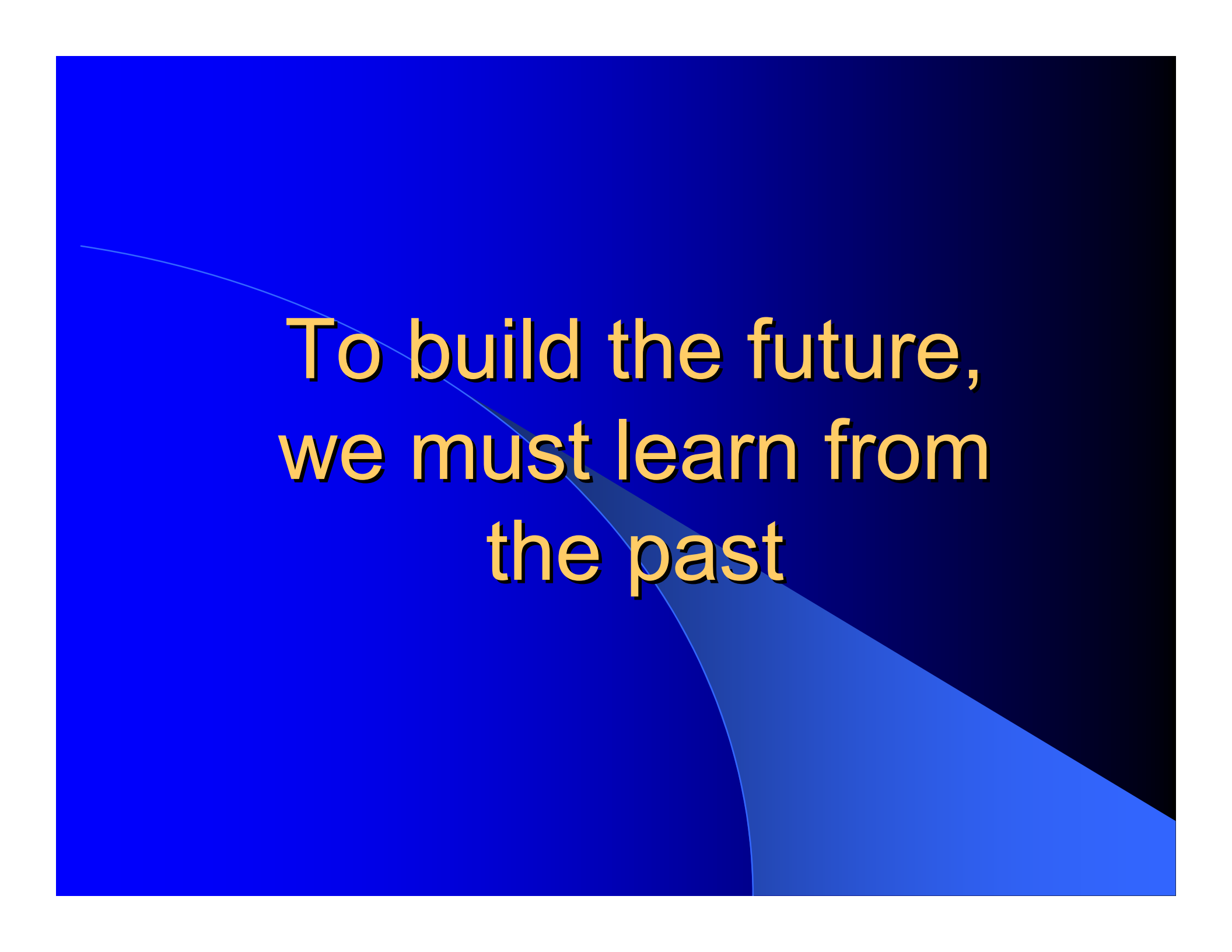# The Past and Future of Pen Computing

Conrad H. Blickenstorfer, Editor-in-Chief
Pen Computing Magazine

chb@pencomputing.com
http://www.pencomputing.com

# To build the future, we must learn from the past

History of pen computing

- **1914:** Goldberg gets US patent for recognition of handwritten numbers to control machines

- **1938:** Hansel gets US patent for machine recognition of handwriting

- **1956:** RAND Corporation develops digitizing tablet for handwriting recognition

- **1957-62:** Handwriting recognition projects with accuracies of 97-99%

- **1963:** Bell Labs develops cursive recognizer

- **1966:** RAND creates GRAIL, similar to Graffiti

Pioneer: Alan Kay
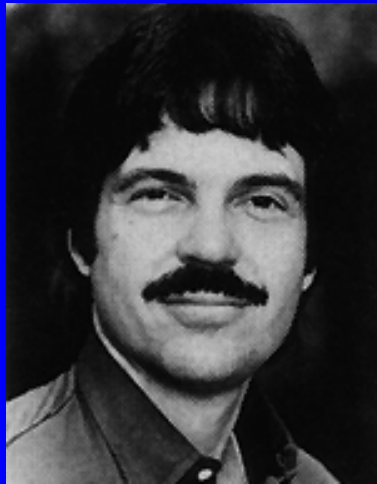
- Utah State University
- Stanford University
- Xerox PARC: GUI, SmallTalk, OOL
- Apple Computer Research Fellow
- Disney
- Envisioned Dynabook in 1968:

The Dynabook will be a "dynamic medium for creative thought, capable of synthesizing all media – pictures, animation, sound, and text – through the intimacy and responsiveness of the personal computer."

History of pen computing

- **1970s:** Commercial products, including kana/romanji billing machine
- **1980s:** Handwriting recognition companies
  - Nestor
  - Communication Intelligence Corporation
  - Lexicus
  - Several others

Pioneers: Apple

- **1987 Apple prototype**
  - Speech recognition
  - Intelligent agents
  - Camera
  - Folding display
  - Video conferencing
  - Wireless communication
  - Personal Information Manager

"Knowledge Navigator"

In 1987, Apple Computer developed the Knowledge Navigator. It added speech recognition, audio, video, and intelligent information retrieval to the "Dynabook" concept.

Pen Computing Hype

- **1991:** Hype is building!
  - Pen as the next interface
  - Pen may replace keyboard
  - GRiD builds pen computer that runs PenDOS
  - GO Corporation finalizes PenPoint
  - EO founded to build PenPoint pen computers
  - But more power needed to run PenPoint and PenWindows

Pen Computing Hype

"The impact of pens on computing will be far greater than the mouse. The two key benefits—extreme portability and ease of use—will enable tiny, low-cost PCs that will appeal to a broader spectrum of users than ever before. Imagine "smart paper" that can do everything paper can as well as recognize objects, do calculations, neatly organize, duplicate and transmit itself."

Greg Slyngstad, General Manager
Microsoft Pen Computing Group, November 1991

Pen Computing Hype

- **1992:** Products arrive
  - GO releases PenPoint in the spring of 92
    - Truly pen-centric
    - But steep learning curve
  - Lexicus Longhand handwriting recognition
  - Microsoft releases Windows for Pen Computing
    - Layer on top of Windows
    - But runs all existing Windows applications
  - Momenta creates its own Interface

1st Wave of Pen Tablets

- **1992-1994**
- 386 or 486 processor
- 4-8MB of RAM
- Windows for Pen Computing/PenPoint
- PC Card slots
- Clipboard format
- 3 to 4.5 pounds
- Active digitizer (Wacom or Kurta/Mutoh)
- 6 to 8-inch monochrome LCDs

Early Pen Computers: Momenta

- Founded 1989 by Iranian Kamran Elahian
- Introduced October 1991
- 386/20, advanced design
- US$40 million in VC capital
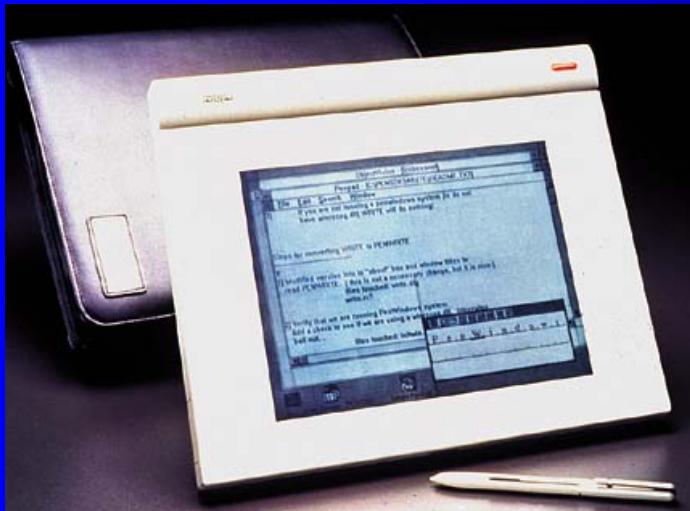- Failed and closed in 1992

Early Pen Computers
AT&T EO 440

- November 1992
- PenPoint OS
- Excellent product
- Larger 880 model had cellphone option
- Sold by Dell for a while
- AT&T stopped production and closed GO/EO in 94
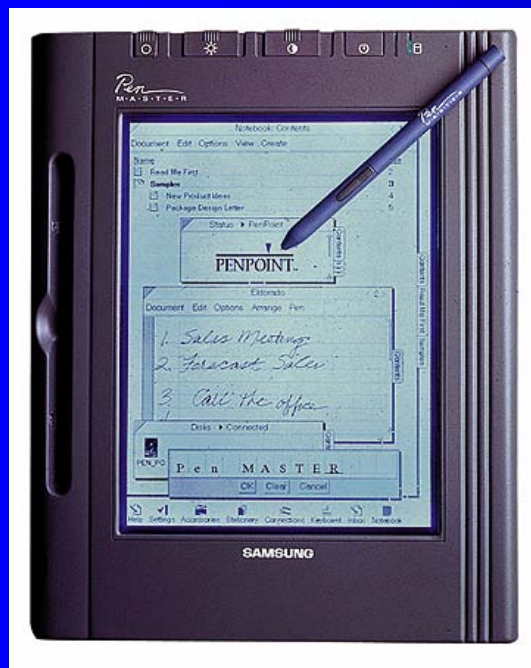- US$70 million VC money lost

Early Pen Computers
NCR NotePad 3125

- Late 1992
- First pen tablet to run Pen Windows or PenPoint
- Weighed just over 4 pounds
- Four hour battery
- 3130 model adds backlight

Early Pen Computers
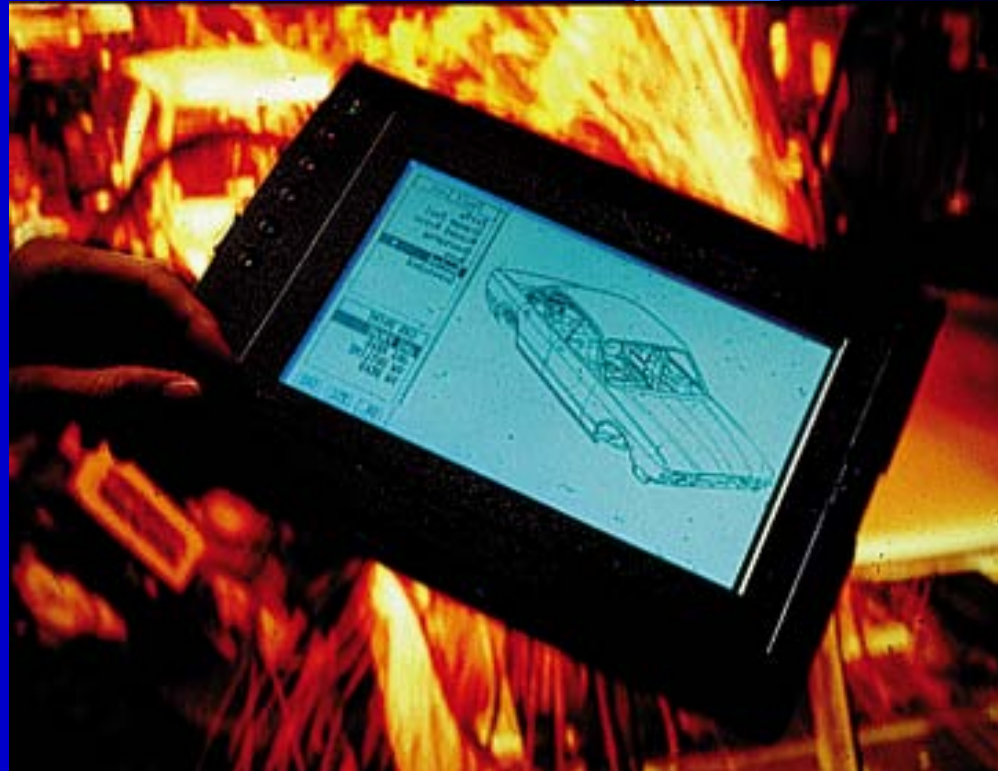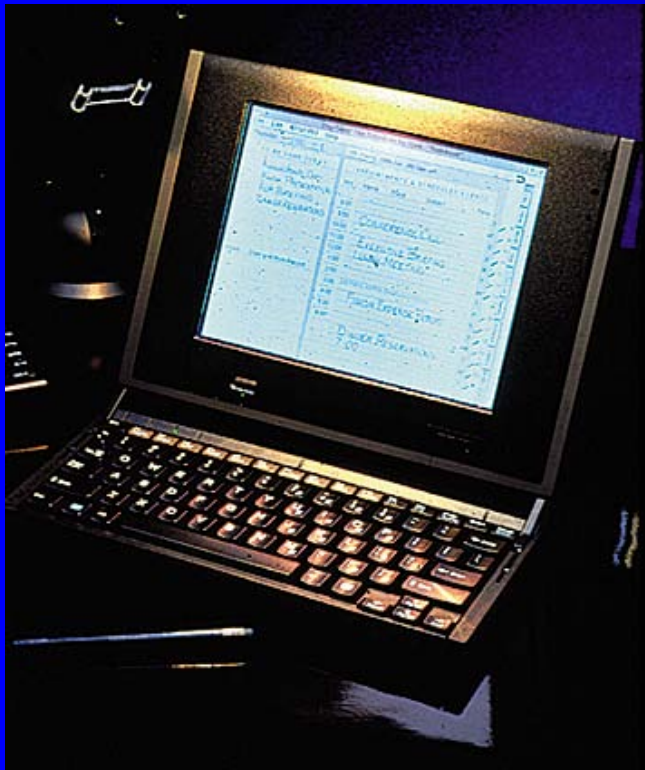# Samsung PenMaster

- Late 1992
- Also sold as GRiDPad SL
- Intel 386/16, backlight
- PenPoint or PenWindows
- Wacom digitizer, edged screen
- 2 PC Card slots
- Great design!

Early Pen Computers
GRiD

Jeff Hawkins designed the GRiD
Convertible, GRiDPAD, GRiD PalmPad
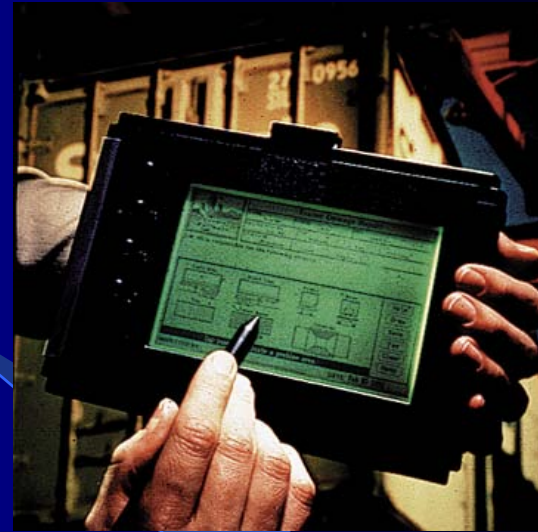
Early Pen Computers
Dauphin DTR-1

- 1992/93
- "Desk Top Replacement"
- Intel 486SLC/25
- PenWindows
- 2.5 pounds
- Sold in computer chains
- Later more powerful DTR-2 and Orasis
- Lost US$50 million, bankrupt (restructured now)

Early Pen Computers
Fujitsu 325Point

- 1993
- Am 386SXLV/25
- PenWindows/PenPoint
- 8.7 x 11.7 x 1.2 inches
- 3.0 pounds
- US$1,695
- <u>Predecessor of famous Stylistic models</u>

Early Pen Computers
TelePAD SL

- 1993/94
- Intel 386SL/25
- 11 x 11 x 1.3 inches
- 4.5 pounds
- PenWindows/PenPoint
- Field force solution
- Later futuristic TelePad 3

Early Pen Computers
Compaq Concerto

- 1993/1994
- 486/25 and 486/33
- 250MB HD
- Active digitizer
- PenWindows
- Detachable keyboard
- Tablet PC….?

Early Pen Computers
IBM ThinkPad 700/710/730

- 1993/94
- The original ThinkPad
- Wacom digitizer
- Paperlike surface
- Intel 486/33
- 2 PC Card slots
- Pen Windows/PenPoint
- 3.5 pounds

Early Pen Computers
IBM ThinkPad 360P

- 1994
- Intel 486SX/33
- Convertible screen
- 2 PC Card slots
- 9.5-inch Color DSTN
- Pen Windows/PenDOS
- US$2,899

Early Pen Computers
Toshiba T200 "DynaPad"

- 1994
- Intel 486DX2/40
- 5 hour battery!
- 9.5" Color or b&w
- Wacom digitizer
- US$ 2,449

Crash 1993/94

- Momenta closes doors (1992)
- Samsung gives up after PenMaster
- NCR drops out
- GRiD sold to AST, liquidated
- Dauphin bankrupt
- AT&T buys GO/EO, EO bankrupt Aug 94
- Slate closes February 1994
- Compaq, IBM, NEC stop pen projects

The Future of Pen Computing

- ## National Semiconductor on WebPAD:

  – "Information Appliances that use National Semiconductor's WebPAD technology are compact web access devices for home or commercial applications. Weighing approximately three pounds and about the size of the average notebook, WebPAD appliances are designed to be comfortable to hold and easy to use. With features like very short start-up, "instant on" access, touchscreen technology, long battery life and no "crashing," these lightweight devices provide a simple, user-friendly gateway to the information superhighway." (http://www.national.com/appinfo/solutions/)

The Future of Pen Computing

- Microsoft on Tablet PC:
  - "The Tablet PC device, which should be available in 2002, will allow users to access e-mail, calendar, project files or even complete databases while away from their desktop PCs. Roughly the size of a paper notebook, the Tablet PC will allow users to take handwritten notes on the screen and move, highlight, save, sort and search these notes -- thanks to new "digital ink" technology. With Tablet PC, users will have the power of a computer with the simplicity of paper."…. "We believe the Tablet PC will spark a new generation of innovations in both hardware and software that will bring new excitement to the market." (http://microsoft.com/windows/tabletpc/)
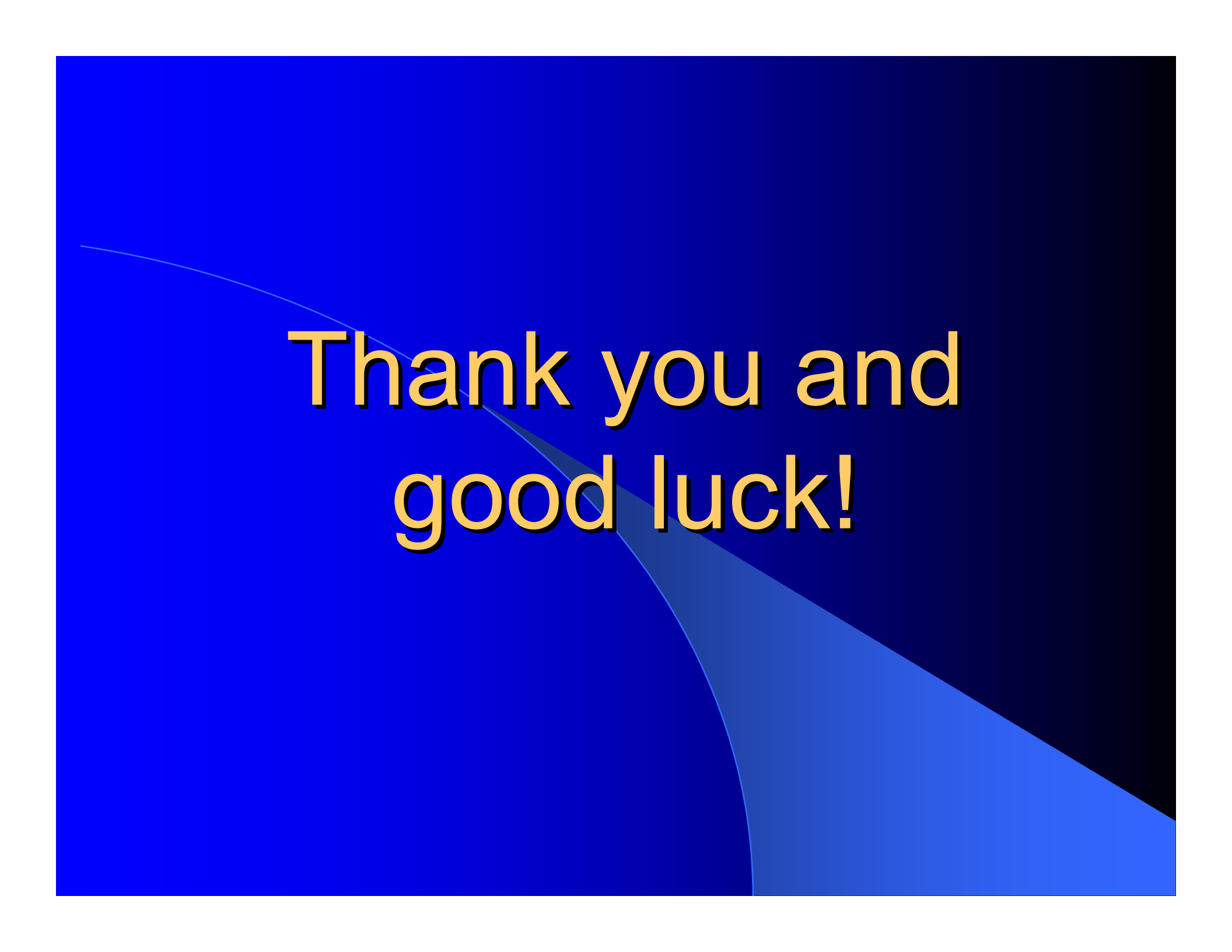
Future of Pen Computing

- Alan Kay (Dynabook visionary):
  - Alan Kay said in June 2001: "The closest thing to a Dynabook right now is the Microsoft Tablet -- done by Chuck Thacker and Butler Lampson, two of the principals at PARC in the 70s. However, they, too, made the mistake of leaving off the keyboard. We knew back in 1968, via the first great character recognition system, GRAIL done at RAND in 1966, and better than Graffiti, that even a perfect and instant recognizer would not do the job. The recognizer would be for controls, fixing typos, and short 'fill in the blank' type stuff, and you would want a keyboard for paragraph length typing. No one has made a commercial device yet with the particular combination that seems to be needed."

    (Alan Kay to MacCentral.com in June 2001)

Recipe for pen tablet success:

- Concentrate on ink but don't forget handwriting recognition
- Not more expensive than standard notebook
- Must not get hot when in use
- No annoying fan
- Backup for active digitizer
- Instant-on and instant off
- User interface designed for pen, not mouse
- Cool, attractive design
- Built-in wireless communication

Thank you and good luck!