The Palo Alto Research Center (PARC)

PARC (Palo Alto Research Center, Inc.), formerly Xerox PARC, is a research and development company in Palo Alto, California that began as a division of Xerox Corporation. It was founded in 1970, and incorporated as a wholly owned subsidiary of Xerox in 2002. It is best known for inventing laser printing, Ethernet, the modern personal computer graphical user interface (GUI) paradigm, object-oriented programming, ubiquitous computing, and advancing very-large-scale-integration (VLSI). Today PARC collaborates with sponsors and clients to discover novel business concepts and transfer scientific findings into production. Current research areas include biomedical technologies, "clean technology," user interface design, sensemaking, ubiquitous computing, large area electronics, and embedded and intelligent systems.

History

PARC's founding director, George Pake, was a physicist, working in the area of nuclear magnetic resonance. Dr. Pake had been serving as provost of Washington University in 1969 when he was approached by Jack Goldman, Chief Scientist at Xerox. The result of their partnership was that Goldman was chiefly responsible for Xerox founding, and generously funding, a second research center, and George Pake was chiefly responsible for choosing PARC's location in Palo Alto — 3,000 miles away from Xerox headquarters.In retrospect, this turned out to be a good idea, for around 1974, PARC was able to hire many employees of the nearby Augmentation Research Center (founded by Douglas Engelbart) as Engelbart's funding from DARPA, NASA, and the U.S. Air Force was drying up.

Much of its success in the computer field was due to the inspired leadership of PARC's Computer Science Laboratory by Bob Taylor, as associate manager (1970–77), and then manager (1977–83),

On January 4, 2002, PARC was incorporated as a subsidiary company of Xerox, called Palo Alto Research Center Incorporated, i.e., PARC. Following the spin-off, PARC remains a wholly owned subsidiary of the Xerox Corporation. As of 2004, Xerox remained the company's largest customer, but PARC had also announced a multi-year relationship with Fujitsu and an entrance into biomedical sciences in partnership with the Scripps Research Institute of La Jolla, CA.

Accomplishments

PARC has been the incubator of many elements of modern computing. Most were included in the Alto, which introduced and unified most aspects of now-standard personal computer usage model: the mouse, computer generated color graphics, a graphical user interface featuring windows and icons, the WYSIWYG text editor, InterPress (a resolution-independent graphical page description language and the precursor to PostScript), Ethernet, and fully formed object-oriented programming in the Smalltalk programming language and integrated development environment. The laser printer was developed at the same time, as an integral part of the overall environment.

Among PARC's distinguished researchers were two Turing Award winners: Butler W. Lampson (1992) and Alan Kay (2003). The ACM Software System Award recognized the Alto system in 1984, Smalltalk in 1987, InterLisp in 1992, and Remote Procedure Call in 1994. Lampson, Kay, Bob Taylor, and Charles P. Thacker received the National Academy of Engineering's prestigious Charles Stark Draper Prize in 2004 for their work on the Alto system.

Xerox has been heavily criticized (particularly by business historians) for failing to properly commercialize and profitably exploit PARC's innovations. A favorite example is the GUI, initially developed at PARC for the Alto and then commercialized as the Xerox Star by the Xerox Systems Development Department. Although very significant in terms of its influence on future system design, it is deemed a failure because it only sold approximately 25,000 units. A small group from PARC led by David Liddle and Charles Irby formed Metaphor Computer Systems. They extended the Star desktop concept into an animated graphic and communicating office automation model and sold the company to IBM.

The first successful commercial GUI product was the Apple Macintosh, which was heavily inspired by PARC's work; Xerox was given Apple stock in exchange for engineer visits and an understanding that Apple would create a GUI product. Much later, in the midst of the Apple v. Microsoft lawsuit in which Apple accused Microsoft of violating its copyright by appropriating the use of the "look and feel" of the Macintosh GUI, Xerox also sued Apple on the same grounds. The lawsuit was dismissed because Xerox had waited too long to file suit, and the statute of limitations had expired. However, some dispute the degree to which the Apple interface was derived from Xerox designs. Indeed, prior to Apple's visits to PARC, its Macintosh project more closely resembled the Valdocs operating system of the Epson QX-10.

There is no denying the long-term impact of PARC's systems. It took two decades for much of their technology to be equalled or surpassed. The interfaces and technology that PARC pioneered became standards for much of the computing industry, once their merits were widely known.

It is legend that Xerox management consistently failed to see the potential of many of the PARC inventions. While there is some truth to this, it is also an over-simplification. They certainly understood the value of laser printing, and of advances coming from the non-computer-focused part of PARC. Most critics don't realize that computing research was a relatively small part of PARC; there were many researchers working in areas such as materials science at PARC, including pioneers in LCD and optical disc technologies.

The work at PARC in the years since the early 1980s is often overlooked, but major work since then includes ubiquitous computing aka pervasive computing, aspect-oriented programming, and IPv6 to name but a few.

Further reading

Michael A. Hiltzik, Dealers of Lightning: Xerox PARC and the Dawn of the Computer Age (HarperCollins, New York, 1999) ISBN 0-88730-989-5

Douglas K. Smith, Robert C. Alexander, Fumbling the Future: How Xerox Invented, Then Ignored, the First Personal Computer (William Morrow, New York, 1988) ISBN 1-58348-266-0

M. Mitchell Waldrop, The Dream Machine: J.C.R. Licklider and the Revolution That Made Computing Personal (Viking Penguin, New York, 2001) ISBN 0-670-89976-3

Howard Rheingold, Tools for Thought (MIT Press, 2000) ISBN 0-262-68115-3

Visit the PARC homepage at http://www.parc.com

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UGA Legend – Herman Stegeman

Windows Keyboard Shortcut