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Bibliography on Animation of Spatial Data: A Guide to Literature, Video and Movie Media (91-22)

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Authors

Buttenfield, Barbara P.
Weber, Christopher R.
MacLennan, Mark
et al.

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Bibliography on Animation of Spatial Data

A Guide to Literature, Video and Movie Media

Barbara P. Buttenfield, Christopher R. Weber, Mark MacLennan, and John D. Elliott

National Center for Geographic Information and Analysis

Department of Geography, State University at Buffalo

Buffalo, N.Y. 14261

PREFACE AND ACKNOWLEDGEMENTS

This bibliography has been generated as part of the research efforts of NCGIA Research Initiative #7, Visualization of the Quality of Spatial Information, and Research Initiative #10, Spatial and Temporal Reasoning, of the National Center for Geographic Information and Analysis, supported by a grant from the National Science Foundation (SES 88-10917); support by NSF is gratefully acknowledged. Incorporated here are citations from journal articles, monographs, books, and technical reports on research in several disciplines, including cartography, computer science, spatial modeling, and the earth sciences. The common thread is the exploration of methods by which to generate animated visual displays of spatial data.

Animation is an important method of communicating information that lends itself to cartographic display. Cartographers may be delinquent in utilizing this technique. Meteorologists, medical researchers, and physical scientists, employing mini-, mainframe and super-computers, are creating today's most sophisticated animated maps and continue to develop the most sophisticated systems for display of spatial data.

We intend this document to be a tool for the general community, and to provide an overview of research in a topical area that needs to be further explored in its own right. It is clear to us as we complete this literature search that the volume of research that has been reported is being catalogued under categories that are quite diverse. Little if any centralization to the topic we now refer to as Cartographic Animation has penetrated keyword generation to date. We anticipate that this bibliography will reduce the redundancy of research efforts and alert individuals who do not commonly interact within the communality of efforts which strive to promote cartographic animation research. We also intend this bibliography to serve as a starting point for inventory of articles and video materials, rather than a comprehensive inventory.

Special thanks are due to Alan MacEachren and David DiBiase of Penn State University for help locating forthcoming literature, and to Hal Moellering (Ohio state University) and Waldo Tobler (Univeristy of California-Santa Barbara) for providing copies of their animated maps. The selection of articles in Section 1.3 on computer graphics, on graphical design, and on perception, cognition and HCI was based upon encountering citations of these articles in literature on computer and film animation.

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Section 2   VIDEO TAPES AND MOVIES

Pricing information for each videotape is included where appropriate, excluding postage
and handling costs. Anyone interested in obtaining any of these videotapes should contact
the appropriate sources to determine availability and current pricing information. Where
they are known, citations in teh literature are included that refer to a particular animation.
At the end of this section, a list of videotapes and movies is appended for which ordering
information, formatting and prices are not known.

Association for Computing Machinery SIGGRAPH (produced annually) **ACM
SIGGRAPH Video Reviews**

   Format: 1/2 VHS (NTSC), 3/4 U-matic (NTSC)
   Cost: $ 60 each

   Source: SVR Order Department
         c/o First Priority
         P.O. Box 576
         Itasca, Illinois 60143-0576 USA
         800-523-5503 (information and orders)
         708-250-0807 (overseas orders)

   Contents:
   Excerpts of newly issued computer animations shown at annual ACM SIGGRAPH
   conferences (varies with video review issue)

Citation:

 SIGGRAPH Video Review Listing, **Computer Graphics**, (1990), 24:3, 129-135.

(Author unknown) (1990) **Supercomputing Review: Volume 1**

   Format: 1/2 VHS (NTSC)
   Length: 30 minutes
   Cost: $ 25

   Source: Media Magic
         P.O. Box 507
         Nicasio, California 94946 USA
         800-882-8284 (orders)
         415-662-2426 (inquiries)
         415-662-2225 (Fax orders)

Baecher, R.M. (1987) **The Dynamic Image: Pioneering Computer Graphics at the University of Toronto, 1967-1987, Restrospective**

Format:	1/2 VHS (NTSC or PAL)
Length:	53 minutes
Author:	Ronald M. Baecher, Producer and Director
Cost:	$125 (ISBN 1-55860-030-2)
	$ 10 Preview Copy (ISBN 1-55860-030-P)

Source:　　　Morgan Kaufmann Publishers
　　　　　　　2929 Campus Drive, Suite 260
　　　　　　　San Mateo, California 94403
　　　　　　　415-578-9911 (inquiries)
　　　　　　　800-745-7323 (orders)
　　　　　　　415-578-0672 (Fax orders)

Contents:
A historical compilation of work by the students, faculty, staff and alumni of the University of Toronto illustrating the advances in human-computer interface design and the production of realistic computer-generated graphical imagery.

Citations:
　Danahy, J.W. (1987) Sophisticated image rendering in environmental design review, **Conference Proceedings, Human Factors in Computing Systems and Graphics Interface**, April 5-9, Toronto, Ontario, 211-218.

　Danahy, J. W., and R. Wright (1988) Exploring design through 3-dimensional simulations, **Landscape Architecture**, 78(5), 64-71.

Chesters, D. and Krueger, A.J. (1989) **Animated Atlas of TOMS Ozone Data, 1978-1988**

Format:	1/2 VHS (NTSC)
Length:	40 minutes
Cost:	$ 20

Source:　　　National Space Science Data Center
　　　　　　　Request Coordination Office
　　　　　　　NASA / Goddard Space Flight Center / Code 633.4
　　　　　　　Greenbelt, Maryland 20771
　　　　　　　301-286-6695

Contents:
This video consists of sequences of time-lapse imagery from the Total Ozone Mapping Spectrometer (TOMS) on NASA's NIMBUS-7 weather satellite. The video was originally produced as a browsing tool for the TOMS digital database. It illustates global atmospheric physics and dynamic climatological features.

Citation:
　Chesters, D., and A.J. Krueger (1989) A video atlas of TOMS ozone data, 1978-88, **Bulletin of the American Meteorological Society**, 70(12), 1564-1569.

DiBiase, D., Krygier, J., Reeves, C., MacEachren, A. and Brenner, A. (1991)
Elementary Approaches to Cartographic Animation.

Format: 1/2 VHS (NTSC)
Length: 30 minutes
Cost: $ 10 or send blank tape

Source: Department of Geography
                  302 Walker Bldg.
                  Penn State Univeristy
                  University Park, PA 16802

Contents:
"Uses of the Temporal Dimension in Carotgraphic Animation presents a variety of
applications of time that can be exploited in geographical analysis and
communication. "The Visual and Dynamic Variables of Cartographic Animation"
explores elementary design principles devised in the context of static graphics and
the impact of adding a temporal dimension to a display.

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(Editor unknown) (1990) **Visualization in Scientific Computing**

Format: 1/2 VHS (NTSC)
Length: 60 minutes
Cost: $ 65

Source: Media Magic
                  P.O. Box 507
                  Nicasio, California 94946 USA
                  800-882-8284 (orders)
                  415-662-2426 (inquiries)
                  415-662-2225 (Fax orders)

Contents:
Computer Simulation of the Global Climatic Effects of Increased Greenhouse
Gases. W.M. Washington, T.W. Battge, G.A. Mechl, L. VerPlank and J.B. Yest
Study of a Numerically Modeled Severe Storm
       R. Wilhelmson, H. Brooks, B. Jewett, C. Shaw and L. Wicker
Modeling the Pacific Ocean Response to Forcing by Wind and Waves
       M. Johnson, J.J. O'Brien and A. Davies
Photometric Classification of Cloud Types on Jupiter. W.R. Thompson

Citation:
    **Visualization in Computational Science: The International Journal of
        Supercomputer Applications**, 4(2), 1990, MIT Press, Cambridge
        Massachusetts.

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Fisher, P. F. (1991) **Modelling soil map-unit inclusions by Monte Carlo simulation**.

Format: TURBO Pascal executable on IBM 720 MB DOS diskette
Cost: Contact the author

Source: Dr. Peter Fisher
                Department of Geography
                University of Leicester, UK

Contents:
A raster graphics simulation of soil parcel attribution where the likelihood of a pixel being displayed as a particular type of soil is determined by a combination of its likelihood of being that type of soil and a random process. Animation techniques are used to iterate the display in viewing time, according to a Monte Carlo process.

Citation:

Fisher, P. F. (1991) Modeling and Visualizing Uncertainty in Geographic Data. In: Beard, M.K., Buttenfield, B.P. and Clapham, S.B. (1991) **Scientific Report of the Specialist Meeting on Visualizing the Quality of Spatial Information.** NCGIA Technical Report, Santa Barbara California, forthcoming.

Fisher, P. F. (in press) Modelling Soil Map-Unit inclusions by Monte Carlo simulation. **International Journal of Geographic Information Systems.**

Hibbard, W and Santek, D (1989) **Presidents' Day Storm**

Format: 1/2 VHS (NTSC)
Length:
Cost: No charge - send a blank videotape

Source: Dr. William Hibbard
                Space Science and Engineering Center
                University of Wisconsin - Madison
                Madison, Wisconsin 53706

Citation:

Hibbard, W., L. Uccellini, D. Santek, and K. Brill (1989) Application of the 4-D McIDAS to a model diagnostic study of the president's day cyclone, **Bulletin of the American Meteorological Society**, 70(11), 1394-1403.

Higley, D.K. K.I. Takahashi, and R.F. Mast (1990) **Interactive Display of Petroleum Exploration Through Time Across the Continental United States**.

Format: ten 3 1/2 in. diskettes
Length:
Cost: $101.50
Source: North Carolina Geological Survey Field Office
            OF 90-0676

Contents:
A color animation which shows the type of petroleum produced within adjacent 1 sq. mile areas, or cells, for 49 petroleum provinces across the U.S. Maps are displayed in cumulative 5-year increments for each province. The oil, gas, oil and gas, or nonproduction category of each cell is coded by color with sympols.

Klein, F.W. and Walter, S.R. (1989) **Aftershocks of the Loma Prieta Earthquake: Computer Animations**

Format: 1/2 VHS (NTSC)
Length: 22 minutes
Cost: $ 21   No charge for borrowing (two-week loan)

Source: U.S. Geological Survey   (for purchasing video)
            Books and Open-File Reports
            Federal Center, Box 25425
            Denver, Colorado 80225   USA

            U.S. Geological Survey Library   (for borrowing video)
            Special Collections MS 955
            345 Middlefield Road
            Menlo Park, California 94025   USA
            415-329-5009

Contents:
The various types and aspects of aftershocks from the October, 1989 Loma Prieta, California earthquake are illustrated using computer animated sequences. The aftershocks are viewed from a variety of three-dimensional perspectives.

Citation:

   Aftershocks of the Loma Prieta Earthquake: Computer Animations. U.S. Geological Survey Open-File Report 89-0687.

Moellering, Harold (1978) **A Demonstration of the Real Time Display of Three Dimensional Cartographic Objects** distributed by Harold Mollering, Ohio State University.

Format: VHS
Length: 13 minutes
Cost: shipping and handling

Source: Professor Harold Moellering
               Department of Geography
               Ohio State University
               Columbus Ohio 43210

Contents:
A demonstration and explanation of the modeling of 3D block diagram of terrain, and of 3D prism map, with narration and music.

NASA / Jet Propulsion Laboratory **Digital Landscapes... A View from Space**

Format: 1/2 VHS or Beta (NTSC)
Length: 24 minutes
Author: NASA/JPL
Cost: $ 19.95

Source: Video Publishing Group, Inc.
               5055 NW 159th Street
               Miami, Florida 33014
               305-621-7283

Contents:
Earth the Movie   Mars the Movie   LA the Movie   Miranda the Movie
Mars Mission Rover

NASA / Jet Propulsion Laboratory   **Earth the Movie; Mars the Movie; LA the Movie; Miranda the Movie**

Format: 1/2 VHS (NTSC)
Length: 20 minutes
Author: NASA/JPL
Cost: $ 29.95

Source: The Video Tape Company
               10523-45 Burbank Boulevard
               North Hollywood, California 91601-2280
               818-753-3057

NASA (1990) **Northern Great Plains Video**

Format:	1/2 VHS (NTSC)
Length:	6 minutes
Cost:	No charge - provide a blank videotape
Source:	EROS Data Center
	Sioux Falls, South Dakota 57198 USA
	605-594-6028

Contents:
This video depicts an animated sequence of greenness change over the 1987 and 1988 growing seasons in the northern Great Plains. Vegetation index images from the NOAA-9 Advanced Very High Resoluiton Radiometer (AVHRR) are used in the animation. A narrator discusses the effects of drought, land cover changes and other phenomena that can be observed.

NASA / Jet Propulsion Laboratory (1988) **L.A. The Movie**

Format:	1/2 VHS (NTSC)
Length:	4 minutes
Cost:	No charge for borrowing (two-week loan)
Source:	U.S. Geological Survey Library
	Special Collections MS 955
	345 Middlefield Road
	Menlo Park, California 94025 USA
	415-329-5009

Contents:
An animated three-dimensional fly through of the Los Angeles basin and surrounding region produced from digital elevation data and Landsat satellite imagery.

National Center for Supercomputing Applications (NCSA) (1990) **Scientific Visualizations: Volume 1**

Format:	1/2 VHS (NTSC)
Length:	60 minutes
Cost:	$ 25
Source:	Media Magic
	P.O. Box 507
	Nicasio, California 94946 USA
	800-882-8284 (orders)
	415-662-2426 (inquiries)
	415-662-2225 (Fax orders)

Contents:
Study of a numerically modeled severe storm
Landscape dynamics of Yellowstone national park: The role of fire 1690 to 1990
Smog: Visualizing the components

Citation:
  Kovacic, D. A., A. Craig, R. Patterson, W. H. Romme, and D. G. Despain (1990)
    Fire dynamics in the Yellowstone landscape from 1690-1990: An animation,
    Proceedings: Resource Technology'90, November 12-15, Washington,
    D.C., 1-9.

National Center for Supercomputing Applications (NCSA) (1990) **Scientific
             Visualizations: Volume 2**

    Format: 1/2 VHS (NTSC)
    Length: 60 minutes
    Cost: $ 25

    Source: Media Magic
                   P.O. Box 507
                   Nicasio, California 94946 USA
                   800-882-8284 (orders)
                   415-662-2426 (inquiries)
                   415-662-2225 (Fax orders)

    Contents:
    Model of an expanded (closed) universe   Maize growth development
    Visualization idioms

National Center for Supercomputer Applications (NCSA) (1991) **NCSA Visualization
             SIGGRAPH Sampler**

    Format: 1/2 VHS (NTSC)
    Length: 25 minutes
    Cost: $ 40

    Source: Attention: Documentation Orders
                   University of Illinois at Urbana-Champaign
                   605 East Springfield Avenue
                   Champaign, IL   61820

    Contents:
    Study of a numerically severe storm
    Smog: visualizing the components
    Landscape dynamics of Yellowstone Park: The role of fire 1690 to 1990

National Center for Supercomputer Applications (NCSA) (1991) **NCSA RealTime #1**

Format: 1/2 VHS (NTSC), BETACAM, 3/4 U-matic(NTSC), 8mm
Length: 26 minutes
Cost: $ 9 (VHS), $ 23 (BETACAM), $ 28 (U-matic), $ 10 (8mm)

Source: Attention: Documentation Orders
              University of Illinois at Urbana-Champaign
              605 East Springfield Avenue
              Champaign, IL   61820

Contents:
Seeing is Believing   Microburst Alert

National Center for Supercomputer Applications (NCSA) (1991) **NCSA RealTime #2**

Format: 1/2 VHS (NTSC), BETACAM, 3/4 U-matic (NTSC), 8mm
Length: 27 minutes
Cost: $ 9 (VHS), $ 23 (BETACAM), $ 28 (U-matic), $ 11 (8mm)

Source: Attention: Documentation Orders
              University of Illinois at Urbana-Champaign
              605 East Springfield Avenue
              Champaign, IL   61820   USA

Contents:
Sounding the Data

Nielson, G.M. and B. Shriver (editors) 1990. **Visualization in Scientific Computing**. IEEE Computer Society Press, Las Alamitos, California.

Format: VHS (NTSC)
Length: 120 minutes
Cost: $ 134.50 (nonmembers)
              $ 107.50 (members)

Source: IEEE Computer Society Press
              10662 Los Vaqueros Circle
              P.O. Box 3014
              Los Alamitos, California 90720-1264 USA
              800-272-6657 or 714-821-8380 (orders)
Contents:
This videotape is a companion to the book by the same title. Most of the chapters are presented in the video by their authors.

Tobler, W.R. (1970) **A Computer Movie Simulating Urban Growth in the Detroit Region**

    Format: VHS
    Length: 8 minutes
    Cost: shipping and handling

    Source: Professor Waldo R. Tobler
                    Department of Geography
                    University of California
                    Santa Barbara CA 93106

    Contents:
    A model of population as a growing Z-surface over the Detroit region.

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Weber, C. R. (1991) **A Cartographic Animation of Average Yearly Surface Temperatures for the 48 Contiguous United States: 1987-1986**. NCGIA Technical Report 91-3, Santa Barbara California.

    Format: Macromind Director executable on Macintosh diskettes (2400KB)

    Length: 15 minutes
    Cost: shipping and handling

    Source: Chris Weber
                    NCGIA
                    Department of Geography
                    105 Wilkeson Quad
                    SUNY-Buffalo
                    Buffalo, NY 14261

    Contents:
    A keyframe animation showing isopleth maps of deviations from average temperature for 344 weather stations in the United States over a 90 year period. Images created using SURFACE-2 and ported into Macromind Director. Temporal legend indicates position in the 90 year period in real time.

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Willgoose,G.W., Bras, R.L. and Rodriguez-Iturbe, I. (1990) **Computer Animation of River Basin Evolution**

    Format: 1/2 VHS (NTSC)
    Length: unknown

    Source: Rafael L. Bras
                    Parsons Laboratory for Hydrodynamics and Water Resources
                    Massachusetts Institute of Technology, Room 48-311
                    Cambridge, MA 02139
                    617-253-2117

Citation:
    Willgoose, G., R. L. Bras, and I. Rodriguez-Iturbe (1990) A model of river basin
        evolution, **Eos**, 71(47), 1806-1807.

US Army CERL (1990) **Global Data and the Animation of Vegetation
        Production**

Format: 1/2 VHS (NTSC)
Length:
Cost: No charge for borrowing (two-week loan)

Source: US Army CERL
           P.O. Box 4005
           Champaign, Illinois 61821-4005   USA
           217-373-7220

U.S. Geological Survey (1989) **Yosemite National Park: A New Perspective**

Format: 1/2 VHS (NTSC)
Length: 5 minutes
Cost: No charge for borrowing (two-week loan)

Source: U.S. Geological Survey Library
           Special Collections MS 955
           345 Middlefield Road
           Menlo Park, California 94025   USA
           415-329-5009

Contents:
An animated three-dimensional fly through of Yosemite National Park produced
from stereo SPOT satellite imagery and conventional aerial stereo photography.

Citation:

  Fequay, J.W., J.M. Thormodsgard and G.G. Kelly (1989) Yosemite National Park: a
    new perspective, **Technical Papers: ASPRS/ACSM Proceedings 1989**, 2
    Image and Data Processing, 80-87.

Section 3   OTHER SOURCES OF INFORMATION

3.1   Periodicals Having Some Focus on Animation

ACM Transactions on Graphics.
Association for Computing Machinery
11 West 42nd Street
New York, NY 10036

Anderson Report.
4265 Avenida Simi
Simi Valley, CA 93063

BYTE MAgazine
70 Main Street
Peterborough, NH 03458

CAD/CAM Digest
PO Box 8100
Dallas TX 75205

Cinefex
PO Box 20027
Riverside, CA 92516

Computer Aided Design
IPC Science and Technology Press, Ltd.
32 High Street
Guildford, Surrey, UK Gu1 3EW

Computer Aided Publishing Report
52 dragon Court
Woburn, MA 63117

Computer Graphics Special Interest Group
(SIGGRAPH)
Association for Computing MAchinery
11 West 42nd STreet
New York, NY 10036

Computer Graphics and Applications
Institute for Electrical and Electronic Engineers
(IEEE)
10662 Los Vaqueros Circle
Los Alamitos, CA

Computer Vision, Graphics and Image
Processing
Academic Press, Inc.
111 Fifth Avenue
New York, NY 10003

Computer Graphics Today
8401 Arlington Blvd.
Fairfax VA 22031

Computer Graphics World
1714 Stockton St.
San Francisco, CA 94133

Computer Pictures
Backstage Productions, Inc.
165 West 46th Street
New York, NY 10036

Computers and Graphics
Pergammon Press, Inc.
Maxwell House, Fariview Park
Elmsford, NY 10523

Klein Newsletter
PO Box 89
Sudbury, MA 01776

Millimeter
2 East 46th Street
New York, NY 10017

Pixel: The Computer Animation Newsletter
217 George STreet
Toronto, Ontario Canada M5A 2M9

3.2   Professional Societies and Conferences

National Computer Graphics Association (NCGA)
       8401 Arlington Blvd
       Fairfax, VA 22031

Computer Graphics Special Interest Group (SIGGRAPH)
       Association for Computing MAchinery
       11 West 42nd STreet
       New York, NY 10036

Society for Moving Pictures and Television Entertainment (SMPTE)
       862 Scarsdale Avenue
       New York, NY 10583

3.3   Other Sources of Information and Video Material

DeFanti, Tom, ed. Siggraph Video Review
       UIC/EECS, Mail Stop 154
       PO Box 4348
       Chicago, IL 60680

George, James and Steven Levine, eds. Frontiers in Computer Graphics
Microfiche Supplements to Computer Graphics
       Association for Computing Machinery
       11 West 42nd STreet
       New York, NY 10036

SIGGRAPH slide sets
       Association for Computing MAchinery
       11 West 42nd STreet
       New York, NY 10036