by Zeltzer, as his simulated human skeleton can (or will) navigate terrain, respond to obstacles, and yet walk with a certain "style" dictated by embedded (but communicating) motion control programs. Simmons and Davis demonstrate the potential of high level representations by showing that "why" questions are answerable with a high-level representation: demonstrating a representation's knowledge structure not only of how to move (or change), but why. The Fortin, Lamy, and Thalmann paper falls into an intermediate level where temporal relationships can be handled with graphical relationships and motions themselves may be of any sort supported by the remainder of the animation system.

Since a principal function of a motion representation is verification that that representation is indeed adequate for a task, we must ask:

3) How is the motion information within the representation visualized?

The obvious answer is, of course, with computer-generated graphics. The less obvious methods are with "natural language" descriptions, physical (robot) control, and question-answering. Significantly, most of these methods are exemplified by these papers. Zeltzer, Ginsberg and Maxwell, and Murthy and Raibert all use graphical models; the latter also controls the real thing. Simmons and Davis use both graphics (diagrams and "movies") and reasoning processes (text) to demonstrate that their system knows "more" than just the input data.

Among the specific graphical issues are the display methods used to simultaneously portray motion and shape, graphics hardware limits, and any human perceptual limits. There are interesting connections here between the graphical synthesis process and the human perceptual process which observes and checks its validity. For example, Ginsberg and Maxwell use a cloud-like figure because it is efficient to display on existing point and vector drawing hardware, yet relies on three-dimensional moving dot perception to integrate it as a connected jointed unit. Zeltzer uses a shaded skeleton figure, sacrificing real-time generation to solid shaded detailed imagery animated only by playback. Murthy and Raibert's hopper must in fact, actually perform. Single snapshops are sufficient to convince us that the Simmons and Davis system can reason about geological change. But for very fast or subtle motions, sophisticated graphical tools such as motion blur and aliasing effects must be taken into account.

The last issue addresses the generality of a motion representation:

4) How many "uses" can a representation support?

Since motion, and especially human motion, is expressible in so many different forms, can a representation be adapted or integrated to permit alternative modes of visualization or expression? For example, Murthy and Raibert's dynamic model supports graphics and control, but not reasoning. Ginsberg and Maxwell's representation is a natural target of a motion acquisition system (for example, by computer visual imaging), and supports graphics, but not (directly) motion description. Fortin, Lamy, and Thalmann could use their system to temporally organize any of the others, although it would lack reasoning processes. Zeltzer's system should demonstrate maximum utility for animation and robotics control. Murthy and Raibert's control system could be used as a low level (but goal-directed) component of Zeltzer's hierarchic system. The ideas in the Simmons and Davis paper could form the basis of a planning and description system built on Zeltzer's model. And so on. While this happens to be of particular interest to me, I find that the other authors are all aware of the multiple possibilities of their systems. The sheer enormity of the task of integrating all these modalities of motion expression leaves considerable challenging work for the future.

With this short introduction, I hope to have shown that motion generation, description, and control are perhaps more central to the motion understanding problem than might previously have been imagined. It is certainly important to understand the workings of the human visual system and the structure of effective computer vision systems for processing moving objects, but the representations that are chosen to elucidate some mechanism cannot be viewed in isolation. Rather, their semantics should be implementable and transformable into a more readily visualized form amenable to either visual inspection or analytical verification. Design and implementation of motion semantics is an exciting and challenging research field stimulating our representation structuring skills while serving scientific and artistic applications.

# Abstracts

# The Perception of Coherent Motion in Two-Dimensional Patterns

Edward H. Adelson RCA David Sarnoff Research Center and J. Anthony Movshon New York University

When one looks at a two-dimensional scene of moving objects, one can usually assign a velocity to each point in that scene with little effort. This suggests that some early visual processes are able to generate a two-dimensional velocity map using fast parallel computations. But it is not obvious how this should be done, and we are currently trying to understand how the human visual system does it.

# Real and Apparent Motion: One Mechanism or Two?

Marc Green University of Toronto and Michael von Grunau Queen's University

Two direction selective adaptation experiments were conducted to investigate whether real and apparent motion are processed by a single visual mechanism. Previous studies with real motion have shown that adaptation to a grating drifting in one direction has an effect on perceived motion of subsequently viewed test gratings (the velocity aftereffect) and also selectively raises contrast threshold (direction-specific threshold elevation). We conducted analogous experiments in which observers adapted to real motion but were tested with apparent motion. In the "velocity aftereffect" study, we found that adaptation to real motion had a profound effect on the strength of apparent motion, suggesting a single mechanism. However, it was found in a second experiment that although adaptation to a moving grating produced a direction selective effect on perception of apparent motion, there was no direction selective threshold elevation for detection of the test stimuli. We conclude that although a single mechanism is responsible for mediate conscious motion perception, detection of objects in real and apparent motion is performed by two separate mechanisms.

# Coherent Global Motion Percepts from Stochastic Local Motions

D. W. Williams and R. Sekuler Northwestern University

A percept of global, coherent motion results when many different localized motion vectors are combined. We studied the percept with dynamic random dot kinematograms in which each element took an independent, random walk of constant step size. Directions of displacement from frame to frame were chosen from a uniform distribution. The tendency to see coherent, global flow along the mean of the uniform distribution varied with the range of the distribution.

Psychometric functions were obtained with kinematograms having various step sizes (0.1 to 1.4 degrees) and element densities (0.2 to 1.6 dots per square degree). Results fall into two categories, depending on whether the step size is larger or smaller than 1.0 degree. For step sizes greater than 1.0 degree changes in dot density altered the psychometric function. No change was found if the step size was less than one degree. These changes in the psychometric function with step size and density are consistent with Ullman's "minimal map theory" of motion correspondence.

For the smaller step sizes, the constancy of the results over a large range of dot densities suggests that spurious directions of displacement due to the interference of random walks for different dots are not important. That is, only the directions of local motion determined by the predefined distribution of directions significantly contribute to the percept. We also found that although temporal summation occurred in a nonlinear manner over frames, it depended only on the set of directions present from frame to frame, not on the spatial relationships between local motion vectors over time. Taken together, these two results suggest that directions of the individual steps are independently detected and that these responses are pooled over time and space to generate the perception of coherent motion.

# **Computing the Velocity Field Along Contours**

Ellen C. Hildreth MIT Artificial Intelligence Laboratory

In this paper, we present a computational study of the measurement of motion. Similar to other visual processes, the motion of elements is not determined uniquely by information in the changing image: additional constraint is required to compute a unique velocity field. Given this global ambiguity of motion, local measurements from the changing image cannot possibly specify a unique local velocity vector, and in fact, may only specify one component of velocity. Computation of the full two-dimensional velocity field generally requires the integration of local motion measurements, either over an area, or along contours in the image. We examine the integration of local motion measurements along contours, using an additional constraint of smoothness of the velocity field. The predictions of an algorithm based on this constraint are compared with human motion perception on a few demonstrations.

# Determining the Instantaneous Axis of Translation from Optic Flow Generated by Arbitrary Sensor Motion

J. H. Rieger and D. T. Lawton University of Massachusetts

This paper develops a simple and robust procedure for determining the instantaneous axis of translation from image sequences induced by unconstrained sensor motion. The procedure is based upon the fact that difference vectors at discontinuities in optic flow fields generated by sensor motion relative to a stationary environment are oriented along translational field lines. This is developed into a procedure consisting of three steps: 1) locally computing difference vectors from an optic flow field; 2) thresholding the difference vectors; and 3) minimizing the angles between the difference vector field and a set of radial field lines which correspond to a particular translational axis. This method does not require a priori knowledge about sensor motion or distances in the environment. The necessary environmental constraints are rigidity and sufficient variation in depth along visual directions to endow the flow field with discontinuities. The method has been successfully applied to noisy, sparse, and low resolution flow fields generated from real world image sequences. Experiments are reviewed which indicate that the human visual system also utilizes discontinuities in optic flows in determining self-motion. In addition, due to the computational simplicity of the procedure, hardware realization for real-time implementation is possible.

# **Complex Logarithmic Mapping and the Focus of Expansion**

Ramesh Jain The University of Michigan

Complex logarithmic mapping has been shown to be useful for the size, rotation, and projection invariance of objects in a visual field for an observer translating in the direction of its gaze. Assuming known translational motion of the observer, the ego-motion polar transform was successfully used in segmentation of dynamic scenes. By combining the two transforms one can exploit features of both transforms and remove some of the limitations which restrict the applicability of both. In this paper we show that by using complex logarithmic mapping with respect to the focus of expansion rather than the center of the visual field perfect projection invariance and better size and rotation invariance may be obtained for any arbitrary motion of the observer.

# Adapting Optical-Flow to Measure Object Motion in Reflectance and X-ray Image Sequences

Nancy Cornelius and Takeo Kanade, Carnegie-Mellon University

This paper adapts Horn and Schunck's work on optical flow to the problem of determining arbitrary motions of objects from 2-dimensional image sequences. The method allows for gradual changes in the way an object appears in the image sequence, and allows for flow discontinuities at object boundaries. We find velocity fields that give estimates of the velocities of objects in the image plane. These velocities are computed from a series of images using information about the spatial and temporal brightness gradients. A constraint on the smoothness of motion within an object's boundaries is used. The method can be applied to interpretation of both reflectance and x-ray images. Results are shown for models of ellipsoids undergoing expansion, as well as for an x-ray image sequence of a beating heart.

# On the Estimation of Dense Displacement Vector Fields from Image Sequences

# H.-H. Nagel Universität Hamburg

Based on recent experimental as well as theoretical investigations, a generalization of previously published approaches towards the estimation of displacement vector fields is formulated. The calculus of variation allows to transform this approach into a set of two partial differential equations for the two components of the displacement vector field. Some simplifying assumptions facilitate the derivation of an iterative solution approach which can be studied in closed form.

# **Tracking Three Dimensional Moving Light Displays**

# Michael Jenkin University of Toronso

A method is presented for tracking the three-dimensional motion of points from their changing two-dimensional perspective images as viewed by a nonconvergent binocular vision system. The algorithm relies on a general smoothness assumption to guide the tracking process, and application of the tracking algorithm to a three-dimensional moving light display based on Cutting's Walker program as well as other domains are discussed.

Evidence is presented relating the tracking algorithm to certain beliefs about neurophysiological structures in the visual cortex.

# Determining Motion Parameters for Scenes with Translation and Rotation

Charles Jerian and Ramesh Jain University of Michigan

A study of methods that determine the rotation parameters of a camera moving through synthetic and real scenes is conducted. Algorithms that combine ideas of Jain and Prazdny are developed to find translational and rotational parameters. An argument is made for using hypothesized motion parameters rather than relaxation labelling to find correspondence.

Determining 3-D Motion Parameters of a Rigid Body: A Vector-Geometrical Approach

# B. L. Yen and T. S. Huang University of Illinois

A vector-geometrical approach is given for the determination of 3-D motion parameters of a rigid body from point correspondences over 2 time sequential images. The resulting algorithms are similar to existing methods. However, the geometrical interpretations provide much valuable insight into the nature of the problem and the uniqueness question.

# A Hybrid Approach to Structure-from-Motion

# Aaron Bobick Massachusetts Institute of Technology

A method is presented for computing structure from the motion of rigid objects which are rotating about a fixed axis. The input consists of two discrete frames containing the positions and instantaneous direction vectors of three points in orthographic projection. Because only the direction of the velocity vectors and not their magnitudes is needed, the method is insensitive to errors in velocity magnitude estimation. This type of computation could be important in recovering the 3-dimensional structure of objects under dynamic viewing conditions because viewer motion about stationary objects will generate fixed axis rotations.

# Multicomputer Architectures for Real-Time Perception

# Leonard Uhr University of Wisconsin

This paper examines the computing demands that must be met by a system capable of scene description and perception of real-world moving objects. A brief survey is made of the major different kinds of computer systems that have been built, or designed, and of the different sources of potential speed-up of processing that have been exploited. Finally, a number of alternative possible hardware architectures that might be capable of handling real-time perception of moving objects are suggested, and examined.

# Perception of Rotation in Depth: The Psychophysical Evidence

Myron L. Braunstein University of California, Irvine

There are a variety of ways in which motion in the environment can provide information about three-dimensional relationships. One transformation that has received increasing attention in both the visual perception literature and in the machine vision literature is rotation in depth. This transformation, which includes any rigid rotation other than a rotation about the line of sight, can provide both a strong impression of depth and specific information about three-dimensional relationships in a rotating object or pattern. Computational theories have been developed concerning the relationships that an observer can potentially extract from the information available in this transformation. If computational theories are to be compared to human performance, a systematic body of data on human perception of rotation in depth is required. Such a body of data has been developing, especially in the last few years. Most of these studies have used computer animation techniques introduced into this area of research by Green. It is now possible to derive some preliminary conclusions from these data about what information is actually used by observers, what sources of information are dominant when multiple sources are available, and what errors occur in perception that can provide insights into the processes that observers apply to this information.

The objective of this paper is to bring together these empirical findings concerning the ability of human observers to perceive three-dimensional relationships on the basis of rotation in depth. It is intended to systematize and clarify the current state of knowledge in this area. The following sections are organized about a series of conclusions, ranging from general to specific, concerning three major issues in the perception of objects undergoing rotation in depth. The first is the relationship between perceived depth and perceived relative distance in a rotating object. Perceived depth refers to the threedimensional structure of an object, without regard to the position of the observer (e.g., the perception of a sphere as a sphere rather than as a circle). Perceived relative distance (or depth order) refers to the perception of which parts of an object are closer and which are more distant (e.g., which is the near hemisphere in a transparent sphere). Perceived relative distance in rotating objects is usually measured with direction of rotation judgments. The remaining two issues concern the variables which determine perceived depth and those which determine judgments of relative distance.

# The Cross-Ratio and the Perception of Motion and Structure

William A. Simpson University of Toronto

Followers of J. J. Gibson have proposed that the crossratio, a projective invariant for four collinear points, underlies the perception of objects in motion. Experiment 1 tested this theory by presenting subjects with displays of 3 or 4 dots rotating in depth. Accuracy was equally high in both conditions for motion and structure judgements, so the cross-ratio cannot be necessary. Experiments 2 and 3 tested the cue of lining up, and some evidence for its use was found. The results are consistent with an analysis based on the sinusoidally changing positions of the dots.

# Selective Attention to Aspects of Motion Configurations: Common vs. Relative Motion

James R. Pomeraniz and Nelson Toth SUNY at Buffalo

The motion of a dot configuration may be described as the sum of its relative (part) and common (whole) motion components. Is either of these two component dimensions extracted before the other in human perception? Reaction time data from selective attention experiments show that neither dimension can be responded to without interference from the other, implying that neither is processed more quickly than or ahead of the other. Following Garner's nomenclature, common and relative motions appear to act as either symmetrically integral or configural dimensions, depending on the particular motion configurations tested.

# Perceiving and Recovering Structure from Events

James E. Cutting Cornell University

How do perceivers identify a moving object as seen against a changing background? How do figure and ground separate? Such questions have engaged psychologists for at least seventy years. In particular, the Gestalt psychologists were deeply concerned with the latter, but had only the ill-

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defined notion of common fate, or uniform density, for dealing with the former. The coherent flow of a moving object is seen, somehow, by extracting those aspects of the whole that segregate it from the ground; the uniform destiny of all parts of the object was thought both to make the whole cohere and to separate the whole from all else. Two pairs of ideas, from two researchers who came out of the Gestalt tradition, helped elucidate the notion of common fate as applied to motion perception.

# Motion Analysis of Grammatical Processes in a Visual-Gestural Language

Howard Poizner The Salk Institute for Biological Studies Edward S. Klima University of California, San Diego The Salk Institute for Biological Studies Ursula Bellugi The Salk Institute for Biological Studies and Robert B. Livingston University of California, San Diego

Movement of the hands and arms through space is an essential element both in the lexical structure of American Sign Language (ASL), and, most strikingly, in the grammatical structure of ASL: it is in patterned changes of the movement of signs that many grammatical attributes are represented. These grammatical attributes occur as an isolable superimposed layer of structure, as demonstrated by the accurate identification by deaf signers of these attributes presented only as dynamic point-light displays. Three-dimensional computer graphic analyses were applied in two domains, to quantify the nature of the 'phonological' (formational) distinctions underlying the structure of grammatical processes in ASL. In the first, we show that for one 'phonological' opposition, evenness/unevenness of movement, a ratio of maximum velocities throughout the movement perfectly captures the linguistic classification of forms along this dimension. In the second, we map out a two-dimensional visual-articulatory space that captures in terms of signal properties, relevant relationships among movement forms that were independently posited as linguistically relevant. The fact that we are finding direct correspondences between properties of the signal and properties of the 'phonological' system in sign language, may arise in part because in sign languages, unlike in spoken languages, the movements of the articulators themselves are directly observable, and, also in part, because of the predominantly layered 'phonological' organization of sign language.

# "Graphical Marionette"

Carol M. Ginsberg and Delle Maxwell Massachusetts Institute of Technology

Many person-modelling 3-D animation systems are currently being developed, but often suffer from confusing and elaborate user interfaces. Given over 200 degrees of freedom, the human form is capable of such intricate motion that its specification and display presents considerable difficulty to both animators and animation systems designers. Given such difficulties with single figures, the orchestration of several in parallel remains a major challenge. In pursuit of understanding thoroughly this complex motion of human beings, while faced with the difficulty of modelling the human form using conventional computer graphics techniques, the actual physical mien of the graphic figure is sometimes relegated a secondary status. A primitive and unconvincing appearance is the usual result. Our research in this field addresses these issues of user interface, motion, and expressive appearance within an animation application.

# A Multiple Track Animator System for Motion Synchronization

# D. Fortin J. F. Lamy and D. Thalmann Université de Montréal

MUTAN (MUltiple Track ANimator) is an interactive system for independently animating three-dimensional graphical objects. MUTAN can synchronize different motions; it is also a good tool for synchronizing motion with sound, music, light or smell. To indicate moments in time, marks are associated with appropriate frame numbers. MUTAN enables the marks to be manipulated. An animator can also adjust one motion without modifying the others. To make this possible, MUTAN handles several tracks at a time (as in sound reproduction). All animation constraints for a graphical object are recorded on each track. Some simple but powerful commands allow the animator to manipulate marks, tracks and frames. MUTAN is part of a complete 3D shaded animation system including the CINEMIRA computer animation language based on actor and camera data types, the 3D HORIZON graphics editor and a 3D digitizing program.

# Knowledge-based Animation

# David Zeltzer The Ohio State University

In constructing a goal-directed system for automatic motion synthesis for computer animation, the essential problem is to account for the extraordinary flexibility and adaptability exhibited by moving creatures. The selective potentiation and depotentiation of elements of a hierarchy of motor control programs is a key to the generation of adaptive motor control. The constraints on motion sequences are analyzed, and mechanisms for achieving continuity of movements are discussed. The organization of two data bases containing knowledge about the simulated environment and about available movements is described. An example showing the interaction between the motion control system and the data bases is presented.

3D Balance in Legged Locomotion: Modeling and Simulation for the One-Legged Case

> Seshashayee S. Murthy and Marc H. Raibert Carnegie-Mellon University

This paper explores the notion that the motion of dynamically stable 3D legged systems can be decomposed into a planar part that accounts for large leg and body motions that provide locomotion, and an extra-planar part that accounts for subtle corrective motions that maintain planarity. The large planar motions raise and lower the legs to achieve stepping, and they propel the system forward. The extra-planar motions ensure that the legged system remains in the plane. A solution of this form is simple because 3D dynamics do not play an important role. We develop a model of a 3D one legged hopping machine that incorporates a springy leg of non-zero mass and a two axis hip. The hopping machine is modeled as an open loop linkage that has different configurations in flight and in stance. Behavior at transitions between phases is calculated by invoking conservation of momentum. We have decomposed control of the model into four parts that control hopping height, forward velocity, body attitude, and spin. Hopping height is controlled by regulating vertical energy. Velocity is controlled by placing the foot fore and aft during flight. Body attitude is controlled by torquing the hip during stance. Spin is controlled by placing of the foot outside the plane of motion. Simulation data are presented which show that these control algorithms result in good control of velocity, body attitude and spin, while traveling along a straight desired path.

### Representing and Reasoning about Change

Reid G. Simmons and Randall Davis Massachusetts Institute of Technology

A recent trend in artificial intelligence research is the construction of expert systems capable of reasoning from a detailed model of the objects in their domain and the processes that affect those objects. We describe a system being built in this fashion, designed to solve a class of problems known as geologic interpretation: given a cross-section of the Earth's crust (showing formations, faults, intrusions, etc.), hypothesize a sequence of geologic events whose occurrence could have formed that region. Solving the geologic interpretation problem requires reasoning about change, in particular, spatial change. The shape of a formation, for example, can be altered by the process of erosion. Doing this reasoning, in turn, requires representing objects, which show the effects of change, and processes, which are the causes of those changes.

The main focus of this research is to explore the machinery needed to represent and reason about both mutable objects and the processes that induce changes in them. To do this, we have developed two representations of objects, one involving *histories* and the other involving *diagrams*. We have also developed two corresponding representations of physical processes, each suited to reasoning about one of the object representations. We have been careful to keep the two representations well separated, limiting their interaction to a relatively small and clearly defined interface.

We have used these representations to model a subset of geology large enough to allow us to solve most geologic interpretation problems. In particular, the model allows us to *imagine* a sequence of geologic events. *Imagining* is a new form of qualitative simulation similar to envisioning.

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# Meeting Minutes

SIGGRAPH Executive Committee Meeting San Francisco January 22, 1983 Approved October 23, 1983

 The meeting was called to order at 9:00 a.m. Minutes from the last meeting were reviewed, revised and approved. The following people attended:

Tom DeFanti Bob Ellis Maxine Brown Sara Bly Jim George Pat Cole Ingrid Carlbom Steve Levine Bary Pollack Ron Lusen Kelly Booth John Beatty Adele Newton Dick Weinberg Dick Mueller Peter Seitz Elaine Sonderegger Nick Pavlovic Molly Morgan Chip Hatfield Lou Katz

# 2. Conference planning committee report

### a. Conference budget reports

Many conference expenditures benefit the entire SIG-GRAPH membership. For example, conference budgets cover the printing costs of proceedings, art show catalogs, etc. It was suggested we add a MEMBER SERVICES category to conference budget reports, along with INCOME, EXPENSES and SURPLUS. Conference treasurers should itemize where monies come from, and where they're spent. Also, the conference chair(s) should include a brief, executive summary with the final budget report.

b. Conference publicity

Continuity in conference publicity, theme and identity was discussed.

The SIGGRAPH organization is currently looking at logo designs. A readily-identifiable logo is one aspect of heightening awareness and establishing continuity. The SIGGRAPH Executive Committee was urged to make a timely decision. (See item #14.)

c. Promoting SIGGRAPH-The organization

The annual conference is only one aspect of SIGGRAPH; the organization and its membership services comprise the other aspect. It was suggested that SIGGRAFFITI be mailed to all conference attendees (excluding those who attended exhibits only) for one year to make them aware of the benefits of the SIGGRAPH organization.

Bary Pollack will investigate the costs of this venture with Smith Bucklin (SIGGRAPH's conference management firm, also responsible for printing and mailing SIGGRAFFITI). The incurred costs will be incorporated into the SIGGRAFFITI budget.

# d. Site selection

It was suggested that the people appointed to do conference site selection report to members of the conference planning committee instead of the executive committee. The conference planning committee wants to track progress before conference chairs are appointed. It was decided that, for the time being, we will keep the reporting structure the way it is.

# e. Demographic survey

In response to exhibitors' requests, Kenworthy & Associates (SIGGRAPH's exhibits management firm) has contracted a professional group to prepare a survey to determine the professional backgrounds of the people registering for the SIG-GRAPH '83 exhibition. Completion of the survey form will be optional, and the information will give us a better idea of the type of people we're servicing. Bob Ellis would like the survey concept extended to include all conference attendets. The SIGGRAPH '84 cochairs are interested in assembling a complete set of statistics on the '84 conference. The '83 co-chairs pointed out that, in addition to the exhibits-only survey, they are expanding the questionnaire annually distributed to course attendets.

It was decided that Kenworthy may survey '83 exhibits attendets. The '83 co-chairs were asked to provide the executive committee with a sample of the course questionnaire. A full conference survey for '84 will be considered.

Bob Ellis agreed to talk with the firm Kenworthy hired to find out what a full conference survey entails. Dick Mueller volunteered to investigate survey feasibility with the appropriate department within CDC, where he works.

**J. GOALS AND OBJECTIVES document** 

The conference planning committee has prepared a document entitled GOALS AND OBJECTIVES (of SIGGRAPH Conferences), that will be published in *Computer Graphics*. The intent is to establish policy, not control, in order to insure the continuity of conference management. It covers such matters as expenditures, reimbursements, and our policy with respect to complimentary registrations.

g. Monitoring finances

The conference planning committee watches and monitors the dollars SIGGRAPH pays to Smith Bucklin and Kenworthy. SIGGRAPH's financial relationships with the two firms are quite different. Smith Bucklin is paid a management fee to administer the technical conferences, publicity and member services. Kenworthy receives a percentage of the fees collected from conference exhibitors.

h. Monitoring conference expenses

Ingrid Carlbom prepared a comprehensive summary of conference income and expenses, for the years 1977-1983. This will be a tremendous help in spotting where expenses have escalated and where income has to be increased to cover costs.

# 3. SIGGRAPH Conferences

a. SIGGRAPH '81, Dallas

Tom DeFanti placed an announcement in Volume 16, Number 4 of Computer Graphics advertising the availability of a few remaining course notes. He offered them to academic institutions, provided they covered mailing costs. The notes were considered to be of such tremendous educational value that they were all sold within 2 weeks of publication of the notice.

### b. SIGGRAPH '82, Boston

Elaine Sonderegger distributed an attendance summary. She also gave a preliminary breakdown of expenditures. The final expense report will be prepared during February 1983.

c. SIGGRAPH '83, Detroit

Complimentary registration: The co-chairs are granting I complimentary registration to a technical speaker for every accepted paper. The executive committee passed a motion making this policy; it will be added to the conference planning committee's list of allowable complimentary registrations.

The chair of every panel session is receiving travel, I night's lodging and a complimentary technical program registration. All panel session participants are receiving complimentary technical program registrations; it is policy to give one to each invited speaker.

Artists exhibiting in the '83 art show are receiving complimentary art show registrations, admittance to the film show, and tickets to the conference reception.

ACM Transaction on Graphics (TOG): In past years, TOG has published the best papers presented at the annual SIGGRAPH conferences. This has precluded their being published in conference proceedings.

The SIGGRAPH executive committee passed a motion requiring that all papers presented at a conference appear in

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the proceedings. The '83 co-chairs were delegated the responsibility of making sure this happens.

It was suggested that papers selected for TOG be distinguished in some way, and a credit appear stating they're reprints. For us to do this, the TOG editor has to obtain reprint rights from the ACM Publications Board.

Accounting: Peat, Marwick, Mitchell & Company has been retained. The firm will become more involved in tracking and projecting finances once more data is accumulated.

Publicity: A graphic designer has been hired. The advertising schedule has been prepared. One-page ads are being placed in ACM's Communications and IEEE's Computer magazines, and will include a tear-off coupon that people can mail in for more information.

Technical program and panel sessions: Ninety-five papers have been submitted. It was suggested that the deadlines for technical papers and panel sessions be the same in the future.

Art show: The expenses for the art show have increased. This year, it is being made a more integral part of the conference.

Posters: Instead of mailing folded posters with the preliminary program, this year's committee will be selling a 3-poster series at the conference for \$15; the price includes a cardboard carrying tube.

Course registration fees: Currently, member and nonmember course fees are the same. The '83 co-chairs are considering raising the non-member fees.

Who's an ACM/SIGGRAPH member? There was some discussion on whether or not we could put a date on the conference registration form, after which someone cannot join ACM to take advantage of member prices. Bob Ellis will inquire.

SIGGRAPH Video Review (SVR): Tom suggested we sell the SVR at the conference.

10 year honorees: The individuals who attended the first SIGGRAPH conference 10 years ago will be honored. An announcement in the next SIGGRAFFITI will request that all 1974 attendees send John Beatty and Kelly Booth their new addresses.

d. SIGGRAPH '84, Minneapolis

Budget: The '84 co-chairs submitted a preliminary budget, projecting an income of \$3.2 million. Due to the poor state of the economy, 1983 attendance figures were used to calculate conference size. Booth space fees will be increased from \$12.50 per square foot to \$15.00 per square foot. The accounting firm of Peat, Marwick, Mitchell & Company has been retained and a treasurer has been appointed. Proposed budget expenses arc being solicited from Smith Bucklin and Kenworthy. Contracts for local accommodations are being reworked.

Exhibition: Due to space limitations, there will be 2 exhibit areas. Assignments will be based on seniority.

Housing: There are plenty of hotel accommodations in the area. Dick Mueller is also arranging for "low-cost" housing (\$50/night) and dormitory space.

Omnimax film: Plans for producing an Omnimax film are being firmed up. See "SIGGRAPH '84 Call for Omnimax Films" by Nelson Max in Computer Graphics, Volume 16, Number 4.

e. SIGGRAPH '85, San Francisco

This week, SIGGRAPH '85 conference committee representatives, Bob Ellis (SIGGRAPH vice-chair for conference planning), Joy Lee (Smith Bucklin) and Bob Kenworthy (Robert T. Kenwoethy Inc.) took a trip to major hotels and the Moscone Center to examine space availability. The co-chairs will submit a budget as soon as possible. They already have ideas for places to hold a reception. And, people are already volunteering to help.

f. SIGGRAPH '86, Dallas

SIGGRAPH is currently looking for people to serve as cochairs.

# g. SIGGRAPH '87, Anaheim

The conference planning committee is reviewing the facilities.

# h. SIGGRAPH '88, Atlanta

The conference planning committee is reviewing the facilities.

# 4. A/V representative on site selection committee

It was suggested that an A/V person be part of the site selection committee. That person would be involved after a city is chosen, and would help find hotels with proper space and wiring accommodations. Those people selecting the city sites would like a set of guidelines written up so they can give better consideration to A/V requirements.

### 5. SIGGRAPH 1984 fiscal year budget

Sara Bly has prepared and submitted the 1984 SIGGRAPH budget. She also recommended we cut down on travel and meeting expenses: meet in cities that are geographically convenient to everyone and minimize travel costs; watch food expenses; meet at less expensive hotels.

# 6. Electronic mail

The executive committee decided to suspend the use of its electronic mail system. Conference committees may use whatever methods of communication they please.

# 7. Awards committee

Jon Meads, administrative chair, has planned a schedule and distributed information to members of the selection committee. Each member of the committee has been assigned a term of office; one member is replaced each year in order to provide new insights.

Smith Bucklin wrote and mailed out press releases. The cut-off date for nominations will be March 1, 1983. Some concern was expressed that biographical information on the person being nominated may not be available to the person making the recommendation. Perhaps the selection committee would consider accepting names only and would assume responsibility for doing the necessary biographical research.

It was decided that the recipient of the Coons Award would give a talk at the opening session; it does not have to be a paper. A total of 45 minutes has been allocated, during which the 2 awards will be made and the Coons Award recipient will speak. The proceedings has 4 pages set aside for a write-up on the two recipients. (Note: Ivan Sutherland was subsequently chosen to receive the Steven A. Coons Award. Jim Blinn was selected as the recipient of the Computer Graphics Achievement Award.)

# 8. Standards

There are several methods ANSI has for generating a standard. One way is to review the work of a development group (i.e., X3H3). Another method is to rule on a concensus, or canvassed, standard (i.e., a methodology that is so widely used it is a de facto standard).

Currently, GKS is a draft international standard. The Germans are now working on a 3D GKS proposal with separate 2D and 3D pipelines. We would like to distribute the GKS manuscript to our membership.

Due to perceived incompatibilities of the proposed 2D/3D GKS systems, the SIGGRAPH executive committee passed the following motion (7-2-0; Bly and Carlbom—opposed):

We propose to ANSI that GSPC '79 be considered as a 3D standard by the canvass method.

Elaine will be attending an ANSI X3H3 meeting in Boulder next week and was asked to inform them of our motion.

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# 9. Bylaws

The new bylaws were approved.

# **10. Elections for SIGGRAPH officers**

Pat Cole is responsible for putting together the slate of candidates. Names must be submitted to ACM headquarters by February 1, 1983. (Note: Results of the June election are: Tom DeFanti, chair; Bob Ellis, vice-chair of conference planning; Sara Bly, vice-chair of operations; Maxine Brown, secretary; Ron Lusen, treasurer.)

# 11. SIGGRAPH Video Review (SVR)

Volumes 5, 6 and 7 have been duped and will be distributed shortly. We have already sold more than half our \$19,000 inventory.

# 12. IEEE Computer Graphics & Applications (CG&A)

CG&A will be offered to our membership at special prices. IEEE will send out a mailing describing this offer.

### 13. SIGGRAPH art show

Copper Giloth has received requests from groups in France and Japan who want to exhibit the '83 art show around the same time we premiere it in the U.S. They're willing to pay, and the money would be used to dupe those art pieces that are printed on film, and to build crates for shipping.

### 14. SIGGRAPH logo design

Peter Seitz, of Seitz Graphic Directions, was asked to develop a symbolic, visual identity for SIGGRAPH, and to carry that identity through the design of our literature, stationery, etc. He first presented an outline of the steps he would follow:

- a. Outline goals and objectives
- b. Sketch designs
- c. Design development
- d. Production
- e. Manual on design use

He then made a presentation on the visual elements he's exploring. The executive committee expressed a definite interest in designs that portrayed perspective (3D) and movement (dynamics).

An ad hoc committee was appointed to work with Peter Seitz to refine these concepts and develop a logo. Members are Bob Ellis, Dick Mueller, Maxine Brown and Pat Cole. This committee will meet again at the '84 conference committee meeting on March 11. It may be necessary to meet again between March and May. Final executive committee approval on a logo design will take place in May. (Note: A logo was chosen and appears on current SIGGRAPH literature.)

### 15. Education committee

Maxine reported that she has already received several responses to her request for volunteers to serve on an Education Committee. Several tasks can start immediately; others will be tabled until someone is found to chair this group. Maxine outlined the following materials she would like to see assembled; a letter detailing specific tasks will be mailed out shortly to volunteers:

a. List of educational institutions offering computer graphics courses and programs.

 b. Descriptions of various career opportunities in computer graphics.

c. List of application-specific information sources (for architecture, fashion design, archaeology, etc.); i.e., what books, magazines, organizations, companies, etc. specialize in various computer graphic applications?

d. Curriculum and A/V material development. (On hold until a chair is found.)

# 16. L.A. SIGGRAPH group

The local L.A. SIGGRAPH group held a highly successful conference in October 1982, and is looking to national SIGGRAPH for guidance and help on future events.

Representatives attended yesterday's conference planning committee meeting.

Individual members of the conference planning committee volunteered to serve as available resources to answer organizational questions. The L.A. SIGGRAPH representatives were also referred to Smith Bucklin and Kenworthy for professional guidance.

SIGGRAPH agreed to co-sponsor the next L.A. SIGGRAPH conference. It was recommended that they immediately choose a site and determine dates. (Note: The L.A. SIGGRAPH Showcase '83 is being held November 19-20, 1983 at California Institute of Technology in Pasadena.)

# 17. Local SIGGRAPH groups

Two new local SIGGRAPH groups were recently formed —San Francisco Bay Area and Chapel Hill. This makes a total of 8 regional SIGGRAPH groups. It is expected that the number of local conferences sponsored by local groups will grow 100% in 1983. To stay informed about local events, the Executive Committee members are now receiving the newsletters of the regional groups.

18. The meeting was adjourned at 6:30 p.m.

# Meeting Minutes

SIGGRAPH Executive Committee Meeting NCC '83, Anaheim May 18, 1983 Approved October 23, 1983

1. The meeting was called to order at 9:10 a.m. The following people attended:

Dick Mueller
Dick Weinberg
Ron Lusen
Jon Meads
Jinko Gotoh
Zsuzsa Molnar
Peter Seitz
Nick Pavlovic
Molly Morgan
Bill Goodin
Derek Lee
Fred Aronson, ACM
Bobbie Zucker, ACM
Roberta Bukar, ACM

2. Conference planning committee (CPC) report

a. Technical Meeting Request Forms (TMRF's)

A TMRF must first be sent to the vice-chair for conference planning (Bob Ellis), with a copy to the chair (Tom DeFanti), before it is sent to ACM headquarters. TMRF's for regional events should first go to the local groups coordinator (Ron Lusen).

b. Interfacing with ACM

Several SIGGRAPH people had an informal meeting today with ACM's chair and secretary, Dave Brandin and Adele Goldberg. The SIGGRAPH people had several concerns, such as the large number of ACM people with whom they were required to deal on a regular basis, and the pressures incurred dealing with last-minute requests from ACM for changes in policy, printed matter, etc. It was suggested that, in the future, ACM personnel issue warnings for actions not within ACM guidelines, request that SIGGRAPH make the appropriate changes in the future and allow the current activity to take place whenever possible.

c. Conference fees

The CPC will establish a policy on annual conference fees.

d. Art show

The annual SIGGRAPH art show lives on after the sponsoring conference ends. The conference books close, and there are no funds to support the ongoing show. Conferences should still budget for the show, but museums and organizations hosting it afterwards should cover all associated costs.

Louise Etra will investigate the mechanisms and costs necessary to make the annual art show a SIGGRAPH budgeted expense; e.g., insurance, shipping, additional slide sets, catalogs, etc.

e. Conference attendee survey

Exhibit Surveys Inc. was invited to submit a proposal to survey this year's conference attendees by mail after the conference. In addition, a questionnaire will appear on the back of the exhibits registration form.

A post-conference survey of all conference attendees will cost approximately \$5000. The board approved a survey of 1983 conference attendees by Exhibit Surveys. Jim George would like to poll SIGGRAPH membership as well as conference attendees. Jim, Elaine Sonderegger, John Beatty and Bob Ellis were asked to serve on an ad-hoc committee to coordinate the activity and approve the questionnaire.

f. SIGGRAPH '83 course notes

The IEEE Computer Society is publishing 2 of this year's course notes. These notes are currently not included in the complete set of notes one can purchase at the conference. It was suggested that they be included unless this would cause budget problems. In the future, all sets of notes should be included in the complete set.

g. Exhibit management review

The CPC is satisfied with the work of SIGGRAPH's exhibits management firm, Robert T. Kenworthy Inc.

h. Conference management review

Unlike the Kenworthy organization, which receives a percentage of the exhibition income, SIGGRAPH's conference management firm, Smith Bucklin & Associates, receives a management fee plus expenses. While this seems appropriate, the CPC is examining how we can more efficiently control these expenses. The CPC is currently working with Smith Bucklin to obtain specific proposals, a breakdown of time schedules and costs.

i. Complimentary registrations

The CPC has revised SIGGRAPH's complimentary registration policy. It will be presented to the board for approval at a later date.

j. SIGGRAPH conference goals and objectives

The CPC released a revised document stating conference goals and objectives. The board will discuss this document at the next meeting.

k. Cost centers

There is some concern that the annual conference should have consistent categories, or cost centers. Bob Ellis will discuss this matter further with accountants.

1. Conference technical programs

Ingrid Carlbom will form a committee, to include Dan Bergeron, Peter Tanner and Kelly Booth, to examine the problems encountered by the annual technical program committees. For example:

i. Should a technical program chair serve on the technical program committee the year prior to his/her conference?

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ii. Are the number of papers being submitted per year dropping and, if so, why?

iii. Should short papers be considered?

m. Conference financial trends

Ingrid Carlbom revised her current "Conference Income & Expense Summary" report. Further revisions were requested.

3. SIGGRAPH conferences

a. SIGGRAPH '83, Detroit

John Beatty, Kelly Booth, co-chairs

The preliminary program is out and the final program is on schedule. The exhibit space will be sold out. The publicity has been increased over last year's; the ads are getting good response. The proceedings are going to the printer. The art show is better than ever; it will be on display in France and Japan concurrent with its U.S. debut in Detroit. The film & video show is publishing a high-quality catalog.

b. SIGGRAPH '84, Minneapolis

Dick Mueller, Dick Weinberg, co-chairs

A full committee meeting was recently held in Provo, Utah; all went well. A logo design was selected for use on all conference literature. A "Call-for-Everything" brochure is being written for distribution in Detroit. The budget has been revised. The contract with Smith Bucklin is being reviewed. The technical program committee members have been selected.

c. SIGGRAPH '85, San Francisco

Pat Cole, Bob Heilman, co-chairs

Pat Cole and Bob Heilman are looking into facilities, exhibition space and meeting spaces for the courses and technical program. The co-chairs have made a first pass at a budget. The technical program chair is being sought. (Note: Brian Barsky, University of California—Berkeley, was subsequently appointed technical program chair.)

d. SIGGRAPH '86, Dallas

The CPC is currently looking in the southwest U.S. for conference co-chairs. It is hoped that the selection will take place by the end of the calendar year.

e. SIGGRAPH '88, Atlanta

Contracts are currently being signed.

f. SIGGRAPH site selection

Elaine Sonderegger and Pat Cole, who are responsible for SIGGRAPH conference site selection, presented a list of possible cities for future conferences. The board decided not to hold SIGGRAPH in NCC towns: Las Vegas (9:yes, 1:opposed); Chicago (8:yes; 2:opposed). The board asked Elaine and Pat to research the advisability of New York. Hank Cronan of our exhibits management firm should be consulted for exhibitor input. It was noted that the costs of the art show and of A/V materials will increase in union towns.

Elaine and Pat will submit a site selection plan at the next meeting. They will prepare a list of 6 cities currently feasible for holding a SIGGRAPH conference, and a suggested order. It was suggested that we consider a 6 year rotational cycle for future conferences.

### 4. Regional SIGGRAPH group activities

 a. SIGGRAPH will consider co-sponsoring regional group activities on a case-by-case basis.

b. According to ACM policy, the creation of a local SIGGRAPH must be approved by a local ACM chapter. If there is no local ACM chapter in the vicinity and people want to organize a regional computer graphics group, it was suggested that the national SIGGRAPH organize a regional TEC.

c. Local SIGGRAPH groups can make use of the ACM Lectureship series if they work through an ACM chapter. They can also take advantage of the ACM Workshop Program.

d. Ron Lusen will share the SIGGRAPH '84 booth at the '83 exhibition to promote local SIGGRAPH groups. e. The names and addresses of local SIGGRAPH chairs will be published in the Computer Graphics quarterly.

f. In 1984 there will be 2 regional SIGGRAPH conferences: Los Angeles and Philadelphia.

g. L.A. SIGGRAPH

This year's L.A. SIGGRAPH Showcase has a budget of \$82,000. The board unanimously approved co-sponsorship of the L.A. Showcase and will help them get an advance from ACM.

h. Philadelphia SIGGRAPH

The Philadelphia SIGGRAPH group is "up and running" under the direction of Dick Moberg and Eric Podietz. Their request for \$500 seed money will be granted from Ron Lusen's budget.

They requested an additional \$500, to be used in the 1983 Symposium on Small Computers in the Arts, held October 14-16 in Philadelphia. This, too, will be granted and will come from Ron Lusen's budget. The board approved SIGGRAPH's cooperation with this event.

### 5. Publications

# a. COMPUTER GRAPHICS

The ACM Publications Board objected to our use of the word "quarterly". According to ACM, it implies a reviewed publication. SIGGRAPH pointed out that it is not part of the title, but a description of the publication. ACM has acquiesced.

b. SIGGRAPH '83 Proceedings

The '83 proceedings has 400 pages; this exceeds the 350 pages budgeted. The additional pages include panel session write-ups and a 10-year index. One possible way to recoup losses would be to charge non-members more money. Future conference committees were urged to stay within their budgeted page counts.

c. SIGGRAPH '83 conference literature

To economize on publication costs, it was suggested that the final program, which includes the exhibits guide, only be printed for conference attendees. The conference proceedings will be printed for both attendees and membership.

d. ACM Transaction on Graphics (TOG)

Ingrid reported that contributions to TOG are increasing and that Dan Bergeron, TOG editor, is no longer dependent upon the SIGGRAPH conference for material.

e. Future conference technical programs and proceedings Ingrid will form an ad-hoc committee to investigate alternative formats for technical program sessions. (See 2.1.).

f. Reprinting back issues of the proceedings

Proceedings from SIGGRAPH '78, '79 and '80 at out of print. It is too expensive to reprint them.

g. IEEE Computer Graphics & Applications (CG&A)

Over 360 SIGGRAPH members have subscribed to CG&A, in response to a special discount offer arranged by SIGGRAPH and IEEE. IEEE will further publicize this offer in their booth at SIGGRAPH '83. There will also be announcements in Computer Graphics and SIGGRAFFITI.

# 6. Awards

Jon Meads, administrator of SIGGRAPH's 2 computer graphics awards, announced that Ivan Sutherland is this year's recipient of the Steven A. Coons Award and Jim Blinn is the recipient of the Computer Graphics Achievement Award. Presentations will be made during SIGGRAPH '83. The board also learned that Sutherland will match his cash prize and present it to the Computer Science Department of California Institute of Technology as a graphics research grant.

The awards committee will meet during SIGGRAPH '83 to review what they've learned about candidate selection and discuss future plans.

# 7. Slide sets

This year there will be an exhibition slide set in addition to the conference and art show sets. It was suggested that the exhibition set be accompanied by a technical write-up describing the hardware or software being displayed; no prices should be listed. SIGGRAPH will print 750 copies of each of the 3 slide sets for sale at SIGGRAPH '83.

# 8. SIGGRAPH volunteers

Maxine is receiving requests from people interested in volunteering their time and energy to help carry out SIGGRAPH activities. Their names are being circulated to the appropriate SIGGRAPH committee chairs.

### 9. SIGGRAPH related organizations

Maxine is receiving letters from various schools, professional organizations and research groups that are involved in computer graphics. A list is being compiled and will be published in Volume 17, Number 4 of Computer Graphics.

# 10. Standards

a. ANSI

Elaine Sonderegger conveyed SIGGRAPH's position on standards at an ANSI meeting in Boulder in January, 1983. Within 3 days, ANSI granted permission to SIGGRAPH to publish and distribute GKS to its membership. (See item "b" below.)

Jim George and Elaine met with the ACM Standards Committee Chair and the ACM representative to X3. The GSPC '79 Core System proposal was discussed as a possible canvass standard. IEEE has decided not to join SIGGRAPH's effort.

Jim and Elaine are drafting a letter to the ACM executive committee recommending that GSPC '79 be reviewed within ACM by the Fall, 1983 and perhaps be adopted as an ACM standard. ACM would then submit it to ANSI; it would arrive about the same time GKS is submitted from an ANSI subcommittee. One of 3 things could happen: (1) GSPC '79 will be accepted, (2) ANSI will review both proposals and recognize the importance of a 2D/3D standard, or (3) nothing will result.

It should be noted that the ANSI GKS is different from the ISO GKS. ANSI added another level and weakened the conformance rules.

It was suggested that SIGGRAPH initiate other standards activities. New areas were discussed, such as raster devices, tape formats for images, etc.

b. GKS

ANSI will print copies of GKS for SIGGRAPH at a cost of \$3 per copy. They will put SIGGRAPH's identifying information on the spine, which is needed in order for a library to catalog it. It will be a "special issue" of Computer Graphics.

# 11. Logo design

SIGGRAPH's logo and graphic design committee has been meeting with Peter Seitz to develop a logo for the SIGGRAPH organization. Many designs were considered, and were rated according to several criteria: suitable, recognizable, memorable, distinctive, aesthetic, applicable. The committee chose one design, which was voted upon and accepted by the board (7:yes; 1:opposed; 1:abstention). This committee will continue to function; it will investigate organizational uses of the logo.

### 12. Japan

SIGGRAPH is aligned with 3 groups in Japan: Nicograph, the Japanese Management Association (JMA), and the Japanese Graphic Designers Association (JAGDA). There are also attempts to form a local SIGGRAPH group in Japan. Laurin Herr has been appointed SIGGRAPH liaison to Japan.

# 13. France

Although there have been attempts to start a local SIGGRAPH group in Paris, there are some obstacles. The local ACM is dormant and will not approve the creation of a local SIGGRAPH group.

# 14. Australian Computer Society (ACS)

The ACS has created an ACS/SIGGRAPH group. This group is not affiliated with us; they just like us and decided to use a similar name.

# 15. EUROGRAPHICS

Ingrid was appointed the SIGGRAPH representative to EUROGRAPHICS '84 in Copenhagen. She was also asked to speak with Dan Bergeron, this year's representative to EUROGRAPHICS '83, for a report on our continued participation.

# 16. SIGGRAPH Video Review (SVR)

ACM needs to adopt a "revolving account" concept. The SVR went overbudget on both income and expenses.

# 17. Budget adjustment

The following new items have been incorporated in the SIGGRAPH budget: (1) advertising and public relations, (2) SIGGRAFFIT1, (3) Computer Graphics publications support from Smith Bucklin, and (4) chair, vice-chair and secretarial support.

# 18. Video discs

Sony wants to make educational video discs, using SIG-GRAPH material, to distribute to its dealers, etc. Sony would supply SIGGRAPH with discs, at cost, to distribute or sell to its membership. (It should be noted that if SIGGRAPH produced a half-hour video disc on its own, it would cost \$300,000.)

Louise Etra teaches courses at the non-profit Sony Visualization Center of the American Film Institute in Los Angeles. She was asked to write up a proposal assuring the above-stated relationship.

# **19. ACM Publications Catalog**

SIG's now pay ACM for listing their publications in the ACM Publications Catalog.

# 20. SIGGRAPH education committee

Maxine is organizing a SIGGRAPH education committee. Several people have volunteered to design questionnaires, the information from which will be used to create various information directories. Preliminary drafts were distributed to board members. Also, plans are being made to have a meeting during SIGGRAPH '83 of all people interested in furthering SIGGRAPH's educational activities.

21. The meeting was adjourned at 6:00 p.m.

# Meeting Minutes

SIGGRAPH Executive Committee Meeting SIGGRAPH '83, Detroit July 28, 1983 Approved October 23, 1983

1. The meeting was called to order at 5:50 p.m. Members of the SIGGRAPH executive committee were introduced to the attendees. The following people were present:

Tom DeFanti **Bob Ellis** Sara Bly Maxine Brown Ron Lusen Ingrid Carlbom Steve Levine Pat Cole Elaine Sonderegger Bernard Dresner Louise Etra Bary Pollack

Norm Badler Steven Bailey John Beatty Philippe Bergeron Peter Bono Roberta Bukar Janet Chin Joanne Culver William Goodin Richard Greco Susan Hartwig-Hood David Straayer Chip Hatfield Robert Heilman Christopher Herot Walt Journey Lou Katz Toshifumi Kawahara

Derek Lee Myles Losch Thomas Mainlock Jon Marble Maria Mezzina Jim Michener Dick Mueller Nick Pavlovic Robert Richmond Gunther Schrack Randy Simmons Jean Tracy Lynn Valastyan Andy Van Dam Patrice Wagner Jim Warner

# 2. SIGGRAPH '83 report

John Beatty, SIGGRAPH '83 co-chair, reported that everything was running smoothly. Conference surplus was not yet determined. He announced attendance figures as of 3 p.m. today.

14,454	Number of distinct registrants
5,375	On-site registrants
3,482	Technical program registrants
(unknown)	Course registrants
(unknown)	Exhibits-only registrants

# 3. SIGGRAPH awards

The executive committee expressed their thanks to Pat Cole and Jon Meads for their efforts organizing an outstanding award presentation.

It was suggested that the Steven A. Coons Award be given annually. If there is a budgetary problem, Jon offered to examine the budget and suggest modifications. This change would require an amendment to the SIGGRAPH by-laws. The executive committee will discuss this proposal at its next meeting.

# 4. SIGGRAPH budget

SIGGRAPH budgets for more money than the conference makes. Tom DeFanti urged board members to notify Sara Bly of real budgetary needs, assuming minimum amounts, so we can design a more realistic budget. Sara, in her new capacity of Vice-Chair of Operations, will oversee budgets and approve long-range spending.

### 5. SIGGRAPH Video Review (SVR)

Bob Hopgood wants to buy a set of videotapes, convert them to the U.K. format and sell them to Eurographics members. He'll initially make 20-50, see how they sell and then determine the next step. The SIGGRAPH board agreed to this request, and will supply Bob with dupes of our 1-inch masters of issues 5, 6 and 7. (He will reimburse us for duplication costs.)

# 6. Videodiscs

In response to our investigating cooperation with Sony on the making of a computer graphics videodisc, Louise Etra reported that she will have a budget prepared for the next SIG-GRAPH meeting on the costs of premastering, mastering, duplicating and mailing.

# 7. SIGGRAPH art show

Joanne Culver is the SIGGRAPH '83 art show travel coordinator. She showed us brautiful French and Japanese posters and brochures advertising this year's show. The Boston Museum and the Tampa Museum are additional sites requesting the show. Traveling shows pay for themselves.

The local SIGGRAPH-France representative asked that local groups be informed when such events are to be held in their cities.

Louise Etra is preparing a proposal to make the traveling portion of the SIGGRAPH art show an on-going organizational event (for budgetary reasons); the art show itself will remain a conference function. She is currently reviewing costs with this year's art show committee.

# 8. SIGGRAPH conference financial summary report update

Ingrid Carlbom presented an updated draft of her conference financial summary report. Suggestions for further revisions were made.

# 9. SIGGRAPH education committee

Maxine Brown announced that the day before, Jim Foley chaired a successful panel session on computer graphics in higher education. This was followed by a meeting of interested and enthusiastic people who wished to volunteer their efforts to further the development of computer graphics curricula and learning materials; areas of immediate concern included computer science, engineering science, art, design and industry. Dr. Alfred Bork agreed to chair this committee and was appointed by Tom. (For more detailed information, see the education report published in *Computer Graphics*, Volume 17, Number 4.)

# 10. Local SIGGRAPH groups (affiliates and friends)

Ron Lusen reported that SIGGRAPH is gaining lots of international interest and experiencing strong growth. He will be attending an ACM meeting in several weeks to discuss the ACM/SIG reporting structure.

Ron announced interest in forming many new local SIG-GRAPH groups in the following areas. Names and addresses of existing groups will be published in Computer Graphics.

Albany	Knoxville	Bramalea (Ontario)
Atlanta	Los Angeles	Calgary (Alberta)
Austin	Madison	Montreal
Boston	Memphis	Ottawa
Bridgeville	Minneapolis	Toronto
Buffalo	Nashville	Winnipeg
Chapel Hill	New York	
Chicago	Philadelphia	Australasia
Clearwater	Pittsburgh	Belgium (Brussels)
Cleveland	Princeton	England (Castleford)
Dallas	San Diego	France
Denver	San Francisco	Israel (BeerSheva)
Detroit	Savanna	Portugal (Lisbon)
Gainsville	Scottsdale	
Houston	Seattle	
Kansas City	Syracuse	
	Washington D.C.	

# 11. Los Angeles SIGGRAPH group

The L.A. SIGGRAPH group will hold Showcase '83 at Cal Tech, November 19-20.

### 12. SIGGRAPH presentations

a. American Film Institute

Louise was invited to give a presentation to the International Video group of the American Film Institute in Los Angeles. She will be using SIGGRAPH's slide sets and videotapes.

b. Video Culture

Copper Giloth will be giving a presentation to the Video Culture group of Canada in November.

# 13. JAGDA

Toshi Kawahara of the Japanese Graphic Design Association (JAGDA) reported that his group formed a committee on computer graphics last year and has already held activities. In October, they will be holding an event, "New World of Expression Using Computer Graphics", and speakers will include Tom DeFanti and Aaron Marcus. Tom will be presenting many works shown at SIGGRAPH's film & video show. Toshi will send SIGGRAPH a report after the event.

Also, Toshi had published an article on the SIGGRAPH '82 art show which he showed the executive committee. He appreciated receiving a copy of last year's slides and proceedings and will send us the JAGDA annual report. He looks forward to our continuing to share publications.

# 14. SIGGRAPH conference site selection

Elaine Sonderegger and Pat Cole made a presentation on future conference sites. The following cities were recommended; they will make a definite selection for '89 prior to the board's October meeting.

- '84 Minneapolis
- '85 San Francisco
- '86 Dallas
- '87 Anaheim
- '88 Atlanta
- '89 New Orleans-

recommendation contingent on a site selection trip

'90 San Francisco-

recommendation pending '85

They also mapped out a strategy for a 6-year cycle. The intent is to rotate between the West Coast, Mid-West and East Coast. Dallas, Atlanta and Anaheim are definite SIGGRAPH cities. Others are in a state of flux. New Orleans, San Francisco, and eastern cities Boston, Washington D.C. and New York, should be evaluated in an on-going fashion.

Boston is building larger convention facilities and should definitely be considered. New York union costs are on par with San Francisco, but New York has a bad reputation. Vancouver was suggested, although discouraged because of exhibitor problems; Elaine and Pat will investigate.

# 15. IEEE Technical Committee (TC) on Computer Graphics

Chip Hatfield wished to confirm SIGGRAPH's cooperation with IEEE for the next 5 years so he could list the SIG-GRAPH conferences on the IEEE calendar. We will need to re-file Technical Meeting Request Forms for all those conferences. Bob Ellis will work with Chip to make this happen.

# 16. Workshop on Motion

Norm Badler reported that the Workshop on Motion was a success. A total of 24 papers were submitted. These papers and summaries of the workshop and all the sessions will be published in the near future.

# 17. SIGGRAPH bibliography reference

Gunther Schrack reported that Alain Fournier requested a mag tape of the last 2 years of Gunther's Computer Graphics bibliography list. John Beatty also requested one.

Tom suggested that Gunther handle these requests informaily. If it becomes too involved and there are too many requests, SIGGRAPH will initiate formal procedures.

# 18. Computer graphics standards

A lengthy discussion of standards took place. SIG-GRAPH's actions with respect to GSPC were criticized and praised.

Several people said we should pursue new standards activities. The first priority, however, is to understand the current status of standards. Sara Bly is coordinating a standards ad hoc committee.

 There was a motion to adjourn (5-for; 3-against). The meeting was adjourned at 9:00 p.m.

# SIGGRAPH Treasurer's Report October 1983

SIGGRAPH's fiscal year ends on June 30 of the designated year. The final income and expense figures for FY'83, as provided by ACM headquarters, are shown in Table 1.

The main point to be gleaned from all of these numbers is the fact that the members' dues (\$110,630) do not come anywhere near paying for the members' benefits. The primary benefit, of course, are the publications received by all of the members, the conference proceedings in particular. The direct cost of providing these publications to the membership totals well over \$250,000. Administrative and related costs raise the total even higher. The conclusion is that the conference income subsidizes the members.

This is even more obvious in the FY'84 budget, which was first published in the May 1983 issue of Computer Graphics. However, the income from the conference was significantly less than had been anticipated. As a result, we have had to cut the budget, eliminating some support for workshops and local groups, as well as cutting back on administrative costs. A revised FY'84 budget is shown in Table 2.

It remains the intent of the executive committee to continue to have members' benefits subsidized by income from the conference, to continue to send the conference proceedings to all members, to support workshops, regional conferences, standards, and local groups, and to start and support other appropriate and worthwhile computer graphics activities that will benefit the members.

We welcome your comments, suggestions, and ideas. Let us hear from you, as that is the only way we can be sure that we are meeting the needs of the membership.

Ron Lusen SIGGRAPH treasurer

# ASSOCIATION FOR COMPUTING MACHINERY Report to SIGGRAPH Membership Fiscal Year 1983 Actual Income and Expenses

INCOME		IST QTR.	2ND QTR.	3RD QTR.	4TH QTR.	TOTAL
SIG member dues		26,194	27,053	27,700	29,681	110,628
Newsletter Back Issue Sales						
Proceedings Sales		22,822	11,762	26,633	35,097	96,314
Conference Net Income		(12,000)	64,622	(12,105)	22,839	63,356
Other		13	63	196	565	837
TOTAL INCOME		37,029	103,500	42,425	\$8,183	271,137
EXPENSES						
Travel and Subsistence		14,786	1,309	4,123	(2,642)	17,576
Temp. Help (Secretarial)		501	1,159	2,439	449	4,548
Temp. Help (N/L Preparation)						
Communications (Telephone)		1,411	2,766	5,088	6,360	15,625
Office Mailing and Handling		3,736	4,237	4,281	8,124	20,378
Stationery & Supplies		366	311	251	(234)	694
Minor Printing (Brochures, Announcements)		4		2,255	5,170	7,429
Copying and Duplicating			127			127
Pub. printing (production)		134,645	22,102	42,928	475	200,150
Wrapping, Handling		1,736	1,100	13,627	900	17,363
Shipping and Freight		1,914	3,337	546	518	6,315
Publication postage		4,847	4,431	19,183	4,960	33,421
Data Processing		2,836	2,899	1,945	1,623	9,303
Promotion/Advertising				1,741	1,741	3,482
Chapter Support		1,500			1,000	2,500
Meetings & Spec. Functions		31	891	1,293	329	2,544
Other Miscellaneous Expenses		25,103	5,093	6,474	8,706	45,376
Headquarters Allocation		6,402	5,522	6,264	5,532	23,720
TOTAL EXPENSES		199,823	55,285	112,438	43,011	410,551
NET FY'83		(162,794)	48,215	(70,013)	45,172	(139,420)
as of date 6-30-82 FUND BALANCE FY*83	297,279	9-30-82 134,485	12-31-82 182,700	3-31-83 112,687	6-30-83 157,859	157,859
earned interest FY*83						12,485
Adjusted Fund Balance FY'83						170,344

Table 1.

# Revised FY '84 SIGGRAPH BUDGET

### INCOME: Member dues \$124,000 Publication sales \$ 37,500 Conference \$250,000 Video review \$ 30,000 Publications Air Service Fees \$ 13,000 Art Show (See Note) \$ 45,000 Slides \$ 30,000 Total Income \$529,500 EXPENSES: Travel \$ 31,300 Office \$ 53,950 Publications \$245,000 Workshops and regional conferences \$ 10,000 Awards \$ 1,800 Video review \$ 40,000 \$ 30,000 Slides \$ 10,000 Data processing Local Group Support \$ 5,000 Other \$ 12,500 ACM allocation \$ 40,125 Contingency funds \$ 30,000 Total expenses \$509,675

Note: Art show expenses exceeded \$90,000 but were covered in the conference budget.

# Table 2.

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# ANNOUNCEMENTS

# Eurographics '83 Report

R. Daniel Bergeron SIGGRAPH Representative

# **Conference** overview

Eurographics '83 was held in Zagreb, Yugoslavia, August 29-September 2. Just as with the SIGGRAPH conference, the first two days are devoted to tutorials, with the formal conference taking place during the last three days. The location of the conference was the principal factor in determining its nature. The conference had the intimate atmosphere of a small "academic" gathering. There were only five tutorials, six or seven exhibitors, and 260 official attendees. The Eurographics Association expected the small response, but is committed to developing and maintaining a truly international character even if that means receiving less income from their conference.

## **Technical programme**

The technical program consisted of four invited papers, three panels and 30 technical papers. The invited papers and panels were always presented with no competition, whereas the technical papers were presented in as many as three parallel sessions. The invited papers were all generally of a survey nature, rather than describing basic research. The panels benefitted from the more intimate environment and generally included extensive audience participation. Given the wide range of interests presented in the 30 papers, the parallel sessions did not present a serious problem for the attendoes. The quality of the technical program was certainly lower than what we expect from SIGGRAPH, but there was some interesting work presented. Eurographics does succeed in presenting much more work in the applications area than SIGGRAPH. Nine of the 30 papers could be classified as "applications," GKS also figured very prominently with six papers covering various aspects and/or implementations of GKS. In addition, two of the three papers designated as "best" were devoted to GKS. As the SIGGRAPH representative, I presented an invited talk on "Current Research Trends in Computer Graphics" and participated in a panel on graphics standards.

### Tutorials

The pre-conference tutorials were relatively small, and seemed to be well-received by the attendees. The notes for the tutorials are more extensive and more professional than those typically produced for SIGGRAPH tutorials. They are more like monographs, than the copies of overhead slides used by SIGGRAPH. The honorarium paid to the tutorial speakers is essentially intended to compensate for the effort invested in the notes. The tutorials offered this year included:

Introduction to Computer Graphics Interactive Techniques Graphics Systems and Standards (GKS) Surface Design Geometric Modelling

# Future EG conferences

Eurographics '84 will be held in Copenhagen in September and promises to be the largest and most ambitious conference over planned by Eurographics. The central and attractive location, the ease of travel access, and the aggressive efforts of the organizers may result in a conference about the size of SIGGRAPH '77 or '78. EG '85 will probably be held in southern France, with Benelux as a strong possibility for EG '86.

# Report on Current Graphics Standards Activities

Elaine L. Sonderegger

Several significant milestones in computer graphics standards development have been achieved in the last few months.

At its October 1983 meeting, the American National Standards Committee on Computer Graphics Programming Languages (ANSC X3H3) voted to forward draft proposed American National Standards for both the Graphical Kernel System (GKS) and the Virtual Device Metafile (VDM) to its parent body, the Standards Committee on Information Processing Systems X3. Both draft proposed standards should be available for public review and comment shortly. It is anticipated that the public review period for the Virtual Device Metafile will be December 1983 through March 1984, and the public review period for GKS will be January through April 1984. (See ACM requests for comments in SIGGRAFFITI and CACM.) The vote to forward the Virtual Device Metafile draft proposed standard to X3 was unanimous; the vote to forward the GKS draft proposed standard to X3 was 47 to 1, with SIGGRAPH the lone No vote. The SIGGRAPH No vote was based on the belief that GKS is an inappropriate building block for a single family of compatible graphics standards. In particular, GKS provides only two-dimensional object description capabilities, and attempts to add three-dimensional capabilities to GKS have been unsuccessful to date.

The International Standards Organization (ISO) Technical Committee 97 (Information Systems), Sub Committee 5 (Programming Languages), Working Group 2 (Graphics) met in Gananoque, Canada in September 1983. That group voted to have the Virtual Device Metafile document produced by ANSC X3H3 registered as an ISO Draft Proposal, to be circulated within Sub Committee 5 for a three month letter ballot. Previously, many members of Working Group 2 had actively participated in the development and refinement of the Virtual Device Metafile.

The ISO GKS work item was subdivided into two parts: Graphical Kernel System—Functional Description and Graphical Kernel System—Functional Description—3D Extension. The 3D Extension work, sponsored by the Netherlands, will consist of a minimal extension of GKS to incorporate three-dimensional capabilities. It is hoped that all technical issues associated with such a minimal 3D extension of GKS will be resolved by the next Working Group 2 meeting in June 1984.

ISO Working Group 2 invited ANSC X3H3 to submit and sponsor a work item on PHIGS, the Programmer's Hierarchical Interactive Graphics Standard. Work on PHIGS is continuing within ANSC X3H3, with the next draft of the document expected in the spring of 1984. It is not anticipated that PHIGS will be strictly compatible with GKS.

Within both ANSC X3H3 and ISO Working Group 2, work is continuing on language bindings for GKS. A Fortran binding is included in the draft proposed American National Standard version of GKS. Other languages for which bindings are being developed include Ada, Pascal, and C. A set of graphics extensions to Basic also has been developed, principally by the ANSC Basic committee.

Work also is continuing within ANSC X3H3 on the development of a Virtual Device Interface specification. It is anticipated that the Virtual Device Interface specification will be available for public review and comment in the summer or fall of 1985.

SIGGRAPH has continued with its efforts to standardize the 1979 GSPC Core System. In September 1983 the ACM Executive Committee decided that the issue of whether or not

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ACM should become a standards making organization was more properly an issue for the ACM Council to decide. At the ACM Council meeting in October 1983, a straw vote strongly supported the development of detailed standards making procedures. A final decision on ACM standards is anticipated at the February 1984 ACM Council meeting. It should be pointed out that any ACM standards making procedures will be in accordance with the rules and procedures of ANSI and will include a period for public review and comment.

SIGGRAPH is considering sponsoring a standards workshop. Possible topics include a conceptual framework for standards development and development of various leading-edge standards proposals. Additional information on such a workshop will be published in Computer Graphics as it becomes available.

# SIGGRAPH '84 Planning Progresses

One thing was perfectly clear after the November 4 SIG-GRAPH '84 committee meeting ended—ACM SIGGRAPH will once again host the year's premier computer graphics conference.

SIGGRAPH '84 Conference Co-chairs are Richard M. Mueller of Control Data Corporation and Richard A. Weinberg of Cray Research, Inc. They will guide the efforts of a committee that is dedicated to providing SIGGRAPH '84 attendees with guality offerings.

"SIGGRAPH '84 will build on the success of our previous conferences and serve as a showcase for the dynamic computer graphics industry," said Weinberg.

For example:

- Exhibit sales are 12 percent ahead of sales at this point last year, reported Exhibit Chair Wayne Huelskoetter of Dicomed, Inc.
- Technical Program Chair Hank Christiansen of Brigham Young University and Panels Chair David Luther of Lexidata Corporation expect strong submissions by their January 9 deadline.
- Course Chair Mike Bailey of Purdue University plans to offer as many as 30 course topics.
- Art Show Chair Patrick Whitney of the Illinois Institute of Technology has moved to a curated show, focusing on the design arts.
- Film & Video Chair Maxine Brown of Maxine Brown Associates intends to expand the already impressive evening presentations to include other forms of electronic entertainment media.
- SIGGRAPH '84 will be the site of the first totally computer-generated Omnimax film. The film will include submitted works from computer graphics artists all over the country.

All SIGGRAPH members will receive complete program information and registration forms by May 1. For information prior to then, contact the SIGGRAPH '84 Conference Office, 111 East Wacker Drive, Chicago, Illinois 60601; (312) 644-6610.

Interested exhibitors should contact the SIGGRAPH '84 Exhibit Office, Robert T. Kenworthy, Inc., 866 United Nations Plaza, New York, New York 10017; (212) 752-0911.

# **'86 Chairs Named**

Raymond L. Elliott and Ellen Gore have been named conference co-chairs for SIGGRAPH '86 to be held August 18-22 in Dallas, Texas. Elliott and Gore were nominated by the SIGGRAPH conference planning committee and unanimously approved by the SIGGRAPH executive committee.

The chairs can be reached as follows: Raymond L. Elliott Los Alamos National Laboratory P.O. Box 1663 MS 272 Los Alamos, NM 87545 (505) 667-7356

Ellen Gore 1SSCO 10505 Sorrento Valley Road San Diego, CA 92121 (619) 452-0170

# **Call for Reviewers**

# G.F. Schrack, Editor, References and Reviews

Computer Graphics and Computing Reviews require reviewers for texts, books and papers. SIGGRAPH members are urged to volunteer by contacting the Editor for References and Reviews (address see front inside cover) and/or the Editor of Computing Reviews (see Computer Graphics 17 (2: May 1983), 155). The majority of the books listed in "A brief survey of texts and books in computer graphics," (See Computer Graphics 17(4: October 1983), 205), should be reviewed. The four book reviews appearing in that issue indicate the style and length of a review. If you wish to become a reviewer, please contact me and indicate your preferences. I will arrange that a copy of the book will be sent to you. The book may be kept if the review is accepted by the editors.

# **Call for Slides**

All are invited to submit images for the SIGGRAPH technical slide set to be distributed beginning at SIGGRAPH '84.

The images in the SIGGRAPH technical slide set are representative of the most recent technological advances, creative artistry and innovative applications in computer graphics. This collection demonstrates state-of-the-art computer graphics being done by industry, academia and the art world.

Images chosen for this slide set are also often used for other SIGGRAPH purposes such as posters, proceedings and conference publicity.

Slides must be submitted by April 1, 1984. Send your slides (each slide accompanied by the completed form on the next page) to: Smith, Bucklin and Associates, Inc., 111 East Wacker Drive, Chicago, Illinois 60601; attention Patty Hayes.

# Slide Submission Form

Submit a completed copy of this form for each slide.

1.	Submitter's name:
2.	Company:
3.	Address:
4,	Telephone: ()
5.	Slide title (optional):
6.	If you are submitting more than one slide, please number them in consecutive order, on the top left corner of the front of the slide mount. The number of this slide is:
7a_	If the image was developed using in-house hardware and software, complete the following: Artist/programmer(s)
	Company:
7b.	If you are submitting images produced by another company but displayed or recorded on your equipment, please credit the artist and company responsible for the image:
	Artist/programmer(s):
	Company:
	Recording device:
8.	Technical information (one to two sentence description of hardware and software used):
	in each slide mount, print the author's name on the top center, front. This will help us orient the slides properly.
• 1	lides will only be returned upon request. here is no guarantee that your images will be accepted for publication. The editors reserve the right to include only those images seeting their specific criteria.
0	IGGRAPH reserves the right to use selected images for conference promotion. Published images will be marked with the proper opyright notice to protect the artist from having others unknowingly copy or reproduce his work without permission. Justions should be directed to: Ellen Gore, ISSCO, 10905 Sorrento Valley Road, San Diego, California 92121; (619) 452-0170.
Ser	d your slides and completed forms to: Smith, Bucklin and Associates, Inc.

Smith, Bucklin and Associates, Inc. 111 East Wacker Drive Chicago, Illinois 60601 Attention: Patty Hayes

# Dynamics

# Maxine D. Brown

"Dynamics" conjures up thoughts of rapid movement, a phenomena exemplified by our industry. This column highlights some of the newly created conferences, research activities, videotapes, magazines, books—in computer science, engineering, art, video and design—with one unifying theme: COMPUTER GRAPHICS. To publicize your activity, please send a brief description to Maxine Brown, Maxine Brown Associates, 15391/i Westwood Blvd., Los Angeles, CA 90024; (213) 477-7151. Publication deadlines require that your information be received three to six months prior to the event. (Disclaimer: The listing of an activity or event does not constitute an endorsement by the SIGGRAPH executive committee.)

ADULT COMPUTER CAMPS...Before one can study computer graphics, he needs an appreciation of computer science fundamentals and some hands-on computer experience. According to the August 22, 1983 issue of TIME magazine, page 61, there's a new type of creative retreat to help the un-computer adult master this new electronic information medium...the adult computer camp! TIME writer Philip Elmer-DeWitt reports: "Camp settings range from the spartan to the sublime. In Scotts Valley, California, Nolan Bushnell, the founder of Atari, will provide a rustic redwood scene where campers bring their own sleeping bags and mix VisiCalc with volleyball. The Computer Resort in Chico, California, sponsored by Texas Instruments, features jumbo-size steaks barbequed around a swimming pool. Princess Cruises in Los Angeles will coordinate 15 hours of classes with a 10-day sail that includes calls at Mazatlan, Puerto Vallerta and Acapulco. Cost: \$1995. Prefer your silicon seminars on terra firma? For \$879, Club Med provides Atari computers along with whitesand beaches and pina coladas at Punta Cana in the Dominican Republic." Additional computer camps reported in the article include the Blue Ridge CompuCamp in Georgia, Summer Computer Institute at Amherst College in Massachusetts, and Clarkson College's Family Computer Camp in Potsdam, New York. The best news is that the IRS views adult computer camps as a tax-deductible business expense!

THE SECOND LINK... is a major exhibition of 30 videotapes by artists from Canada, the United States, Great Britain and Europe, organized by the Walter Phillips Gallery of The Banff Centre School of Fine Arts with the generous support of the Canada Council and the Government of Canada Department of Communications. An international tour is being organized for 1984-1985. For further information, contact the Walter Phillips Gallery, The Banff Centre School of Fine Arts, Box 1020, Banff, Alberta, Canada TOL OCO, telephone (403) 762-6283. Lorne Falk is the curator.

PUBLICATION TO ACCOMPANY "THE SECOND LINK"...is an informative 60-page book containing color reproductions on the artists in the exhibition and 9 essays by Gene Youngblood (California Institute of the Arts), Sandy Nairne (ICA, London), Carl Loeffler (ArtCom magazine), Kathy Huffman (Long Beach Museum of Art), Peggy Gale (from Toronto), Lorne Falk (Walter Phillips Gallery), Dorine Mignot (Stedelijk Museum, Amsterdam), Brian MacNevin (Walter Phillips Gallery), and Barbara London (Museum of Modern Art, New York). For orders and institutional discounts, write: Art Metropole, 217 Richmond Street West, Toronto, Ontario, Canada M5V 1W2, telephone (416) 977-1685.

TECHNOLOGY, ENTERTAINMENT, DESIGN (T.E.D.) ...an exciting multi-media communications conference bringing together the leading-edge creators of technological advances in information distribution. Professionals in business, technology, film, television, advertising, marketing and design will be exposed to the broadest spectrum of state-of-46/Computer Graphics \* January 1984 the-art communication technology, February 23-26, Monterey, California. Speakers include: Nicholas Negroponte (MIT); Benoit Mandelbrot and Richard Voss (IBM); Ed Catmuli (Lucasfilm); Stewart Brand (author of THE WHOLE EARTH CATALOG, currently at work on THE WHOLE EARTH SOFTWARE CATALOG); Robert Abel (Robert Abel and Associates); Russell Aldrich (Apple Computer Inc.); Michael Schulhof (chairman of the Strategic Planning Committee and a director of Sony Corporation of America); Herbie Hancock (electronic composer and musician); John Naisbitt (author of MEGATRENDS); Vincent Spezzano (president of USA TODAY newspaper); Steve Sohmer (senior vice president of NBC Entertainment). Harry Marks (Marks & Marks), Frank Stanton (president emeritus of CBS Inc.) and Richard Wurman (graphics designer, publisher and author creator of NYC/ ACCESS, LA/ACCESS, etc. guide books) are conference cochairs. Conference fee is \$475, and registration is limited. For more information, contact Judi Skalsky, Director, T.E.D. Communications Conference, 635 Westbourne Dr., Los Angeles, CA 90069, (213) 854-6307.

BOOK ANNOUNCEMENTS...the following books were recently published:

COMPUTER IMAGES: STATE OF THE ART by Joseph Deken, Stewart, Tabori & Chang, NY, 1983

DIGITAL IMAGE PROCESSING by William Green, Van Nostrand Reinhold, 1983

INTERACTIVE COMPUTER GRAPHICS SYSTEMS edited by William C. House, Van Nostrand Reinhold, 1983

INTRODUCTION TO THE GRAPHICAL KERNEL SYSTEM (GKS) by Hopgood, Duce, Gallop and Sutcliffe, Academic Press Inc., a subsidiary of Harcourt Brace Jovanovich, 1983

MATHEMATICAL METHODS IN COMPUTER GRAPHICS AND DESIGN edited by K. Brodlie, Academic Press Inc., 1980

MICROCOMPUTER GRAPHICS AND PROGRAMMING TECHNIQUES by Harry Katzan, Jr., Van Nostrand Reinhold, 1983

COMPUTER GRAPHICS DIRECTORY '84...published by Computer Graphics World, is a comprehensive directory of graphics hardware and software companies, as well as various service and support groups. It contains over 1,200 listings of hardware, software, consultants, service bureaus, associations, conferences and educational sources; recent start-up companies are included. The directory is fully crossreferenced and indexed for easy use. For ordering information, write Computer Graphics World, c/o PennWell Directories, P.O. 21278, Tulsa, OK 74121.

ORANGE COAST COLLEGE COMPUTER GRAPH-ICS CENTER...offers an impressive array of interdisciplinary courses dedicated to computer graphics. Courses cover such areas as: Introduction to Computer Graphics, Color and Design for Computer Graphics, Motion Graphics/Computer Graphics, Programming/Computer Graphics, Math Topics for Computer Graphics, CAD, and Documentation/Computer Graphics. The well-equipped Computer Graphics Lab encourages individual interaction; there are 29 Apple II + graphics stations, each with monochrome and color monitors attached, light pens, joysticks, digitizers, printers, plotters, film recorder and video camera. The program is coordinated by Donna Westerman, Fine Arts Chair, Orange Coast College, 2701 Fairview Rd., Costa Mesa, CA, 92626, (714) 432-5735.

UNIVERSITY OF CALIFORNIA-LOS ANGELES (UCLA) VISUAL ARTS EXTENSION PROGRAM... offers professional training in graphic design including handson skills as well as methodologies and practical problem-solving of design projects. Learning the new technologies and how they impact the field is an integral part of this program. Students have the opportunity to learn hands-on computer graphics to ensure an up-to-date professional training. Course topics include: Computer Graphics for Print and Electronic Transmission; Introduction to the Role and Applications of Computers in Graphic Design; Computer Graphics: A Survey of Affordable Systems and Their Capabilities—Medium to Low Cost Range; CAD/CAM for Graphic, Product and Industrial Design: A Hands-on Class; Graphic Design: An Introduction to the Use of the Computer; Computer Graphics: Art Technology of the Future; and, Computer-Aided Design/ Graphics: A Hands-On Course for Graphic Designers, Interior Designers, Architects and Landscape Architects. For information and counseling, contact the Graphic Design Program, The Arts, UCLA Extension, P.O. Box 24901, Los Angeles, CA 90024, (213) 206-8503.

# Upcoming Events

# 1984 CADRE Conference January 8-11, 1984 Santa Clara, Calif.

Computers in Art, Design, Research and Education (CADRE) will be held January 8 through 11, 1984, at Mission College in Santa Clara, Calif. The conference program features presentations from nationally recognized experts in the use of the computer in creative and instructional applications; an in-service teachers institute; computer music concerts; an art show featuring pieces generated with the use of computers; tours to Santa Clara County (a.k.a. Silicon Valley) companies that are developing state-of-the-art computer equipment for art, design and educational environments.

The conference is sponsored by the San Jose State University Art Department, Mission College and the West Valley College Foundation. For registration information, contact Marcia. Chamberlain, San Jose State University Art Department, (408) 277-2542.

Employment Register ACM Computer Science Conference February 13-16, 1984 Philadelphia, Penn.

The Twelfth Annual Computer Science Employment Register will be conducted at the Franklin Plaza Hotel. This register aids in matching computer scientists and data processing specialists with employer opportunities. The purpose of the register is to provide a mechanism for establishing contact between applicant and employer in a professional manner. The register operates as follows: the applicant completes a form giving identifying information, education, publications, experience, interests, references, position and salary desired. The employer completes a similar form giving identifying information; position available along with starting date, salary and benefits; and education, experience and specialization requirements for the position.

For more information, contact: Orrin E. Taulbee, ACM Computer Science Employment Register, Department of Computer Science, University of Pittsburgh, Pittsburgh, Penn. 15260. Semaine Internationale De L'Image Electronique (The International Week of the Electronic Image) May 21-25, 1984 Biarritz, France

Semaine Internationale De L'Image Electronique will be held May 21-25, 1984, in Biarritz, France. Sponsored by CESTA (the Commission for Study of Advanced Science and Technology) in cooperation with ACM SIGGRAPH France, this conference will attract attendees from all levels—science, government, manufacturer, student, artists. More than 400 technical papers have been submitted.

For information, contact Bernie Dresner, c/o SIGGRAPH France, Commission Superieure Technique, 11 Rue Galilee, 75116 Paris France or contact CESTA, Semaine Internationale De L'Image Electronique, 5 Rue Descartes, 75005 Paris France. Telex number: 250795F. Telephone number: 331-634-3298.

The First International Conference on Computers and Applications June 20-22, 1984 Beijing (Peking), China

This conference will include technical presentations on all aspects of computers and applications. These may include design methodologies appropriate to computer architecture, software systems, data base management systems, office information systems and new developments in machine intelligence and computer graphics. The conference is co-sponsored by the Chinese Institute of Electronics Computer Society and the Institute of Electrical and Electronics Engineers Computer Society.

For more information, contact: Harry Hayman, IEEE Computer Society, 1109 Spring Street, Suite 300, Silver Spring, Maryland 20910; (301) 589-8142.

# IFIP Working Conference on Problem Solving Environments for Scientific Computing June 17-21, 1985 France

IFIP TC2 will be holding a working conference on "Problem Solving Environments for Scientific Computing at the INRIA-SOPHIA-ANTIPOLIS Laboratory in France June 17-21, 1985. A problem-solving environment (PSE) is an integrated multi-tasking system that supports the solution of a given problem. In many scientific areas, computer software has been developed with specialized high-level languages, complex data structures, graphical displays and post-processors.

The meeting will include both invited and contributed papers. Those interested in attending should write to the conference chairman, B. Ford, NAG Central Office, 256 Banbury Road, Oxford OX2 7DE, England, preferably including a brief description of their work and interests in the area. Please also indicate whether you will be able to finance your own expenses.



SIGGRAFFITI is published quarterly by the Association for Computing Machinery's 11,000 member Special Interest Geoup on Computer Graphics at 111 East Wacker Drive, Chicago, Illinois 60601. ACM/SIGGRAPH membership inquiries? Contact ACM, 11 West 42nd Street. New York, New York 10036; (212) 869-7440.

# ACM SIGGRAPH '84

The Eleventh Annual Conference on Computer Graphics and Interactive Techniques will be held July 23-27, 1984, Minneapolis, Minnesota. Courses, technical program, exhibition, film & video shows, Omnimax film and art show are scheduled.

For registration information, contact: SIGGRAPH '84 Conference Office, 111 East Wacker Drive, Chicago, Illinois 60601; (312) 644-6610.

Interested exhibitors should contact: SIGGRAPH '84 Exhibition Office, Robert T. Kenworthy, Inc., 866 United Nations Plaza, New York, New York 10017; (212) 752-0911.

# PUBLICATIONS AVAILABLE

- Proceedings of SIGGRAPH '83 (Detroit, July 25-29, 1983). 440 pages; 34 papers, 11 panels, 10-year index. ACM/SIGGRAPH members: \$30. Others: \$40. Order no. 428830
- Proceedings of the SIGGRAPH/ SIGART workshop titled Motion: Representation and Perception (Toronto, April 4-6, 1983). 214 pages; 24 papers. ACM/SIGART/SIGGRAPH members: \$10. Others: \$15. Order no. 430830

# GKS TO BE DISTRIBUTED TO SIGGRAPH MEMBERS

The SIGGRAPH executive committee approved a \$45,000 budget to cover the expense of printing and mailing the GKS document. Printing will commence as soon as final permission from ANSI is granted.

# SIGGRAPH CONFERENCES ADOPT LOGO

A SIGGRAPH logo has been designed by Seitz, Yamamoto, Moss, Inc. of Minneapolis. This new logo will be used on future conference printed materials and other SIGGRAPH publications in addition to the ACM logo.

# SIGGRAPH '84 CALL FOR PARTICIPATION

Technical papers: January 9, 1984 Acceptance notification: March 19, 1984 Final papers: April 30, 1984 Contact Technical Program Chair Hank Christiansen, Civil Engineering, 368CB, Brigham Young University, Provo, Utah 84602; (801) 378-6325.

Panels proposals: January 9, 1984 Acceptance notification: March 19, 1984

Contact Panels Chair David A. Luther, Lexidata Corporation, 755 Middlesex Tumplice, Billerica, Massachusetts 01865; (617) 663-8550.

- Proceedings of SIGGRAPH '82 (Boston, July 26-30, 1982). 352 pages; 30 papers, 4 abstracts, 11 panels. ACM/SIGGRAPH members: \$22. Others: \$32. Order no. 428820
- Proceedings of SIGGRAPH '81 (Dallas, August 3-7, 1981). 344 pages: 36 papers, 2 panels. ACM/SIGGRAPH members: \$21 Others: \$30. Order no. 428810.

# COLOR SLIDE SETS

SIGGRAPH color slide sets are perfect tools for teaching courses and convincing management of computer graphics applications!

 SIGGRAPH '83 Technical (78) ACM/SIGGRAPH members: \$25. Others: \$30. Order no. 915830 Art show submissions: January 9, 1984 Contact Art Show Chair Patrick Whitney, Institute of Design, Illinois Institute of Technology, 3360 S. State Street, Chicago, Illinois 60616; (312) 567-3250.

1983

acm

Film & video show submissions: June 25, 1984

Acceptance notification: July 13, 1984 Contact Film & Video Show Co-chair Maxine D. Brown, Maxine Brown Associates, 15391/2 Westwood Boulevard, Los Angeles, California 90024; (213) 477-7151.

Technical slide set: April 1, 1984 Contact Slide Sets Chair Ellen Gore, ISSCO, (619) 452-0170. Send submissions to Smith, Bucklin and Associates, Inc., 111 East Wacker Drive, Chicago, Illinois 60601; attention Patty Hayes.

- SIGGRAPH '83 Art Show (78) ACM/SIGGRAPH members: \$25. Others: \$30. Order no. 915831
- SIGGRAPH '83 Exhibition (74) ACM/SIGGRAPH members: \$25. Others: \$30. Order no. 915832
- SIGGRAPH '82 Technical (78) ACM/SIGGRAPH members: \$20. Others: \$25. Order no. 915820
- SIGGRAPH '82 Art Show (74) ACM/SIGGRAPH members: \$20. Others: \$25. Order no. 915821

# HOW TO ORDER

Order publications and slides by sending checks or money orders payable to ACM, Inc., or request the free ACM publications catalog, by writing: ACM Order Department, P.O. Box 64145, Baltimore, Maryland 21264. Be sure to include order number and your ACM/ SIGGRAPH membership number.





Four new hours of videotape have been edited and duplicated to form issues 8, 9, 10 and 11 of the SIGGRAPH Video Review. Each issue is on videotape and is one-hour long. The material in the tapes is in full color and represents advanced applications of computer graphics technology, both hardware and software.

Both 3/4" U-matic and VHS formats are available. We do not make Beta or 1/2" reel-to-reel tapes. PAL and SECAM tapes also are not available.

The 34" tapes are one-hour long. One issue fits on one tape. Thus, the four new issues occupy four tapes. At the ACM SIGGRAPH member price of \$50/tape, all four issues come to \$200. The nonmember prices is \$60/tape, so all four are \$240. Educational institutions may use the member price. For overseas airmail, please include an extra \$10/tape, or \$40 for the set. Similarly, all 11 issues come to \$550 for members, \$660 for non-members, plus \$110 in additional postage for overseas airmail if necessary.

The VHS videotapes are two hours long. Two issues are on each tape, except for issue 7. Issues 1 & 2, 3 & 4, 5 & 6, 8 & 9, 10 & 11 are each \$50 for members, and \$60 for non-members. Issue #7 is \$40 for members, and \$50 for non-members. The same surcharge of \$10/tape applies for overseas postage. Thus the new issues, 8, 9, 10 and 11, are \$100 for members and \$120 for non-members. All 11 issues are \$290 for members, \$350 for nonmembers, with an additional \$60 for overseas airmail.

# Ordering information:

 You MUST send a check payable in U.S. funds drawn on a U.S. bank. I will return purchase orders unfilled. Return airmail postage is included in the price for North American orders. If you are in an extreme rush, include your Federal Express number.

Make the check payable to SIGGRAPH.

 Send check and order to: Tom DeFanti, UIC/ EECS, Box 4348, Chicago, Illinois 60680. (For Federal Express, use 531 S. Plymouth Ct., Chicago, Illinois 60605).

 Write or call for clarifications. My phone number is (312) 996-5485. I do not loan copies or provide press copies.

For best results, include a statement specifying which tapes you want and in which format. Or, include this form and circle the appropriate items below:

Tape format: 34" or VHS Issues wanted: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11

# Contents of Issue 1:

- Edited 5/15/80
- 1. TOPES-Bell Laboratories
- 2. Newswhole-University of Toronto
- 3. VideoCel-Computer Creations, Inc.
- 4. Sunstone-Ed Emschwiller
- 5. Voyager 2-J. Blinn et. al.
- 6. Information International Inc. Demo Reel
- 7. DNA with Ethidium-N. Max et. al.

Contents of Issue 2:

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- 9. Pantomation-T. DeWitt et. al.
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Contains information on four new issues!

ACM TO VOTE ON VDM ACM, in its capacity as a member of the Standards Committee on Information Processing Systems X3 working under the procedures and policies of the American National Standards Institute, will be asked to vote next spring on the suitability of the Virtual Device Metafile (VDM) as a standard mechanism for retaining and transporting graphics data and control information. The Virtual Device Metafile was devel- oped by the American National Stan- dards Committee on Computer Graphics Programming Languages (ANSC X3H3). Many members of the International Standards Organization Working Group on Graphics also parti- cipated actively in the development and refinement of the VDM. VDM presently	SIGGRAPH LOCAL GROUPS SIGGRAPH has 10 local groups currently names and telephone numbers of contact p For details, contact Ron Lusen, Princeton Box 451, Princeton, N.J. 08544; (609) 68 Australasia lan Moore (02) 224-4702 Chapel Hill Austin/Grant/Geoss/Carruthers (919) 962-7553 Chicago Maria Mezzina (312) 996-3002 Delaware Valley Dick Moberg/Eric Podietz (215) 923-3299 Los Angeles Molly Morgan (213) 546-5355	persons. Several others are in formation. University, Plasma Physics Lab, P.O.
is both a draft proposed American National Standard and a draft proposed International Standard. Copies of the VDM draft proposed standard may be ordered from the American National Standards Institute, 1430 Beoadway, New York, New York 10018; (212) 354-3300.	DO YOU HAVE A SPECIAL WORF SIGGRAPH-sponsored workshops are a n computer graphics. If you have an idea fo Sara Bly, Lawrence Livermore National Li Livermore, California 94550; (415) 422-6	nears of addressing specific topics in r a graphics workshop, please contact aboratory, P.O. Box 5504 M/S L-156,
Please send comments on the suitability of VDM as both an international and a U.S. standard for a graphics data inter- face to Elaine L. Sonderegger, ACM SIGGRAPH Representative to ANSC X3H3, 264 Shagbark Drive, Derby, Connecticut 06418. Comments should be received by February 15, 1984.	Fall 1984 O	ance and Japan, the SIGGRAPH '83 art w. enn State, University Park, Pennsylvania Intario Science Center, Don Mills, Ontario fuseum of Science, Richmond, Virginia to their town should contact Joanne
NEW SLIDES EDITOR APPOINTED Elien Gore is collecting slides for the 1984 SIGGRAPH technical slide set as well as supervising the production of the art show and exhibition sets for SIGGRAPH '84. Thanks to Steve Levine who has served for six years as fiche and slides editor. Steve, an expert in film recording technology, will con- tinue as a technical advisor for slide	FROME PAPER WINS AWARD Look for "Incorporating the Human Factor in Color CAD Systems" by Fran- cine Frome in the 20th Design Automo- tion Conference Proceedings. Frome, Bell Labs, received the best presentation award at the ACM/IEEE Design Auto- mation Conference this year. Her paper discusses how to make use of user studies and behavioral research to design more effective and productive	*83 COURSE NOTES AVAILABLE A complete record of 21 tutorials and seminars held at SIGGRAPH '83 can be yours if you purchase the SIGGRAPH '83 course notes set. The cost is \$250 for ACM/SIGGRAPH members and \$310 for others. Send your check made payable to SIGGRAPH to: Tom DeFanti, UIC/EECS, Box 4348, Chicago, Illinois 60680. No purchase orders will be accented.

tinue as a technical advisor for slide production. Send your slides to: Smith, Bucklin and Associates, Inc., 111 East Wacker Drive, Chicago, Illinois 60601.

design more effective and productive CAD systems.



See the enclosed SIGGRAPH Video Review listing . . . including four new issues!

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# Letters on Core System Standardization

The following letters were sent to various members of the ACM Executive Committee and ACM Standards Committee as they began considering the SIGGRAPH proposal to adopt the 1979 GSPC Core System as an ACM standard. A forum discussing the pros and cons of Core System standardization will appear in the February 1984 issue of Computer Graphics World.

I am informed that the ACM is being asked to label documents as "ACM standards", and that the Status Report of the Graphic Standards Planning Committee of SIGGRAPH (more familiarly the "Core") is proposed as the first such document. I understand that the motivations for this proposal are:

- A claim that the Core is a de-facto standard, and deserves recognition as such.
- Concern about the slow pace of international standardization.
- Concern about the inefficient dissemination of draft international and American national standards.

I have been an active participant in the development of standards for computer graphics over the past six years'. This process started, in 1978, as an attempt to get the Core adopted as an international standard. As soon as this proposal was subject to consultation with interested parties through the procedures of ANSI, it was rejected. This position has repeatedly been voted upon in the relevant ANSI committees, and continually re-affirmed. Had, at any time, the ANSI committee brought the Core forward, it would have been given the same detailed and careful review to which GKS was subject when the German committee submitted it. I was a participant in the 1978 International Standards Organization morting at which submission of the Core was urged upon Robin Williams, the SIGGRAPH representative.

Despite ACM's standing as an international body, the proposal is viewed as exclusively U.S. inspired, and intended to serve narrow U.S. interests. The weight attaching to the U.S. position in international standards committees is so large that other countries find it difficult to make their positions felt. The proposal, which appears to lack any mechanism for international review, will be viewed as a means for making U.S. proposals completely immune from international comment. The constructive participation of ANSI in the development of GKS is, on the other hand, viewed as a hopeful precedent. In my judgement, an attempt now to nullify ANSI's support for GKS will gravely impair U.S. ability to get future proposals for programming language standards adopted internationally.

As a non-U.S. member of ACM and SIGGRAPH, I oppose both the concept of ACM standards, and this instance of it. As a user and implementor of graphics systems I do not consider the Core technically adequate, either as a system or as a document. As a participant in the international standardization process, I urge the ACM not to destroy hard-won international cooperation by thoughtlessly usurping a role for which they are not equipped.

David S. H. Rosenthal Carnegie-Mellon University

'I chaired the British Standards Institute working group in this area, and co-chaired the technical review of GKS for the corresponding international working group. I am writing to express my views on the SIGGRAPH championship of the CORE systems as to the first ACM standard. I am a member of the ACM and of SIGGRAPH. I am also a member of ANSC X3H3, Technical Committee on computer graphics.

1 do not support SIGGRAPH's action on behalf of CORE. With GKS soon to be an international as well as national graphics standard, the move to standardize CORE can only (and already has) confuse the users. The CORE effort was very beneficial to the development of graphics and is very important to this industry's growth. GKS incorporates many CORE principals.

The users needing a 3D computer graphics standard already are using CORE as a de facto standard. An official acceptance of CORE as a standard will not gain much for these users. Rather when an ANSI and ISO 3D standard is published, CORE would serve as a point of divergence for vendors and users alike.

Education of programmers in the issue of programmer portability should also be addressed. In the 70's, the book by Newman and Sproull was considered the definitive graphics text. CORE concepts were described in detail. In the 80's, the book by Foley and van Dam is considered the key text. Both CORE and GKS concepts are described and discussed.

ACM and SIGGRAPH are leaders in the computer industry. Let us remember that many members represent countries other than the USA. I will not support an action that pulls the U.S. community away from an international standard. In the recent SIGGRAPH election, a number of us voted against certain board members because of their stand on this issue by voting for the challengers.

I acknowledge and applaud SIGGRAPH's efforts in helping to standardize graphics by doing the base line development needed to get this infant industry growing. There are yet many areas of research and development to explore. I suggest the SIGGRAPH board initiate such development efforts, the results of which can be submitted for generalization, fine tuning, etc., by future standard groups.

Janet S. Chin Member, ACM Member, ACM/SIGGRAPH Member, ANSC X3H3

As a member of ACM and SIGGRAPH, I would like to express my concerns about the possible attempt by the SIG-GRAPH board for making the 1979 GSPC Report a standard.

I have been involved in the standardization effort in the graphics area since 1977 and have enjoyed many discussions with SIGGRAPH colleagues about graphics standards, in particular the GSPC CORE.

The CORE document you intend to publish lacks the incorporation of better functionality, structuring and especially methods for achieving portability and device independence which have evolved between 1979 and today. Other branches of the standardization work have indeed successfully incorporated these improvements. Moreover, these documents such as GKS (180 DP79-12) and the proposed ANSI PHIGS document have been or are submitted to a carefully defined and very effective public review procedure.

For those reasons 1 am strongly opposed to promote a document, which we can now only look upon as an essential but now long past intermediate stage, to be an international standard. I therefore would suggest that ACM does not undertake action to branch off from the main stream of standardization efforts.

The international standardization community, notably ISO/TC97/SC5/WG2 graphics of which I am also a member would be most happy to welcome the participation of and input from the ACM and/or SIGGRAPH expertise.

Paul J.W. ten Hagen Associate Member of ACM and Member of SIGGRAPH

As a member of ACM and SIGGRAPH as well as a member of ISO/TC97/SC5/WG2 I would like to express my concerns about the possible attempt to seek approval for the GSPC 1979 proposal as an ACM "standard" by the ACM board. I have the impression that this step will be taken without the knowledge or consent of the ACM members. Besides that, I feel that adoption of the GSPC proposal will not be in the best interest of industry and graphic's community. Not only because of the interference of ISO/ANSI standardization activities and other standardization activities will confuse the graphic's community, but also because there has not been any real public review of the GSPC 79 proposal.

Besides of that, I feel, that the GSPC 79 proposal lacks the incorporation of methods for portability and device independency that evolved since 1979.

The adoption of the ISO D.I.S. GKS has been approved internationally. A 3D extension of GKS will be due soon.

ISO's WG2 will continue its work on providing international standards for graphics.

I have the impression that there is a small persistent lobby trying to get more formal acceptance of the GSPC79 proposal, although a previous attempt to have IEEE sponsor this process has failed.

I strongly recommend ACM to support one international standardization arena only, namely ISO, and I therefore ask the ACM board to carefully consider the possible consequences before approving the GSPC79 proposal to become an ACM "standard". To me it is clear that now is the wrong time to forward the GSPC 79 proposal as a "standard"; although some years ago it might have been the appropriate basis.

L.R.A. Kessener

I am deeply concerned and confused by the attempts of ACM to circumvent the graphics standards movements by ANSI and ISO. The long awaited positive movements towards a fully supported set of international standards are to be in no way expedited by ACM's recent actions.

In fact, the clear consensus of the graphics community as reflected in an ANSI 47 to 1 vote showing the overwhelming support of the current standards projects and likewise the lack of support behind "CORE". In fact, the single vote came from SIGGRAPH.

Any further attempts to standardize "CORE" will cause SIGGRAPH to lose its credibility in the graphics industry and users community.

I strongly urge ACM not to consider adopting "CORE" as an ACM standard but rather back the efforts of ANSI and ISO.

Thomas B. Clarkson, III President, Graphic Software Systems During the week of September 19-23, Working Group 2 met in Gananoque Canada.

During that meeting, the subject was raised of possible ACM action with regard to standardization of proposals for Computer Graphics.

By unanimous vote of WG2, I have been instructed to provide to you a copy of the attached resolution, with the intent that this resolution will provide the ACM executive board with the benefit of understanding WG2's views on the subject.

Juergen Schoenhut Convenor ISO TC97/SC5/WG2

Resolution referred to in Schoenhut letter

WHEREAS: WG2 has become aware that ACM is being asked to review and approve adoption of the Status Report of the Graphic Standards Planning Committee (also known as the Core System) as a "Standard".

and

- WHEREAS WG2 is involved in a formal process designed to obtain wide international participation in the development and adoption of national and international standards for computer graphics. This process is designed to ensure that these standards are agreed not merely by the national and international graphics community, but also by experts in related areas such as programming languages, virtual terminals, transmission protocols, and text processing.
- and WHEREAS: Much of the work of WG2 has been based on the concepts and principles set out in the Core documents. WG2's objection to these documents being labeled as "standards" is not primarily based on their technical content, but rather on the fact that they have not been subject to this process. Thereby they did not gain necessary attributes such as international concensus and compatibility with standards in related areas (in particular, lack of language bindings). Consequently, it is not practical to certify implementations as conforming to a Core "standard".
- and WHEREAS: The effect of labelling these documents as "Standards" will be to subvert the international standardization process. Despite ACM's status as an international organization, this proposal is already universally perceived as a United States initiative. The attempt to do so damages the credibility of ANSI as the only possible US voice in this process by direct contradiction of ANSI stated positions. In view of the dominance of the United States computer industry, future international standards are unlikely to be effective without credible US participation.

and

WHEREAS: Further, the attempt subverts the established mechanism of ensuring compatibility with relevant standards in related areas.

THEREFORE:

WG2 resolves to welcome the constructive participation of ACM in improving the standardization process in particular by addressing apparently shared concerns about the effective dissemination of draft standards for public comment, and the speed of the adoption process. However, WG2 respectfully requests that ACM not label the Core or any other document as a "Standard" for computer graphics.

While not a member of ACM, I feel strongly about the SIGGRAPH Board's attempt to seek approval for making the 1979 GSPC Report (CORE) a standard.

As Chairman of ISO/TC97/SC5/WG2 subgroup on 3D graphics I can report that all the members of the subgroup at the recent WG2 meeting were against parallel development of computer graphics standards. The subgroup includes members of ANSI, BSI & DIN. We feel that the CORE was an important lead in computer graphics development but it is no longer appropriate to consider it a proposal as a standard.

The subgroup is now actively pursuing the development of graphics standards appropriate to 3D. I would urge you to encourage those people, in SIGGRAPH, who have an excellent technical background, to join my group.

Please contact me if you wish any further information.

W.T. Hewitt University of Manchester

ACM-SIGGRAPH has announced its intention to publish the GSPC Core Graphics System as an ACM Standard. I am writing to you on this matter as a member of ACM and SIG-GRAPH and as a person that has been contributing to the design and review of Computer Graphics Standards for several years. Whereas I recognize the great merits of GSPC-Core initiating the process of standardization in the area of Computer Graphics, exploring new models for Computer Graphics systems and pushing forward the state of the art in Computer Graphics, I strongly oppose the promotion of GSPC-Core to an ACM standard, for the following reasons:

- a) Although implementors and vendors of the GSPC-Core system refer to it as the "Core Standard", it misses an essential property of such a standard, namely to allow portability of application programs between all different implementations of the standard. The different implementations of the GSPC-Core system differ significantly because there is no one agreed language binding for the standard and because there are no established rules or procedures to resolve ambiguities in a uniform manner.
- b) There already exist several standardizing organizations both within the US and internationally. This is sensible as long as they deal with standards in different areas. Different organizations issuing standards in the same field make the design and use of standards more difficult and more complex. This clearly cannot be the interest of members of ACM and ACM-SIGGRAPH.
- c) Since the publication of the GSPC-Core in 1979, considerable effort was invested in refining and improving models and functionality of other Computer Graphics standards. GSPC-Core did not undergo the complete review process imposed on standardization projects within the recognized standardization organizations required before full agreement can be reached. Therefore, GSPC-Core still contains ambiguities and technical deficiencies. It represents the state of the art as of 1979, GSPC cannot be considered technically adequate today.

I also would like to point to the fact that ACM is an international organization with a great number of members outside the U.S. The legal and political consequences of turning ACM into an international standardization organization cannot be completely foreseen at present. In the international community a first 2D standard for Computer Graphics was designed within ISO, various national standardization organizations have agreed to adopt that standard.

Decisions have been taken in the ISO standards group on Computer Graphics to create an internationally agreed 3D-standard. While the merits of GSPC-Core are unquestioned by all experts in the field, and while existing implementations will continue to serve their users (at least until the new developments are finished), the publication of GSPC-Core as an ACM standard will offer no help to any GSPC users. On the contrary, there is a chance that such a step will interfere with the standardization activities, both within the US and internationally. I therefore ask you to reconsider such a decision and not to issue GSPC-Core as an ACM-standard.

# Gunter Enderle

Kernforschungs-Zentrum Karlsruhe

I understand from US colleagues that ACM is considering the possibility of approving GSPC 79 as a "standard". I am chairman of the ISO subgroup of TC97-SC5-WG2 concerned with graphics metafiles. I urge your organization to reject this proposal. I have a number of reasons.

- In 1979 the GSPC '79 document was passed from ACM-SIGGRAPH to ANSI and the X3H3 group within ANSI took it as a baseline document for many of their initial efforts. However the experts on computer graphics within X3H3 rewrote the GSPC'79 document to eliminate deficiencies and inconsistencies attributable to the commendable speed with which it was produced. GSPC'79 is no longer the baseline document for any ANSI effort.
- An active body of people have worked hard since the production of the seminal GSPC and GKS documents in 1979. From their efforts, considerable progress has been made towards standards for
  - functional description for computer graphics (GKS)
  - graphics metafile (ANSI VDM)
  - · graphics virtual device interface
  - 3D extensions to GKS
  - programmers hierarchical interaction graphics standard

These efforts have built up close working relationships between ANSI X3H3 and the other national standards groups working on graphics standards. International agreement on standards in this area is dependent on this type of collaboration and the mutual trust that it generates.

- It is plain to see that it takes time to reach agreement on standards for computer graphics. All estimates of timescales have proved overoptimistic, due to the complexity of the task, not the effort available and contributed. A contributory factor is the rate of change in the prevalent technology.
- 4. Any standard must specify criteria for conformance by which products which claim to conform may be tested. This in turn requires the standard to be internally as self-consistent and unambiguous as possible. GSPC'79 is neither sufficiently consistent nor has any adequate criteria for testing conformance. By contrast the standards efforts noted above have expended considerable effort in these areas on all its work.

I would therefore suggest that the proposal to approve GSPC'79 is technically unnecessary and inappropriate, will cause the international community to doubt the usefulness of involving US participation, is ill-timed and will not even serve those who have packages implementing GSPC-79.

C.D. Osland Rutherford Appleton Laboratory

54/Computer Graphics • January 1984

As a member of ACM and ACM SIGGRAPH, I regularly receive the SIGGRAFFITI newsletters. In the June 83 edition of SIGGRAFFITI, I found to my greatest surprise the announcement that ACM intends to make the Core 79 the first ACM standard.

I have been a member of German and international standardization committees and, therefore, know very well the merits of the Core system at its time but also the deficiencies. Before undertaking a new effort with the Core system, ACM should consider the following points:

- ACM should take into account the standardization efforts which have been taking place since 1979 which have led to a graphics standard and which are still continuing.
- ACM should check whether the 1979 Core system serves the needs of the graphics community in 1984. Note that in ISO a standard undergoes a revision every 5 years and according to this rule the Core system has to be updated.
- 3. Before issuing a standard, ACM should develop an appropriate procedure for the development of standards. For example, in ISO a public review is mandated. A public review of Core 79 would surely identify the deficiencies of the Core system and help to bring it into a mature state required for a standard.

Issuing the Core System in its current state would not improve the reputation of ACM and would affect the work within the standardization bodies which primarily is done by SIGGRAPH members.

Dr. Klaus Kansy Gesellschaft fwer Mathematik und Datenverarbeitung mbH

I am writing to you concerning two issues soon to be considered by the ACM Executive Board: (1) whether ACM should formally sponsor "ACM Standards" and, if so, (2) whether the ACM-SIGGRAPH GSPC graphics Core System should be adopted as an ACM Standard. I have been a member of ACM since 1968 and a member of ACM-SIGGRAPH since 1973 (serving on the SIGGRAPH Board from 1977 to 1979). My loyalties to the Association are very strong; my concern for the impact that decisions regarding these questions will have on the effectiveness of ACM and SIGGRAPH motivate this letter.

I am opposed to the concept of "ACM Standards." Despite the income that could be generated by publication and sale of such standards, I believe the costs will outweigh the benefits. The costs are both direct and indirect. Direct costs are substantial and represent a long-term commitment to develop, maintain, and interpret the standard for the community at large. Will these costs be offset by sales income? Even if careful financial analysis shows that the answer is "yes," I am more concerned by the indirect costs to ACM of such a program.

Unless ACM is planning on paying the people who develop, maintain, distribute, and interpret standards, ACM will have to rely upon volunteers. These days, people are overcommitted, and it is harder and harder to staff all the worthwhile activities of the Association. Association members are technical experts—the best in their field. Those of us committed to standards focus our voluntary efforts through American National Standards Committees. Staffing an ACM Standards effort with new people would draw their energies away from the other, already-undermanned activities sponsored by the Association. In many of these other areas ACM is the only technically-qualified and effective force. In any case, a decision of this magnitude deserves input from a broader base than simply the graphics community. The expected benefits to be realized and the costs, both direct and indirect, should be presented to the ACM community and as much consensus as possible obtained before ACM proceeds along this path. Without the support of the ACM membership, who will ultimately have to provide the volunteers to staff and lead the effort, a formal ACM Standards activity cannot succeed.

With regard to the second question, I am also opposed to the adoption of the GSPC Core System as an "ACM Standard," should such a thing come into being. My objections fall into several categories—some technical, some economic, and some general.

Technical Objections-The GSPC Core System proposal addressed the first of two technical impediments to portability of graphics software; viz., device-independence. Its widespread influence is a measure of how well it succeeded. The second impediment, portability of the graphics application, was only partially addressed by the Core System. In 1977 we decided that specifying the programming language syntax for the user interface was inappropriate and premature. (I say "we" because I was one of the eight people who designed the original Core System proposal in 1976-1977.) Since then, the Core System has served as a "guideline" for many deviceindependent graphics subroutine systems, including GKS, the Draft International Standard currently being processed by X3 as a draft proposed American National Standard (dpANS). But guidelines are not standards, and what the industry and user community needs now is a standard that includes both semantics and syntax. Language bindings for Ada, BASIC, C, FORTRAN, Pascal, and PL/I for the dpANS GKS are in various stages of development. For ACM to duplicate this effort for the Core System would be wasteful and timeconsuming. For ACM not to provide language bindings for the Core System would be contrary to the best interests of the ACM membership.

Economic Objections-As an independent supplier of end-user graphics applications, my company (and thousands of vendors and users like me) will have to incur substantial costs to provide two versions of every product or application: one built on the ANSI Standard GKS and one on the Core System. The confusion caused in the minds of the general public by having two "standards" whose scope overlaps considerably can be overcome only by a vast amount of time, money, and effort spent on user education differentiating between the purposes and uses of the two "standards." (Are there, fact, many good reasons for having two standards that overlap as they do?) The time delay caused by such confusion may also be expected to slow the acceptance of graphic standards in general. The standards development process is already slow enough; to introduce more delay at this stage is hard to justify in view of the critical need to provide standards with which to build widely-distributed, well-engineered applications.

General Objections-My last argument attempts to convey to you what perceptions others in the graphics community have about ACM in general and SIGGRAPH in particular. People are saying that SIGGRAPH is being obstructionist and is acting with a "sour grapes" attitude because the Core System was not adopted by ISO and the ANSC X3H3 graphics committee. As evidence, they point to SIGGRAPH's seeming inability to accept technical compromise as the method of achieving the consensus so necessary for standards to be widely adopted and used. They will be able to cite SIGGRAPH as the only ANSC X3H3 member (out of about 45 voting members) to vote against forwarding dpANS GKS for public review and comment. (Note that the vote was not to approve GKS, but only to circulate the dpANS for public review.) A side effect of the sole negative vote will be to delay the public review period by one to two months. I happen to believe that SIGGRAPH's motives are sincere, but that is because I personally know the individuals involved. What bothers me is the impression being given to our new members who don't necessarily know the people. I do know that the overseas reaction (in the UK, Germany, Austria, the Netherlands, and France) is unfavorable and unflattering to ACM and SIGGRAPH. ACM's credibility as an *international* organization is being questioned. I urge you to seek out the opinions of others, especially the SIG-GRAPH Board members who do not favor this proposal.

I apologize for this lengthy letter. I'm sure you recognize that the issues you are being asked to deal with are complex and your decision will have ramifications outside the technical realm. I would be happy to discuss these views personally with you at your convenience.

Peter R. Bono, Athena Systems, Inc.

As a SIGGRAPH member, and ACM member since 1965 (#1054287), 1 feel compelled to comment on possible ACM support of SIGGRAPH action seeking formal standards status for the GSPC Core 79 report. No one asked me, or the rest of the international and domestic SIGGRAPH members, if they endorsed an action which requires a long term commitment and represents a strictly American point of view.

As vice chairman of ANSI X3H3 I can report that a resolution opposing the planned SIGGRAPH action was overwhelmingly approved earlier this year. I can only add that subsequent votes to forward GKS as an ANS have become increasingly closer to unanimous.

As the person responsible for coordinating IBM's world wide position on graphic standards I can inform you of IBM's support for the (GKS based) X3H3 activity. It is consistent with IBM's participation in the voluntary formal standards development process, operating under the guidelines developed by ANSI.

I believe that endorsing even the evaluation of Core 79 as a standard could cause a schism between ACM and some vendors, between the domestic and international members of ACM, and between ISO and ANSI.

For these reasons I ask you to study the issue carefully before moving forward. I am confident that X3H3 would provide any level of detail you wish on all of the questions raised above to either you or your delegate.

Barry J. Shepherd

I am writing to you as Chairman of the ACM Board with respect to the attempt by the SIGGRAPH Board to seek approval for making the 1979 GSPC Report (aka. CORE) a standard. I am a member of the ACM and SIGGRAPH, but as the SIGGRAPH Board has taken this important step without the knowledge or consent of its membership, I have only learned of this through my membership on X3H3, the ANSI committee working on standardization of graphics languages. (I head X3H35, working on the GKS standard, and have been working in portable graphics for about ten years and standardization for five.)

In my opinion the adoption of the CORE as a standard would not be in the best interests of the computer graphics industry. For instance, the core does not have a list of routine names and calling sequences for any computer language, minimizing the CORE's potential for aiding in program portability. This would also make certification difficult or impossible. While I realize my personal opinion should not hold great sway with the ACM Board, I would like the Board to know that the proposed action is not noncontroversial. X3H3, with members from a wide spectrum computer graphics businesses, research laboratories, and universities, has approved the U.S. version of the ISO standard GKS by a vote of 47 to 1, with SIGGRAPH as the 1. Continuing with the attempt to standardize the CORE could adversely affect ANSI's relationship with ISO due to agreements that have been reached on who will standardize what. I feel this might tarnish the reputation of the ACM. The relationships between the ACM and the IEEE (which has been unsuccessfully approached to sponsor the CORE standardization effort) may be damaged, as well as those between SIGGRAPH and NCGA (the National Computer Graphics Association.)

Please have the ACM Board consider the possible adverse consequences carefully before approving the continuation of the CORE standardization effort. If I can be of any assistance in providing additional information on this question, please do not hesitate to contact me.

Thomas Wright ISSCO

As a member of ACM and as a designer of a long-range plan for use of computer graphics within the FAA, I am writing to you to enlist your support for the adoption of the SIGGRAPH GSPC ("Core") system as an ACM standard and eventually, as an alternate three-dimensional graphics standard for the computer industry.

As you are no doubt aware, recent actions of ANSI X3H3 make it unlikely that an ANSI/ISO three-dimensional graphics standard will be adopted before the end of this decade. This delay in drafting a standard is unacceptable. The growth of the graphics industry requires standardization if the consumers of graphics systems are not to be placed in untenable situations: the inability to exchange graphics products electronically.

Within the FAA we have drafted a master plan that requires two separate, incompatible, graphics exchange paths. These paths serve users of engineering graphics separately from users of administrative graphics, a distinction that is totally artificial, but dictated by the lack of industry standards. We have established a goal of unifying these paths by 1988. When we drafted this plan, we assumed (as did other graphics users) that ANSI was well on its way towards a three-dimensional graphics standard in line with the X3H3 goals established in 1980. It now appears that ANSI is now even farther away from a threedimensional standard than they were 1980. We cannot tolerate these delays and I am sure that other users cannot either. For example, the entire office automation industry is now engaged in marketing incompatible systems, a situation that forces large organizations to restrict competition if they expect to exchange graphics information by other than paper media. Thus the lack of a graphics standard can be seen as inhibiting the growth and acceptance of office automation.

I do not mean to suggest that adoption of the Core system as an alternate standard will solve all of these difficulties. However, the Core system is a proven, though imperfect, system and its adoption as an alternate standard now may give our industry enough working room to provide an orderly growth path without the delays inherent in the ANSI/ISO effort and without being presented with a de facto standard imposed by a consortium of Japanese firms.

I urge you, as a member of ACM's executive board, to be receptive to the SIGGRAPH plan when it is presented to you.

Mark F. Lewis Federal Aviation Administration As an ACM member, as secretary of the ANSI X3H3 committee, and as the representative of hundreds of computer graphics users at Sandia Labs, I am very concerned about the steps the Council may soon take to adopt the GSPC Core as a standard. Let me explain why I think it would be a mistake to make the Core a standard.

The technical merits of the Core versus GKS can be debated in great detail, at great length, causing great boredom for the majority of computer graphics users. I suggest that all one really needs to understand are two facts which make the rest of the discussion irrelevant.

Fact number 1: The Core will never be adopted as an international standard, no matter what happens to it in the United States. The Computer Graphics Committee of the International Standards Organization (ISO) has already adopted GKS, has been working on a 3-D version of GKS, and will soon hear a proposal to work on a hierarchical, interactive graphics package which maintains as much commonality as possible with GKS, allowing for the different nature of the applications. The ISO group and the interests they represent around the world are solidly behind GKS and are showing no interest in the Core.

So consider what this fact means to the U.S. computer graphics vendors. A vendor would have to be pretty shortsighted to think that he would never want to sell his products in Europe, Japan, or anywhere but the U.S. He had better support what the foreign buyers have said they want (through their ISO representatives), namely GKS. He may support Core too, if he can afford separate development, marketing, and maintenance efforts for two competing products. But GKS will be his first choice. The vendor who already supports Core must continue to support it, but he will also have to develop GKS products to stay competitive. This may not be so bad if he can take advantage of it as an opportunity to enter a new market.

Making the Core a U.S. standard will not change the vendor scenarios I've described, with the possible exception of fooling some vendors into not believing or not understanding the implications of fact number 1. They will not survive long in a highly competitive market.

Fact number 2: The Core does not provide portability, which is the one most important thing you want from a standard. The Core's fatal flaw, which makes it practically useless as a standard, is that it has no language bindings. This means that practically every Core implementation has its own unique set of routine names, its own unique way of ordering parameters, maybe even its own unique way of grouping functionality within routines. And that, in turn, means that a program written for one Core implementation cannot run on any other Core implementation.

Unfortunately for the unwary user, this is a subtle point. It can easily be ignored or glossed over by a slick salesman. How many more users will be taken in by the deception if the misleading label of "standard" is added to the Core? And how much software development effort that could have gone into useful, portable graphics software will be diverted to the unportable standard? You see, even the smart users stand to lose if the amount of portable graphics software available to them is reduced in this way.

These two facts thus lead us to the following conclusions. Most vendors would not adopt a Core standard. Most users would not adopt a Core standard. Those who do adopt a Core standard would be hurt in the long run. If too many are hurt, it could unnecessarily retard the growth of the entire computer graphics industry.

I include an extract from the January 1983 ANSI X3H3 minutes, and officially submit it in addition to this letter as comments on the adoption of the Core as a standard. I hope these comments will help you to better serve the needs of the international community of computer graphics users who are part of the ACM membership.

Randall W. Simons Sandia National Laboratories

Referred to in Simons' letter

# 5.2 SIGGRAPH

The SIGGRAPH board has voted to present the 1979 Status Report of the SIGGRAPH Graphics Standards Planning Committee to the ANSI ISSMB for consideration as a proposed American National standard either by the accredited organization method or the canvass method. SIGGRAPH may ask IEEE to co-sponsor the effort. If IEEE agrees, then the accredited organization method will be used. Otherwise, the canvass method will be used.

Elaine Sonderegger gave the committee some background on this decision. SIGGRAPH asked permission of both ANSI and ISO to publish GKS and was denied. SIGGRAPH feels that they should be able to publish information that is important to their members. SIGGRAPH is also very concerned with the progress and direction within X3H3. They are very concerned with the issue of incompatible 2D and 3D standards. It is the hope of SIGGRAPH that if both GKS and the CORE are standards for several years, one standard could be achieved in the future.

There was considerable discussion about the implications of this action by the SIGGRAPH board. Some people felt that this would only add to the confusion over the various peoposed standards. Others felt that a 3D GKS and the PHIG would meet the needs of the constituency served by the Core.

Motion: Whereas the 1979 GSPC Core System may be proposed for approval as an American National Standard (ANS); should that come to pass, X3H3's position is:

X3H3 regrets that the 1979 GSPC Core System has been proposed for approval as an American National Standard (ANS). X3H3 bases its opinion on the following facts, observations, and judgements:

- X3H3 is soon to recommend GKS (DIS 7942) as an ANS. Ten to fifteen other ISO TC97/SC3 member bodies have indicated an intent to use GKS as a national standard.
- X3H3 has spent nearly three years working closely with the International Graphics Community (through ISO TC97/SC5/WG2) to specify a GKS that is technically sound and acceptable to all national bodies including ANSI.
- ANSI has a firm policy against overlapping standards and standards development activity.
- GKS has a substantial overlap with the GSPC Core System proposal.
- X3H3 is attempting to address the need of the 3D user community, by proposing the work of X3H31 as an ISO TC97 new work item.
- 6. The proposing of the Core System will, at the very least, result in the delay in the acceptance by users of GKS as a National and International standard. It may also lead to a delay in the adoption of GKS as an ANS. Both situations potentially represent a substantial economic loss to industry, consumers, and goverament.

 Approval of the Core System as an ANS would cast serious doubt concerning ANSI's willingness to accept the results of International consensus standards in the programming languages area. This may adversely impact the progress of other ANSI initiatives in this area.

- After a thorough review, X3H3 judged in 1979-1980 and still judges the 1979 Core System as 'technically inadequate', contrary to one of ANSI's criteria for acceptance.
- 9. The 1979 GSPC Core System, although a profound influence in the history of graphics standards development, was nevertheless NOT developed in accordance with either the rules or the spirit of the rules and procedures of ANSI. In particular, no procedure existed to consider the comments arising from the publication of the GSPC Core System proposal in 1979, no body was constituted to make changes suggested as the result of public review, no written responses and few oral responses to comments were prepared and disseminated, and no appeals mechanism was available to those people and organizations whose comments were not answered. In short, although the Core System document was widely disseminated, explained, and discussed, there was no mechanism for formal public review and comment leading to revisions that would reflect a general consensus on the technical adequacy of the Core System.
- 10. The widespread implementations of graphics facilities based on the 1979 GSPC Core System indicate less the technical adequacy of the specifics of the proposal than they do the needs of a rapidly growing and maturing industry for standards in general. The GSPC Core System provided a tremendous lift for graphics; but that it was viewed more as a "guideline" than a true standard is evidenced by the great diversity in Core System implementations. Almost all implementations deviate from the 1979 Core System proposal in at least one significant area; most in several areas. Adoption of the 1979 Core System as an ANS will not provide the vast majority of users the full benefits expected from an American National Standard, especially in the area of program portability. (Bono, Straayer) (29-6-9)

The members voting for the motion were: Amoco, Athena Systems, BNR, Calma, Computer Sciences, Data General, Digital Research, GSS, Hewlett-Packard, Houston Instruments, Hughes Aircraft, Intel, IBM, Imlac, ISSCO, JPL, Lawrence Berkeley Lab., NCAR, NSA, Olivetti, RPI, Sandia, SAI, SDC, Systonetics, Tektronix, US Army, WPL, and Norpak. The members voting against the motion were: Los Alamos National Lab., Precision Visuals, Puk Associates, Sanders Associates, SIGGRAPH, and RHB. The members abstaining were: CDC, DEC, E & S, Lawrence Livermore Lab., McAuto, NBS, Tymshare, Univac, and Wang.

After several telephone conversations with ACM members concerning possible action to forward GSPC CORE as an American National Standard, I have concluded that it is important that I share Tektronix' views on the subject.

First, I am forwarding to you X3H3/83-21, the minutes of our Boulder meeting last January. This contains a resolution by the plenary of X3H3 expressing our concern about such a move. To make the picture complete, I have also included X3H3/83-33, Elaine Sonderegger's views on the resolution.

Tektronix is strongly committed to support the evolution of a single, compatible family of graphics standards evolved to serve the world wide graphics community. We view the current work of ISO TC97/SC5/WG2 to be compatible with the work of ANSI X3H3, and that the work of both is directed toward the goal of compatible national and international standards. We see any attempt to forward an incompatible alternative (CORE) as a formal standard damaging and counterproductive. Tektronix has a substantial investment in CORE related products. We intend to continue to support those products and our customers who have invested in them. We regret that CORE is not playing a more direct role in the formal standards arena. We had worked hard on ANSI X3H3 to support CORE as an American National Standard, but we came to a realization some time ago that it would not come to pass. We would have welcomed support for CORE earlier, but to us it is clear that the time is wrong now.

David H. Stragyer Tektronix, Inc.

The SIGGRAPH Executive Committee has voted to initiate the process to adopt GSPC '79 Core (Computer Graphics, 13, 3) as the ACM Three-Dimensional Graphic Standard.

Why?

- GSPC '79 Core has become the defacto standard offered by vendors. Fourteen exhibitors at SIGGRAPH '82 listed themselves as providing Core Standard Software: Apollo Computer, Aztek Inc., Computer Design and Applications, Digital Equipment Corporation, Genisco Computer Corporation, Intelligent Systems Corporation, ISSCO Graphics, Lexidata Corporation, Megatek Corporation, METHEUS Corporation, Precision Visuals, Sun Microsystems, Tektronix, and Vector Automation.
- GSPC '79 Core is being incorporated into the firmware of new devices; the Tektronix 4100 Series of intelligent graphic work stations.
- GSPC '79 Core is widely known. SIGGRAPH has reprinted that issue of the newsletter several times and distributed in excess of 15,000 copies worldwide.
- GSPC '79 Core is widely available to users. The installations of the various mainframe implementations include;

D1-3000	400 sites
Template	250 sites
Tektronix IGL	in excess of 1000 sites
LANL CGS	50 sites
GW Core	60 sites

- GSPC '79 Core is available on micro computers; Apple Computer has distributed 3500 copies for the Apple II.
- GSPC '79 Core has been implemented in many environments, is thoroughly tested and provides threedimensional facilities along with compatible twodimensional facilities.

We define compatible three- and two-dimensional graphics systems as those in which the two-dimensional facilities are a proper subset of the threedimensional facilities, the three-dimensional and two-dimensional facilities are easy to use, and the three-dimensional and two-dimensional facilities may be intermixed.

7. No other three-dimensional standard is likely to emerge in the near future and it is difficult to add threedimensional facilities to the proposed GKS Standard in a compatible fashion. GKS is a two-dimensional standard and is being adopted by ISO and is currently out for a vote within a subgroup of ANSI; the U.S. version and the international version are different and GKS has not been widely circulated for comment. In fact, SIG-GRAPH was denied permission to reprint it in our newsletter last fall. It is not a present work item of either ISO or ANSI to extend GKS for three-dimensions in a compatible way. The PHIGS project within ANSI has been designing a three-dimensional standard since 1979, it is not compatible to GKS, it may be a work item for ISO WG2 in October of 1983, but a standard is many years away.

 SIGGRAPH has always concerned itself with the tools available to a graphics application programmer and GSPC '79 Core is available from the vendors because the application programmers have demanded it. It is time that we recognize the importance of the GSPC '79 Core and adopt it as the ACM Three-Dimensional Graphic Standard.

# Possible Outcomes

- GSPC '79 Core will not pass the canvassing. We believe that this is unlikely with its large installed base.
- 2. Due to the ACM pressure of a compatible threedimensional standard, ANSI and ISO will get on the ball and develop a compatible three-dimensional version of GKS in a timely fashion. Probably will not happen; currently, ANSI tried to recruit volunteers for this but there are only two recruits. However, if they did develop a compatible three-dimensional standard before we canvass and adopt GSPC '79 Core, then our pressure will have been instrumental in obtaining a compatible three-dimensional standard for the application programmers.

# Summary

We believe that GSPC '79 Core has been proven worthy of adopting as an ACM Standard due to its wide user base and availability in many configurations. It is the unofficial yard stick by which graphic systems are measured. It is time that GSPC '79 Core be given the ACM Official Status it deserves.

# James E. George

I address this letter to you in your role as President of ACM. The subject is graphics standards. Having had a thing or two to do with them over the years, I felt it appropriate to add my comments to the current debate.

The facts as I understand them are as follows.

- The GKS standard is suitable for applications that are primarily 2D and output oriented. Accommodations exist for other capabilities. But, they are just that accommodations.
- The GSPC 79 proposal reflects thinking that is four or five years old and lacks the benefit of understanding that has been developed in the intervening years.
- ANSI X3H3 has done valuable and significant work that evolves the understanding of the components of graphics standards far beyond either GKS or GSPC 79. However, their process is, correctly, slow and deliberate. A resulting standard is probably still more than one year away.

In short, all of the alternatives are flawed--GKS with limited capabilities; GSPC 79 with limited understanding; and ANSI X3H3 with a limited current result.

Unlike 1979, today we have more than 100 commercial suppliers who are beginning to recognize that some form of graphics standards must be incorporated within their products. They are looking to the technology community, of which ACM is one of the primary bodies, for guidance and leadership. Any move they make will be expensive to implement and even more expensive if it is not correct.

What is amazing is that there is still not a clear understanding of the advantages and drawbacks of each of the standardization options. I would posit the following to you. Companies who are in the business of producing graphic services, such as charting and graphing, could benefit from a low-level, semi-conductor implementation of concepts in the GKS standard. Companies who wish to provide a programmable graphic capability, either for their own staff in order to produce products, or as part of products for their marketplace, could benefit from a high level implementation of GSPC 79 in software. As the ANSI X3H3 standards mature and reach adoption and issuance, they offer an upgrade path to those companies who have taken earlier steps either via GKS or GSPC 79.

In short, Dave, what I am trying to say to you is the issue is not "either-or." There is a role and proper use for each of the standardization options that are before the world graphic community today. I would add my voice to others who urge you and ACM to sponsor GSPC 79 for adoption as one of the ANSI X3H3 standards. I do this with the full knowledge that, at best, it is an interim standard, eventually to be superceded by much more sophisticated standards as they evolve from X3H3. In doing so, I would urge ACM to aggressively take the role of the teacher that it is and educate the graphics community as to the viable alternatives available through each standardization option. I would discourage ACM from taking the position that GSPC 79 is "the" graphics standard for all time.

David, I wish to assure you that my position in this letter is based more on the practical issues that my clients raise to me in my consulting practice about the adoption of graphics standards rather than on any emotional consideration that might be expected from a parent for one of its children.

In 1979 the graphics industry and its derivative industries did not account for more than \$200 million in revenues worldwide. In 1984 worldwide revenues for the same community will exceed several billion dollars. It is appropriate and imperative that the technical society which had been the first to sponsor the development of graphic standards in the first place, should also have the courage and wisdom to take a difficult, correct, and courageous position at a very crucial time. I urge the ACM to sponsor GSPC 79 as a candidate for an American National Standard.

Robert M. Dunn R.M. Dunn & Associates, Inc.

We are writing to you as chairman of the ACM board with respect to the attempt by the SIGGRAPH board to seek approval for making the 1979 GSPC report (the core proposal) an ACM standard.

We are both members of ACM and SIGGRAPH and members of the British Standards Institute Computer Graphics Working Group.

It is our opinion that the adoption of the core as an ACM standard would not be in the best interests of graphic standards of the ACM. The core has been proposed and rejected as a standard by existing internationally recognized standards bodies and it would, in our view, only serve to confuse the situation if the core were now to be promulgated as a standard by a body not traditionally recognized as a standards organization.

The BSI Working Group on Computer Graphics have collectively expressed their opposition to this move by SIG-GRAPH, which they see as a divisive influence on the whole standards field.

We would urge the ACM board to consider very carefully the implications of this move by SIGGRAPH, before embarking upon what we view as action that could damage this international standing and high reputation of ACM.

F.R.A. Hopgood D.D.A. Dwce Rutherford Appleton Laboratory

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August 18-22, 1986 Dallas, Texas

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