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The Internet's Hollow Promise

Del Coates
San Jose State University, dcoates@delcoates.com

CAID currents

A decade ago, a drafting machine was probably the most expensive piece of equipment in a design office. A large office might have had a blueprint machine and a fairly expensive milling machine for modeling, but a small office could get by with little more than a T-square, triangle and pencil.

By
Del Coates, IDSA

Del Coates is professor of ID at San Jose State University, and associate director of the university's Silicon Valley Ergonomics Institute. Called the "grandfather of CAID" for his 30-year involvement, he established one of the earliest CAID labs in 1978 while chair of ID at the Center for Creative Studies. As a consultant, he has advised an international list of clients on matters ranging from CAID and ergonomics to strategic design.

hollow computers for cost-effective CAID

Today, a single CAID workstation and its software costs more than the total capital investment of a good-sized design office of just a decade ago. A designer that cannot produce computer files is not considered a serious player.

Cash outlay doesn't begin or end with purchase of the hardware and software, especially in the case of a high-end system. You can spend a lot just deciding what to buy. Consider the example of a small office whose two principals recently completed a two-year search for a system that would be compatible with their clients'. Between researching systems and attending the necessary training, they spent countless hours and funds before finding out that the high-end system they had chosen "was unmanageable, non-intuitive and not in the least bit tailored for product designers." Disconcerted, they canceled their orders and have settled for the intermediate solution of a less costly Macintosh-based system.

Had they bought the high-end system, they would have spent thousands more per year on software and hardware maintenance contracts. They also would have paid for software obsolescence and repair, and, of course, the hardware would have become obsolete after three to five years.

What is the alternative? Certainly no one would advocate a return to the days of T-squares and triangles. A more high-tech solution may lie in the Internet. Touted as being many things to many people, it now shows promise of making high-end CAID more accessible by enabling a shift away from desktop computing to "network computing." Instead of more powerful and costly workstations, designers would use cheaper, stripped-down "hollow computers" with fast processors and optimized Internet connections, but small memories.

Like today's most sophisticated "distributed processing" systems, the Net would distribute processing and storage to powerful computers called "network servers." The hollow computer on a designer's desktop would no longer be under the exclusive control of its own operating system but a Net-based operating system, the same one controlling the network servers. The desktop unit would constitute, in effect, only one component of a huge, globe-spanning supercomputer.

Depending on the user's needs from moment to moment, the operating system would assign as much or as little of the Net's available computing power to work on that project and complete it most expeditiously. Always searching the Net for unused computing capacity, it could assign several network servers to render a complex image of a design concept much faster than any workstation an office could afford. This would all be transparent to users, of course. As far as they would be concerned, everything would be happening inside the "super"–albeit hollow–computer on their desks.

Best of all, this virtual supercomputer would be cheap. Database software giant Oracle Corp. has built a prototype of a $500 hollow PC. A fast, state-of-the-art RISC processor—accounting for only $50 of its cost—powers it. Another $50 device, the asynchronous transfer mode chip, allows the Internet to send it fast streams of video and other data. It has only four megabytes of conventional RAM and another four of "flash" RAM, a relatively new kind of memory that maintains stored data even while the computer is off. The flash RAM would store a rudimentary operating system and essential programs for booting up, communicating with the user and the Net and performing other basic functions. The computer in a fully implemented Net-based system, where files reside on network servers, would need no hard disk.

Don't expect full-blown CAID workstations, even hollow ones, at this price, though; $2,500 would be more likely. A 16- or 21-inch color display, alone, would cost much more. For speed and technical practicality, several megabytes of display memory would almost certainly reside in the unit; no sense sending pixel information over the wire. Nevertheless, a hollow workstation probably won't cost much more than today's display alone.

Although Oracle plans no hardware production, it does plan to market a Network Computer Operating System, probably at a cost of about $15 to each user, that would guide any hollow computer connected to the Net. Promised by next year, expect the system to incorporate e-mail, video conferencing software, an Internet browser and a basic word processor.

Such a setup could reap many dividends:

• Lower capital investment. Even at $2,500, hollow CAID workstations will cost so much less than "solid" ones that the smallest offices will be able to afford the most advanced CAID. Because most of the power will reside on the Net, you won't be responsible for replacing hardware to improve performance; Net Gnomes out there in cyberspace will install additional servers on the Net as needed. Instead of buying software and rebuying it in the form of updates, you'll pay only for what you use by renting it by the minute. This way, you'll have access to many more applications than you can afford now, but you won't have to pay fully for software you use only occasionally.

• Direct collaboration with clients and model makers. It will be easier to transfer data. You and people at other sites will be able to look at the same images on your respective screens and design cooperatively.

• No hassles with software updates and bug eradication. Software vendors will continually update and debug software as they do now. Whenever you log on to use a particular application, you'll automatically get the latest and best version. The network operating system will automatically update any software residing in your machine each time you log on, just as on-line services maintain their software now.

• More effective maintenance. Technicians using diagnostic and maintenance software like IBM's Housecall will respond to calls for help by looking inside your computer from the Net and fixing it remotely, without you having to disconnect it.

• On-demand help and training. Software and hardware vendors will conduct training sessions on the Net at regularly scheduled times or on demand.

• Easier accounting. Because software costs will be based on time of use, you will simply pass on those direct costs to clients at billing time, as you do phone and other incidentals; you won't have to figure in amortization rates.

One drawback would be the mind-numbing, budget-

killing delays as the Net tries to push and pull complex design data through a modem at 28,800 bits per second. Fortunately, substantial improvements are on the way. For example, the newest modems can transfer data over cable TV networks instead of phone lines—at 10 million bits per second! However, network computing conjures images of the global computers of Forbidden Planet, Giles Goat Boy and Tron with their omnipotent—ultimately evil—Master Operating Systems. Or more realistically the '70s-style giant mainframe computers hosting "dumb" terminals. Without the microcomputer revolution that shifted power away from management information systems, we might still be squinting at green-on-black screens and typing cryptic_strings_of_words_connected_by_underline_characters on teletype terminals—and waiting 24 hours before picking up plots at the MIS office.

Knowing that we have come too far to go back there, we should recognize that network computing can yield the best of both computing worlds, centralized and decentralized. Unlike the old mainframe days, network computers don't have to be completely hollowed-out dumbbells. Users of network computing will have more independence and options than mainframe serfs did. They will be able to make their computers as powerful and independent as they wish, without losing the advantages of network computing when they want them. ■

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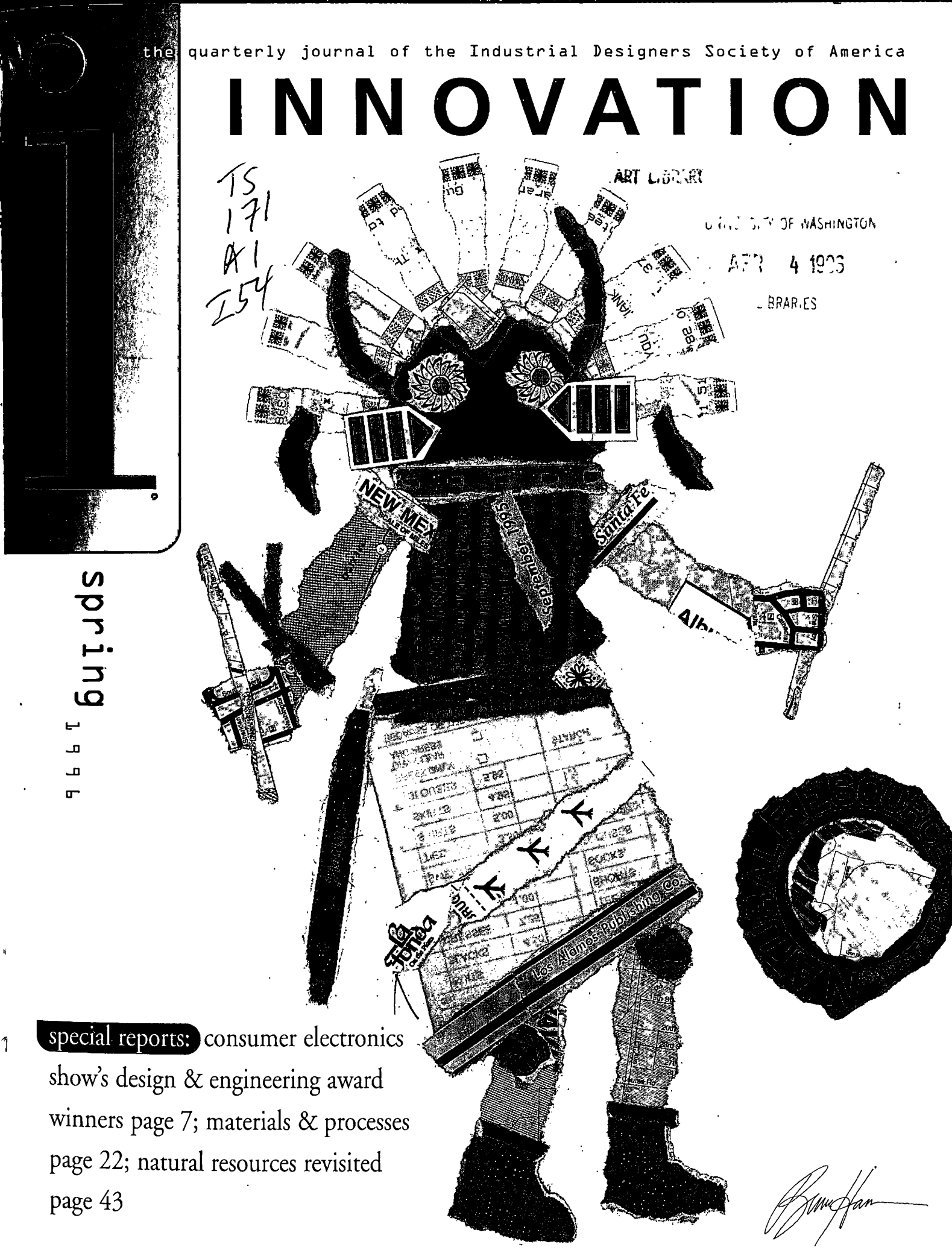

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Design Format
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Robert T. Schwartz

Editorial Office
IDSA
1142 Walker Rd.
Great Falls, VA 22066
P: 703.759.0100
F: 703.759.7679

Advertising Office
Mary-Jane Atwater
Mitchell-Petersen
P: 703.998.4000
F: 703.379.4611

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materials & processes

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By David Kusuma, IDSA, Guest Editor

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21st century breakthroughs / a brave new world

By Michael Paloian, IDSA

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the magic of glass / the answer is clear

By Betty Baugh, IDSA

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accessing ecodesign / reducing ecological loads

By Philip White, IDSA

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a design for disassembly / quantifying parts & materials

By Bret H. Smith, IDSA

In order to create effective tools for implementing the three R's (reduce, reuse, recycle), designers need a way to make the right choices. This research provides checklists that can help.

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columns

Correction for Fall/Winter 1995:
In the Fall/Winter '95 issue of Innovation, a slight error was made in Chuck Jones' title at Xerox. Chuck's full and correct title was Manager, Industrial Design/Human Interface Strategy.

IDSA

Cover: The collage on the cover was created by Bruce Hannah, IDSA, for IDSA's 1995 National Conference, Natural Resources. "When I returned from Santa Fe, I couldn't help but express my joy with the conference with this collage!"

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