An applications checklist: common uses of computer graphics in America's best-run organizations

Devised by Alan T. Paller, president of AUI Data Graphics and a director of Integrated Software Systems Corporation (Issco), the following checklist is designed to help identify some of the important "high payoff" uses of computer graphics. Every one of these applications has been successfully implemented by at least one organization in the US.

For those of you who wish to use this checklist in your own organizations, simply select applicable sections, modify them to suit your particular needs, and distribute them to middle- and upper-management personnel. Respondents should check the boxes according to their level of interest in a particular application: 1 = low to 4 = high.

For a marketing department

(1) Monitoring sales performance of each product line.
   [ ] 1 2 3 4

(2) Monitoring performance of sales management and staff.
   [ ] 1 2 3 4

(3) Presenting results of test-marketing programs.
   [ ] 1 2 3 4

(4) Evaluating advertising impact and the productivity of advertising agencies.
   [ ] 1 2 3 4

(5) Demographic analysis of market penetration.
   [ ] 1 2 3 4

(6) Competitive analysis of market penetration.
   [ ] 1 2 3 4

(7) New product introduction.
   [ ] 1 2 3 4

(8) Sales contest introductions and conclusions.
   [ ] 1 2 3 4

(9) Briefings to top management on sales and marketing results.
   [ ] 1 2 3 4

(10) On-line early warning systems for monitoring the sales of various products in different markets.
    [ ] 1 2 3 4

(11) Preparing visuals for sales presentations.
    [ ] 1 2 3 4

(12) Preparing visuals for presenting new marketing plans and the annual budget.
    [ ] 1 2 3 4

(13) Presenting market research information to distributors to assist them in planning their own market expansion programs.
    [ ] 1 2 3 4

For a finance department

(1) Financial control charts that convert standard accounting printouts into meaningful management results.
    [ ] 1 2 3 4

(2) Briefing slides for financial review by top executives.
    [ ] 1 2 3 4

(3) On-line early warning systems for instant access to financial data.
    [ ] 1 2 3 4

(4) Investment monitoring, analysis, and reporting.
    [ ] 1 2 3 4

(5) Inventory control monitoring.
    [ ] 1 2 3 4

For institutional investment

(1) Charting Compustate data.
    [ ] 1 2 3 4

(2) High-low stock prices.
    [ ] 1 2 3 4

(3) Corporate and municipal bond analysis.
    [ ] 1 2 3 4

For investor relations

(1) Presentations to security analysts for review of company performance.
    [ ] 1 2 3 4

For an international financial division

(1) Monitoring performance and early warning systems summarizing data for senior executives.
    [ ] 1 2 3 4

(2) Charts monitoring international currency fluctuations and their impact.
    [ ] 1 2 3 4

(3) Multilingual charts for transmitting information in meetings where a common language does not exist.
    [ ] 1 2 3 4

For strategic planning and merger assessment

(1) Charts supporting forecasts of revenue and costs.
    [ ] 1 2 3 4
(2) Charts demonstrating and illustrating demographics and other external data in which long-range plans are shown.

(3) Charts showing how well prior long-range plans predicted actual data.

(4) Charts demonstrating alternative scenarios.

(5) Charts showing the probable impact of new merger activities.

(6) Strategic planning charts, including bubble charts, showing the impact on growth and return on investment of various alternative additions and deletions of strategic business units.

For board room and senior executive applications

(1) On-line early warning systems for summaries of financial, marketing, and operations data.

(2) Slides for board room presentations.

(3) Slides for assisting in public presentations made by senior officers.

For a communications and public affairs office

(1) Illustrations for company newsletters.

(2) Graphics for annual reports.

(3) Presentation graphics for public meetings.

(4) Presentation materials to support requests for new projects or changes in corporate image.

For a rate hearings and government relations department

(1) For utilities: preparing documentation supporting requests for rate increases.

(2) Preparing presentation materials to respond to consumers and other advocates at rate hearings.

(3) For pharmaceutical companies: preparing materials to support requests for federal approval of new substances.

(4) Small and large charts for use in hearings and courtrooms.

For engineering

(1) Analysis of data from experimental programs such as research results from test drives of new automobiles.

(2) Cost analyses of various manufacturing processes.

(3) Energy utilization monitoring for energy conservation studies.

(4) Environmental pollutant control monitoring.

(5) Giving engineering programmers access to graphics from inside their programs.

(6) Preparation of engineering documentation (parts or service manuals) by extracting information from CAD/CAM systems, adding text, and preparing camera-ready pages of diagrams and text.

(7) Project management charting.

For plant management

(1) Cost control and cost projections.

(2) Productivity measurement and monitoring.

(3) Inventory control.

(4) Controlling manufacturing processes.

For data center management and corporate administration

(1) On-line cost control for data center management, which allows instant access to the costs incurred in various components of the data center managed by the organization.

(2) Charts showing actual computer usage by each user group and projections to end-of-year in comparison with the budget.

(3) Computer performance monitoring and capacity planning chart books and early warning systems.

(4) Preparation of presentation material for acquisition of new equipment such as computers or other administrative support capital investments.

(5) Cost control charts for such items as postage; rent; messenger and air express services; and for any other administrative service that can become a major cost center.

(6) Mapping the corporate communications network.

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For clinical and scientific research departments

(1) Transforming statistical data into charts in which patterns can be seen visually.
   1 2 3 4

(2) Preparing data for presentation to management.
   1 2 3 4

(3) Preparing diagrams for inclusion in professional papers that are published in journals.
   1 2 3 4

(4) Energy exploration analysis.
   1 2 3 4

For a quality control division

(1) Quality control surface charts.
   1 2 3 4

(2) Chart books monitoring quality control of all production and manufacturing processes.
   1 2 3 4

(3) Charts to enhance briefings of operations people when new quality control data gathering programs are being presented.
   1 2 3 4

(4) Presentation materials for quality control information to be used in briefings for operations and manufacturing.
   1 2 3 4

(5) Charts of new program introductions to support requests for additional resources in annual budget presentations.
   1 2 3 4

For personnel and training departments

(1) Graphic analyses of compensation patterns.
   1 2 3 4

(2) Graphics to support employee communications programs.
   1 2 3 4

(3) Charts monitoring human resource requirements over the next several years.
   1 2 3 4

(4) Charts and overhead transparencies to support budget requests for additional funding for personnel and training functions.
   1 2 3 4

For customer service and maintenance

(1) Productivity monitoring charts.
   1 2 3 4

(2) Complaint and fault assessment charts.
   1 2 3 4

(3) Presentation charts to introduce programs that will reallocate customer service resources.
   1 2 3 4

(4) Charts in feedback reports to clients showing progress.
   1 2 3 4

For graphics arts, printing, and publication

(1) Automating slide, overhead transparency, and paper chart production to allow more work to be processed by existing personnel.
   1 2 3 4

(2) Improve turnaround time to serve a larger audience.
   1 2 3 4

(3) Combine text and graphics in automated publication production systems, thereby reducing delays and cut/paste time.
   1 2 3 4

(4) Improve the quality of all the graphics produced by computer users through the production of chart books of acceptable sample design that can be replicated by other computer users.
   1 2 3 4

For government agencies

(1) Presenting budget information to management and legislatures.
   1 2 3 4

(2) Reporting to public and consumer groups.
   1 2 3 4

(3) Preparing statistical reports.
   1 2 3 4

(4) Management reporting of key production data.
   1 2 3 4

Computer Graphics '84 calls for papers

The National Computer Graphics Association has announced its call for papers for Computer Graphics '84, the association's fifth annual conference and exposition. Set for May 13-17, 1984, in Anaheim, California, the conference will cover graphics technology from microcomputers to mainframes.

Papers presented in more than 60 technical sessions will focus on the application of computer graphics to a wide variety of business and industry situations. The papers will describe the development, use, expansion, implementation, maintenance, or management of either general-purpose or specialized graphics systems.

"More than at any previous computer graphics conference, the papers presented at Computer Graphics '84 will paint a complete and detailed picture of the impact graphics technology is having on the way we work, manage, and learn," said Stephen A. Mucchetti, NCGA's 1984 conference chairman and a vice president of Booz, Allen, and Hamilton.

Three days of technical sessions will examine business graphics, engineering and architectural CAD/CAM, graphics in education and learning, printing and publishing, scientific applications, mapping and cartography, video technology, visual arts and design, future hardware and software directions, human factors, industry standards, and legal issues.

A copy of the call for papers, which details the subject areas for the technical papers and outlines the submission process, can be obtained from the Education Coordinator, National Computer Graphics Association, 8401 Arlington Boulevard, Suite 601, Fairfax, VA 22031; (703) 698-9600.
Researcher investigates new RAM architectures for frame buffers

Ware Myers, Contributing Editor

"Intel has committed its future line of dynamic RAMs to a new form of access mode called Ripplemode," Douglas L. Finke reported to the National Computer Conference in Anaheim, California, May 17.* Two of the biggest problems in graphics terminal design, he says, are (1) matching the bandwidth out of the bit-map frame buffer to the bandwidth necessary to drive the CRT display and (2) meeting the bandwidth requirements for updating. The new Ripplemode is a considerable improvement, Finke contends, over previous architectures.

The bandwidth matching problem arises out of the mismatch between the time required to read a bit from dynamic RAM, currently around 300 ns, and the time necessary to write a pixel, which varies from 66.5 ns for a 384 line by 512 pixels/line display to 8.0 ns for a 1024 x 1280 display, under the conditions assumed by Finke. For instance, to supply bits at the 8-ns pixel rate requires setting up 38 memory devices in parallel (300 ns/8 ns = 38).

With 16K devices no memory space is wasted, since 80 devices are needed to store 1280K bits. With later devices, however, considerable memory space is normally left over. Only 20 64K devices are needed to store 1280K bits, but if 38 devices are needed for parallelism, then 47 percent of their space is not used. With the soon-to-be-available 256K-RAM chips, the wastage rate climbs to 87 percent.

Existing methods for solving this mismatch problem include page mode, extended page mode, parallel outputs, and Nibble-mode. Each approach helps, according to Finke, but each also has disadvantages.

Ripplemode. This new mode "provides greater speed and bandwidth than any of the modes mentioned above," Finke says, "with none of the associated problems." It is made possible by HMOS-III-level technology and innovative circuit design (which he does not detail).

Ripplemode provides sequential cycle times for reading column addresses of only 40 ns, about one-third of the corresponding time of current chips. Further, it improves performance by the use of a look-ahead function in the column address buffers. In all, it speeds up access about six times over the standard random-access mode. Bits can be read forward, backward, or even pseudo-randomly, without any degradation in access time as long as the bits are all within the same row. In addition, the new mode is upward-compatible with page and extended page modes.

Finke points out that this sixfold increase in access speed will make it possible to implement a 384 x 512 display with just one 256K x 1 dynamic RAM chip with Ripplemode. In contrast, five parallel chips are now required to match rates for this size of display—300 ns/66.5 ns = 4.5 chips.

Pixel update. The second general requirement placed on a bit-map frame buffer is the ability to update the bits at a rate fast enough to keep up with changing graphics data. This task is usually accomplished during horizontal and vertical retrace times. Some of this time must also be allocated to refresh cycles. Thus, to update 1,310,720 pixels (1024 x 1280) takes 1.13 seconds at a write rate of 300 ns, or nearly 68 frames at 60 frames per second, according to Finke's assumptions. This rate is satisfactory for some slow-to-change applications, but is inadequate for those needing a faster change of scene.

With Ripplemode devices the update rate can be improved by a factor of two, Finke demonstrates. The write time per column address within a row is only 75 ns, compared to the 300 ns assumed above. However, no updates are scheduled during horizontal retrace because the horizontal blanking time is not long enough to allow for rippling through an entire row. Under these assumptions, rewriting all bits in the 1024 x 1280 raster would take 0.53 seconds, or some 32 frame times.

For still faster applications, such as animation, Finke says double buffering is necessary, even with Ripplemode. With two equal-size buffers, one feeds the display while the other is updated full time. Then, at the appropriate time the system switches frame buffers.

Finke feels that "it is becoming technically feasible and more desirable to optimize RAM chip architecture for varying applications." He expects the architectures for mainframe memories and graphics displays to be "considerably different in the future." He is investigating other innovative structures and believes that an entire high-performance bit-map memory will eventually be implemented on a single chip.


CAD/CAM service now offering subscriptions

International Technology Marketing is now offering a CAD/CAM information service designed to provide organizations with current data on the companies, markets, and technological developments in the CAD/CAM industry.

The ITM CAD/CAM Industry Information Service will give subscribers an annual report, a seminar, and periodic supplements on CAD/CAM systems, hardware, software, and services. These will include financial data on leading companies, market data, comparative technical product data, and industry trends.

Annual master subscriptions to the service cost $12,000. Corporate division or subgroup secondary subscriptions are being offered by ITM for $6000 each. A prospectus describing the ITM CAD/CAM Industry Information Service is available from International Technology Marketing, CAD/CAM Industry Information Service, 120 Cedar St., Wellesley Hills, MA 02181; (617) 237-2089.

In spite of recession, graphics industry booms

The computer graphics industry will grow to $8 billion by 1986, according to International Data Corporation, a market research and consulting firm for the information processing industry. This was one of the findings reported in IDC's recently published study entitled *Computer Graphics Industry Statistical Reference Book*. Industry revenues topped $3 billion for 1982, even with the effects of the economic recession on the CAD/CAM and graphics peripheral markets.

Major market trends analyzed in the report include the changes in CAD/CAM applications and product mix, the emergence of image processing applications, the gradual increase of business graphics usage, and the rapid growth for graphics peripherals including displays, plotters, digitizers, and cameras. By 1986, shipments of CAD/CAM equipment will approach $3.5 billion and graphics peripherals shipments will exceed $2 billion, according to IDC.

This report was written for clients of IDC's Computer Graphics Industry Service. It is available on an individual basis at a price of $2500 from Neil Kleinman, IDC Pacific Technology Center, 1448 15th Street, Suite 101, Santa Monica, CA 90404; (213) 458-1681.