

NIST-IR 6372

**Electronic Book ‘98 Workshop:
“Turning a New Page in Knowledge Management”
Proceedings**

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Welcome to the first Electronic Book Workshop!

The world's first workshop on the exciting new field of electronic books is taking place right here, at the National Institute of Standards and Technology (NIST). As this new industry prepares to launch

Electronic Book '98

“Turning a new page in knowledge Management”

WORKSHOP AGENDA

THURSDAY, OCTOBER 8

7:30 a.m. Registration, Green Auditorium
National Institute of Standards and Technology – NIST
Gaithersburg, MD.

8:15 a.m. Welcome and Introduction
Ray Kammer, *Director, National Institute of Standards & Technology*

Dr. Shukri Wakid, *Director, Information Technology Laboratory, NIST*

Dr. Victor McCrary, *Technical Manager, Symposium Organizer*
Information Technology Laboratory, NIST
“NIST and the Electronic Book”

Session 1 Session Chair: *Victor McCrary, Information Technology Laboratory – NIST*

9:00 a.m. Day 1: Keynote Address: Dick Brass, *Vice President*
for Technology Development, Microsoft
“The History of Electronic Books”

9:30 a.m. Daniel Munyon, *Chief Executive Officer, EveryBook*
“The Importance of Publishing Standards and the Electronic Book”

10:00 a.m. Doug Klein, *President & Chief Operating Officer, NuvoMedia*
“The E-Book in a Reader’s Life”

10:30 a.m. Break

Session 2 Session Chair: *Ben Shneiderman, Professor, Department of Computer*
Science, Head of the Human-Computer Interaction Laboratory, University of Mary-
land

11:00 a.m. Clayton Lewis, *Vice-President for Business Development, Librius*
“Digital Delivery Dynamics and Dangers”

11:30 a.m. Rich Lysakowski, *Executive Director, Collaborative Electronic*

Notebook Systems Association (CENSA)

“Electronic Notebook Systems for R&D and Testing: Driving Creation and Acceptance for Industry”

- 12:00 p.m. Nick Sheridan, *Senior Research Fellow*,
Matt Howard, *Display Research Engineer*
Xerox – Palo Alto Research Center
“Research on the Gyricon Media and other Aspects of the Electronic Book at Xerox PARC”
- 12:30 p.m. Dr. Robert Thibadeau, *Director, Imaging Systems Laboratory*,
School of Computer Science, Carnegie Mellon University
“Advanced Technologies for E-Books: Publishing Server, Color”
- 1:00 p.m. Lunch – NIST Cafeteria
- Session 3** Session Chair: *Magdalena Navarro, Optical Technology Division, NIST*
- 2:00 p.m. Drew Loucks, *Elo TouchSystems*
“What Do Touchscreens Make Possible?”
- 2:25 p.m. Dr. J. William Doane, *Kent Displays, Inc.*
“Paper-like Displays for Electronic Books”
- 2:50 p.m. Christina-Lampe-Onerud, *Associate Director of Electrochemical Systems*,
Arthur D. Little, Inc.
“Portable Power for Electronic Books”
- 3:15 p.m. Len Kawell, *President, Glassbook, Inc*
“Requirements for an Open Electronic Book Exchange Standard”
- 3:40 p.m. Break
- Session 4** Session Chair: *Michael Papillo, Defense Advanced Research Projects Agency/Houston Associates, Inc.*
- 4:00 p.m. John Mancini, *President, Association for Information And Image Management International*
“Electronic Books and the Web: New Challenges for Information and Image Management”
- 4:25 p.m. Chris Pooley, *Chief Executive Officer, Modern Age Books*
“Electronic Books: Using the PC as a Gateway”

- 4:50 p.m. Jerry McFaul, *President, Special Interest Group on CD Applications and Technology – SIGCAT*
 “CDs and DVDs: The Driving Storage Technologies for E-Books of the Future”
- 5:15 p.m. Barrett Comiskey, *Principal Scientist, E Ink Corporation*
 “Electronic Inks for Electronic Publishing”
- 7:00 p.m. Exhibits and Reception – Gaithersburg Hilton
 Sponsored by the Video Electronics Standards Association - VESA

FRIDAY, OCTOBER 9

- 7:30 a.m. Registration – Green Auditorium – NIST
- Session 5** Session Chair: *Joan Fuller, Deputy of Dual-Use Applications/Basic Research, U.S. Air Force*
- 8:00 a.m. Gene Golovchinsky, *Fuji Xerox Palo Alto Laboratory, Inc*
 “Document Appliance”
- 8:30 a.m. Steve Stone, *Microsoft*
 “Standards for an Emerging E-Book Industry”
- 9:00 a.m. Evelyn Sasnor, *Director, Online Publishing, McGraw Hill Company*
McGraw-Hill Company
 “Electronic Books from a Educational & Professional Publisher’s Point of View”
- 9:30 a.m. Julia Blixrud, *Senior Program Officer, Association of Research Libraries*
 “E-Books and Research Libraries: New Opportunities for Service, New Challenges for Information Management”
- 10:00 a.m. Jonathan Guttenberg, *Vice President New Media, Random House*
 “Electronic Books from a Trade Book Publisher’s Perspective”
- 10:30 a.m. Break
- Session 6** Session Chair: *Richard Morris, Program Manager, Advanced Technology Program, NIST*
- 11:00 a.m. Day 2: Keynote Address: Gary Shapiro, *President, Consumer Electronics Manufacturers Association – CEMA*
 “Electronic Books - Creating the Market!”

- 11:30 a.m. Cita Furlani, *Director, Information Technology and Electronics, Advanced Technology Program, NIST*
 “ATP’s and the Adaptive Learning Systems Program”
- 11:50 p.m. Carol Risher, *Vice President for Copyright and New Technology, Association of American Publishers – AAP*
 “E-Books and Copyright Issues – Some Uncharted Waters”
- 12:10 p.m. Judith M. Dixon, *Consumer Relations Officer, National Library Service for the Blind and Physically Handicapped Library of Congress*
 “E-books: Implications for the Blind and Visually-Impaired”
- 12:30 p.m. James Sachs, *Chairman and Chief Executive Officer, Softbook Press*
 “A Paperless Publishing and Distribution System”
- 1:00 p.m. Lunch - NIST Cafeteria
- 2:00 p.m. **Panel Discussion** – Dr. Dean Collins, Panel Moderator
Chief, High Performance Systems and Services, Information Technology Laboratory, NIST
- Panelists:
 Dr. Moses Asom, *Director for New Ventures, Lucent Technologies*
 Stephen Wolff, *Executive Director, Advanced Internet Initiatives Division, Office of the CTO, Cisco Systems*
 Mike Weiner, *Chairman, Manning and Napier Information Services*
 Robert Zich, *Director Electronic Programs, National Digital Library Program, Library of Congress*
 James Morrison, *Professor, University of North Carolina, Chapel Hill*
 David Rothman, *Coordinator, TeleRead*
 Dr. Carole Ganz, *International Programs, National Science Foundation*
 Gordon Lyon, *Group Leader, Information Technology Laboratory*
 Dr. George E. Miller III, *Vice President for Academic Affairs, Johnson C. Smith University*
- 4:30 p.m. Concluding Remarks
 Dr. Victor McCrary, *Technical Manager, Information Technology Laboratory, NIST*

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Electronic Book '98 Workshop

Thank you!!!

Thank you!!!

This workshop is the first of its kind, and its implementation is due to the work, the efforts, and the faith of a many people. An enterprise like this is a public victory – not for one, but for many. My personal thanks and appreciation go to:

My management in the Information Technology Laboratory (ITL), especially Dean Collins for his support of the NIST CD-Book effort, from my original ideas to our research team, and this workshop - thank you for the vote of confidence!

Gordon Lyon, my supervisor, for his encouragement, and Shukri Wakid, my director, for having a vision of making ITL a place which fosters creation and innovation. Industry appreciates your efforts!

For the ISIS team: John, Fernando, Fred, Eung-Gi, Hai, Xiao, Mike, Brett, Josh, Kwabena, Seth, Oliver, James, Angela, Alice, Pierre, Garrett, Karthik, James, Edwin, Andrene, Dameon, David, Eric, Nicholas, Sean, Brandon, and Y.Im – you all have made a difference in ITL and NIST. Keep pushing the edge!!

Mary Floyd, Pamela Perry, Annette Shives, and Dinah Wynne for being the rocks of Gibraltar and constant support – you all keep the R&D engine going!

Brian Belanger, Willie May, Jack Snell, David King, Ray Kammer, Ovid Ovidmar, and Richard Morris – thank you for your mentorship and encouragement !

Karen Dacres for your constant support and your expert legal advice – thank you for keeping my team and me legally on track!!!

Karl Bell and Jorge Urrutia for rolling out the red carpet and making the participants feel welcome in “our house”.

Carol Risher for her support, advice, and working behind-the-scenes – let’s do this again next year!

Bill Lempesis and Cathy Egan of VESA for being our co-sponsors and organizing the exhibits and reception.

John Sanderson, Rita Thomas, Brenda Stream, Lynne and Kelly Myers who kept the presses rolling through the night – you folks are first rate!!

Ed Mai – master artist and designer for all workshop media – “you are the man!”

Patrice Boulanger, Lori Phillips, Leigh Sherman and all of the people in Conference Programs for their help and assistance – you all came through!

Phil Bulman and the folks in Public Relations – you did a great job!

Paul Vassallo, and James Garrant for putting their necks on the line, and their faith in my vision – I salute you!

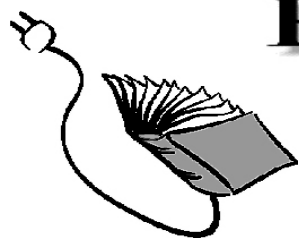
Albert Paul, Reginald Galimore, Gabe Hodziewich, Fred Byers, and Chris Surdak for being true friends.

Francesca and Max for their patience and love – Daddy loves you, too!

Finally to all of the speakers, panelists, session chairs, and YOU the attendees; you have made this a historic event which will truly be remembered!!!

My thanks to you all!

Victor McCrary
Electronic Book '98 Workshop
National Institute of Standards and Technology - NIST



Electronic Book '98

Turning a New Page in Knowledge Management

October 8-9, 1998

NIST
Gaithersburg, MD

Victor McCrary

Victor is the technical manager of the Information Storage and Interconnect Systems (ISIS) Team in the Information Technology Laboratory. He leads the current NIST efforts in electronic book development and standards. His team is responsible for research and development in the areas of DVD storage, flat panel display interfaces, biometrics, optical pattern recognition, and hypermedia technologies. Victor is also interested in the integration of technologies to form value-added systems to enrich the human-information appliance interaction: e.g. electronic books, HDTV, and video skimming applications.

He received honors as the Most Promising Black Engineer Award in 1990 from U.S. Black Engineer & Mobil Oil Corp, and in 1992 the Pioneer of the Year award from the National Society of Black Engineers and Motorola; both for his work in semiconductor lasers at Bell Laboratories.

Victor has a B.A. in Chemistry from Catholic University ('78) as well as a Ph.D. in Chemistry from Howard University ('85), and an Executive Masters in Engineering Management from the Wharton School of Business/School of Engineering at the University of Pennsylvania ('95).



Technical Manager

**Information Storage
and Interconnect
Systems (ISIS)**

**Information Technology
Laboratory, NIST**

www.nist.gov/itl/div895/isis/



NIST and the Electronic Book

Victor McCrary

Information Technology Laboratory

October 8, 1998

NIST



Electronic Book '98 Workshop

Vision:

To bring people together from all corners of the electronic book world in order to promote the development of new technologies and discuss the standards and inter-operability issues for electronic books. In particular:

- Next generation technology
- Technological/market barriers
- Need (if any) for voluntary standards

NIST



Why NIST ???



NIST

- Agency mission
- Information Technology Lab's role is to interface with industry
- 2-year R&D project: Project Janus- the NIST CD-Book
- We like to have fun!!

The Electronic Book: Technology Scenario

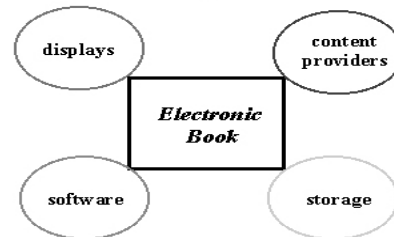


FIGURE 1

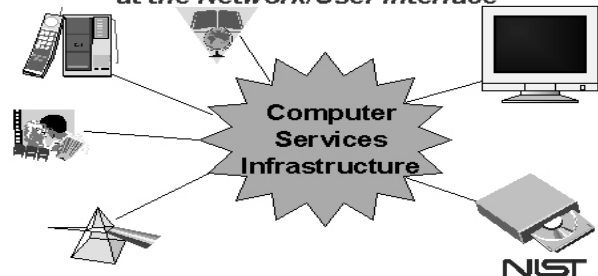
Information Storage & Interconnect Systems (ISIS)

"Projects focussed on technologies that improve user applications, and standards that enable high performance & distributed computing & integrated systems."

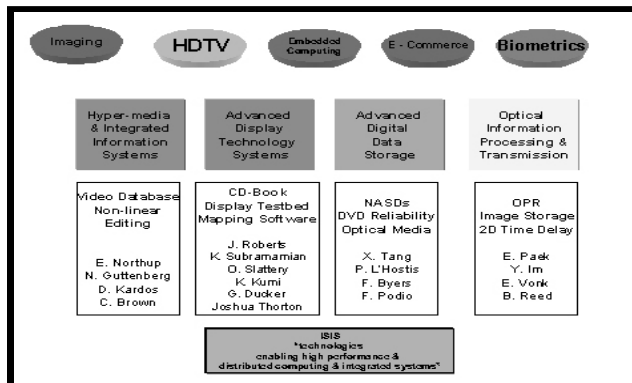
- Advanced Digital Data Storage
- Optical Information Processing & Transmission
- Advanced Display Technology Systems
- Hypermedia & Integrated Information Systems

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Technology & Standards Development at the Network/User Interface

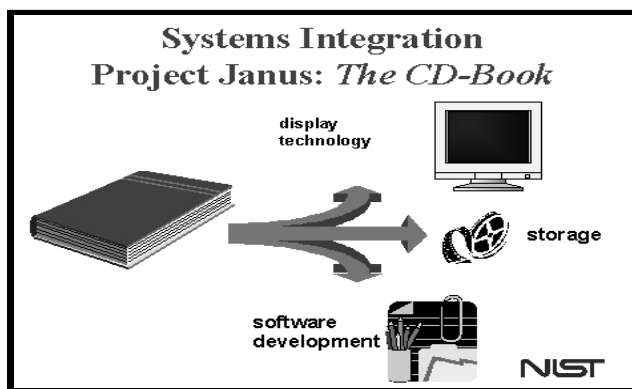


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Project Janus: Scope of NIST R&D Efforts

- » Human-display interface
- » Software environment - language, flexibility
- » Storage media: CD, DVD
- » Network storage & transmission simulations



Book the First--Recalled to Life

The Period

It was the best of times. It was the worst of times. It was the age of wisdom. It was the age of foolishness. It was the epoch of belief. It was the epoch of incredulity. It was the season of Light. It was the season of Darkness. It was the spring of hope. It was the winter of despair, we had everything before us, we had nothing before us, we were all going direct to Heaven, we were all going direct the other way--in short, the period was so far that the present period; that some of its noisiest authorities insisted on its being received, for good or for evil, in the superlative degree of comparison only.

There were a king with a large jaw and a queen with a plain face, on the throne of England; there were a king with a large jaw and a queen with a fair face, on the throne of France.

Press on the U icon to underline

Book the First--Recalled to Life

The Period

It was the best of times. It was the worst of times. It was the age of wisdom. It was the age of foolishness. It was the epoch of belief. It was the epoch of incredulity. It was the season of Light. It was the season of Darkness. It was the spring of hope. It was the winter of despair, we had everything before us, we had nothing before us, we were all going direct to Heaven, we were all going direct the other way--in short, the period was so far that the present period; that some of its noisiest authorities insisted on its being received, for good or for evil, in the superlative degree of comparison only.

There were a king with a large jaw and a queen with a plain face, on the throne of England; there were a king with a large jaw and a queen with a fair face, on the throne of France.

Select the title: "Book the First--Recalled to Life"

More messages in the earthly order of events had lately come to the English Crown and People. For a congress of British subjects in America, which, strange to relate, have proved more important to the human race than any communal sins yet recorded through any of the children of the Coccy-line blood.

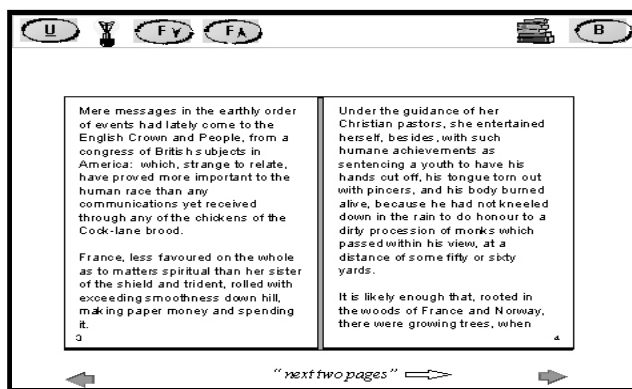
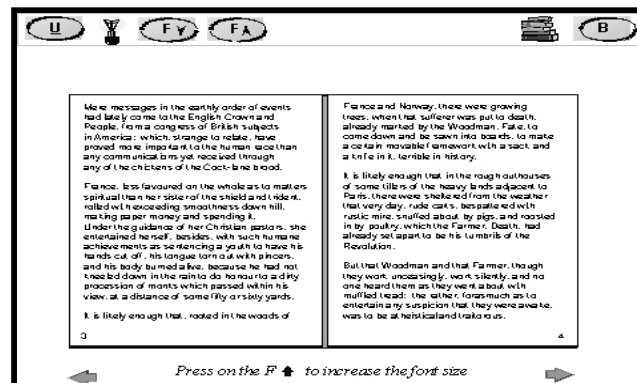
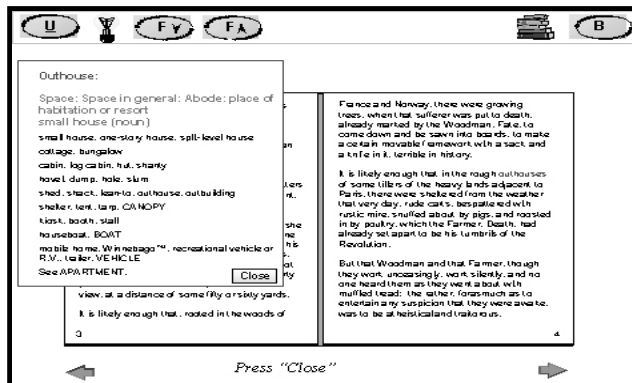
France, first favoured on the whole as to matters spiritual, then in her splendor of the shield and tide, rolled with exceeding smoothness down hill, making paper money and spending it. Under the guidance of non-Christian apostles, she entertained herself, besides, with such humane achievements as smothering a youth to have his hands cut off, his tongue torn out with pincers, and his body buried alive, because he had not knelt down in the rain to do honour to a dirty procession of monks which passed within his view, at a distance of some fifty or sixty yards.

It is likely enough that, roared in the woods of France and Norway, there were growing trees, when that sufferer was put to death, already marked by the Woodman. Talia, to come down and be sown into boards, to make a certain movable framework with a sack, and a knife in it, terrible in history.

It is likely enough that, in the rough outhouses of some little of the heavy lands adjacent to Paris, there were sheltered from the weather that very day, rude carts, bespattered with rustic mire, stuffed about, by signs, and roosted in by poultry, which the Farmer, Dandin, had already set apart to be his lumber of the Revolution.

But that Woodman and that Farmer, though they work unceasingly, work silently, and no one heard them as they went about with muffled heads; the other, forasmuch as to entertain any suspicion that they were awake, was to be atheistical (talkative).

Select: "outhouses"



The Electronic Book: Functional Requirements (the end-user's view)

- Ergonomic look & feel of a book
- Page brightness equal or better than paper (all environments!)
- Software features: dictionary, high-lighting, font-resizing
- Voice activated
- Low power consumption and low power dissipation
- Portable and lightweight
- Multi-path distribution of content - wire, wireless, portable media

The Electronic Book: Technical Specifications (the technology provider's view)

| | |
|---|---|
| <ul style="list-style-type: none"> • Display reflectivity ratio • Total weight • Power requirements • Power dissipation • Content format | <ul style="list-style-type: none"> • Storage media format • Voice recognition error rejection ratio • Display aspect ratio • Software platform • Content security, and integrity |
|---|---|

NIST

Simulation and Comparison of Network Architectures including Network-Attached Storage Devices (NASDs)

PRO...S

- Scalability
- Heterogeneity
 - ↳ Operating System independence
 - ↳ Location independence [Network Plug and Play]
- Offloading of the file server[s]
 - ↳ Elimination of the I/O traffic bottleneck
- Ideal for
 - ↳ Cluster Computing [distribution of the data]
 - ↳ Video Servers

PRO...BLEMS

- Security Issue
 - ↳ direct attachment to the network
- Protocol Issues
 - ↳ bus versus network protocol

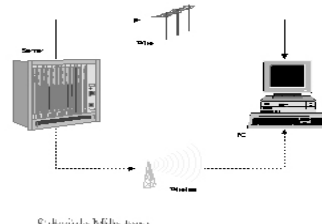
Electronic Book Data Transmission Project

Goals:

- Have an overall view of the different ways that electronic materials are delivered to book libraries, especially issues such as pressure and bandwidth
- Once more the overall issues are viewed at the book, we want discussion research configurations, also involving use of the typical wire network transmission devices used for the Internet (medium 20 to 50 Mbps, T1, 1.5 Gbps, Ethernet...) but also wireless connections (satellite...)

Research Questions:

- Compare the same e-book, transmission systems
- Develop people involved in reference materials and book distribution to discuss current and future developments and support such as request and speed of use

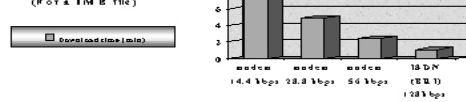


• End of the project: 17 September '98

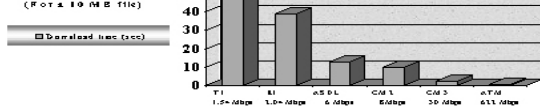
NIST

Download theoretical times

"Mbytes" downloads (For a 1 MB file)



"Seconds" downloads (For a 10 MB file)



WIRELESS

Mobile Wireless Access Technologies

| IS/P Support | Coverage | Throughput (kbps) | Overhead | Frequency |
|----------------------------------|----------|-----------------------------|----------------|-----------|
| Cellular Digital Packet Data | 10% | 20-30% of metropolitan U.S. | 10 to 100 kbps | 1.8 GHz |
| Unlicensed mobile cellular | 10% | 20% of metropolitan U.S. | 2.5 kbps | 1.8 GHz |
| Personal Communications Services | 10% | 100% of North America | 4 kbps | 1.8 GHz |
| Private packet radio | 5-50% | 20% of metropolitan U.S. | 1 to 4 kbps | 1.8 GHz |

Fixed Wireless Access Technologies

| | IS/P Support | Maximum distance (km) | Throughput (kbps) | Overhead | Frequency | Price per end |
|--------------------------------------|--------------|-----------------------|-----------------------------|---------------------|-----------------------------------|----------------------|
| | | | (continuous point-to-point) | | | |
| Mobile | Less than 2% | 5 miles | 1 to 45 kbps | 25 kbps to 1.2 Mbps | 1.8, 2.3, and 3.0 GHz | \$12,000 to \$15,000 |
| Satellite | Less than 4% | 100% (global) | 8 kbps to 45 kbps | 5 kbps to 1.2 Mbps | Fixed-satellite: 3-30 GHz | \$5,000 to \$500,000 |
| Terrestrial point-to-point microwave | Less than 2% | 50 miles | 1 to 2 kbps | 1 kbps | 900 to 9,000 MHz, 2.4 and 5.7 GHz | \$1,000 |
| LAN | 1-50% | 50 miles | 1 to 2 kbps to 5 kbps | 5 kbps | 5.12 to 5.24 MHz | \$500 |

E-book Transmission Project:

Still more work!!

Determine with precision the modems issue

Get more thorough with the wireless connection test



⇒ Try to guess which new standards could be in data transmission and allow reliable E-book

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Electronic Book '98: Workshop Discussion Topics



NIST

- End-users - what do they want??
- Displays - where are now, where do we go?
- Content - integrity, security -- free??
- Distribution & storage - multi-path or restricted?
- Standards or dominant design - free market?

Electronic Book '98: Today and Tomorrow's Goals

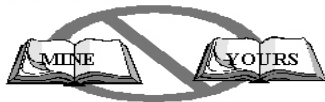
- Stakeholders interact, especially end-users!!
- Identify technical challenges for next generation of electronic books
- Standards & interoperability issues "put on the table" - look to avoid Beta vs. VHS debacle
- Identify role for NIST
- Let's have fun! - do we do this again next year??



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2 Themes: Think About It!

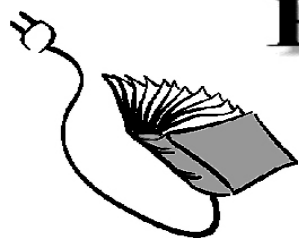
- No Beta vs. VHS



- *"There is enough to around for everybody"*

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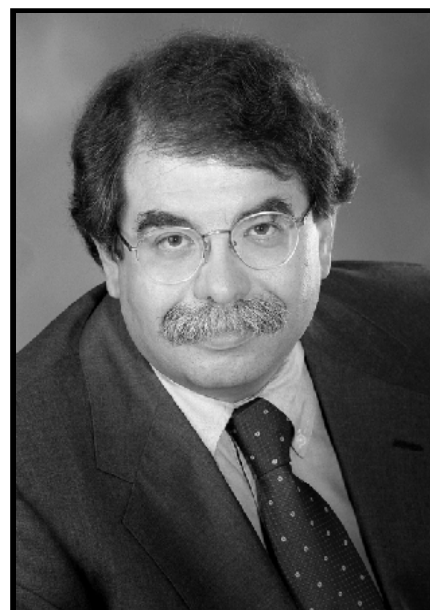
NIST
Gaithersburg, MD

Dick Brass

Dick Brass is the vice president of technology development at Microsoft Corp's research division. His responsibilities include organizing and executing Microsoft's effort in the emerging field of electronic book software and "eBook" devices. Prior to joining Microsoft in November 1997, Brass served eight years at Oracle Corp. — first as President of Oracle Corp.'s Data Publishing subsidiary, and then as Oracle's Senior Vice President for Corporate Affairs. In the mid 1980s, Brass founded General Information, Inc., which produced some of the first software telephone directories.

Brass is perhaps best known for developing the first dictionary-based spelling checking software, as well as the first electronic thesaurus—*The Random House Electronic Thesaurus*—in 1981. His firm, Dictronic Publishing, acquired the exclusive electronic rights to many of the world's most important reference works, including *The Random House Dictionary*, *Roget's International Thesaurus*, *Black's Law Dictionary*, the *Chicago Manual of Style*, and similar works abroad. Wang Laboratories purchased Dictronic in 1983, and Brass then served as Director of Electronic Publishing at Wang.

In the 1970's, Brass was Features Editor of *The Daily News* in New York City. He also reported for WNBC-TV, *The Wall Street Journal* and the *New York Post*. Brass attended Cornell University. He is 47 and lives in Seattle with his wife, Regina, a physician.



Vice President

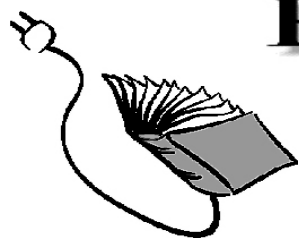
**Technology
Development**

Microsoft

www.microsoft.com

Synopsis

Dick Brass will deliver a presentation entitled “A Brief History of the Electronic Book.” In it, he provides a review of the various eBook efforts to date, beginning with Vannevar Bush’s 1945 proposal for an electronic book called the Mernex, and continuing through the most recently announced devices. Brass shows in his presentation that like all pioneers, eBook entrepreneurs have faced adversity, skepticism, and a very high rate of failure. Moreover, despite dozens of well intentioned efforts in the last 50 years, no electronic book has succeeded in replacing paper as the principal distribution medium for text. Nonetheless, Brass is hopeful: He points out that with the continued advances in display, storage, and other technology, plus the advent of the Internet, today’s eBooks are much improved over past appliances. At the same time, the publishing community is anxious for an alternative to paper that provides better margins, lower distribution and production costs, and freedom from costly returns. Consumers would benefit from wider selection, easier transport, and lower prices. Brass believes that the eBook revolution is about to begin.



Electronic Book '98

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NIST
Gaithersburg, MD

Daniel Munyan

Daniel Munyan is the inventor of record and patent holder (5761485) for the two-screen personal electronic book system in the U.S. under patent application in 35 countries worldwide. Founder of Everybook, Inc. in 1995, he was the Director of Management Information Systems at the Pennsylvania Credit Union League for 10 years. In the early 80's, he served as a Respiratory Therapy Technician.

He received his MBA from Bloomsburg, University of Pennsylvania and his bachelor's in Geology/Earth Science from Millersville, University of Pennsylvania. He served in the military service in the U.S. Army's 3/4 Cavalry Unit of the 25 Infantry Division. He is married, with one daughter.



**Chief Executive
Officer**

Everybook, Inc.

www.everybk.com

Synopsis

The Electronic Book has existed in science fiction since the 1940s. It has been a very real goal of technologists since the early 1970s. Throughout the late 1980s and early 1990s, small and large companies have attempted to marry inexpensive technology to the publishers' craft. The pot of gold represented by eliminating production costs, reducing distribution margins, and replacing physical shipment with bandwidth has attracted many entrepreneurs and corporate moguls.

Attempts to do away with the book "as we know it" have failed in the market because of a lack of content and a lack of customers. Three university studies and a research project at Xerox's Research Centre Europe hold the keys to unlock the formula for publishers and readers to make the transition from paper to an electronic book. Everybook, Inc., of Middletown, Pennsylvania is building an electronic book and bookstore based upon a study of the human physiology of reading, the history of printing, and the most successful technologies of the 20th century.

The Development of the Electronic Book in Relation to Publishing Standards

In this age of unprecedented leaps in technology, we often lose sight of the benefit of the experience and accomplishments of the past. This is often defined as "reinventing the wheel." I believe that in large measure, the technologies of today are "reinventing the book." At Everybook, we are pursuing a vision of how publishers, readers, and the environment can benefit from an electronic book system that does not compromise the very things we love about books. This vision is based on two guiding principles.

First: A book is information, but information is not necessarily a book.

This principle reminds us that books do not create themselves out of a pile of information. A guiding hand must economically and profitably find and nurture authors. It must catalog and edit manuscripts, check facts, and shepherd words and ideas through a written journey from introduction to conclusion. It must oversee production, promotion, and distribution in a way that apportions revenue and protects future sales. The Internet can not perform these functions. A traditional bookstore or library can not complete all of these tasks.

Second: What a computer does best, a book can not do, but what a book does best, a computer can not.

Computers work well in document creation, editing, storing, and distribution. But a fully functional computer can not bring its display any closer to your eye than the length of your bent arms, because of its pointing device or keyboard. Typing posture and reading posture have little to nothing in common.

Books transport and display knowledge and feelings in comfortable, familiar format. Books have no learning curve for usage. They display a huge amount of textural and graphical information for their weight, cost, and size. Our hands balance them perfectly, paginating without the loss of content or theme. Our eyes move from left to right facing pages (except in Hebrew) without interruption.

From the very beginning of the development of a mechanical or electronic book, these principles have been abandoned. According to James Bryant, ebook historian, the earliest references in the 1940s and '50s treat ebooks as bulky and unwieldy pieces of machinery. They are kept somewhere that the reader has to visit in

order to use. By the 1960s we meet the equivalent of a whole library in a briefcase but the data is contained on “pinhead tapes” and the author does not discuss how these are handled or identified.

My first point involves: The Evolution of the Page and the Book

I believe the place to start our examination of the future of the book is in its history. The Sumerian cuneiform tablet represents the oldest example of human textual writing. The tablet gave way to the scroll for the obvious reasons of greater storage capacity with less weight. The scroll became the codex, or modern book. Some historians give Julius Caesar credit for creating the first facing page design. He folded his two column correspondence, which he made by cutting blank scrolls into individual sheets, so he could save “paper.” Others say that the early Christian Church figured out that by unrolling a scroll and fan folding it, then sewing one side between two pieces of wood, they could make their Bibles sturdier and allow for quick jumps (in what some would call early hypertext) between Old Testament prophecy and New Testament fulfillment.

No matter how books developed, before the fall of Rome, the book assumed the facing-page bound-edge format that it still retains 1,500 years later. Books have standardized around two basic sizes: reference, in a roughly 8.5"x11" configuration; and entertainment, in a 5.75"x8.5" design. These sizes maximize paper production with the least amount of waste.

My second point involves: The Importance of the Publisher to Reading and Learning

The evolution of the page and book took place in the age of the manuscript. The manuscript age did not involve printing, publishing, or cataloging. Even after the rise of the merchant class and the early university system of the 12th and 13th centuries, learning was dependant on the manual production of individual manuscripts. The universities created a demand and use for books that were not religious texts.

Universities relied on stationers for paper, and book copiers to supply students with commissioned duplications. Stationers had no way of knowing the accuracy of copies of the texts, which were often brought back by the crusaders from the Moors who collected them from Egypt, Greece, and Palestine. Also, inaccuracies were introduced as the book was copied or translated in Europe. Further copying compounded mistakes, which created problems for the advancement of European knowledge. Booksellers sought books, which were largely kept in monasteries, but the monasteries had no system of cataloging.

So the rise of the university created a demand, but the technology of the time and the lack of publishers and a business model stifled it as well. Historian Elizabeth Eisenstein has argued that the early Italian Renaissance died as a result. The universities survived, but the original burst of scholarship could not be maintained because the communication system was inadequate.

In the mid 15th century, things began to change with the advent of the printing press. In 1452, Gutenberg conceived of the idea for movable type. In his workshop, he brought together the technologies of paper, oil-based ink, and the wine-press to print books. The printing press, however, was not a single invention. It was the aggregation in one place, of technologies known for centuries before Gutenberg.

The advent of the printing press did not bring about a great shift in the social organization of learning in Europe. Many people went into the printing business and went right back out again because the distribution of books was poorly organized. The market was there, and the potential for filling the demand, but the transport, control, and “advertising” mechanisms were not in place.

In addition, there was still a low literacy rate in Europe. Most people did not know how to read. But non-literates were still affected by the book trade because the elites, who controlled society, were affected by books. And non-literates still had access to book culture because there were traveling storytellers who stood in the market and read from books as a means of making a living.

The situation improved by the introduction of the annual Frankfurt Book Faire (which remains the world's largest and is taking place this week). Frankfurt, an early center for printing, sponsored a book fair that drew publishers, booksellers, collectors, and scholars. This helped coordinate supply and demand. The faire also produced a catalog of all the works shown there—an early version of Books in Print.

The real innovation in culture, related to print, took place during the Protestant Reformation, at the beginning of the 16th century. Martin Luther begot the Protestant Reformation in the early to mid 1500s in Germany. Shortly thereafter John Calvin began his work in Holland. The Reformation was the first revolutionary mass movement, in part because it took advantage of publishing, printed tracts, and translated Bibles.

I take a single striking conclusion from this overview of the transition from manuscript to printed page. It was the rise of publishing that addressed issues of supply and demand. Publishers gathered and categorized manuscripts. Publishers systematized the organization of subjects into coherent bodies of knowledge. Publishers organized production, editing, sales, trade shows, and distribution. They did not invent writing, or printing, or universities but they brought together the known elements of writing printing, and reading into the business of learning.

My third point is: The Physiology of Reading

There is a coherent body of literature that explains, in part, the physiology of reading. While there is much more to be said on this topic, I believe that enough has been accomplished to explain the human attachment to the book.

The human eye and brain require the largest display of text and graphics, in a fixed ratio, that can be comfortably balanced and manipulated to maximize reading speed, comprehension, and enjoyment. Embry Riddle Aeronautical University found in a study in 1996, that the length of a page of text is directly proportional to the speed at which the page can be read and be comprehended. The study found that a page of standard size characters was best comprehended with at least 60 lines of type. An age-old typographer's guideline has dictated the width of columns in type. There is evidence that a page should have no more than 80 characters across at 12-point type for maximum reading speed and comprehension. Beyond that line length, the eye must reacquire its position at the beginning of each new line of type.

A second area of interest in the study of the physiology of reading is the universality of human experience with portrait pages—that is, pages that are taller than they are wide. This year, Kent State University commissioned a literature study of graphic design. The study found that for at least 3,000 years, documents have been portrait oriented. For mostly unknown reasons, humans seem to favor portrait orientation of written information.

A third area of interest in the study of the physiology of reading is the perceived and measurable affordances of paper and books over single electronic displays in human reading studies. An ongoing study of reading behavior by Xerox Research Centre Europe lists a number of differences perceived and measured between

reading, notation, and summarizing with multiple pages versus a single display system. Since the paper example in the test used only four pages, many of the findings are transferable to books.

The abilities of the book outshine that of the computer display in the following areas:

- A. Focusing the reader's attention
- B. Allowing efficient movement, layout, and manipulation of multiple pages simultaneously
- C. Making use of page boundaries for annotation and visual cues
- D. Viewing larger amounts of information at one time
- E. Providing a better structural relationship between separate parts of text
- F. Easing information scanning

There is no doubt that comfort factors also play a role in making paper or books easier to work with than computers. The position of the head, hands, posture, and eye movement are all more relaxed with a book than a computer.

There are measurable consumer expectations and comfort levels associated with particular print display systems. In 1998 Kent State University completed a controlled experiment with both field groups and focus groups measuring simple preference for reading format. The study determined that 72% of participants indicated a preference for a portrait page for book reading. Surveyors found that 68% had a preference for reading books from two opposed portrait pages. One important qualifier to the conclusions was that portrait page preference was as high among heavy internet users as internet novices.

A second experiment was undertaken to measure design preference and navigability of reading material. The most important overall finding from the second experiment is the clear preference among the research subjects for portrait-oriented, page-based designs that avoid the need for scrolling.

The conclusion I take from the study of the history and physiology of reading is that there are strong, long-term correlations between human learning and the physical format of the book. This relationship between humans and books exists despite the presence of alternative reading and learning mediums.

The fourth point is that: Modern Publishing Standards and Practices Do Not Preclude the Addition of Electronic Features

There are three areas in which the computer can improve the traditional book without the compromising look and feel of this most successful product in history. Those areas include: the cost of publications, the storage of those publications, and access.

A. Cost: Forty to sixty percent of the price of a mass market publication goes to distributors and retailers. Forty percent of books consigned to large bookstores are returned unsold—to be remaindered, pulped or burned. Production costs in reference and educational textbooks can climb as high as 18% of the list price. By ending the production process at the editing of a publication, print run risk, returns, distribution costs, and retail costs all fall significantly. The least expensive way to accomplish the goal of reducing publication costs is NOT to modify the file that the publisher has already paid to compose for print. Today that means the Postscript or PDF format.

B. Storage: To the reader, storage and portability of publications are synonymous. Publishers and readers are sensitive to the size of a book depending on its intended use. Readers are sensitive to the size of books

within collections when those publications must be transported for work or enjoyment. The computer offers to store publications much more efficiently than traditional books.

For much of the history of electronic composition, limitations of storage devices gave cause to keep publication files small. Publishers have accepted the PDF format as their standard because it is universal, platform independent, read-only, and the smallest file-format available. The small-form storage device that has the greatest degree of engineering standardization and independence is the PCMCIA card. Each storage card has its own controller on board, freeing the system electronics from keeping up with the rapid improvements in storage technology. Current ATA Type III cards—no larger than a stack of five credit cards—can hold up to a gigabyte of data. In PDF file terms, a GB can hold 200 moderately illustrated college reference books, or 350 legal volumes, or approximately 2,500 600-page novels.

C. Access: The physical requirement of going to a bookstore or library to read, borrow, or buy a publication has limited the amount of books read, borrowed, or purchased. Mail order and web order for publications have improved the ability of the consumer to access publications. The limitation to access is now delivery. The limitation to delivery is the physical nature of the book, requiring production, storage, and transportation. Delivering the book instantaneously, across a universal communication system, in the same format in which it was printed, from a virtually limitless collection, obviously maximizes access. Today that means the Internet, touch tone phone lines, PDF files, and a medium that will not change the physical form of the book.

My fifth point involves: The Everybook System of Integrating Publishing, Print, and Electronics

Everybook was founded in 1995 to integrate useful electronic functions into the existing paradigm of the book. Our mission is to create a living, personal library that perfectly reflects its readers' values, desires, and knowledge within the body of a single book. Our goal is to manufacture and support a rugged electronic book that can hold everything a person will read for the rest of their lives—from sheet music to books, from magazines to maps, from auto repair manuals to restaurant menus. Our objectives include:

A. Providing a risk-free and cost-free publication distribution environment for publishers.

This objective requires us to use the publishers standard file printing format, hold their profit margin, and eliminate print run risk, production costs (beyond editing, page layout, and cover design), and returns. This objective requires the creation of a closed-loop environment between the reading medium: our patented EB Dedicated Reader™, and our online digital archive, the Everybook Store. This closed loop allows the publishers to have efficient security of copyrights and royalties. It provides perfect group data on the browsing, sales, and lending of their products, cross-linked with demographics, to facilitate accurate planning and marketing. Everybook can accomplish this objective while holding all individual customer data completely private. We can secure transactions through multi-level authentication, while securing publications with private key/public key encryption within the storage device.

The end result? Everybook turns a free archiving service into a point of sale for publishers.

B. Providing a comfortable, easily portable, familiar reading medium that pays for itself.

That medium should create a personal library that allows the lending of books to other Ebs, provides high discounts on publications downloaded, and retains the look and feel of a traditional book and bookshelf. This objective is accomplished by emulating a traditional book in ruggedness, appearance, and feel, while hiding the electronic componentry that adds mass storage, continuous access, and instant or scheduled

delivery. Most importantly, the facing, dual-portrait-page reading format of the traditional book is reproducing exactly in size and proportion.

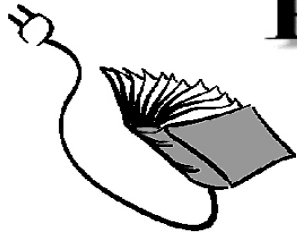
C. Providing an inexpensive, nearly limitless bookstore and library of publication content to consumers.

We also provide personalized filters of offerings, continuous access, instant or scheduled delivery, and insurance of existing collections against loss or theft.

D. Providing a responsible corporate persona that aids literacy and book affordability, while attacking the environmental burdens of printing and distribution.

This objective is accomplished by using recycled plastic for the EB casing, and providing a business environment that does not require the destruction of trees, and does not use chemicals for making paper or ink. Moreover, our system minimizes the physical storage and distribution of product, and the disposal of unsold publications.

Ok, I've been talking for 19 minutes. What does it all mean? Neither efficiency, cost, nor utility demand that the form of the traditional book change its nature while being improved with new technologies. Early studies of reading physiology indicate consumer comfort and utility around the form of the traditional book. The Personal Computer keeps the eye and reading material at an uncomfortable distance for efficient, sustained reading. Publishers file, format, and production standards reflect efficiency, utility, and consumer preference. Technology can therefore best improve publications and publishing by building on top of and within these historically proven standards—just as it has built on the invention of the wheel.



Electronic Book '98

Turning a New Page in Knowledge Management

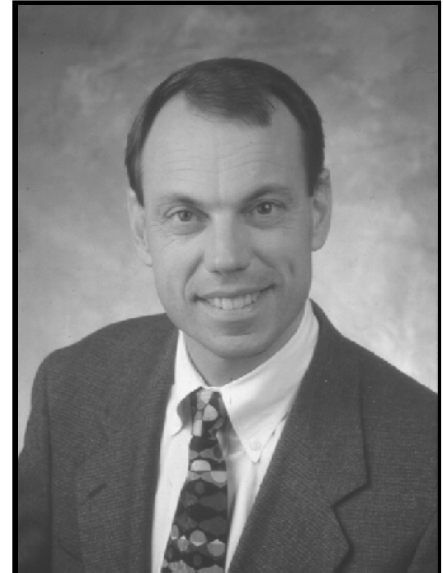
October 8-9, 1998

NIST
Gaithersburg, MD

Douglas Klein

Douglas H. Klein is president and chief operating officer. Before joining NuvoMedia, Klein spent ten years at Network Computing Devices, where he had direct management responsibilities for all NCD engineering, program management and service and support.

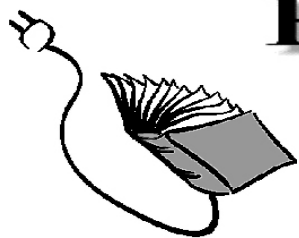
As president and general manager of NCD Systems Corp., a wholly owned subsidiary, Klein managed a reorganization that resulted in a return to profitable operations. His redirection product line in NCD history. Klein earned his Master of Science in Mechanical Engineering from California Institute of Technology and his Bachelor of Science in Mechanical Engineering from the University of Cincinnati.



President and CEO

NuvoMedia

www.nuvomedia.com



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Clayton Lewis

Clayton Lewis is responsible for business development activities at Librius. Most recently, Mr. Lewis was Executive Vice President of ETC, a subsidiary of Tele-Communications, Inc. (TCI). As EVP, Mr. Lewis developed and managed three divisions: Corporate Training, Education, and International. He created and implemented a strategy to build ETC rapidly through strategic acquisitions and alliances, growing annual revenue to approximately \$90M.

Prior to joining ETC, Mr. Lewis was Senior Vice President of Business Development at RXL Pulitzer. RXL is the multimedia subsidiary of the Pulitzer Publishing Company.



Vice President

Business Development

Librius

www.librius.com

Digital Delivery Dynamics and Dangers

Clayton Lewis



Librius

Emerging Market

- Spending on books
- Handheld devices
- Homes online
- Amazon.com
- Pressure on publishers
- Technology advancements

Success Factors

- Publisher participation
- Ease of use
- Affordable

Publisher Participation

- New sales channel
- Infrastructure
- Rights issues
- Cyber publishers

Ease of Use

- Improvement over traditional books
- Shopping experience
- Customer support
- Reliable hardware

Affordable

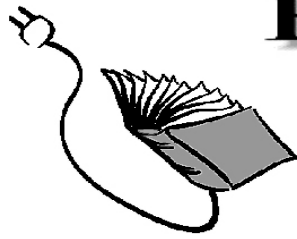
- Electronic reading device
- Participation plans
- Titles
- Access

Dangers

- Closed proprietary systems
- Publisher exclusivity
- Poor customer support
- Faulty hardware

Consumer View

"First Impression"



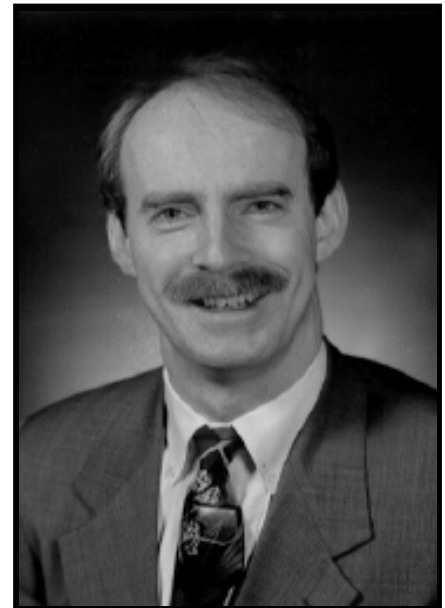
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Rich Lysakowski

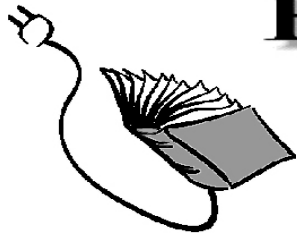


Executive Director

**Collaborative
Electronic Notebook
Systems Association**

CENSA

www.censa.com



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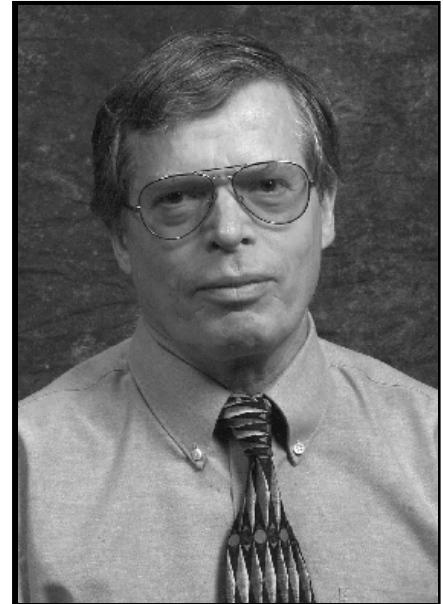
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Gaithersburg, MD

Nick Sheridan

Nick Sheridan is a Senior Research Fellow at Xerox Palo Alto Research Center and the Manager of the Electric Paper Area. He has worked in the area of electronic writing media for more than six years. His group is currently developing the Gyricon medium and exploring various applications of the technology.

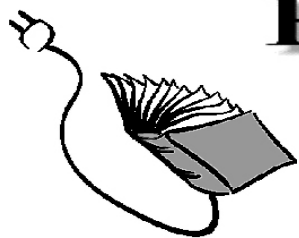
He holds more than 40 U.S. patents and has done pioneering work in acoustical holography, blazed holographic diffraction gratings, coherent optical processing, electrophoretic displays and ionographic printing.



**Senior Research
Fellow**

**Xerox Palo Alto
Research Center**

www.xerox.com



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Matt Howard



**Display Research
Engineer**

**Xerox Palo Alto
Research Center**

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Research On Gyricon Media And Other Aspects Of The Electronic Book At Xerox PARC

N. Sheridan and M. Howard

Electronic Book '98 Workshop

October 8-9, 1998



Preview

- PARC/Xerox e-book Research
- The Gyricon e-paper medium
 - The technology
 - A Gyricon e-book

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Goldfish Project

- Document Usage Studies
 - What is an office?
 - What is a document?
 - What is use?

People:

A. Adler
A. Gujar
B. Harrison
K. Ohara
A. Sellen

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Reading Appliances

- Xlibris, An active reading machine
 - Notebook-like
 - Annotations with free-form ink

People (FX-PAL):

J. Sullivan
B. Schilit
M. Price
G. Golovchinsky
C. Marshall



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New User Interfaces

- Manipulative
- Human Gestural

People:

K. Fishkin
T. Moran
B. Harrison
A. Gujar
R. Want

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Principles of Operation

- Bichromal spheres cast in elastomer
- Sphere dipole causes rotation in electric field to show either black or white

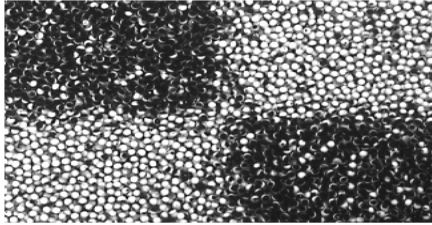


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Gyricon Magnified



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Gyricon Has Paper-Like Properties

- Thin... 0.12 to 0.4 mm
- Flexible
- Reflective, wide viewing angle
- Low cost
- Low power to write
- No power to store

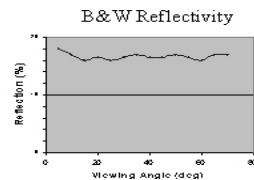
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Gyricon Performance

- **Black and White**
 - Reflection ~ 18%
 - Contrast Ratio ~ 6:1
- **Color and White**
 - Reflection ~ 33%
 - Contrast Ratio ~ 3:1
- **Resolution > 100 dpi?**



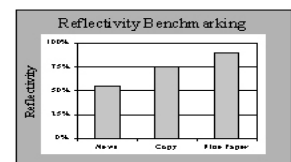
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Paths to Improved Reflectivity

- Tighter ball packing
- Better quality balls
- Improved windows



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Gyricon And The Electronic Book

- Could be used as pages of a bound e-book.
- Could be used as display media for tablet-style e-book.
- Could be used in a novel "wand" addressing scenario...

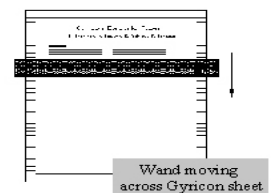
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A Wand-Addressed Electronic Book

- Sheet(s) of Gyricon display media
- Writing wand
- Software



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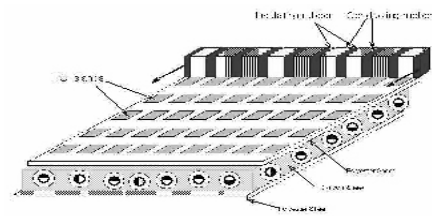


Why Wand Writing?

- Very low cost
- Very compact -- no display box
- Very portable
- User can work with many sheets of e-paper
 - distribute, organize, archive
 - ideal for manuals

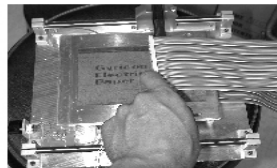


How The Wand Works



Wand Under Development

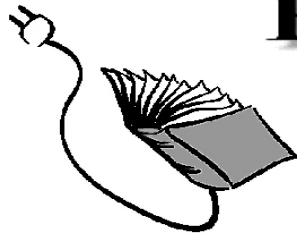
- **Presently:**
 - Fixed path
 - Hand-operated
 - 40 dpi
- **Will Be:**
 - Unconstrained
 - ~100 dpi



Review

- Xerox/PARC heavily involved in electronic book and related document research.
- Gyricon and portable, low-cost wand viewed as foundation for a variety of electronic book devices.





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Gaithersburg, MD

Robert Thibadeau has had a diverse career in computational linguistics, machine vision, 3D graphics, and television computing and digital libraries. His current research is in coupling technical and financial models, which can justify digitally republishing older books and other artifacts.

Robert Thibadeau



Director

**Imaging Systems
Laboratory**

**School of Computer
Science**

**Carnegie Mellon
University**

www.cs.cmu.edu

Ebooks

Servers, Color, and more

06/19/2001

Who

rht@cs.cmu.edu

projects & consulting
scanning, ebooks, systems, servers, clients,
DTV, books

06/19/2001

Universal Library Project

- Directors:
 - Robert Thibadeau (Scanning, Systems, Hardware, Metadata, Presentation)
 - Mike Shamos (IP and Algorithms)
 - Jaime Carbonell (Natural Language)
 - Raj Reddy (Dean of CS)
 - Gloriana St. Clair (Univ. Librarian)

06/19/2001

Robert Thibadeau, Ph.D. rht@cs.cmu.edu

Standard Model

- Server
 - Protection/Encryption
 - Macro Organize
 - View/Download on Demand
 - Ecommerce

06/19/2001

Robert Thibadeau, Ph.D. rht@cs.cmu.edu

Standard Model

- Client
 - Ebook - Computer - DTV - Analyser
 - Micro Organize
 - Statistics - Anonymity (Viewable)
 - Authenticate

06/19/2001

Robert Thibadeau, Ph.D. rht@cs.cmu.edu

Advanced Digital Library Resource Center

- www.ul.cs.cmu.edu/adlrc
- Coined "Fidelity" for book presentation
- Rules
 - 1. Low Fidelity : Free to read
 - 2. High Fidelity : Pay to Access
 - 3. Fee for Mirror
 - 4. Physical Site with Specialized Equipment
 - 5. Input Capability at Site

06/19/2001

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Fidelity

- How close to the experience to reading a real book
- How improved over that experience, e.g., hyperlinks, search, is not fidelity : it is Enhancement

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National Academy Press Experimental SUCCESS!

- www.nap.edu,
www.elpress.com/publiotech
- Free to Read increasing Book Sales
- CMU Book Object
 - Any Form of Book Storage
 - Digital Labels describing form and content
 - **now** Publiotech from Electric Press
 - **now** BookInTime from Xerox

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CMU Search Object

- Resolve Long URL for Content Query
- Two Interfaces
 - Search Engine Output Translation
 - Search Engine Database Building
- Automated CMU Book Object Label Generation by requested granularity

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Free to Read : Low Fidelity

- Hunt Institute www.cmu.edu/hunt
 - 2.5 Years Scanning Large Watercolors
 - Not Thumbnail Free to View, but not impacting sales either
- www.nap.edu
- www.antiquebooks.net

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- www.antiquebooks.net
- Provide Trophy and Old Book or Document to Buyer

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Smartbook

- A True Ebook from Australia : SHOW
- Effort failed at initial funding attempt but group is now a knowledgeable group particularly good in design
- Contact me as agent
- Principal 'Aussie is David Collins

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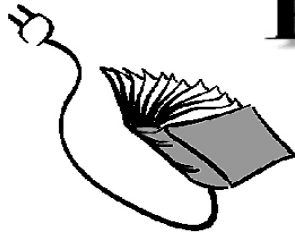
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Houses of Worship

- www.hows.net
- www.hows.net/howarchitecture.pdf
- Electronic Church Bulletins
- Self Edited by the Churches
- 41,000 Churches with editors
- Owning a Content Base for Ebook and DTV presentation

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October 8-9, 1998

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Drew Loucks

Drew has a B.S. in Electrical Engineering from San Jose State University 1984. He is an active member of the Society for Information Display and a voting member of the Video Electronics Standards Association (VESA).



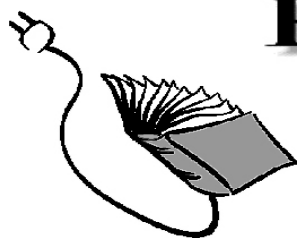
Welcome to
Elo TouchSystems

A Raychem Company

Senior Staff Engineer

Elo TouchSystems

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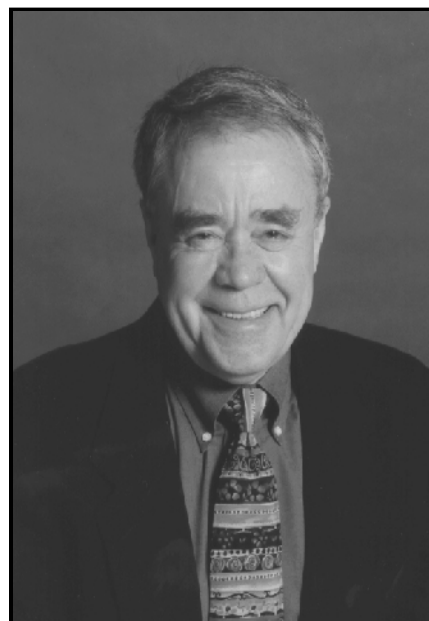
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NIST
Gaithersburg, MD

J. William Doane

J. William Doane is co-founder of Kent Displays, Inc., which he joined full time following his retirement from Kent State University in 1996. While in KSU, he served as Director of the Liquid Crystal Institute, professor of Physics and Director of the National Science Foundation's Science and Technology Center for Advanced Liquid Crystalline Optical Materials (ALCOM).

A fellow of the American Physical Society, he has over 200 published articles and ten patents on liquid crystal materials and devices. Awards received include the Society of Information Display's Jay Rajchman Prize and the American Society of Patent Holders' Corporate Inventors Award.



Vice President

**Research and
Development**

Kent Displays, Inc.

www.kentdisplays.com

Electronic Book '98

Paper-Like Displays for Electronic Books

J. W. Doane

X.Y. Huang, A. Khan, D. Davis, C. Jones, N. Miller & G. Podojil
Kent Displays, Inc.

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Gaithersburg, MD



E-Book

BASIC COMPONENTS

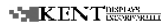
- *Display
- Memory
- System Electronics
- Battery

* Most Challenging Component in the Development of the E-Book.



Display Requirements

| PROPERTIES | INK ON PAPER |
|-------------------|-------------------------------|
| Power Consumption | Zero |
| Viewability | |
| -Brightness | 80% |
| -Contrast | 10:1 |
| -View Angle | ±70° from Normal |
| Resolution | 720 dpi |
| Gray Scale | Halftone |
| Weight | 1.5 - 2.0 lbs. (Typical Book) |
| Ruggedness | Robust |



Display Types

- Emissive Displays:
 - Ex.: OLEDs, Backlit LCDs
 - High Power Consumption; Poor Readability in Bright Light
- Reflective Displays which Require Refresh
 - Ex.: Active Matrix LCDs, STN-LCDs, etc.
 - Medium Power Consumption
- Reflective Displays with Bistable Memory
 - Ex.: Ch-LCDs, FLC-LCDs,
 - Very Low Power Consumption



The Weight Challenge

| | |
|--------------------------------|-------------------------------|
| Display Module (6.3" diagonal) | 0.5 lbs. (Plastic Substrates) |
| Controller Board/Electronics | 0.5 lbs. |
| Package | 0.7 lbs. |
| *Battery (5.4 Wh) | <u>0.3 lbs.</u> |
| Total: | 2.0 lbs. |

*Battery Size Governed by Weight Limits



Power Consumption Ch-LCD vs. STN

VGA (480 x 640) 6.3" diagonal

| | Ch-LCD | STN-LCD |
|--------------------|--------------------------------|--------------------------------|
| Display + Driver | 300 mW (During Update Only) | 200 mW (Constantly Applied) |
| Controller | 100 mW | 100 mW |
| Backlight | 0 | 1000 mW (Emissive) |
| System Electronics | 1500 mW | 1500 mW |



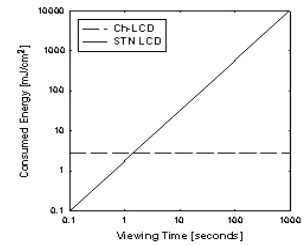
Battery Life

Assumptions: Battery, 5.4 Wh; Paging Rate, 1 page/min

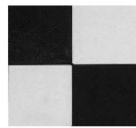
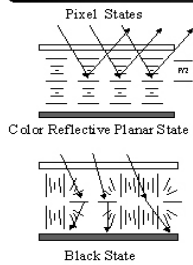
| STN-LCD SYSTEM | BATTERY LIFE | DISPLAY TYPE |
|---------------------------------|--------------|--------------------------------|
| With Backlight | 1.9 hours | Emissive |
| Without Backlight | 3 hours | Reflective, Continuous Refresh |
| Smart Power (CPU power-down) | 18 hours | Reflective, Continuous Refresh |
| Ch-LCD | | |
| Smart Power (CPU power-down) | 341 hours | Reflective, Bistable Memory |



Power Savings with Bistable Memory



Bistable Cholesteric Textures



4 Pixels



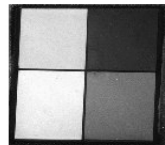
Ch-LCD VGA, 5" Diagonal, 133 dpi



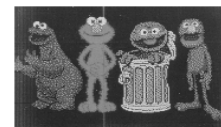
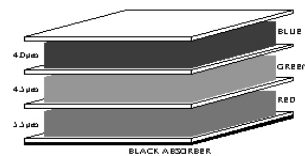
3 x 10⁶ Pixels



Cross-Section of Four Color or Black & White Stack



Triple Stack Eight Color



Ch-LCD, 1/8 VGA, Eight Color Image

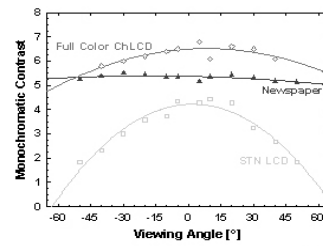


Full Color (4096 Colors) Ch-LCD

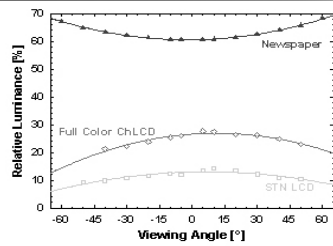


Images of Book Covers

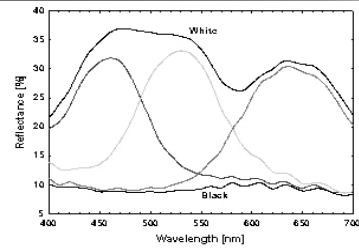
Contrast Ratio Comparison between Ch-LCD and STN-LCD



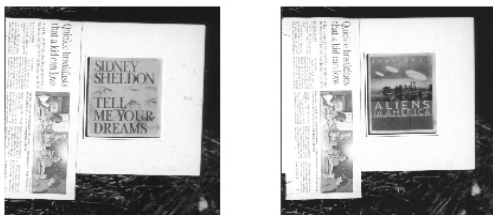
Brightness Comparison between Ch-LCD and STN-LCD



Reflection Spectra from Triple Stack



Brightness & Contrast Comparison of Ch-LCD with Newspaper



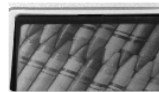
View Angle of the Full Color Display



$\theta = 0^\circ \quad \phi = 0^\circ$



$\theta = 30^\circ \quad \phi = 90^\circ$



$\theta = 30^\circ \quad \phi = 0^\circ$

Plastic Substrates

- **Make Display More Robust**
- **Reduce Weight**
- **Plastic Materials just now Under Development**
- **Plastic Display Manufacturing Under Development**



Plastic VGA, 133 dpi Ch-LCD



Ch-LCD for E-Book

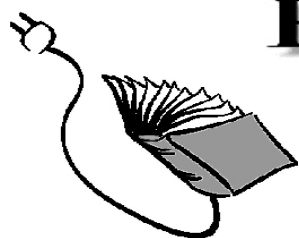
- **Size** VGA (480 x 640), 6.3" diagonal
- **Power** Zero Power except when Paging
- **Viewability**
 - **Brightness** 40%
 - **Contrast** 20:1
 - **View Angle** $\pm 70^\circ$
- **Resolution** 125 dpi
- **Gray Scale** 16 Levels
- **Colors** 4096 Colors
- **Speed** 2 pgs./sec. (5 Search)



Conclusions

- **Ch-LCD Technology is a Natural Fit for E-Book Displays**
 - **Lowest Power Consumption (Long Battery Life)**
 - **Flicker-Free**
 - **Highest Brightness over Largest View Angle**
 - **High Contrast**
 - **Low Cost (No Active Matrix)**
 - **Amenable to Plastic Substrates**
 - **Resolution (with Gray Scale) at Limit of Human Eye Capability**
 - **Full Color and Black & White**





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October 8-9, 1998

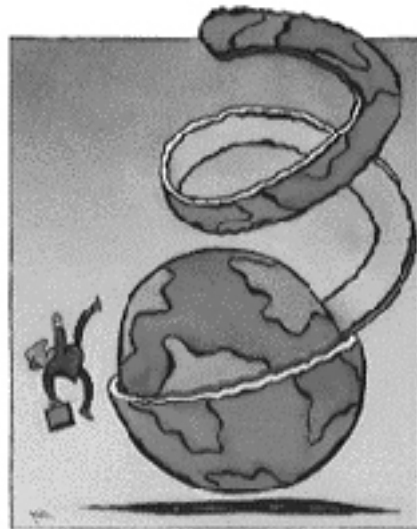
NIST
Gaithersburg, MD

Dr. Lampe-Ounerud is an Associate Director in the Battery Industry Studies group at Arthur D. Little. Her areas of specialization include innovation and design of battery systems. She has also undertaken market evaluations and strategic business opportunities in the portable power field. She received her Ph.D. degree in Inorganic Chemistry from Uppsala University, Sweden. Dr. Lampe-Ounerud has been involved in the innovation and development of thin-film lithium-based battery systems since 1991. She is the inventor of several synthesis techniques to manufacture high-quality, phase-controlled metal-oxide based materials for improved energy storage.

Prior to joining Arthur D. Little, Dr. Lampe-Ounerud was a Director at Bell Communications Research, Bellcore, where she directed the research and development of their plastic lithium-ion battery technology, PLiON. Her responsibilities at Bellcore included development of 50 mAh to 8 Ah prototypes of this technology, which is now widely licensed for production around the world. These prototypes were tailored to applications ranging from cellular phones to laptop computers.

At MIT, Dr. Lampe-Ounerud investigated one-dimensional magnetic structures in collaboration with colleagues from MIT's computational physics groups. The research focused on the structure-property relationship of novel mixed metal compounds.

Christina Lampe-Ounerud



Associate Director of Electrochemical Systems

Arthur D. Little, Inc.

www.adlittle.com

Portable Power For the Electronic Book

Dr. Christina Lampe-Onnerud

Electrochemical Systems

A

Overview Value Chain

Power source selection is a key success factor supporting the overall value chain.



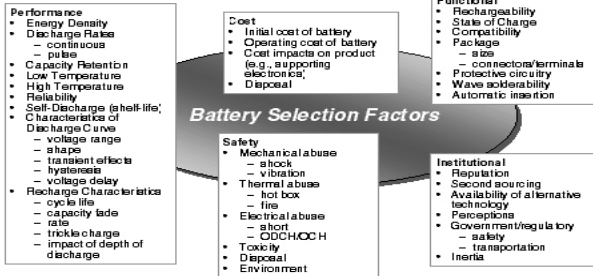
**POWERING
PACKAGING
IP PROTECTION**

A

1

Portable Power Overview

Many market segmentations are possible, and a wide range of buying factors influence battery selection.



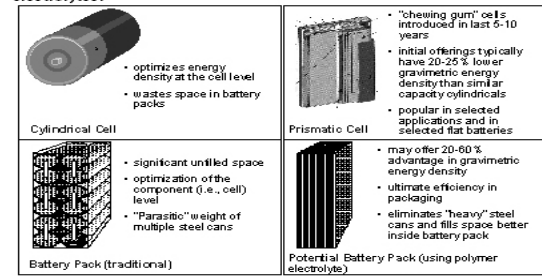
A

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2

Rechargeable Battery Technology

More creative packaging techniques are being employed to boost energy density, and these approaches are facilitated by polymer electrolytes.



A

SLK 03/06/06/07/08/09/10/11/12/13/14/15/16/17/18/19/20/21/22/23/24/25/26/27/28/29/30/31/32/33/34/35/36/37/38/39/40/41/42/43/44/45/46/47/48/49/50/51/52/53/54/55/56/57/58/59/60/61/62/63/64/65/66/67/68/69/70/71/72/73/74/75/76/77/78/79/80/81/82/83/84/85/86/87/88/89/90/91/92/93/94/95/96/97/98/99/100

3

Consumer Cells Europe Regulatory Status

Currently more than 25% of the battery market within Europe is subject to collection programs for consumer batteries.

- Currently collecting:
 - Austria
 - Denmark
 - Italy
 - Netherlands
 - Sweden
 - Switzerland
 - Belgium
 - Germany



- The participation rate varies considerably from country to country
- The EC Battery Directive implementation is delayed to next year

A

SLK 03/06/06/07/08/09/10/11/12/13/14/15/16/17/18/19/20/21/22/23/24/25/26/27/28/29/30/31/32/33/34/35/36/37/38/39/40/41/42/43/44/45/46/47/48/49/50/51/52/53/54/55/56/57/58/59/60/61/62/63/64/65/66/67/68/69/70/71/72/73/74/75/76/77/78/79/80/81/82/83/84/85/86/87/88/89/90/91/92/93/94/95/96/97/98/99/100

4

Battery Industry Review & Analysis Future Small Cell Technology Mix

In response to unrelenting pressure for increased energy density, two "advanced" rechargeable technologies have entered the market in the last few years.

| | Nickel-Cadmium | Nickel-Metal Hydride | Lithium-Ion |
|------------------------|---|--|---|
| Energy (ratio to NiCd) | 1.0 | 1.3 - 1.5 | <2.0 |
| 1995 Sales (cells) | 1.6 billion | 600 million | 200 million |
| Features/Benefits | <ul style="list-style-type: none"> Best choice for very high discharge rate applications, and low cost products Reliable work horse that will endure in the marketplace | <ul style="list-style-type: none"> Higher energy than NiCd Plug-compatible with NiCd, minimizing redesign Aqueous electrolyte implies safety and lower risk | <ul style="list-style-type: none"> Higher energy density available High cell voltage (e.g., 3.6 volts) will enable single cell applications Apparently a safe method to capture the high energy of lithium |

A

SLK 03/06/06/07/08/09/10/11/12/13/14/15/16/17/18/19/20/21/22/23/24/25/26/27/28/29/30/31/32/33/34/35/36/37/38/39/40/41/42/43/44/45/46/47/48/49/50/51/52/53/54/55/56/57/58/59/60/61/62/63/64/65/66/67/68/69/70/71/72/73/74/75/76/77/78/79/80/81/82/83/84/85/86/87/88/89/90/91/92/93/94/95/96/97/98/99/100

5

There are three broad classes of lithium-ion technology, with only liquid electrolyte cell commercialized thus far.

| | Liquid Electrolyte | Gel Electrolyte | Solid Polymer Electrolyte |
|-----------------------------|---|---|--|
| Basic Construct | 100% nonaqueous electrolyte which resides in pores of electrodes and in PP, PE separator | Typically 30-70% liquid electrolyte which resides in a gelling network polymer such as PVDF, PAN | All solid state with a solvating polymer and/or monomer without traditional liquid solvents |
| Status | Commercial since 1991, with about 200 million cells produced in 1997 | Many licensees and developers, though technology not yet commercial | Under development since early 1980s, but only by a few groups |
| Principal Attributes | <ul style="list-style-type: none"> Energy density of 2-3xNiCd Cylindrical and prismatic cells | <ul style="list-style-type: none"> Energy density 0.9-1.1 Li-ion Allow flat batteries | <ul style="list-style-type: none"> Energy density could reach 1.2-1.5 Li-ion Flexible battery design |
| In use | <ul style="list-style-type: none"> Safety New materials Lower cost systems | <ul style="list-style-type: none"> Safety Manufacturability Energy density advantage | <ul style="list-style-type: none"> Conductivity and transference number Electrolyte materials |

A

SLC/OSM/tech and Trade

B

Each wave of technology in devices has resulted in increased variety and proliferation of applications and battery technology.

| ERA | Key Dates | Primary | Rechargeable | Major Applications |
|----------------|-----------|-----------------------|-------------------------------|--|
| Electric | pre-1925 | C/Zn | Vented NiCd, Pb/H+ | Flashlights |
| Electronic | 1925-1950 | C/Zn | NiCd | Radios |
| Solid State | 1950-1980 | C/Zn Alkaline | NiCd Sealed Pb/H+ | Two-way Radio Calculators Watch Personal Audio |
| Microprocessor | 1985 - | C/Zn Alkaline Lithium | NiCd Sealed Pb/H+ NiMH Li-ion | Cellular Phone Computer PDA Camcorder |

A

SLC/OSM/tech and Trade

7

The last few years have seen an unprecedented rate of development and commercialization of battery technology.

| 1989 | 1994 | 1999 |
|--|---|---|
| <ul style="list-style-type: none"> Sealed lead acid Nickel-cadmium | <ul style="list-style-type: none"> Sealed lead acid Nickel-cadmium Nickel-metal hydride Lithium-ion | <ul style="list-style-type: none"> Sealed lead acid Nickel-cadmium Nickel-metal hydride Lithium-ion Metallic lithium (rechargeable) Lithium-ion polymer electrolyte Lithium-polydisulfide Nickel-zinc Zinc-manganese dioxide Zinc-air |

A

SLC/OSM/tech and Trade

2

Four major factors are stimulating major development efforts for secondary batteries in conjunction with growth in applications.

| | Drivers | Comments |
|------------------------|---|---|
| Dominant Driver | Improved batteries for portable products, especially cellular telephones, computers and camcorders | <ul style="list-style-type: none"> Battery has become a limiting component for a variety of portable products Tremendous market opportunity will continue for years |
| | New regulatory requirements for zero-emission vehicles | <ul style="list-style-type: none"> Mandated market in U.S. Improved battery technology is a common requirement for almost all vehicle approaches |
| | Pressure for "environmentally friendly" battery systems | <ul style="list-style-type: none"> Pressure to collect and recycle will continue to increase, and stimulate search for "green" battery |
| | Load leveling to provide fuel flexibility and reduced emissions, plus utility operating benefits such as spinning reserve | <ul style="list-style-type: none"> Improved battery technology is one of several candidate approaches |

A

SLC/OSM/tech and Trade

9

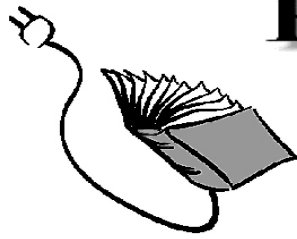
Battery selection is a critical component for mobile computing and communication, and it affects product features, convenience and cost.



A

SLC/OSM/tech and Trade

10



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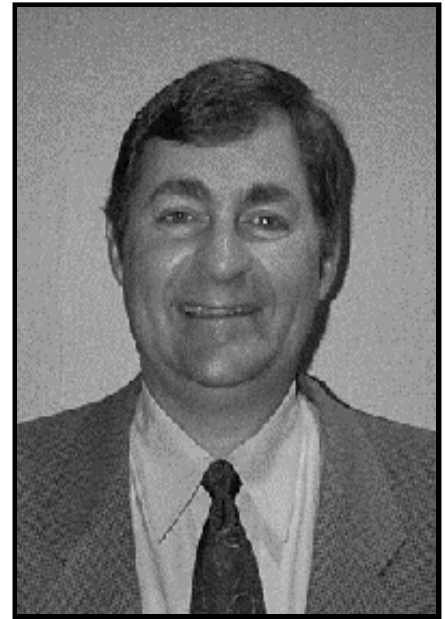
October 8-9, 1998

NIST
Gaithersburg, MD

Len Kawell

Len Kawell, the President of Glassbook, was one of the original three founders of the Iris Associates, where he codesigned Lotus Notes and which he comanaged for the last thirteen years.

Before Iris, Len worked at Digital Equipment, where he was a member of the original team that developed the VAX/VMS operating system, the MicroVAX computer, and VAX Notes and VMS Mail. Len has a B.S. in Computer Science from the University of Illinois.



President

Glassbook, Inc.

www.glassbook.com

Requirements for an Open Electronic Book Standard

Len Kawell
President
Glassbook, Inc.

Who we are

- Glassbook is a consumer electronics co.
 - Dedicated to building high-fidelity e-book hardware and software.
 - Both readers and publisher/seller software.
- I was a founder of Iris Associates
 - Co-designer of Lotus Notes and V.P. of Iris for past 13 years.
 - We pioneered public-key cryptography-based protection of electronic documents.

October 8, 1998

Glassbook, Inc.

What is an Open E-book Exchange Standard?

- Industry, academia and libraries agree on and use common
 - Content format
 - Copyright protection system.
- Provide interoperability
 - Consumer can read book on any device
 - Avoid VHS vs. Beta
- To be "open" it must be available to all participants

October 8, 1998

Glassbook, Inc.

Content Format Requirements

| | Consumers | Publishers | Authors | Booksellers | Libraries |
|-------------------------------|----------------------------|---------------------------|-----------------|---------------------|----------------------|
| High-fidelity text & graphics | Equal to paper books | Preserve design | Aesthetics | Marketing materials | Someday reduce paper |
| Ease of production | Buy new books ASAP | Quick pre-press to e-book | Self-publishing | Sell new books ASAP | |
| Well-proven format | Hate bugs | Retain expertise & tools | Self-publishing | | Retain expertise |
| Wide hardware support | PCs, handhelds, PDAs, etc. | Need installed base | | | |

October 8, 1998

Glassbook, Inc.

Copyright Protection System Requirements

| | Consumer | Publisher | Author | Bookseller | Library |
|----------------------|---------------------------|-------------------------|----------------------|------------------------------|-------------------------|
| Secure | Authentic source, privacy | Revenue protection | Royalty protection | Revenue protection | Liability prevention |
| Lending and Giving | Get value of paper book | One sale / one copy | No free copies | Piracy prevention | Cannot exist without it |
| Scalable | Fast server access | Large publisher servers | | Very large bookstore servers | Large library servers |
| Fair Use | Research, school | Very limited copying | Very limited copying | | Conserv'n, research |
| Account-Auditability | Privacy | Revenue tracking | Royalty tracking | Revenue tracking | Patron tracking |

October 8, 1998

Glassbook, Inc.

What do we propose?

- NIST-sponsored Working Group.
- Standard that meets outlined requirements.
- Glassbook is championing technology called EBX that we can contribute.

October 8, 1998

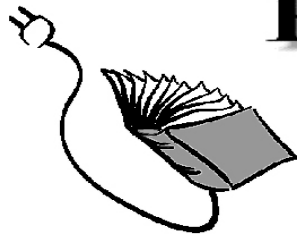
Glassbook, Inc.

Summary

- Glassbook is an e-book technology provider.
- Industry-wide standard is needed to kick-start the market.
 - Multiple de facto standards will only keep market small for everyone.
- Let's all work together and make e-books a huge success!

October 8, 1998

Glassbook, Inc.



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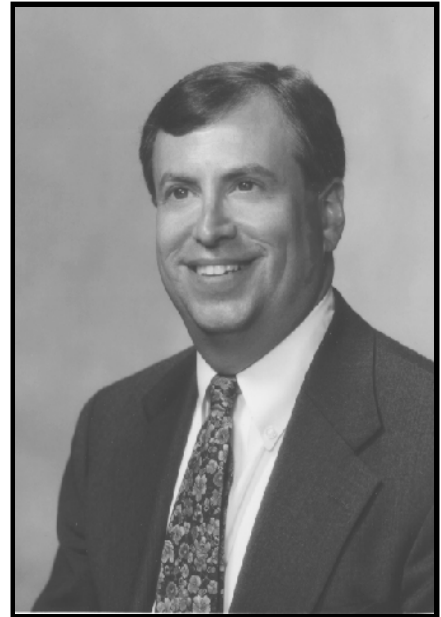
NIST
Gaithersburg, MD

John Mancini

John Mancini joined AIIM in May 1996. Prior to joining AIIM, Mancini spent 11 years in various positions at American Electronic Association in Washington, D.C. and Santa Clara, California, most recently as Executive Vice President and Chief Operating Officer. The American Electronics Association is the nation's largest technology trade group, representing over 3,000 U.S. high technology companies. He has authored several publications on the electronics industry and has testified before Congress on numerous occasions.

Mancini is a frequent speaker at meetings and conferences throughout the world on various topics including the document management marketplace and association direction and activities.

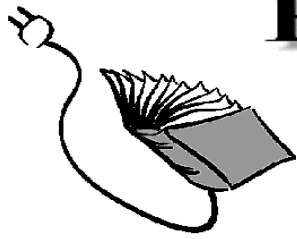
He holds a bachelor's degree from College of William and Mary and a master's degree from Princeton University. He is a member of the American Society of Association Executives.



President

**Association for
Information & Image
Management
International (AIIM)**

www.aiim.org



Electronic Book '98

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October 8-9, 1998

NIST
Gaithersburg, MD

Chris Pooley

President and CEO. Joining Modern Age Books in November 1997, Pooley has 12 years of experience with successful startup companies in the field of electronic publishing. In a series of senior management positions, Pooley has developed national and international sales and distribution channels, managed software development, licensed data and technology from key publishers.

As the 3rd employee of SilverPlatter Information, Inc., Pooley's efforts helped that company grow to over \$50 million in revenue in nine years. Then, at Pro CD, Pooley managed the sales growth for the award winning Select Phone product line. Under his leadership, sales grew from \$2.5 million to over \$20 million in two years.



CEO

Modern Age Books

www.mabooks.com

Electronic Book '98

Using the PC as a Gateway
Chris Pooley
Modern Age Books

October 8, 1998



Who is Modern Age Books?

Modern Age Books offers state-of-the-art technology to bring printed books and manuals to the computer screen.



What We Do.

We serve OEMs, VARs, book publishers, software publishers and their customers by creating electronic versions of:

- Trade Books
- Hardware Manuals
- Software Guides



Customers We Serve.

- Trade Book Publishers
- PC & Peripheral OEMs
- Software Publishers
- Consumers Internet/Retail



Publishing Partners

- Macmillan Computer Publishing
- Osborne/McGraw-Hill
- Microsoft Press
- Sybex
- IDG Books Worldwide



Enter the Hand-Held Devices

- A new era in electronic books
- Tremendous media interest
 - Technologists
 - Consumers
 - Book publishers



Back in the old days...

- Beta vs. VHS, an expensive lesson
- 1986 1st Microsoft CD-ROM conference
- Phillips/Sony set standards
- ISO 9660



CD-I Spoils the Party

- Pre-launch announcement delays market acceptance
- Standards issues stall adoption
- CD-I is years late and 100's of million over budget



Book Publishers

- Tied to Desktop Publishing Software
 - Quark
 - Frame
 - Pagemaker
 - Ventura
- Flexibility of SGML/XML not there yet
- Cost of conversion a big issue



Hand-held Success Story

- Palm Pilot from 3Com
- Over 2 million in use
- 100's of applications written
- Leverage the installed PC base



Hand-Held Electronic Books -- Success Factors

- Strength in standards
- Reduce conversion costs to publishers
- Leverage PC base for users
- Accelerate technology adoption

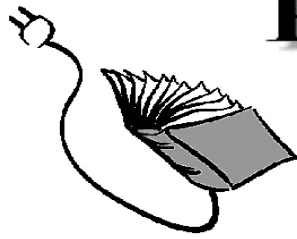


The road ahead.



- Standards will win
- Facilitate collection building
- Speed adoption
- Remember the VHS/Beta lessons





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Jerry McFaul

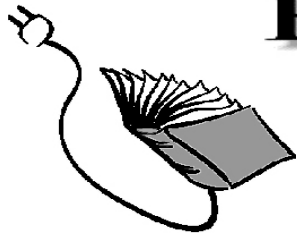


President

**Special Interest Group
on CD Applications and
Technology**

SIGCAT Foundation

www.sigcat.org



Electronic Book '98

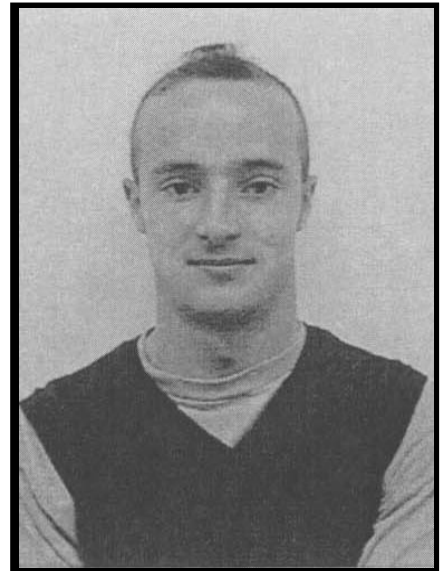
Turning a New Page in Knowledge Management

October 8-9, 1998

NIST
Gaithersburg, MD

Barrett Comiskey is one of the technical founders of E Ink, a Cambridge based company working on flexible, high contrast displays. He holds a degree in Mathematics from MIT, where he co-invented E Ink's technology.

Barrett Comiskey



Principal Scientist

E Ink Corporation

www.eink.com

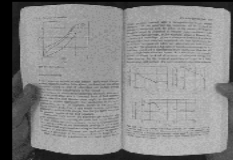
Electronic Inks for Electronic Publishing



Barrett Comiskey
E Ink Cambridge MA
Electronic Book '98 10.8.98

Paper Books

- High Reflectivity (~75%)
- Good Contrast Ratio (~30:1)
- Ambient Light Viewable
- No Power Required
- 180° Viewing Angle
- Lightweight and Rugged



The E-Books of Today



- Backlit LCD
- Continuously Powered
- 75-100 dpi
- Delicate Glass Substrates
- Moderate Viewing Angle (60°)



Can E-Books Substitute for Paper?

LCD

- High Reflectivity (~75%)
- Good Contrast Ratio (~30:1)
- Ambient Light Viewable
- Bistable
- 180° Viewing Angle
- Lightweight and Rugged

II



Our Approach

The Goal

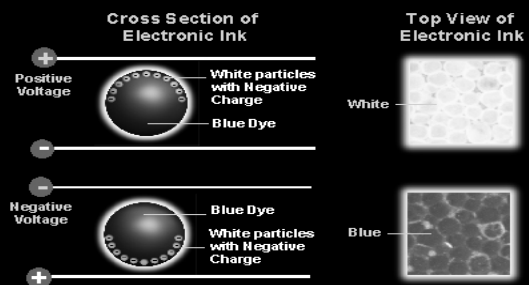
Create a paper-like electronic display material that can be cheaply integrated onto flexible substrates.

The Solution

An "ink" made of microcapsules, each of which can change color with an applied electric field.



How Electronic Ink Works



What's In Electronic Ink and Why?

- **Pigments and Dyes**
 - Titanium Dioxide → High Reflectivity
 - Absorbing Dye → High Contrast Between Any Two Colors
- **Microcapsules**
 - Printable Ink → Plastic Substrates
Low Cost
Large Areas



The Next Generation of E-Books

| | E Ink |
|-----------------------------|-------|
| Bright White State (~75%) | II |
| Good Contrast Ratio (~30:1) | II |
| Ambient Light Viewable | II |
| Bistable | II |
| 180° Viewing Angle | II |
| Lightweight and Rugged | II |

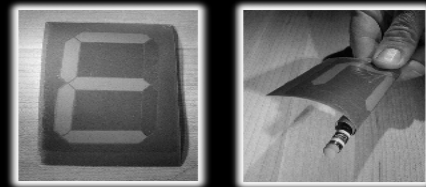


Progress

| | 1997 | 1998 | 2000 |
|----------------------------------|-------|-------|------|
| Reflectivity | 15% | 35% | 60% |
| Contrast Ratio | 3:1 | 15:1 | 60:1 |
| Substrate Size | 1"x1" | 8"x8" | ? |
| Addressing Voltage (5 Hz) | 300 V | 40 V | 10 V |



Paper-like Look and Feel



Addressing of Electronic Ink

- *Today*, Electronic Ink can be formed into sheets which can be electrostatically or directly addressed.
- *In the near future*, Electronic Ink will be integrated with an inexpensive backplane for high resolution displays.



Other Functional Inks

- Conductive Inks
- Resistive Inks
- Dielectric Inks
- Semiconductive Inks (3-5 Yrs)

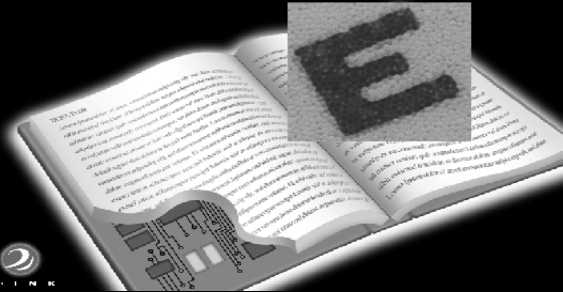


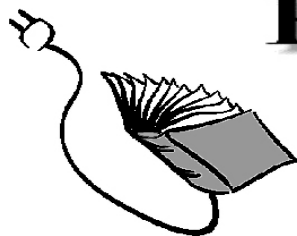
Electronic Publishing

- In the first generation, flexible sheets of Electronic Ink can be integrated with an electrostatic head, enabling reusable electronic newspapers.
- In the next generation, Electronic Ink will be integrated with other functional inks to provide a high resolution electronic display as attractive as paper at an affordable cost.



Next Generation Electronic Books





Electronic Book '98

Turning a New Page in Knowledge Management

October 8-9, 1998

NIST
Gaithersburg, MD

Gene Golovchinsky

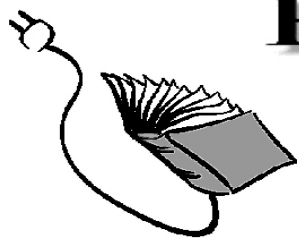
Gene Golovchinsky is a Sr. Research Scientist at FX Palo Alto Laboratory (FXPAL), where he is a member of the Mobile computing group. His research interests include user interface design (with an emphasis on information exploration and information retrieval), hypertext, and pen-based computing. Gene completed his Ph.D. at the University of Toronto in 1996.

Prior to joining FXPAL, Gene had worked at GMD-IPSI in Darmstadt, Germany, at IBM, and at Kaiser Electronics.



Fuji Xerox

www.fxpai.xerox.com



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NIST
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Steve Stone

Steve Stone, Director of Electronic Books Development, is responsible for design and development of Electronic Book related projects at Microsoft. Prior to joining Microsoft, Steve was General Manager for Spyglass Mosaic as well as Spyglass Device Mosaic.

Prior to that, he held a number of software management and development engineering positions with Intergraph Corporation as well as NCR. Steve holds a B.S. and M.S. in Computer Science from the University of South Carolina. Steve is married and has three children.

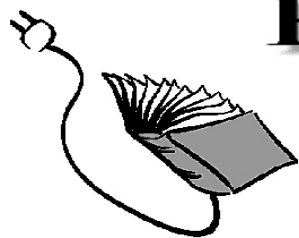


Microsoft

www.microsoft.com

Synopsis

Electronic Books will provide a tremendous improvement over paper books in both the developed world as well as third world countries. Combined with the Internet, Electronic Books provides a tremendous improvement in the richness, speed, and volume by which it can deliver book, magazine, and newspaper content to the consumer. For Electronic Books to succeed, tens of thousands of titles must be available immediately upon release of the Electronic Book devices. Publishers are willing to provide content if a standard file format and content structure exists into which they can write their content as well as a digital rights management system that can protect their content. Companies that understand this will work quickly and aggressively to correct this by developing electronic book standards with the correct content structure as well as content protection features.



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Evelyn Sasmor has worked in all areas of STM publishing, covering a wide variety of subject areas ranging from mathematics to medicine, and supervising functions from editorial to back office. Currently, she is Director of Online Publishing from McGraw-Hill's Educational & Professional Publishing Group, and is developing web sites from both existing and original content. One current project is the recently released Internet service, Harrison's Online, which is based on the world's leading textbook of medicine, Harrison's Principles of Internal Medicine.

Prior to joining in McGraw-Hill, Evelyn was with Harcourt Brace & Company, where she held various positions, including Head of Journals and Director of Production and Operations for books and journals for Academic Press.

Evelyn Sasmor


The McGraw-Hill Companies

**Director, Online
Publishing**

McGraw-Hill

www.mcgraw-hill.com

Electronic Books

An Educational & Professional Publishing
Perspective



NIST Meeting, October 9, 1998
Evelyn Sasmor, McGraw-Hill

Publisher role

- selection, editing, presentation, marketing, distribution
 - goal of publisher is to present in best format for material and to widest possible audience
- McGraw-Hill publishing programs

October 9, 1998

2

The McGraw-Hill Companies

Topics of discussion

- User expectations
- Data issues
- Security issues
- Distribution
- Current M-H initiatives
- Future developments

October 9, 1998

3

The McGraw-Hill Companies

Advantages of electronic books

- can provide vast quantities of data without lose of trees and without muscle strain
 - some types of books will certainly be augmented by, and in some cases replaced by, electronic formats
 - some subject areas more readily amenable to this format than others, e.g., not good for electron micrographs
- search capabilities

October 9, 1998

4

The McGraw-Hill Companies

User expectations

- possibility of interactive and computational processing
- connection to PC and to Internet
 - electronic often means up to date to users; can only provide ongoing updates reasonably with connection to Web sites
 - to really provide computational processing need connection to PC

October 9, 1998

5

The McGraw-Hill Companies

User expectations continued

- opens possibility for multimedia in hand-held book format
 - multimedia makes some concepts much easier to understand, e.g., cell mitosis, and can enhance the learning process

October 9, 1998

6

The McGraw-Hill Companies

Current issues

- Readability
 - more print-on-paper-like format would make acceptance easier
- User need for browsing capabilities
 - hard to match the kind of intuitive browsing that people are so adept at with the printed book with any electronic medium

October 9, 1998

7

The McGraw-Hill Companies

Current issues continued

- acceptance within user community
 - McGraw-Hill's BetaBooks
 - learned from BetaBooks that people do read online
- more technological advances needed
- need for additional skill sets within publisher's staff

October 9, 1998

8

The McGraw-Hill Companies

Data issues

- content management issues
 - publishers cannot afford to redo data for each application; need to be able to use SGML/XML
- mathematics, complex diagrams, complex tables
- can we leverage efforts for CD and online versions?
- can we link to websites?

October 9, 1998

9

The McGraw-Hill Companies

Security issues

- Copyright protection
- Authenticity of content
- Downloading
- Encryption
- Example: Our online textbook content model

October 9, 1998

10

The McGraw-Hill Companies

Distribution

- Publisher goal
 - widest possible distribution and easiest accessibility
- Current hand-held book models
 - Proprietary formats
 - Restricted distribution through vendor outlets
 - Vendors may wish to enhance revenues by selling user data
- Price

October 9, 1998

11

The McGraw-Hill Companies

Current M-H initiatives

- focusing on online and CD
 - *Harrison's Online* and similar projects
 - customized course materials from HE
- looking at various formats and beginning some experiments
 - SoftBooks
 - RocketBooks
 - EB Dedicated Reader

October 9, 1998

12

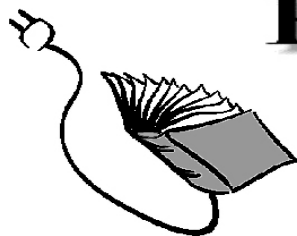
The McGraw-Hill Companies

Current M-H initiatives contd.

- HE experimenting with electronic textbooks
 - starting with just content on line — in HTML not PDF
 - will later add tools required
 - reach nontraditional students
- Professional launching full-function online services
 - *Harrison's Online* provides full updated content in HTML

Future development

- Need to resolve content management issues
- Need to resolve security issues
- Need to find good distribution model and price effectively
- Depends greatly on user acceptance of this medium



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Julia Blixrud

Julia Blixrud both co-manages the ARL Statistics and Measurement Program, which gathers data about ARL member libraries and seeks to identify ways to improve the performance of libraries, and is responsible for publication and information service activities within ARL's Communications Program.

Her background includes experience in technical training, library networking, serials, and foundation work. She speaks and writes in the areas of technical standards, library cooperation, library statistics, and serials. She has a BA in Library Science and Scandinavian Studies from Augsburg College (Minneapolis) and an MA in Library Science from the University of Minnesota.



**Senior Program
Officer**

**Association of Research
Libraries**

www.arl.org

*E-Books and Research Libraries:
New Opportunities for Service;
New Challenges for Information
Management*

Julia C. Blixrud, Senior Program Officer
Association of Research Libraries
Electronic Book '98

*Libraries and Books:
A History*

- Personal Collections
 - Study Collections
 - Public Collections
-
-

*Libraries and Technology:
A Brief Overview*

- Labor intensive work
 - Materials handling
 - Record management
 - Early adapters
 - Processing
 - Preservation
-
-

Libraries and Standards

- Identification
 - Purchase
 - Share records
 - Application
 - Search
 - Share records
-
-

Library Functions

- Acquire
 - Organize
 - Circulate
 - Preserve
-
-

*Library Functions:
Updated for the E-World*

- | | |
|--------------------|---------------------|
| ■ Acquire —————> | ■ Purchase Content |
| ■ Organize —————> | ■ Manage Access |
| ■ Circulate —————> | ■ Deliver Format |
| ■ Preserve —————> | ■ Reformat & Retain |
-
-

Acquisitions

- Research Library Book Market
 - 110 North American ARL universities
 - Spend \$200,000,000 per year
 - \$45-50 unit cost
- Methods
 - Jobbers
 - Approval plans
 - Single title

Acquisitions

- Technology
 - Integrated Library System
- Standards
 - Identifiers (ISBN)
 - ANSI/NISO Z39.43 (Standard Address Number)
 - EDI
 - ANSI/NISO Z39.2 (MARC)

Cataloging

- Scope of Activity
 - 10 million records year
- Method
 - Auto-loading of full records
 - Contracted projects
 - One-by-one

Cataloging

- Technology
 - Integrated Library System/Online Public Access Catalog (OPAC)
 - Web
- Standards
 - ANSI/NISO Z39.2 (MARC)
 - ANSI/NISO Z39.50 (Information Retrieval)

Circulation

- Scope of Activity
 - Regular: 80 million transactions
 - Reserve: 15 million transactions
- Method
 - Transaction-based
 - Self-check

Circulation

- Technology
 - Integrated Library System/OPAC
- Standards
 - ANSI/NISO Z39.2 (MARC)
 - ANSI/NISO Z39.57 (holdings)

Preservation

- Scope of Activity
 - Research libraries: \$81 million per year
 - Several million items yearly
- Method
 - Conservation [preserve original] (binding, repair, deacidification)
 - Reformatting (photocopying, microfilming, digitizing)

Preservation

- Technology
 - Copiers
 - Chemical substances
 - Cameras
 - Storage
- Standards
 - ANSI/NISO Z39.48 (Permanent Paper)
 - Microfilming, microfiche

Format Assimilation Pattern

- Experimentation
- Pilot Projects
- Documentation of Early Adapters
- Standards Development
- Peer Pressure Adaptation

Left for Last

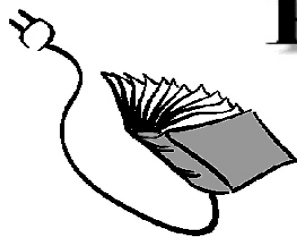
- Training
 - Staff
 - Library Users
- Evaluation
 - Cost
 - Functionality

E-Book Service Opportunities for Research Libraries

- Purchase more content economically
- Provide more access efficiently
- Deliver materials more quickly
- Ensure availability on demand

E-Book Information Management Challenges for Research Libraries

- Integration with other formats
- Interoperability in systems and retrieval capabilities
- Ensuring long-term access to content (and format, if necessary)



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NIST
Gaithersburg, MD

Johnathan Guttenberg

[Books@Random]
RANDOM HOUSE ONLINE, INC.

Vice President

New Media

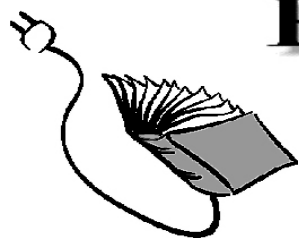
Random House

www.randomhouse.com

Jonathan M. Guttenberg was named Vice President of New Media at Random House following the acquisition of Random House by Bertelsmann AG and the subsequent merger with Bantam Doubleday Dell (BDD). Jonathan had been with BDD since October 1993. In his current role, he is responsible for defining and implementing the company's strategy for all electronic media. Mr. Guttenberg oversees the company's various electronic publishing projects, including BDD Online and Bold Type, the company's sites on the World Wide Web. He is also responsible in dealing with all new delivery systems including — on demand printing and handheld electronic readers.

Previously, Mr. Guttenberg spent six years at Viacom International, Inc., moving from Corporate Development to Viacom New Media. In Corporate Development, Jonathan explored new business opportunities for all of Viacom's operating groups through outside acquisitions and/or internal development. At Viacom New Media he served as Director of Business Development and Operations and Director of Marketing. In these roles, he contributed to virtually every aspect of Viacom's New Media business.

Prior to Viacom, Jonathan worked at Columbia Pictures Entertainment, Inc. as an Analyst in Corporate Development, and founded his own computer sales and consulting company, Mr. Software, Inc., in New York City. Jonathan is a graduate of the Annenberg School of Communications at the University of Pennsylvania.



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Gary Shapiro

Gary Shapiro is president of the Consumer Electronics Manufacturers Association (CEMA), the trade association representing over 400 U.S. consumer electronics manufacturers.

Mr. Shapiro began his career with the association in 1982 as its government and legal advisor. In 1983, he was promoted to staff vice president. Two years later, he was appointed assistant general counsel and then promoted to vice president in 1988. In 1989, Shapiro was promoted to vice president, secretary and general counsel of EIA, the parent to CEMA. In 1990, he shifted back to the consumer electronics area as group vice president and in October 1995 became president of CEMA.

Mr. Shapiro has been an active leader in the development and launch of HDTV. He co-founded and serves as chairman of the HDTV Model Station and has served on the Board and Executive Committee of the Advanced Television Test Center (ATTC).

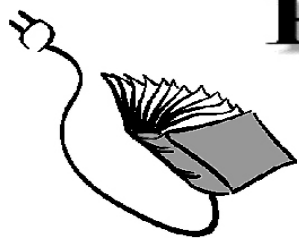
Mr. Shapiro is well known in the exposition and meetings world for CEMA's CES® and for his leadership on industry issues. He is past chairman of the Board of Trustees of the International Association for Exposition Management (IAEM) Foundation and past chairman of IAEM's Industry and Government Affairs Committee. He also serves as chair-elect for the Center for Exhibition Industry Research.



President

**Consumer Electronics
Manufacturers
Association**

www.cemacity.org



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Cita M. Furlani currently serves as Director of the Information Technology and Electronics Office of the Advanced Technology Program at the National Institute of Standards and Technology. In this role, Furlani works with industry in developing programs in areas such as information technology in healthcare, component-based software, manufacturing automation, photonics and microelectronics manufacturing, intelligent control, electronic commerce, adaptive learning systems and semiconductor lithography.

Before joining ATP, Furlani served as Chief of the Office of Enterprise Integration (OEI), Information Technology Laboratory, NIST. Furlani coordinated Department of Commerce activities in the area of enterprise integration. Furlani also served as special assistant to the NIST Director in her role as Chair of the Committee on Applications and Technology of the Administration's Information Infrastructure Task Force. Previously, Furlani was on detail as technical staff to the Director of NIST in the position of Senior Program Analyst. Ms. Furlani holds a Master of Science degree in Electronics and Computer Engineering from George Mason University and a Bachelor of Arts degree in Physics and Mathematics from Texas Christian University.



Cita Furlani

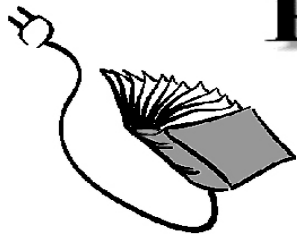
Director

**Information Technology
and Electronics**

**Advanced Technology
Program**

NIST

www.atp.nist.gov



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NIST
Gaithersburg, MD

Carol Risher



**Vice President of
Copyright and New
Technology**

**Association of
American Publishers**

www.publishers.org

Copyright and E-books - Exploring Uncharted Waters

In the enthusiasm to consider the wealth and variety of literature and information products that will be available to import to e-book devices, there hasn't been much mention of the issues raised by Copyright -[ownership, control, protection against copying, licensing, derivative works, authenticity]

To explore these issues necessary to sketch out the basics:

- copyright begins at creation
- cascading bundle of rights that
- can be assigned on an exclusive or non-exclusive basis
- the owner of any exclusive right can enforce that right over others

The owner of copyright has the right to authorize the making of copies of the work, the making of derivative works (new works derived from the original -traditional examples include adaptations, abridgments, translations, a screenplay from a novel), the distribution of the work in copies to the public (including by electronic means.)

Copyright holder exercises control for a variety of reasons:

- authenticity
- reputation
- economics
- integrity

Care about how the work is displayed and quality control

many issues involved in e-book scenarios -

who own the rights - if its book newly created - at time of original contract can discuss release times - similar to hard back/ paperback scheduling

if its book that was published earlier before e-book was contemplated - concerns over who owns what rights - book may be bundle of rights - copyright in photos owned by photographer who only authorized use in print edition - similarly graphs and charts and previously published information - this has been at issue in the creation of multimedia and mixed media works where tracking down the ownership and negotiating the new rights has been a significant part of the work in bringing out the CD-ROM.

Similarly authors rights - at issue is who owns electronic rights and how are they defined - involved in pending litigation right now -

issues are not new - came up in audio book licensing as well as multimedia but they are issues that must be addressed.

Quality of display - how to test - who insures-

And then, bigger issue of copyright protection - in cyberspace - WIPO legislation - (update) involves key issues - who is liable, anti-circumvention, rights management information

Where is leakage - in ebook environment - from publisher to distributor - from distributor to retailer =- from retailer to customer - from customer to peers - super-distribution/redistribution

how to test - how to protect -

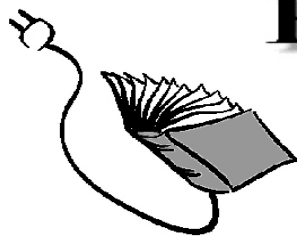
- E-books for coursepacks

- ebooks for onscreen information

- ebooks as tool - how to insure protection integrity certification of customer - payment royalty etc. etc. etc.

not easy issues but ones that must be addressed.

ebooks as devices for rent ? libraries??



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Judith M. Dixon

Judith M. Dixon is Consumer Relations Officer at the National Library Service for the Blind and Physically Handicapped, Library of Congress, which provides braille and recorded reading material to blind and physically handicapped Americans. During her seventeen years in this position, she has been concerned with all aspects of reading by people with print limitations. In recent years, the advent of new technologies have brought about a widening of opportunities for the availability of many types of reading material.

Ms. Dixon has been a user of online services since 1982 and a user of the Internet since 1993. For the past three years, she has been conducting Internet overview sessions to encourage other blind persons to become involved with this exciting new technology. She has published several articles on topics related to electronic access and accessible web design.

She also serves on a variety of committees that are setting standards and establishing guidelines for online access. Ms. Dixon earned a B.A. from Stetson University in 1974; an M.A. from Adelphi University, Garden City, New York, in 1976; and a Ph.D. in clinical psychology also from Adelphi in 1980.



Consumer Relations Officer

National Library Service for the Blind and Physically Handicapped

The Library of Congress

www.loc.gov

E-Books: Implications for the Blind and Visually-Impaired

Judith M. Dixon, Ph.D.
National Library Service for the Blind and
Physically Handicapped
Library of Congress

Demographics of the Visually-Impaired Population

- 4.3 million severely visually impaired, noninstitutionalized: 2% of population
- Estimated new cases per year -- 200,000
- 2/3 are 65 or older
- 44 million people aged 45 or older (53% of population) are visually impaired or have family member, friend, neighbor, or coworker who is visually impaired.

How Does the Blind/Visually-Impaired Population Read?

- Braille
- Records
- Cassettes

What Is Available in Special Format?

- Small percentage of print books (3-5%) and 1/2% of magazines that are published each year are produced in recorded or braille formats
- Mostly general-interest titles
- Very few reference works

Sources of Special-Format Reading Material

- Specialized libraries (NLS/BPH, Library of Congress)
- Private organizations (RFB&D)
- Volunteers

Electronic Media--A New Source for Reading

- Enabled by accessible computers with braille and speech
- Electronic texts on diskette
 - Computerized Books for the Blind
 - E-text from RFB&D
 - Scanner with OCR software
- Online resources

Development of Digital Talking-Book System

- NISO standard under development
- Draft expected in 1999
- www.niso.org/commitaq.html
- *Digital Talking Books: Planning for the Future*
(www.loc.gov/nls/dtb.html)

Advantages of Digital Format

- Improved navigation
- Less manipulation of media
- Incorporation of text with digital audio
 - Spelling on demand
 - Keyword searches

Components of Digital Talking Book

- Audio file (digitized human speech)
- Tagged text file (HTML, XML)
- Linking file (synchronizes audio and text file)

Electronic Book Display Devices

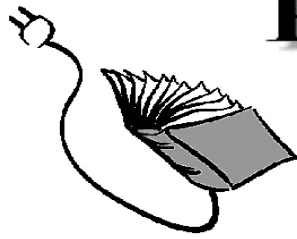
- Built-in access
- Universal access port
- Access to electronic file
 - Structured text , with style sheets to specify presentation

Note About PDF Files

- Not directly accessible
- Limited access via plug-in
- Most structure lost in conversion

Implications of Recent Legislation

- Workforce Investment Act
 - Mandates accessibility standards for electronic and information technology
 - Will apply to all Federal purchases
 - www.access-board.gov



Electronic Book '98

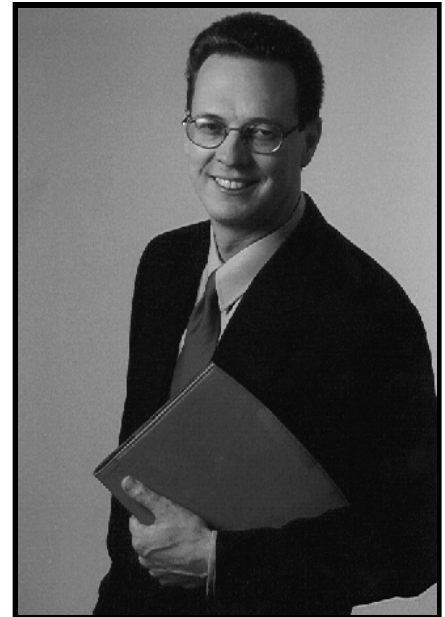
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James Sachs

Mr. Sachs has 20 years of experience in product development, and is best known as a co-designer and patent holder of the Macintosh mouse, which has since become the reference design for PC mice today. Prior to founding SoftBook Press, Mr. Sachs was vice president and general manager of the technology group of Hasbro, Inc., where he created the company's preschool multimedia software business and developed several popular software titles. He has also held top managerial and product development positions at Worlds of Wonder, Inc., where he was responsible for the development of more than 60 high-volume consumer electronic products and toys, including Teddy Ruxpin, the best-selling animated talking product in history.



Chairman and CEO

Softbook Press

www.softbook.com



Our Business:

For people who must regularly read large amounts of essential information, SoftBook is the Electronic Reading System that provides content in a convenient, secure, and cost-effective manner – unlike print...



...Like a better, faster, cheaper Amazon.com without the paper, PC or postage



Advantages of Electronic Publishing

(why publishers want to sell content electronically)

- No manufacturing costs
- No distribution costs
- No returns or inventory risk
- Lack of costs and risks justifies publishing more and forever
- Information is instantly accessible



Advantages of Electronic Reading

(why consumers want to buy content electronically)

- Extraordinary selection & availability
- Instantly searchable
- Zero incremental weight and size
- Extraordinary capacity
- Easily and automatically updatable
- Extremely cost-effective

But...



The Electronic Publishing Dilemma

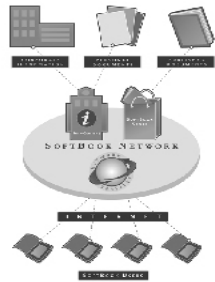
(why it's not happening yet)

The Problem:

- People don't read large amounts on a computer
- Publishers don't want to risk piracy of valuable copyrighted information

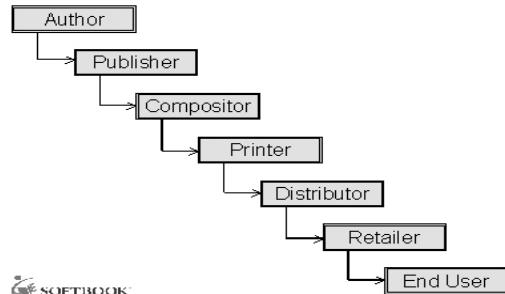


The Solution...



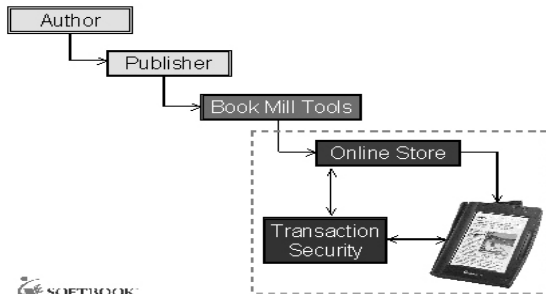
SOFTBOOK
PRESS

Print Publishing Food Chain



SOFTBOOK
PRESS

Electronic Publishing Food Chain



SOFTBOOK
PRESS

The SoftBook System

Convenience

- Portable w/ large capacity
- Instant online access

Comfort, Ease of Use

- Ergonomic design, page oriented
- Not a computer, simple UI

Content

- Customer-published materials
- Vast online bookstore
- Document conversion tools

Capability

- Extensive searching
- Annotation
- Enlarging

Cost

- 90% less than a notebook
- Discount off paper equivalent

Copyright Secure

- No redistribution
- No piracy

SOFTBOOK
PRESS

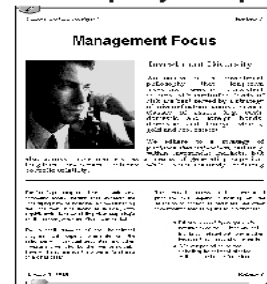
Pricing & Availability

First Customer Ship: Q4 1998

Pricing: \$599 (includes all services)

SOFTBOOK
PRESS

SoftBook Display Capabilities



SOFTBOOK
PRESS

Show Me!



 **SOFTBOOK**
P.O.C.E.

