The Invention of the Touchscreen

(As published in The Oak Ridger's Historically Speaking column the week of August 17, 2026)

At my request, Jim Palmer, has written about his involvement with Elographics. I think his insights add to the history and evolution of the company that invented the touchscreen. Enjoy Jim's recollection of a time in his career when he was President of Elographics!

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Elographics, Inc. is one of many successful startup technical companies in Oak Ridge, Tennessee. The touchscreens that are now so prevalent for computers, tablets and smartphones may be attributed to technological innovations made by Elographics in the 1970's.

The early days of Elographics included two years where current Oak Ridge resident James R. (Jim) Palmer was President. Palmer met Elographics' founder, George Samuel (Sam) Hurst, at an R&D magazine "IR -100" award ceremony in July 1973. Palmer represented the Industrial Products Division of Hughes Aircraft Company, which won an IR-100 award that year for its "Probeye" hand-held infrared viewing device. Hurst represented Elographics which won an IR-100 award for its "Elograph" graphical digitizer. Elographics was looking for a full-time President and Palmer was looking for an entrepreneurial opportunity.

After some postal mail exchanges and a phone call or two, Palmer was invited to Oak Ridge for an interview. Besides Hurst, Elographics' Board members included Herman J. Hurst (no relation to Sam), John W. T. Dabbs, William C. (Bill) Colwell, Jr., and Harold W. (Hal) Schmitt. Other prominent Elographics shareholders were Wilbur D. (Dub) Shults, Ronald M. Keyser, Robert N. Compton, and Theodore A. (Ted) Welton. Palmer recalls being taken to an Oak Ridge Playhouse production of "Fiddler on the Roof" as part of his interview process.

In due course an offer was extended to Palmer which he accepted. He was appointed President and General Manager of Elographics beginning in January 1974.

Elographics' early technology was built around an invention of Sam Hurst, for which a patent was applied for on April 17, 1972, and was issued as US Patent US3798370A on March 19, 1974. Martin J. Skinner, who was a patent agent at Oak Ridge National Laboratory, moonlighted for Elographics to file and prosecute the patent application. The patent covered a novel electrode design which placed a pattern of conductive dots along each edge of a uniformly resistive sheet. With appropriate switching, this provided a uniform electrical gradient in the X direction and in the Y direction. This permitted the acquisition of geometric coordinate points across such documents as EKG strips, analog graph plotters, photographs, and so forth. These devices were called graphical digitizer tablets.

Up until the end of 1973, Elographics' products were housed in wooden cabinets and utilized a needle stylus to pierce through the document to be digitized and into the underlying resistive sheet. This captured X and Y voltages that represented the coordinates of the location of the stylus. These coordinates were displayed on two digital readouts on a panel above the tablet.

When Palmer arrived, employees at Elographics were John E. Talmage, Jr. who served as the principal technologist, L. Dexter Bates who was the chief engineer, Mike Blair who also served in engineering capacities, a technician whose first name is recalled as being "Jeff," but whose last name is unfortunately now lost, and Betty Lou Colwell (wife of Bill Colwell) who served as secretary. James Frank Wilson who was a young physicist at ORNL, and then a law student, served as Elographics' day-to-day legal advisor.

The start of Palmer's tenure produced some aesthetic improvements such as changing the logo to a more contemporary design and replacing the wooden cabinets with a modern molded plastic unit. These enhancements were developed by friends of Sam Hurst and Bill Colwell at ORNL.

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In a much more significant technology advance, the company had also just recently developed a pressure sensitive tablet that could use a ballpoint pen to merely touch the document to generate the digital X-Y coordinates instead of piercing the document with a needle stylus. This advance was covered by US Patent US3911215A which was applied for on March 18, 1974, and was issued on October 7, 1975.

The coordinates determined by the Elograph could be input into early electronic computational devices such as a Wang electronic calculator. The Wang 300-series calculators used small magnetic core "donuts" for memory and had orange glowing "Nixie tubes" for the display.

The Elograph tablets required electronic calibration and Bates improved that process using an Altair 8800 computer kit. The Altair 8800, released in 1974, is widely recognized as the spark that ignited the microcomputer revolution. However, by today's standards the Altair 8800 was very primitive. It had no keyboard, mouse, or screen. The computer that users assembled from their kit provided front-panel toggle switches to boot up the computer and to enter programming instructions. The results were read via blinking LEDs on the front panel. Bates added the very useful feature of adapting a punched paper tape reader to boot up the Altair and input the data.

The main customers for Elograph digitizers were from Oak Ridge National Laboratory and the result of word-of-mouth recommendations from other customers. One of the limitations in expanding sales was a difficulty in explaining what the product could do. Palmer developed an advertisement that depicted an ordinary wooden ruler with an imbedded LED display that was illuminated to show a numerical value. This eye-catching advertisement bore the title "Digital Ruler?" and the text of the ad described what the Elograph could do. This ad ran in R&D magazine and drew several new customers. Palmer also made an extensive sales trip to prospective customers in the Northeast, driving his family's '67 Mercury Cougar.

A much larger sales success was achieved by Ray Evans who had been hired as the marketing manager. Evans cultivated a quantity order of digitizers from Ladd Research Industries. Ladd was a Vermont company that developed and supplied products for electron microscopy and similar fields.

The pivotal events that dramatically changed the trajectory of Elographics were the results of conversations Palmer had with a consultant he knew from when he worked at Hughes Aircraft Company. The consultant was working on a project with the US Navy, and he wondered if the Elograph could be made transparent. If so, they wanted to use it when it was placed in front of a monitor display screen. Palmer and Bates went to work on that, and Palmer traveled to Corning Glass in Pittsburgh to talk with them about this. Corning had developed a process for vacuum depositing a transparent conductive coating onto glass. Elographics adapted this glass sensor for use in its digitizer and eventually shipped a prototype to the Navy consultant. This was the world's first ever computer touch screen.

Despite that milestone, as every entrepreneur knows, it can take a long time from making a technological breakthrough to achieving commercial success. Cash flow became a real problem and Palmer eventually decided that he was not the entrepreneur that he thought he was. He resigned in January 1976. He was soon replaced by William A. (Bill) Gibson, who was an excellent choice for the company at this stage of its development. Other new employees also joined the company, including Robert J. (Bob) Cooney.

According to information found online, soon after Gibson joined Elographics, Siemens Corporation came to Elographics and offered to back it in the development of a curved glass sensor. Then in 1982 Elographics displayed 33 televisions covered with the new transparent touch-sensitive panels in the US Pavilion at the 1982 World's Fair in Knoxville, Tennessee. For many people this was the first opportunity to see and use a touchscreen.

In early 1986, Raychem Corporation in Menlo Park, California acquired Elographics. Raychem was a New York Stock Exchange company, and the acquisition was structured as an exchange of Elographics shares

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of stock for Raychem shares of stock. This made a lot of money for the original investors and Raychem provided the working capital needed for the company to continue development of new products and expand sales at a rapid rate.

On February 24, 1994, the company officially changed its name from Elographics to Elo TouchSystems. Products bearing that name are still sold today and placed in service around the world. If you take a tourism canal ride in Amsterdam, a clerk will sell you your ticket using an Elo TouchSystem. And, as a fitting closure to a circle of historical events, the Jersey Mike's sandwich store in Oak Ridge uses an Elo TouchSystem as its point-of-sale terminal.

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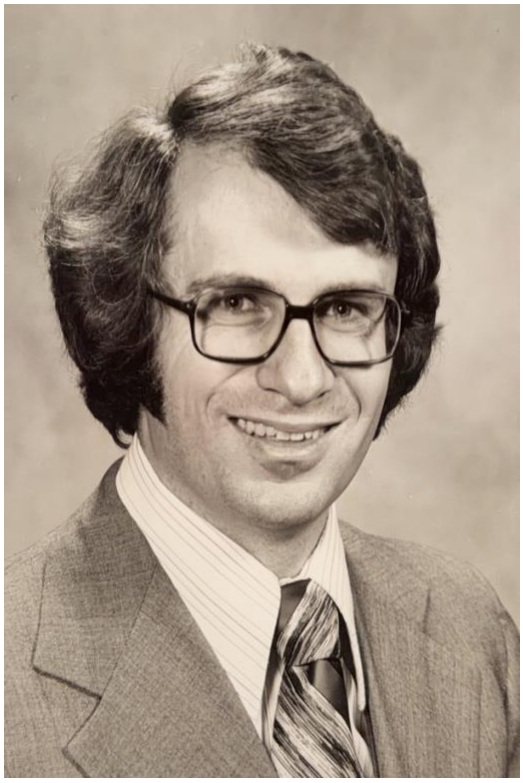
Thank you, Jim Palmer, for providing insights only a person who lived the experience could share.



Jim Palmer in 1977

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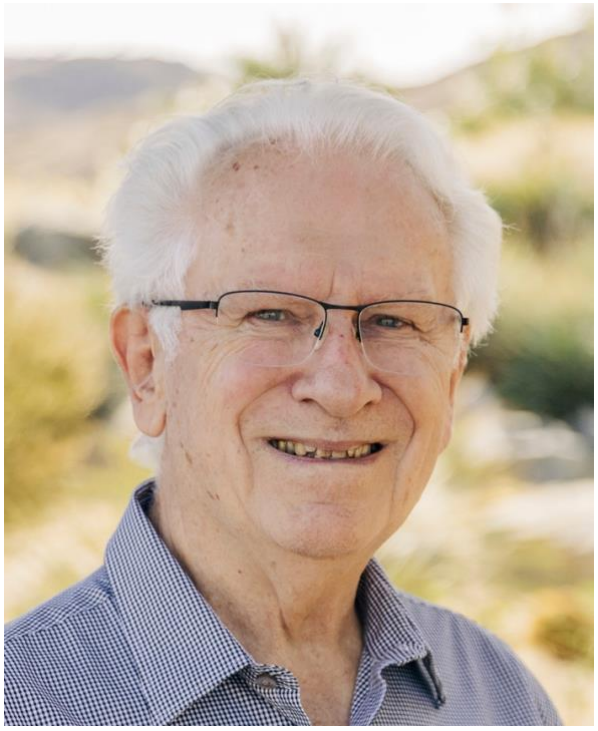

Jim Palmer today