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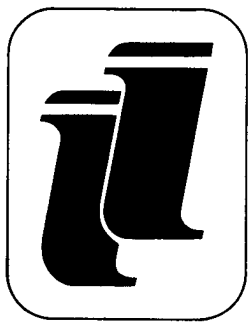

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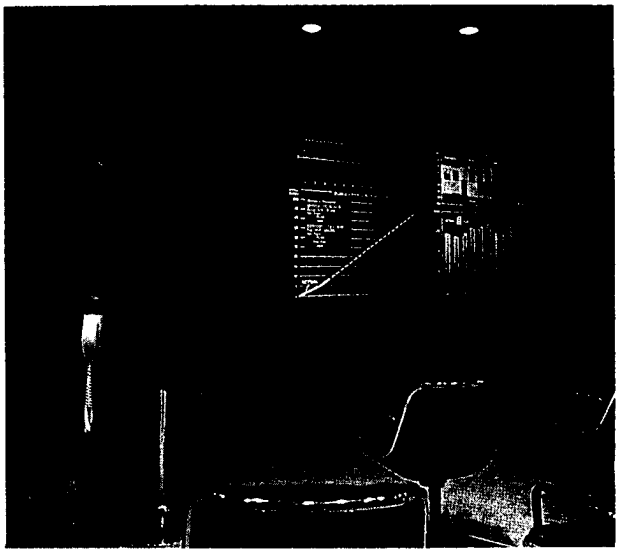
Approved For Release 2008/03/04 : CIA-RDP85B01152R000600780001-8

Computer Graphics in the Board Room

by W. Robert Widener

SUMMARY

Management's biggest problem is a profusion of irrelevant information. Charts and graphs can cut into the data, allowing busy executives to get only what is wanted, when it is wanted. But standards for graphics are badly needed, causing management to distrust graphics of any kind. The emergence of inexpensive color graphics terminals now makes it possible to tie-in to mainframe computers for timely data in the form of readable, clear graphics. Ultimately, a management communications center is the best defense against a deluge of data. If such a center is used properly, time savings in management meetings can approach 80 percent. Thus, a capital expenditure for computer graphics capabilities is warranted to support the planning, performance review, and decision-making process.



In the Bristol-Meyers Corporate Communications Center, graphics presentations can be controlled from lectern or chair.

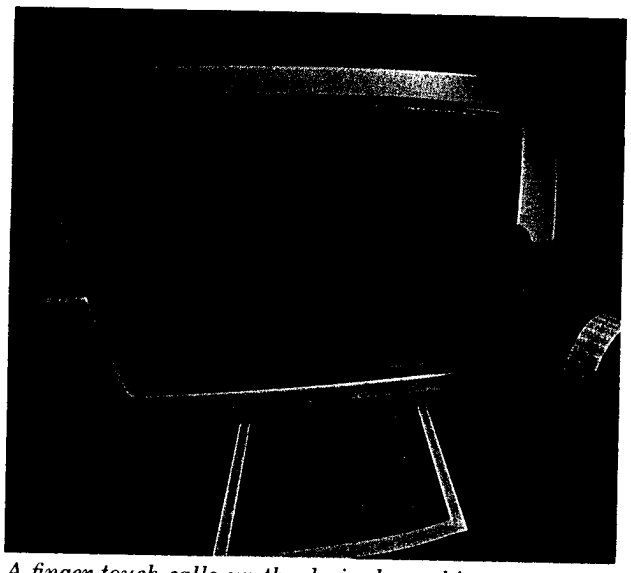
Even though most large organizations have installed powerful computing systems and worldwide communications networks, and most of these systems now operate in "real time," so that one can access a great deal of information directly through a terminal, few top management executives have elected to install terminals in their offices for daily use.

A recent report on a study conducted by McKinsey and Company, Inc., the international consulting firm, pointed out: "U.S. business and industry have tripled their spending for computers in the past five years, yet top management has barely increased their use of the computer resource."

In an article on the same subject in *Time*, the editors put it this way: "In the Office of the Future, most executives still prefer the past."

I believe there are two key reasons for this reluctance on the part of senior managers to use computers directly:

- Computers have not been easy to use. They are not "friendly." This applies both to software pro-



A finger touch calls up the desired graphic on a "touch-screen" business graphics workstation.

grams that require complex log-on codes and access protocols, and to the typical computer terminals and keyboards that require a high level of typing skills and attention to details.

- The applications developed by systems designers usually produce only spin-off information from accounting-oriented data bases, such as sales summaries, and older data that is of little interest or use to senior managers.

But important new developments in both software and terminals are now available that can change all that. "Touch screens" can eliminate the keyboard entirely, as well as on the log-on and protocol process. And planning and simulation models, and other software programs that permit management to ask "what if" questions, are catching on rapidly.

So, more and more, top management executives are turning to their systems departments and are asking for information on those business functions they must deal with every day. No longer will simple summaries of transaction-oriented data bases suffice in the executive suite.

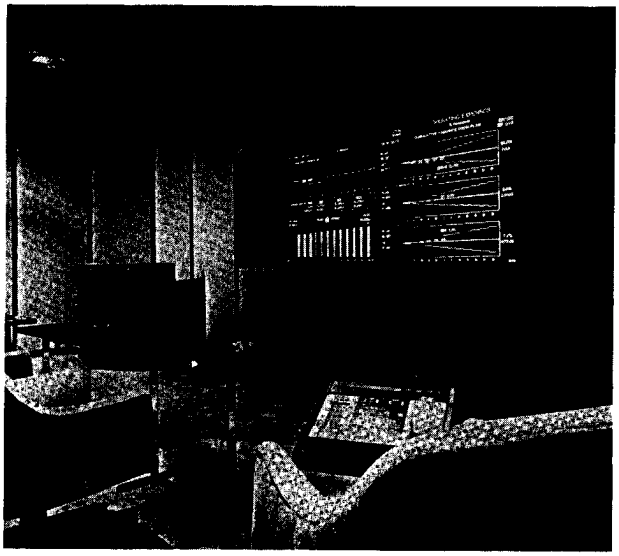
These new systems can be called decision-oriented or, from the top manager's viewpoint, "heuristic," because they allow the exploration of various alternatives, and the making of future projections from existing data bases.

For decades, the dominant form of communications in the executive suite has been paper — paper in the traditional "black book," accounting reports, memos, copies of memos, and reams of computer printout. Though the computer has emerged as an essential tool for every business, it has aggravated management's communications problems because it can produce a hundred times more paper than the accounting department ever could.

Compounding the problem is the fact that most of the information produced in paper form is comprised of traditional accounting summaries. A report book, or "black book," as many call it, is in fact an accumulation of various reports that have been produced by several management groups over many years. Often a new report is added to satisfy some specific need of the moment. But it's seldom that a report is eliminated. So the book continues to grow in size and complexity; it always contains a great deal of useless information that has little or no relevance to top management's decision-making function.

This excess of information introduced by today's computer systems product is part of the problem that must be solved to develop a computer-based information system for top management. Russell Ackoff, professor of business at the Wharton School at the University of Pennsylvania, says in his classic article, "Management MIS-information systems":

"The systems designer perceives management's biggest problem to be a lack of relevant information. So he sets out to design a bigger data base. The ulti-



Executives at The Ranier National Bank monitor the bank's performance on color display stations.

mate system he envisions is one in which everything will be available to management at any level of the business on demand.

"I submit, however, that management's biggest problem is, in fact, the overabundance of *irrelevant* information. What we need to do to design a system to serve top management is to create applications that condense, filter and summarize. Very few of the major MIS programs I see being built in business deal adequately with these three important functions."

The use of charts and graphs to condense and summarize information in a group management environment is not new. Many large organizations have established chart rooms, where top executives can review graphic summaries of data, projected onto graphics display terminals and large screens. Yet after visiting and evaluating over 100 chart rooms in a five-year period, I still had not found a single charting system that served as the prime communications tool in a major business. Clearly, there was something about charts that management often mistrusted, and when a decision was to be made, management invariably relied upon the accounting reports.

I came to the conclusion that the underlying reason was that there were no standards or conventions for charts as there are for accounting reports. Accordingly, management feels uneasy with the chart as a support tool for major planning, performance review, and decision-making meetings.

With the emergence in the past two years of inexpensive color graphics terminals and large-image color projectors, it is possible to tie these effective electronic display systems into the main computer when the proper programs for condensing and summarizing have been developed. By using a series of carefully tested graphic standards, which management has approved and understands, it is possible to introduce the output of the computer into the decision-making process. But to complete the linkage between the data processing system and the dedicated management display system requires the definition by management of a separate systems design activity — a dedicated EDP program with its own charter separate from the regular data processing planning activity.

One of the most compelling reasons to develop more dynamic management information systems is the increased volatility of the world around us. All the changes that were predicted in the 1960s — the acceleration of all the forces that impact our personal and business lives — have become painful reality in just two turbulent decades.

Without dwelling on what has been obvious to all managers and business people over the past several years, here is a brief summary of some of the major new forces that have significantly increased the pressures on management:

1. The rise of the multinational corporation, a massive proliferation of products and services it provides, and a significant expansion in the geographical scope of the organization's operations.
2. The emergence of an international system of money and banking has introduced a daily volatility in money management never experienced in prior decades.
3. Energy politics and economics have affected every part of the world and every business.
4. Global jet travel has become a routine part of corporate life, creating new pressures, multiple time-zone lags and often producing severe physical problems and negative impact on normal family life.
5. Environmental, equal rights and other social movements have become a major force in corporate life.
6. Corporate "Star Wars" have come to involve some of the largest galaxies in the industrial universe, e.g., IBM vs. AT&T.
7. More rapid and extreme movements in interest rates than ever before in our history.

In the midst of this continuing change in the business and economic environment, we are now entering still another new period of rapid change vis-a-vis the office. The phrase "The Office of the Future" has become widely used to loosely describe a range of new information processing developments for administrative and clerical functions as opposed to data processing functions. Though definitions vary, everyone pretty much agrees that some kind of "revolution" is under way, and that it will have a significant impact on the way businesses handle their paperwork, mail and message traffic in the future. And it will also affect how management deals with information. But to date, this concept has not provided top management — especially in a group environment — with easy access to the graphically displayed data it needs in the contemporary, volatile business world.

From management's point of view, the technological development that may be most directly useful to top executives is the significant improvement in graphic displays that condense and simplify the presentation of information.

For over 30 years, the cost of developing top management information systems required for regular decision-making was an expensive proposition. In just the past two years, however, the prices of microprocessors and computer graphics terminals have dropped dramatically. Today, a fully-programmed management display system with the following features:

- full color
- touch-sensitive "menu" access terminal that eliminates the need for an executive keyboard
- high resolution, large-image color display

is available for under $200,000. And just five years ago, the price for a comparable system was $800,000.

Yet just having such computer graphics technology at an affordable price is not enough. Charts can be misleading if they are improperly designed, and can seriously impair sound decision-making, such charts can confuse management, and set back the serious use of graphics in the decision-making process. Unless graphics standards are set, along with an agreed-on discipline on how charts are to be prepared and reproduced, management will not trust the system. And if they don't trust it, they won't use it. This lack of standards and chart design discipline has caused a continually changing *creative art* in graphics, rather than making it into a precise decision-support tool.

Although chart rooms — I prefer to call them management communications centers — have fallen short of their potential, they are here to stay; they are gaining in popularity every year. I have personally been involved with developing some 70 such management communications centers and this form of presentation clarifies and enhances the meaning of information for top executives.

The critical tasks in designing these centers are: care in selecting the information elements to present, and determining the role that standard graphic formats will play in the presentation process. The rest is essentially architectural and interior design preference. Some centers are plush, while others are spartan. I prefer a room that is very comfortable but modest in decor, so the surroundings do not distract from the key function of the room — the presenting of data and information on the display screen.

The most significant result of using a communications center is that the time required to make a decision is reduced. Meetings can be effectively conducted in one-half to one-third the time required for meetings using paper systems.

Never before in the history of business has time been so valuable. Many top executives today feel that time has become more important than money in the decision-making equation. And time saving is the most dramatic and immediately apparent benefit of the increased use of standard graphic displays in the management planning and performance review process.

Another important benefit of management communications centers stems from what can be called "pattern perception," or the ability to grasp the relationships between data from graphic patterns. Vast amounts of data can be projected in graphic form, and evaluations and decisions can be made precisely and quickly. There is simply no way the same results could be achieved by detailed analysis of every data item in a management reporting system.

Though we can't yet definitively measure improvements in the quality of decisions, the sheer acceleration of the process leads to better decisions because management is able to respond more quickly to the changing business, economic and competitive environments. As the system's responsiveness increases, however, it is essential that the credibility of the information be maintained rigorously. And the fully-accredited charting system in which management has been involved, and so understands and approves, is the key to this progress. The computer as a swift and precise informational tool can help. But there will be no substitute for having the right information in the system and for presenting it in a consistent and agreed-on display form.

The management communications center can play an important role in enhancing the presentation of information to those executives who meet in groups. It can provide a visible locus on the executive floor for an intense and orderly informational process. It can give management a new "reach" over their entire organization — worldwide — that they cannot get any other way. And it can do this in one-half the time they now spend in meetings.

If the tools are accepted widely and used properly, time savings can approach 80 percent or more. These benefits would seem to warrant the effort and capital investment required to put in a corporate communications facility for the management display function, and to support the planning, performance review, and decision-making process. ❐

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Paleolithic Cave Painting
1300 B.C.

"...the significance of these forms is not a fundamentally aesthetic one, created simply because of an urge to create something pleasing to the eye; they are a direct and realistic statement on the part of the artist concerning something that was of utmost importance to him..."

Art in the Western World
by
David M. Robb and J. J. Garrison

Approved For Release 2008/03/04 : CIA-RDP85B01152R000600780001-8

CompuChrome™ Computer Graphics System 1980 A.D.

"...the significance of these charts is <u>not</u> a fundamentally aesthetic one, created simply because of a desire on the part of the graphic arts department to draw something pleasing to management; they are a direct and realistic statement by the computer on the status of the key performance indicators of the company, something that is of utmost importance to management."

W. Robert Widener
President
Intelligence Interlink Corporation

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CompuChrome...

...is a stand-alone fully-integrated business charting system designed to be used by any non-technical person—from secretary to assistant to financial analyst or business planner up to President and Chairman. Our users say CompuChrome is more flexible and far "friendlier" than Tektronix, Ramtek, HP, IBM and the others. It is the only business graphics system anyone can use immediately without training...just point to the chart you want—the rest is automatic.*

The tiny powerful computer can go anywhere—credenza, breakfront, closet; turn it on and off like an appliance; "touch" new data into the screen and ask it to redraw the chart; "touch" again and ask for a crisp, clear 8 x 10 color print in seconds; or a slide.

No computer personnel are required; there is no expensive main-frame overhead. Yet our multi-function software does more than Telegraf, Dissplа, or other costly packages that must be scheduled on the big computer—when they're ready, not when you're ready.

And—it is the only computer graphics system in regular use by several CEO's—personally.

Sure we're new, and you hadn't heard of us until now. But that's changing as fast as we're changing business graphics. Please call me today for your CompuChrome demonstration.

W. Robert Widener
President

**Detailed competitive comparison on request.*

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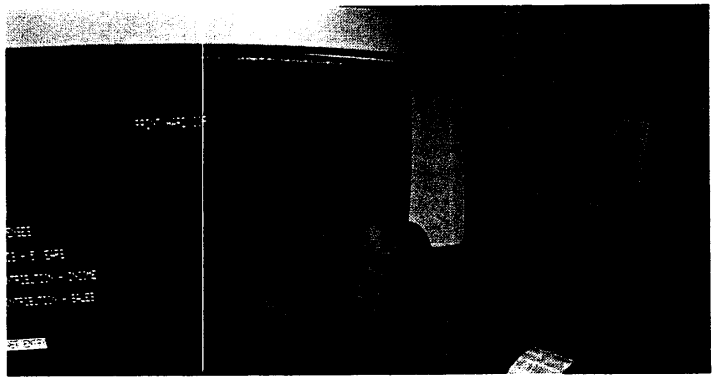

i INTELLIGENCE INTERLINK CORPORATION
220 East 42nd Street · New York, N. Y. 10017 · (212) 599-3444

Intelligence Interlink Corporation · 220 East 42nd Street · New York, N.Y. 10017 · (212) 599-3444

Over the past fifteen years, W. Robert Widener, President and Founder of Intelligence Interlink Corporation, has designed and equipped over 70 communications facilities in business, banking and government. In many of these projects, he also developed a full Graphic Reporting System, set up graphic production facilities, conducted graphic production training programs, and where the Client's computer development programs were sufficiently advanced, developed appropriate computer display systems.

A partial list of Clients appears below:

AEtna Life and Casualty Company
ALFA Group, Mexico
American Productivity Center, Houston
American Telephone & Telegraph Company
Atlantic Richfield Company
Banco Nacional de Mexico
B.F. Goodrich Company
Borden, Inc.
Bristol-Myers Company
Chase Manhattan Bank
Crocker Bank- San Francisco & Los Angeles
First National Bank of Maryland
First Pennsylvania Bank and Trust Company
Gulf & Western Industries, Inc.
Hoffmann-la Roche, Inc.
International Business Machines Corporation
International Nickel Corporation
Liberty National Bank & Trust Company (Okla. City)
Manufacturers Hanover Bank & Trust Company
Massachusetts Mutual Life Insurance Company
Mercantile Bank & Trust Company (St. Louis)
Merrill Lynch & Company, Inc.
Monsanto Company
Occidental Petroleum
Pepsico, Inc.
Radio Corporation of America
Sears, Roebuck & Company
Sperry & Hutchinson Company
The First National Bank in St. Louis
The First National Bank of Chicago
The First National Bank of Tulsa
The New York Bank For Savings
The White House
Transamerica Corporation
U.S. Department of Housing & Urban Development
U.S. Department of Justice
U.S. Department of Transportation
U.S. Postal Service

DATAMATION®

HE WROTE THE SCRIPT

W. ROBERT WIDENER

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PEOPLE

HE WROTE THE SCRIPT

In 1962, W. Robert Widener received an assignment he now calls "the turning point of my life."

Widener's occupation at the time was a combination of advertising and entertainment. As he puts it, "I was a dramatizer of business messages." For example, one of his presentations for AT&T was a musical comedy for a florist show pointing out the advantages of ordering flowers by telephone rather than by telegram.

The assignment that turned Widener's life around also came from Bell. This time the point was not just a new ad gimmick; the phone company wanted Widener to help it alleviate an image problem.

The report of a three-year task force on data communications had just been released by AT&T. It predicted that by the year 1970, data traffic over phone lines would surpass the volume of voice traffic. Bell's portrayal of itself as a mover in an exciting new technology, however, backfired. Visions of Big Brother were conjured up by reporters who had no frame of reference for computer communications, Widener recalls. And they were asking to whom these machines would be talking, and why.

To combat this negative impression of future information technology, Bell decided to read out to the business community with a positive scenario and a serious investment. The company asked Widener to create something lasting—not just a show, but also a room to house a technology presentation and give it life. The room and the presentation together would make up the Bell System Business Communications Seminar (still in use today). The seminar room was designed to make attendees feel they were actually in the boardroom of tomorrow watching the future unfold.

In Widener's scenario for AT&T, the executive of the '80s would require no paper. In the modern world, business decisions would be made from financial and operating information available at the press of a button. Corporate leaders, freed from the primitive constraints of manual information collection, would gather to make decisions by consensus in a comfortable communications center where data from the corporate information system could be displayed on demand. Even the geographic dispersal of corporate entities would pose no problem to the information-rich leaders of the future.

W. ROBERT WIDENER: "Systems designers think management needs more information. That's wrong; management needs less."

When the show was complete, recalls Widener, "I did what no screenwriter should ever do—I believed my own script. I had a preview of the whole exciting future then, and I was right there on the ground floor."

Widener has indeed built his present career on this vision. The systems element of information access that Bell had asked him to imagine was key to his next moves, but so was the management element of information presentation. "The ceos who attended Bell's opening [of the center] all commented on the excitement and power of that room and the way it worked," recalls Widener. For the fast-paced presentation, the room was equipped with three movie projectors and 16 slide projectors. "This was pre-multimedia," explains Widener. "There weren't any controllers then. The whole thing had to be done with relay boxes. I had a real wizard out in Queens [N.Y.] who created these electromechanical monsters. He pieced them together without ever drawing a diagram."

Known to some as the "War Room King" (although he doesn't like the war room term, preferring his own "management communications center"), Widener has since designed over 60 briefing rooms for major corporations. Until recently, the only automation involved was the storage and retrieval of charts and graphs. Present technology has enabled real-time systems that bypass the art department through data base access and stored formats. Widener's work in the interim has been on the formats themselves—no small task.

"Understanding the system and believing in it is the true man-machine interface," Widener stresses. For years he has researched and refined a credible charting system based on the relationships that interest chief executives. "Ceos view the company differently," says Widener. "They need specialized systems." The charting system Widener now uses is based on "key variances," actual performance compared to plans.

"The computer graphics industry offers too much," says Widener. "Systems designers think management needs more information. That's wrong; management needs *less*. Graphics should condense, filter, and summarize. And there is no way to use more than seven colors in management graphics."

Widener is presently offering a decision support system known as CompuChrome through his New York-based company, Intelligence Interlink Corp. Using the same charting discipline he developed for presentation graphics, the menu-driven system has a touch screen. The standalone unit is built around a souped-up Chromatics smart color terminal and is said to be useful for teleconferencing.

"There are a lot of goodies being grabbed by technical people that are not being accepted by management," Widener warns. "They're just new toys. My system is behaviorally driven and technology supported, rather than the other way around.

"The world moves slowly," he adds. "I've been laboring in this vineyard now for 16 years. Sixteen years in the history of man is just a blip on the radar screen of time, but it's an eternity in the life of an entrepreneur."

—**Sarah Rolph**

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Today's Top Brass Eyeing War Room Graphics

By Bill Laberis
CW Staff

CAMBRIDGE, Mass. — With its tilt-swivel chairs, large rear-projection screen and sleek control console, the corporate war room is a far cry from the traditional boardroom dominated by an imposing, long table.

And secreted behind the walls are the guts of a half-million dollar management communications system, the likes of which corporate mastodons will find essential to conducting business in today's changing world.

This was war room designer W. Robert Widener's message as he spoke as part of a panel titled "Best Applications of Corporate War Room Graphics" at Harvard Computer Graphics Week 1981 last week.

According to Widener, the paper tiger is alive and growing, threatening to swamp top corporate management in a sea of confusing and often redundant periodic reports.

Also, most such reports are out-of-date within days of being drafted, if not sooner, he said.

"There is no need for management having anything but the most current financial and operating statistics, which are readily available right in the mainframe," Widener said. "With things changing the way they do in a multinational business setting, top brass is finding it must have the latest information within easy access. Management is, in fact, beginning to demand it."

DP War Room

What management needs is a central repository for all relevent economic, financial and other statistical business data, a repository independent of the DP department and part of top management's exclusive domain, he said.

This is the war room where the touch of a finger against a skin-sensitive screen calls up the latest available corporate information for vivid color graphics display, a room where a largely paperless, comprehensive work session can be held.

"The total war room makes extensive use of full-color graphics to condense a mountain of information into a readily addressable and readable form," Widener commented. "Computer graphics is simply the ultimate management output in the war room setting."

Widener, whose Intelligene Interlink Corp. has installed 60 such war rooms and communications centers, said the historical information stored in almost any corporate CPU can be translated into graphs, which at a glance give monthly trends, averages and cyclical data.

He singled out the case of the Banco Nacional de Mexico, which recently installed a war room costing nearly $600,000.

The bank's war room features a real-time interactive graphics system with specialized software that permits one man, the president, to singly operate and manipulate a wide array of peripherals.

But all is not roses at the $10 billion bank since the system installation, according to Sergio Ramirez, bank controller.

Speaking through an interpreter after the panel session, Ramirez said the war room installation has caused "many big problems" to develop between top management and the bank's extensive DP department, which was not consulted about the war room.

Instead, the war room is an independent management-driven and exclusively management-serving entity that has "created the awareness of deficiencies further down in the (DP) department," according to Ramirez.

But management-DP department rifts notwithstanding, Widener and the other panel members said the war room with its state-of-the-art interactive graphics is a sure bet to increase management productivity in quantum leaps.

"We're talking as much as a 30:1 productivity factor, meaning an executive can at times assemble the information he needs for a presentation in minutes where it formerly would take him hours, even days," said Irvin Miller, senior graphics specialist at IBM.

"And with an interactive system, the executive can respond to change literally minutes before a presentation," he added. "In a war room environment, speed is most important."

Graphic support for the planning executive

by

W. Robert Widener
President

Intelligence Interlink Corporation

Reprinted from the January 1983 Annual Conference issue of Resource *with the permission of the Life Office Management Association, 100 Colony Square, Atlanta, Georgia 30361.*

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Graphic support for the planning executive

W. Robert Widener
President
Intelligence Interlink Corporation

I want to discuss not just how to employ graphics in the planning process but how to continue to employ those graphics as you manage the activity, because they are essential to success.

Truth in any area of a complex society is very difficult to pinpoint at times. One of the things that has happened in the information systems world is that the volume of information continues to proliferate at an incredible rate. One problem we have is trying to focus on those small pieces of information that are really meaningful.

We sometimes tend to measure communication by the pound. If someone asks us to do a report on a particular part of our industry, our organization or the marketplace, we tend to think the thicker the report the more brownie points we get and the better job we've done. However, the length of a communication bears little relationship to its truth content or its usefulness.

For example, The Lord's Prayer has 56 words; the 23rd Psalm, 118 words; the Hippocratic Oath, 217 words; Lincoln's Gettysburg Address, 266 words; the Ten Commandments, 297 words; the U.S. Government Report on Cabbage Prices, 26,911 words.

We are in the midst of almost incredible change. When in our history have we seen interest rates, airline fares, and everything else change so much? One of our problems is that the decision makers are in the information business.

The computer is an important tool to you. We couldn't run the financial services industry without the computer. You use it as a customer service tool all the time, but what about the decision maker? What about the management group? Why aren't we using these tools at the top management level for effective decision making to help us run the business better?

costs, and show profit profiles of alternative investment or alternative business strategies. We are not really doing that yet. There are models, but they get used by the planners and statisticians. Top management is not comfortable using those tools.

Part of the problem is content; the other part is the form of presentation. The computer was supposed to be a decision tool right from the beginning. But, as things have turned out, it compounds the informational problem at the management level. It can produce more information per minute than the accountants ever could and, more often than not, it does just that. Managers see this pile of paper pouring out and say, "My gosh, what is the bottom line of all this; what is the meaning?"

"U.S. business and industry have tripled spending for computers in the past five years, and top management has barely increased its use of the computer resource."

U.S. business and industry have tripled spending for computers in the past five years, and top management has barely increased its use of the computer resource. McKinsey has done the most in-depth studies of computer utilization at all levels of the organization, and it comes out periodically with its latest report saying, "We are using the computer as an operating tool, but not as a profit tool." Part of the problem, of course, is that we are producing spin-off information from accounting-oriented data bases. It is after-the-fact information that is of little value in planning or decision making.

What we do need is a decision-oriented data base that can be used to identify potential market demands, indicate improvements in operating

When management information systems first came out, the designers didn't know what top management wanted, so they gave them everything. The idea of the total data base emerged.

As Dr. Russell Ackoff of the Wharton School said in his article, "Management Misinformation Systems," "Most management information systems are designed on the assumption that the

critical deficiency is the lack of relevant information. It seems to me they suffer more from an abundance of irrelevant information."

All the information we need to run our business is generated and available to us somewhere in the mass; the problem is bringing it to the surface. We spent the bulk of the money on the customer, because that is where we had to start. That was logical. We had to respond to the policyholder.

"We sometimes tend to measure communication by the pound. However, the length of a communication bears little relationship to its truth content or its usefulness."

Then accounting had to respond to management requests for information: "What are our expenses, and what is our bottom line?" Accounting had to respond, so it put the data in the computer. We got bigger and bigger computers, and then we got networks. Now we are nationwide, worldwide or whatever.

But the last piece of the puzzle is how to get the data out to the decision maker.

Charts and graphs emerge as a simple way to do it. We have all been looking at charts and graphs for years, and I am sure all of you use charts and graphs in one way or another.

One of the things that you find in a typical time series chart is that it shows ups and downs but no point of reference. You don't see a point where you say, "This is the time to make a decision, and this is the decision we should make." You can't look at that kind of chart and fire a manager, or close an office, or open an office or expand into a new market. Most charts are a tool for saying something, not a tool for measuring and performance review.

Many executives find charts and graphs so confusing that they would rather just call the treasurer and have a peek at the till. The problem is, what are you going to chart and how are you going to chart it?

Business charting has been in a kind of intellectual no-man's-land in the academic environment. It isn't statistics, it isn't business administration, and it certainly isn't fine art.

How do you format information in such a way that managers can accept it and feel comfortable using it? Feeling comfortable is very important. When you look at a set of numbers, you feel comfortable because you made the assumptions that underlie the accounting system. The accountants developed a standard language, and it became a reliable, precise tool that is used every day. Why can't we do the same with graphics?

"All the information we need to run our business is generated and available to us somewhere in the mass; the problem is bringing it to the surface."

We can show actual versus plan, or present versus same month last year. Then we can show variance from plan and from last year in both dollars and percent; if it is favorable we will make it green, and if it is unfavorable we will make it red.

Now we seek comparisons against this period last year. We show three things—first, bottom line.

Second we show a trend for the beginning of the year. A business is a living thing. An accounting report, no matter how current a cross section of the business at one point in time, is a still picture. It doesn't show you the direction or the magnitude of change. Increasingly in this dynamic world of future shock that we are already in, the direction and magnitude of change are both extremely critical.

Third, we bring in the latest forecast of total year figures. Different organizations do this differently. AEtna does it twice a year; most organizations do this three times a year—a reforecasting of our total year in light of latest conditions.

Once you see the basic idea of a standard format, it gets simpler; you can move more quickly through very complex data. You can see it graphically at a glance.

The process is an evolution. It takes several reporting periods to become totally comfortable with the chart instead of the accounting report. You don't give up the report or reduce its size until you are comfortable with the calibration of the chart.

Graphic representation of data can help you forecast where your business is going, too. In an actual situation where we were doing work for a major bank, our charts showed that actual results were a staggering 100% over planned in one quarter. I became concerned because of the volatility the charts were showing.

After a couple of years of this, I finally said to the chairman of the board, "It may be none of my business, but I sense too much volatility in all your major divisions. You are lucky because the volatility has all been upward—over plan, above target—but if you have that much volatility above the target, what is to prevent you from going below?"

His reaction was one of anger. He said, "Widener, I didn't hire you to run my bank. I was running banks before you were born. Your business is just to make the charts." Later that afternoon he cancelled the chart contract.

"The accountants developed a standard language, and it became a reliable, precise tool that is used every day. Why can't we do the same with graphics?"

That bank later went out of business. It was Franklin National Bank. Its problem was foreign currency trading. It was overextending itself without supervision, without a feedback loop to management. You need the feedback loop, because management at the top is always responsible.

Here is a business that went out of business, and the charts showed very clearly that it was heading into a storm. The radar was vibrating, and management turned off the scope.

The old bromide about information accounting was that figures can lie and liars can figure. In the new world of business charting, my new version of that is charts can lie and liars can chart. If we let our company move into an environment of business charting wherever it has a terminal, and all we have done is buy a couple of packages and let them run up on the mainframe while everybody draws charts, we are going to have an awful lot of fudging going on.

Your people are going to do that if you don't have a realistic set of ground rules. You will have what I call "graphic anarchy." This is a big point. You are going to be spending money for business graphics tools, software and terminals, and you are going to be creating graphic anarchy. You have to have a standard.

The charting system will help you to pinpoint the critical factors provided it is designed right, calibrated right and tested. If it reflects the true measurements of performance of your business, then the chart goes a long way.

Now you are able to present information with video projectors and other state-of-the-art equipment. Hard copy devices are available that permit you to make slides, overhead transparencies or 8 x 10 color prints in minutes.

We talk about the office of the future. Conferences seem to focus on word processing and electronic mail and that kind of thing—and they are important functions—but graphics is the part of the office of the future that gets to the heart of this massive paper problem.

You cannot interpose these charts and graphics in the decision-making process unless you build credibility. Standards are the key to credibility. You have to design the dials and gauges, you have to calibrate them, and you have to test them before you implement them. There is a lot of designing going on and a lot of implementing, but very little calibration or testing.

If you are going to make a multi-million-dollar decision, or even a multi-thousand-dollar decision, and you are looking at a chart and have to say, "I don't believe that chart; I am confused; call the treasurer and let's take a peek in the till," we are in trouble in the charting arena. We haven't gotten very far.

"The old bromide about information accounting was that figures can lie and liars can figure. In the new world of business charting, my new version of that is that charts can lie and liars can chart."

A recent article in *Time* magazine, titled "Terminal Phobia," asked, "Why won't executives use terminals?" It said what we all knew for years—the keyboard requires typing, and it requires thinking. Executives don't want to go through that process. They are interested in getting information in a hurry, so now we have developed a touch screen.

This has been a key to the use of these systems at the senior management level. The week after next we are putting one of these in the senior vice president and controller's office at Chase Bank in New York. A few months ago we installed one for the chairman of the board of Borden Company. He uses it every day and says he never expected that he would do so.

Mr. Widener developed the Bell System Business Communications Seminar for AT&T in 1964 and has since designed and equipped communications facilities for a number of corporations. For many of his clients he has developed graphic systems and facilities, and developed computer display systems where appropriate.

Intelligence Interlink Corporation
220 East 42nd Street
New York, N.Y. 10017
(212) 599-3444

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COMPUTER GRAPHICS IN DECISION MAKING

W. Robert Widener *President & Founder*
Intelligence Interlink Corporation New York, N.Y. and Los Angeles, CA.

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COMPUTER GRAPHICS IN DECISION MAKING

THE MOVE TOWARD HEURISTIC SYSTEMS

A perceptible movement is underway in the data processing world today. It is a new movement unnoticed to date by most management people, but it is real, and it is gaining momentum. It is a move toward heuristic systems that can directly aid managers in decision making. This movement has been long in coming, and many still feel it has not yet begun. But the evidence is now quite discernible to those who look closely at some of the newer decision-oriented systems now being undertaken by a few progressive organisations.

Throughout the twenty-five years since the computer first came on the business scene, the thrust in software development was necessarily on the 'bread-and-butter' applications: payroll, inventory control, order entry, accounting, and so on. This was logical because the first requirement was to computerise those business functions that involved a high volume of repetitive low-order transactions. Work on heuristic systems that permit a manager to explore alternatives and evaluate various data sets was necessarily deferred until these often mundane, albeit necessary, business applications were developed, debugged and integrated into the data processing activity stream.

As a result, even today, in an environment of highly sophisticated hardware, high-level user languages, real-time response and timesharing systems, and almost unlimited data storage capacities, very few high-level executives have direct access to their computer systems or use these systems in their own strategy development, planning and performance review processes.

This reality was driven home with unusual clarity by a cover story in the New York Times (001). The article showed Donald T Regan, Chairman of Merrill Lynch, the big stock exchange firm, seated at a computer terminal in his office. He indicated that he uses it 'almost every day', but that it is mostly a 'scorekeeping system rather than a strategic tool'.

In the same article, Frank Cary, Chairman of IBM, indicated he 'would not waste his creative time' using a computer, and that he preferred to receive his information in monthly written reports. The article concluded that '... if the computer age is well upon us, then most chief executives are doing their best to keep it at a distance'.

This lack of interest at top management levels in utilising a computer directly in both the planning and performance review processes is unfortunate. There are two key contributing factors:

1 Computers have not been easy to use – they are not 'friendly'. This applies both

to the software approaches that have been most often tried at top management levels, as well as the typical computer terminals and keyboards that have been placed in front of the executive.

2 The applications tried have usually been developed by ambitious systems designers, and more often than not have failed to reflect the areas of the business that interest senior managers.

There are new pressures in today's dynamic business environment that are, however, changing this point of view. There are also some new technologies that now make it possible to produce a dedicated system for top management use that is extremely 'friendly'. The most significant new pressure in the past half-dozen years is the growing complexity of managing large geographically-dispersed multinational organisations. The dynamics and dimensions of change we heard about so often in the 1960s have, in fact, become reality, and it has become very difficult for any one man to keep pace with all that goes on in his own company, in the US business and economic environment, and in world financial and money markets. Most paper reports that are produced are out of date within a few days, and some are out of date before the ink is dry.

So more and more, top management executives, like Donald Regan at Merrill Lynch, are turning to their systems departments and are asking for a better quality of information, and perhaps more important, information that relates to those business functions they must deal with every day. No longer will simple summaries of transaction-oriented databases suffice in the executive suite.

Now that most large organisations have achieved some degree of stability in their data processing operations, they can turn their attention to the heuristic, management-oriented applications. Increasing management interest in these applications will accelerate this movement.

Another pressure to get on with true 'management information systems' is the natural boredom that sets in in the systems department after literally years of reprogramming the same applications to keep pace with computer generation changes and new hardware acquisitions. Many talented systems practitioners who have risen to the top in their profession are literally champing at the bit to get into more substantive and challenging areas. Heuristic systems provide that challenge, and the top management 'client' is an elusive, demanding but exciting customer. The game is tough to play, it is full of risks and can often backfire into a career setback if things go wrong. But the rewards are also there (I know many leading systems people who feel *they* should be running the company), and along with them the financial benefits and 'perks'. Many people are now getting into this new area, and we will be seeing many more decision-oriented systems coming into place over the next several years in the major businesses of the country, as well as in government.

Thoughtful examination of the factors outlined above, coupled with increasing indications of the acceptance by a few top managers of the computer as a daily operational aid, lead me to believe we are at the beginning edge of an inclined top-management usage curve that will move up in the next decade, possibly quite sharply. And like any other effective management tool, if it really works for a few, many other senior managers will soon follow.

One of the biggest incentives to make the change may just be the almost insurmountable paper pile-up in the executive suite that has resulted from the information explosion in business, and has been further fueled by the computer revolution.

THE PAPER TIGER IS ALIVE AND GROWING

For decades, the dominant form of communications in the executive suite has been paper, paper in the traditional 'black book', paper circulated through the inter-office mail, accounting reports with dozens of columns of numbers, memos and copies of memos and copies of copies all on paper. Though the computer has often been heralded as the newest and most valuable information tool of business, and most organisations could no longer operate without it, this swift and powerful information machine has seriously compounded management's communications problems because it can produce a hundred times more paper than the accounting department ever could. And today, more often than not, it does just that.

Compounding the problem of paper proliferation is the fact that most of the information produced in paper report form is composed of the traditional accounting summaries that have been the prime output from the system to management for decades. A report book, or 'black book' as many call it, is in fact an accretion of various reports that have been produced by varying management groups over the years. Often a new report is added to satisfy some specific need of the moment. It is seldom, however, that anyone takes the time to *eliminate* a report. So the book continues to grow in both size and complexity, and always contains a great deal of useless information that has little or no relevance to top management's decision-making function.

CRITICAL SUCCESS FACTORS

In a recent article the President of Heinz was quoted as saying 'Most of the information contained in the reports I receive is irrelevant'. (002).

One of the skills I have developed in working with over 60 corporations during the past 15 years is the ability to take a report book and cut it down in size. This is usually the first step in a program of report improvement. In fact, I hate to admit this, but I can take almost any corporate report book on an airplane, and on a coast to coast flight, in addition to having a leisurely dinner and watching a movie, I can cut that book down to at least half, and sometimes one-third its original size. And, more important, I can do this without eliminating *any* important, relevant information that relates to the decision requirements of the top management group.

So this excess of information today's computer systems produce is part of the problem that must be addressed if we are going to develop a computer-based information system for top management. This concept was expressed very concisely by Russell Ackoff who is Professor of Business at The Wharton School at the University of Pennsylvania, and is widely known as one of the most incisive thinkers in the management systems field. He wrote:

> 'The systems designer perceives management's biggest problem to be a lack of relevant information. So he sets out to design a bigger database. The ultimate system he envisions is one in which everything will be available to management at any level of the business on demand.'
>
> 'I submit, however, that management's biggest problem is, in fact, the overabundance of *irrelevant* information. What we need to do to design a system to serve top management is to create applications that condense, filter and summarise. Very few of the major MIS programs I see being built in business deal adequately with these three important functions.' (003).

It was my feeling that charts were an effective way to condense and summarise information in the group management environment. Not wanting to reinvent the wheel, I travelled extensively in the mid-sixties trying to find the best charting system in use in business. Yet after looking at over 100 chart rooms over a five-year period I still had not found a single charting system that served as the prime communications tool in a major business. Clearly there was something about charts that management often mistrusted, and when a decision was to be made, management invariably turned back to the accounting report. After extensive examination of this recurring problem, I came to the conclusion that the underlying reason was that there were no standards, or agreed on conventions in charts as there are in accounting reports. Accordingly, management feels uneasy with the chart as a support for decision making. The cartoon I found which drives this point nome with simplicity and humour carries the following caption under a humurous rendering of a board meeting:

> 'These charts and graphs are too confusing. Call the treasurer and let us have a peek in the till.'

CHART STANDARDS AND CONVENTIONS NEEDED

After studing a number of charting approaches for several years and conducting experiments with real business reporting information, I began (with the cooperation of several interested top management executives) the development of a series of chart standards and conventions that would effectively summarise key information elements for presentation to management. We have now installed this system in about 40 companies and 18 banks, and these standards have gone a long way towards raising the credibility of the chart in the executive suite.

Now, with the emergence in the past two years of inexpensive colour graphics terminals and large-image colour projectors, it is now possible to tie these effective electronic display systems into the main computer when the proper programs for condensing and summarising have been developed. Utilisation of a series of carefully tested graphic standards, which management has approved and understands, now makes it possible to introduce the output of the computer into the decision-making process. To complete the linkage between the data processing system and the dedicated management display system a definition is required in the systems department of a separate systems design activity, a dedicated program with its own charter apart from the regular data processing planning activity. To quote from The Conference Board study on information technology and its impact on business and management.

> 'Rapidly surfacing is the recognition that top management, to be effective, must have its own set of special information hardware, software and systems.'

That study was published in 1972 and, in retrospect, it is interesting to note just how much on target that prediction was. With microprocessor technology now a state of the art reality, it is not only possible for us to dedicate separate computing facilities to the management decision system, it is now also the least expensive approach. As it turns out, to attempt to maintain a management reporting and display system on the mainframe computers is not only unworkable in terms of computer availability and response times, it is just too expensive. Detailed below are some of the alternatives that are now open to us in planning dedicated, stand-alone information and display systems for top management use. It is surprising that more entrepreneurs have not identified this unique market and pursued it.

TOP MANAGEMENT HAS BEEN NEGLECTED

When one considers the extent of the talent that is in the data processing field, the magnitude of the capital investment to date, the absorption by computer and systems companies of thousands of highly-educated and talented professionals in an almost limitless range of disciplines, from the behavioural sciences, to information theory, to industrial design, to human factors engineering, and so on, considering all this resource availability, it is almost incredible that it is possible to make the following two statements in 1980:

1 No-one – I repeat – *no-one* has effectively created and marketed any system that is widely used by top managers of the business community.

2 No-one – I repeat – *no-one* in either the hardware or software communities has yet concerned themselves with the packaging of end-user systems to make them 'friendly' to top managers, easy to use, and pleasant to look at in the executive suite. (Or, better, invisible in the executive suite.)

SHORT-RANGE EXPEDIENCY VERSUS LONG-RANGE PLANNING FOR MIS

One of the original and continuing problems of the traditional 'systems design effort' is that it focuses almost entirely on near-term data processing applications. Caught up in the frantic swirl of 'the one-year plan', and the 'two-year objectives', and the 'five-year goals', everyone on the team is locked into a rigid mould created by the demands of day-to-day users. This seems totally justifiable on the surface. After all, we have to satisfy the needs of our paying customers or we are not in business. Logical as this appears to be in the near term, it is mortgaging the future potential of the computer as a management tool.

To put this in a familiar perspective, let us consider the automobile manufacturer who designs his car to satisfy the immediate market-place, but ignores the long-range realities of the energy situation, consumer attitudes, environmental restraints, etc. He builds a car that is marvellous for the moment, but rapidly becomes obsolete as market needs change. We are painfully seeing the significant impact of this kind of short-range thinking in the automotive field today. This same kind of observation can be made about the traditional computer system planning and development approach.

Another way of looking at the problem is suggested in those advertisements you see on money-making. They read, 'everyone is too busy making a living to ever earn any money'. The systems analogy could be, 'everyone is too busy satisfying today's data processing users to ever create a management information system'.

Are there any effective solutions?

The question of whether there are any effective solutions to this classic problem is immediately raised. What can we do to continue to improve our basic EDP programs, provide necessary support for our users now, while at the same time taking a longer-term look at our management information needs?

Another question which is regularly asked is 'Why should we attempt to computerise our management information at all?' Like Frank Cary of IBM, many top managers believe

that the traditional paper reports in standard accounting format have served them well over the years, and the benefits to be derived from spending time and money to put these reports in a computer, or to generate them by computer are not at all clear.

THE CHANGING MANAGEMENT ENVIRONMENT

One of the most compelling reasons to develop more dynamic management information systems is the increased volatility of the world around us. All the change that was predicted in the sixties - the acceleration of all the forces that make an impact on our personal and business lives, all of those predictions have become painful reality in just one turbulent decade.

Don Fabun, who produced two classic works **(004,005)** and subsequently other prognosticators of the sixties and seventies such as Alvin Toffler **(006)** and Daniel Bell **(007)** have all pointed toward a growing number of changes we will face/are facing in the social, economic and business arenas of the world in the seventies, eighties and beyond.

Without dwelling on what has been obvious to all managers and business people over the past several years, we offer a brief summary list of some of the major new forces that have become realities in this fourth quarter of this twentieth century, and have significantly increased the pressures on management:

1 The rise of the multinational corporation has been attended by a massive proliferation in the number of products and services provided, and a significant expansion in the geographical scope of the organisation's operations. The 'span', as it is often called, has grown exponentially.

2 The emergence of an international system of money and banking has introduced a daily volatility in money management never experienced in prior decades.

3 Energy politics and energy finance have come to dominate our daily lives and have made a universal impact on business.

4 Sonic and now supersonic global jet travel has become a routine part of corporate life, creating extreme new pressures, multiple time-zone lags and often severe physical and sociological stress (they make detrimental impact on family life).

5 We have seen the environmental and equal rights movements become a major force in corporate and bureaucratic life. The need for the corporation to be socially conscious in earlier days could be handled by the public relations department. Today, this collection of tasks requires significant management attention, and major budget support.

6 Corporate 'star wars' have come to involve some of the largest galaxies in the industrial universe, (IBM versus AT&T). The battles may last for decades, and the impact on the individual business and its communications and informational structures will be difficult to assess clearly for some time.

7 During the past 24 months we have seen more rapid and extreme movements in interest rates than ever before in our history; oil prices have increased more in one year than in all prior decades; speculation in gold and other commodities frequently reaches hysterical proportions, to the point that one can no longer wait for the

daily newspaper, it is not dynamic enough. Fortunes can be made and lost between breakfast and lunch if one is not constantly in touch with what is happening in the market-place.

So management today find themselves in this new dynamic environment, and more and more they are recognising that their information tools have not kept pace. The other day a chief executive I work with was in a very dark mood. He said, 'I cannot believe that it is only October, and most of the key assumptions on which we based our 1980 plan have already changed. At least half of all that hard planning effort in July and August was wasted'.

Systems tailored to top management's changing needs

We can only reiterate the conclusion of the Conference Board study on the impact of information technology on management:

'Rapidly surfacing is the recognition that top management, to be effective, must have its own set of special information hardware, software and systems.'

One has only to examine and understand the differences between top management executives and operating executives to conclude that the approach to the design of information systems does, in fact, vary significantly between the two. The top management executive, particularly the CEO, is a breed apart from the operating manager. He perceives the business and the world differently, he has unique ambitions and drives, and a considerable ego - this kind of man requires a systems designer who somehow becomes his counterpart in creating both the conceptual framework for a management system, as well as finalising that concept into a working system. The reality of the world is that very few systems designers have the background, experience, maturity, and view of the world that are all essential for him to be accepted in the executive suite as an equal partner in an MIS program.

This, in my view, is one of the compelling reasons why we have seen so little use of the computer by the top management group.

The microprocessor, coupled with high-level user-oriented languages, however, can close part of that gap by making it possible for a management-oriented person to learn how to create systems that he and his management will understand, trust, and use. If a key financial analyst, for example, who has had occasional contact with the President in working up cash flow projections, analysing acquisition possibilities, and other high-level financial documents can be given a set of programs that permit him to input data, and with simple English commands, manipulate that data in almost any way, as he would normally do on paper, then through a series of interactions with the President, of the kind he is used to having and both are comfortable with, he can in fact create programs that will be understood and accepted by the President.

COMPUTER GRAPHICS: THE ULTIMATE OUTPUT FOR MANAGEMENT

The old adage 'a picture is worth a thousand words' is as true today as it was a hundred years ago. Our minds are essentially analogue in function, not digital. Yet very few top management executives are prepared to accept computer graphics output as a replacement for the more traditional accounting report. I have outlined part of the problem

above, few organisations have developed a set of graphic standards and conventions.

Another deterrent has been the cost. Two years ago, the development of a fully-programmed computer graphics system that could handle all of the basic reporting information required for regular decision making was an expensive proposition – $500 000 or more. In just the past few months, however, computer graphics terminals have become state of the art technology, and the price of these systems has dropped dramatically. Today, a fully-programmed, serious, management information display system in full colour, including the touch-sensitive menu access terminal (which eliminates the keyboard for the executive user) is available for under $100 000.

As part of his Doctoral thesis, J S Prokop set up one of the most exhaustive laboratory examinations of executive decision making task management ever conducted. Utilising a test group and a control group in a laboratory environment, he evaluated the differences in performing a series of decision-making tasks utilising printed reports on paper, and compared this process to the performing of the same tasks utilising a real-time computer display. In every test situation, one important result was continually recorded:

> 'The most significant result statistically was that the actual time required to make a decision was decidedly reduced in favour of the display presentation.' (008).

Never before in the history of business has time been so valuable. Many top management executives today feel that time has become more important than money in the decision-making equation. And time saving is the most dramatic and immediately apparent result of the increased use of standard graphic displays in the management planning and performance review process.

Pattern perception has become an essential part of the space program and is used extensively in land-mass analysis and meteorology. Vast sums of data can be projected in graphic form, and evaluations and decisions can be made precisely and quickly. There is simply no way the same results could be achieved by detailed analysis of every data item in the total volume of the input data.

Similarly, management can learn to apply these same tools in due course, and can save considerable time over the traditional paper reporting and alphanumeric display techniques.

Though to date we have not been able to definitively measure improvements in the quality of decisions, the sheer acceleration of the process will lead to better decisions because management will be able to respond more quickly to the changing business, economic, and competitive environments. As the system's responsiveness increases, however, it is essential that the credibility of the information be maintained rigorously. And the move toward fully accredited charting systems, which management has been involved with, understands, and approves, is the key to this progress. The computer as a swift and precise informational tool can help. But there will be no substitute for having the right information in the system, and for presenting it in a consistent and agreed-on display form.

TWO TYPICAL MANAGEMENT COMMUNICATIONS CENTRES

Two Management Communications centres are shown in Figures 1, 2 and 3. One serves the

Figure 1: Management communications centre

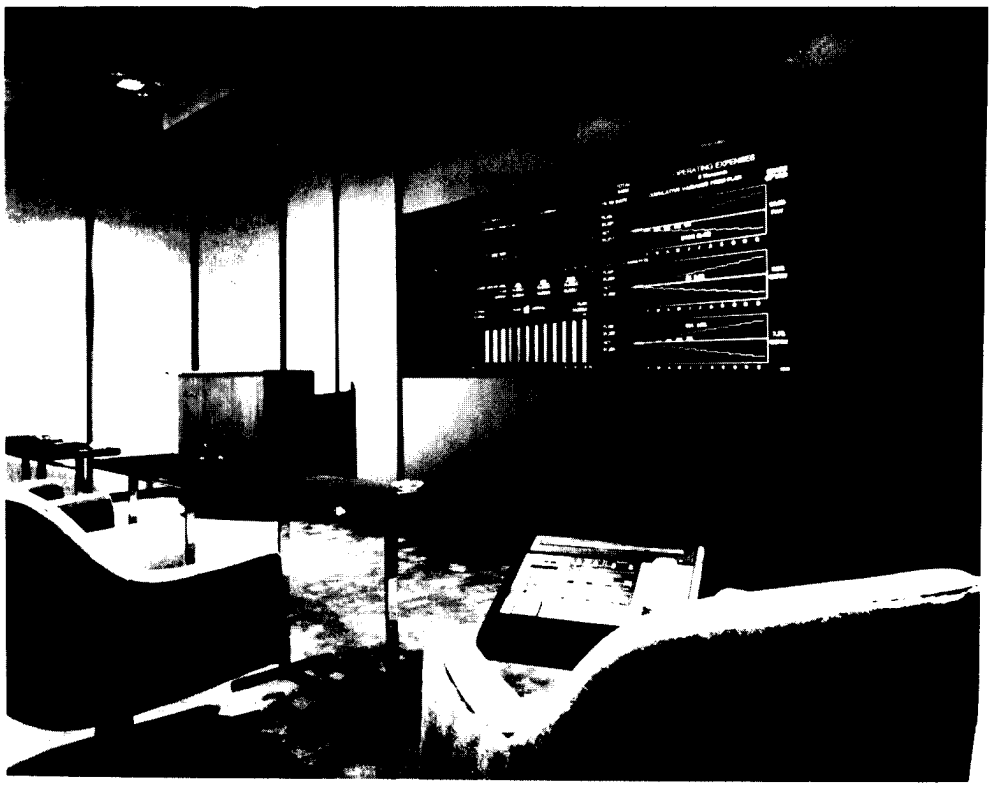

Figure 2: Management communications centre

Figure 3: Management communications centre

Board of Directors at Mercantile Bank in St Louis, the other serves the senior management group at Rainier National Bank in Seattle, Washington. Both were designed by Robert Widener.

The traditional long boat-shaped board table is giving way to a less formal and more flexible seating arrangement utilising comfortable tilt-swivel tub chairs, and small individual tables. The focus of the room is the large rear-projection screen which displays up-to-the-minute management information in large easy-to-read charts. These charts can now be drawn by the computer and displayed in real-time with a large-image video projector driven by the CompuCHROME computer display system. Data can be changed as desired by management and the chart can be redrawn instantly. This capability permits management to ask 'what if?' questions and read the answers in graphic form a few seconds later.

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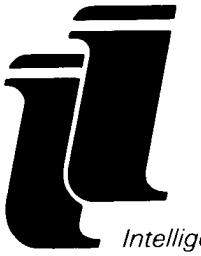

Intelligence Interlink Corporation . 220 East 42nd Street . New York, N.Y. 10017 . (212) 599-3444

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