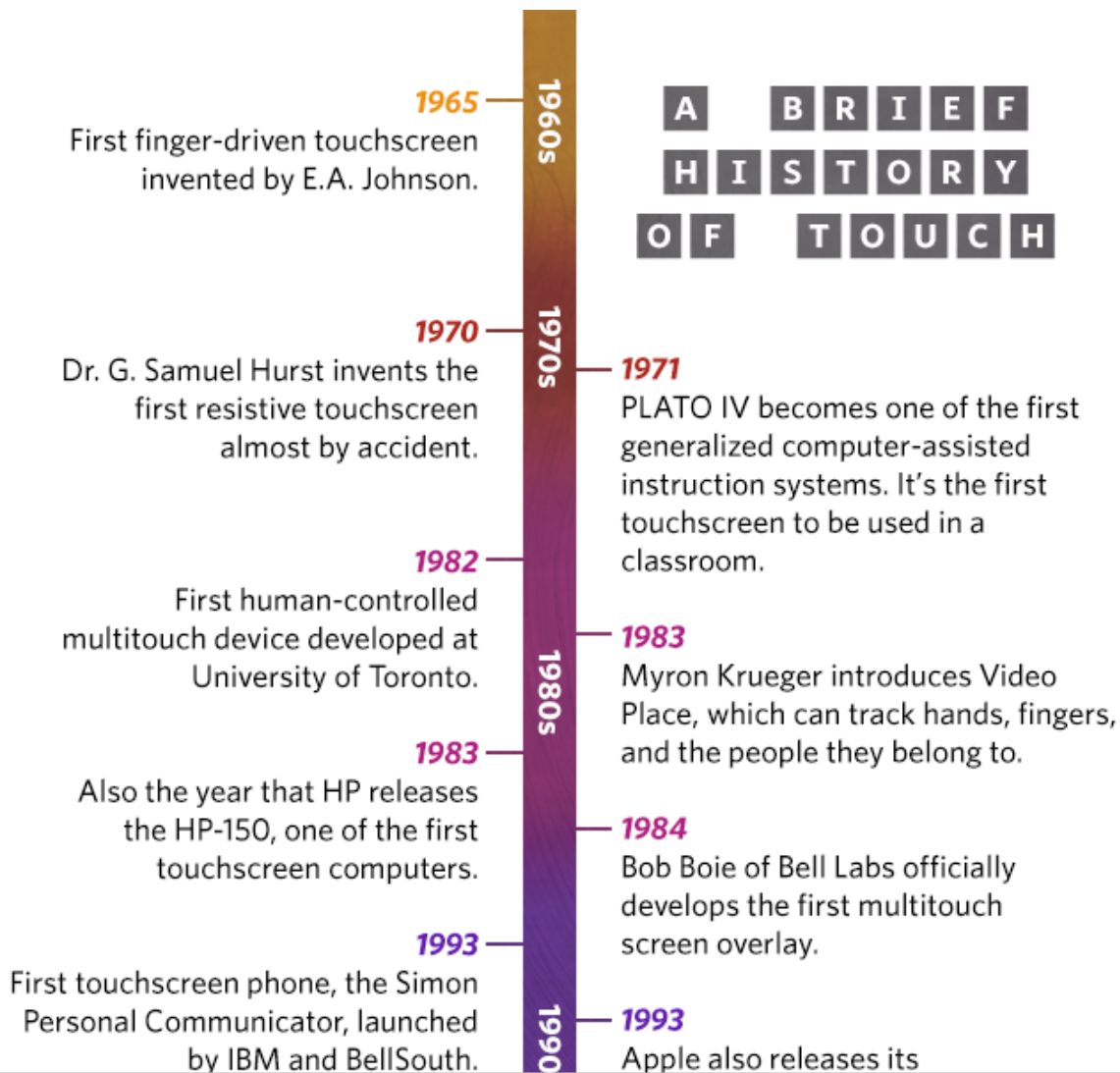**Finger-free phones, full body gesturing, and our "touchscreen" future**

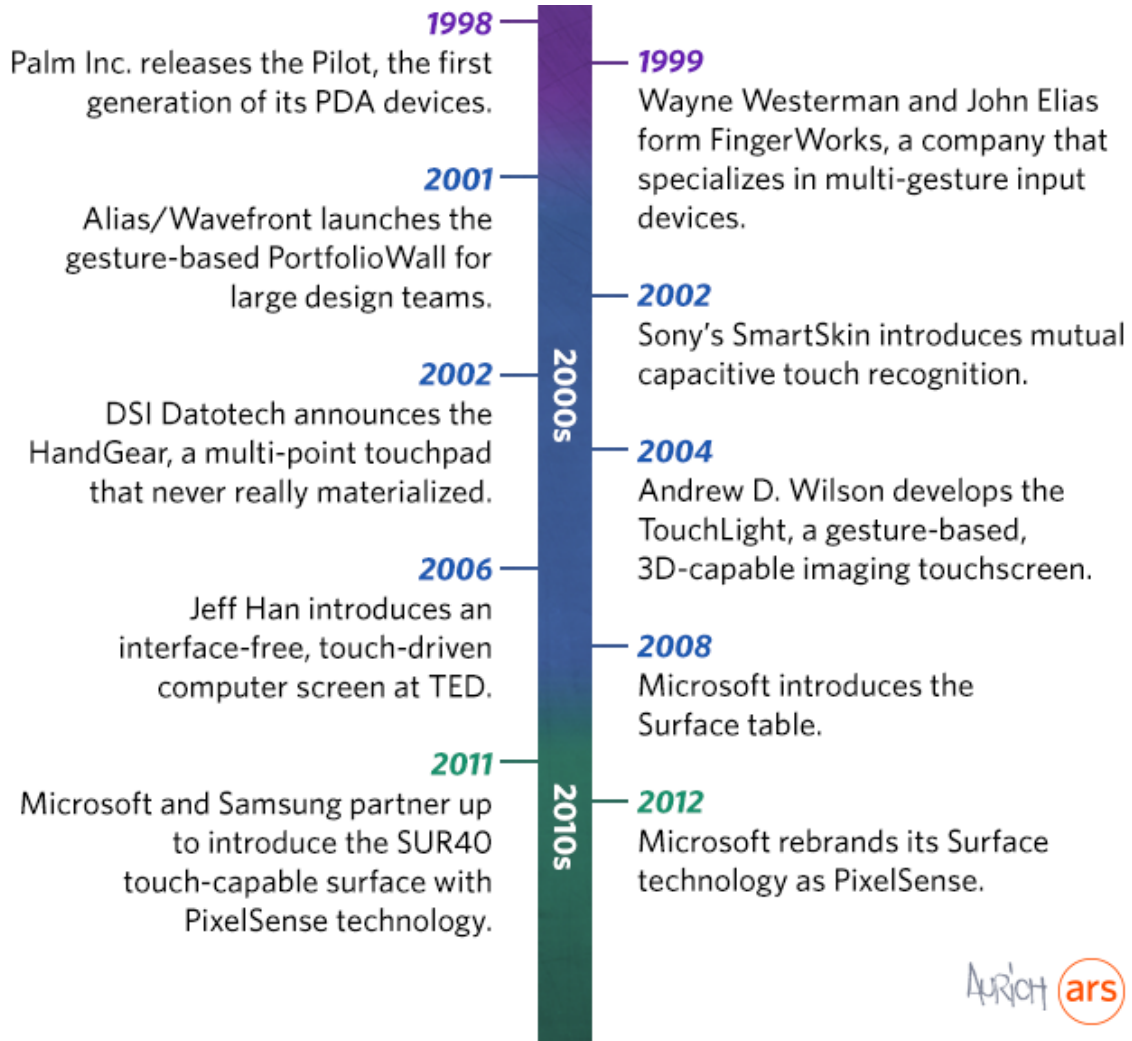**How today's touchscreen tech put the world at our fingertips**

> **View more stories**

It took generations and several major technological advancements for touchscreens to achieve this kind of presence. Although the underlying technology behind touchscreens can be traced back to the 1940s, there's plenty of evidence that suggests touchscreens weren't feasible until at least 1965. Popular science fiction television shows like *Star Trek* didn't even refer to the technology until *Star Trek: The Next Generation* debuted in 1987, almost two decades after touchscreen technology was even deemed possible. But their inclusion in the series paralleled the advancements in the technology world, and by the late 1980s, touchscreens finally appeared to be realistic enough that consumers could actually employ the technology into their own homes.

This article is the first of a three-part series on touchscreen technology's journey to fact from fiction. The first three decades of touch are important to reflect upon in order to really appreciate the multitouch technology we're so used to having today. Today, we'll look at when these technologies first arose and who introduced them, plus we'll discuss several other pioneers who played a big role in advancing touch. Future entries in this series will study how the changes in touch displays led to essential devices for our lives today and where the technology might take us in the future. But first, let's put finger to screen and travel to the 1960s.


A BRIEF HISTORY OF TOUCH

1965 — *1960s*
First finger-driven touchscreen invented by E.A. Johnson.

1970 — *1970s*
Dr. G. Samuel Hurst invents the first resistive touchscreen almost by accident.

— **1971**
PLATO IV becomes one of the first generalized computer-assisted instruction systems. It's the first touchscreen to be used in a classroom.

1982 —
First human-controlled multitouch device developed at University of Toronto.

— **1983**
Myron Krueger introduces Video Place, which can track hands, fingers, and the people they belong to.

1983 — *1980s*
Also the year that HP releases the HP-150, one of the first touchscreen computers.

— **1984**
Bob Boie of Bell Labs officially develops the first multitouch screen overlay.

1993 —
First touchscreen phone, the Simon Personal Communicator, launched by IBM and BellSouth.

— **1993** *1990*
Apple also releases its

1998

Palm Inc. releases the Pilot, the first generation of its PDA devices.

1999

Wayne Westerman and John Elias form FingerWorks, a company that specializes in multi-gesture input devices.

2001

Alias/Wavefront launches the gesture-based PortfolioWall for large design teams.

2002

Sony's SmartSkin introduces mutual capacitive touch recognition.

2002

DSI Datotech announces the HandGear, a multi-point touchpad that never really materialized.

2004

Andrew D. Wilson develops the TouchLight, a gesture-based, 3D-capable imaging touchscreen.

2006

Jeff Han introduces an interface-free, touch-driven computer screen at TED.

2008

Microsoft introduces the Surface table.

2011

Microsoft and Samsung partner up to introduce the SUR40 touch-capable surface with PixelSense technology.

2012

Microsoft rebrands its Surface technology as PixelSense.

2000s

2010s

AURICH (ars)

1960s: The first touchscreen

Johnson, 1967

Historians generally consider the first finger-driven touchscreen to have been invented by E.A. Johnson in 1965 at the Royal Radar Establishment in Malvern, United Kingdom. Johnson originally described his work in an article entitled "Touch display—a novel input/output device for computers" published in *Electronics Letters.* The piece featured a diagram describing a type of touchscreen mechanism that many smartphones use today—what we now know as capacitive touch. Two years later, Johnson further expounded on the technology with photographs and diagrams in "Touch Displays: A Programmed Man-Machine Interface," published in *Ergonomics* in 1967.

A capacitive touchscreen panel uses an insulator, like glass, that is coated with a transparent conductor such as indium tin oxide (ITO). The "conductive" part is usually a human finger, which makes for a fine electrical conductor. Johnson's initial technology could only process one touch at a time, and what we'd describe today as "multitouch" was still somewhat a ways away. The invention was also binary in its interpretation of touch—the interface registered contact or it didn't register contact. Pressure sensitivity would arrive much later.
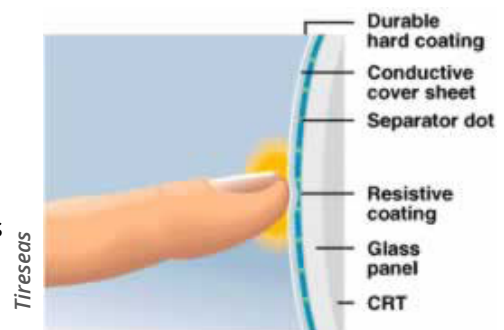
How capacitive touchscreens work.

Even without the extra features, the early touch interface idea had some takers. Johnson's discovery was eventually adopted by air traffic controllers in the UK and remained in use until the late 1990s.

1970s: Resistive touchscreens are invented

Although capacitive touchscreens were designed first, they were eclipsed in the early years of touch by *resistive* touchscreens. American inventor Dr. G. Samuel Hurst developed resistive touchscreens

To study atomic physics the research team used an overworked Van de Graff accelerator that was only available at night. Tedious analyses slowed their research. Sam thought of a way to solve that problem. He, Parks, and Thurman Stewart, another doctoral student, used electrically conductive paper to read a pair of x- and y- coordinates. That idea led to the first touch screen for a computer. With this prototype, his students could compute in a few hours what otherwise had taken days to accomplish.

Hurst and the research team had been working at the University of Kentucky. The university tried to file a patent on his behalf to protect this accidental invention from duplication, but its scientific origins made it seem like it wasn't that applicable outside the laboratory.

Hurst, however, had other ideas. "I thought it might be useful for other things," he said in the article. In 1970, after he returned to work at the Oak Ridge National Laboratory (ORNL), Hurst began an after-hours experiment. In his basement, Hurst and nine friends from various other areas of expertise set out to refine what had been accidentally invented. The group called its fledgling venture "Elographics," and the team discovered that a touchscreen on a computer monitor made for an excellent method of interaction. All the screen needed was a conductive cover sheet to make contact with the sheet that contained the X- and Y-axis. Pressure on the cover sheet allowed voltage to flow between the X wires and the Y wires, which could be measured to indicate coordinates. This discovery helped found what we today refer to as resistive touch technology (because it responds purely to pressure rather than electrical conductivity, working with both a stylus and a finger).

As a class of technology, resistive touchscreens tend to be very affordable to produce. Most devices and machines using this touch technology can be found in restaurants, factories, and hospitals because they are durable enough for these environments. Smartphone manufacturers have also used resistive touchscreens in the past, though their presence in the mobile space today tends to be confined to lower-end phones.
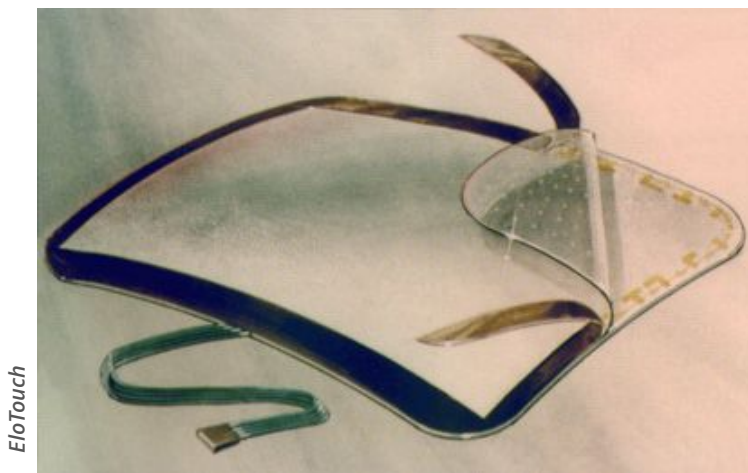
EloTouch

A second-gen AccuTouch curved touchscreen from EloTouch.

DOCKET ALARM

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts

Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research

With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips

Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS
Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS
Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS
Sync your system to PACER to automate legal marketing.