Chapter 4. USING SPECIAL TECHNIQUES TO ENHANCE PARTICIPATION

C. FINDING NEW WAYS TO COMMUNICATE

Communication—especially interactive communication—is a major goal of public involvement. Face-to-face meetings are a traditional method of providing such contact, but changing technologies offer many new options for people to get information and provide input, comment, or support. New technologies—largely based on electronics—are accelerating and enhancing the communication process. They offer real-time methods of communication without relay, distribution, or recording delays. Often, they can better illustrate complex information, and can give people a stronger, more immediate sense of connection to the overall transportation planning and project development process.

Interactive technology does not replace traditional direct contact techniques. Rather, it needs to be well integrated with them in an overall public involvement program. A majority of people still prefer to talk on the phone to a live voice or present their views in their own handwriting or face-to-face. People feel excluded or unable to participate if they have no ready access, and many find computers or televisions more impersonal and distancing than traditional means of communication. Some minority, ethnic, low-income, or poorly educated individuals feel particularly uncomfortable with new technology.

Yet, as new communication technologies become more and more prevalent, their potential for public involvement blossoms. People can participate in large meetings without leaving their living rooms—via phone, special modem connections, the Internet, or satellite transmissions. They save travel time and cost because electronic communications are able to span long distances. Participants with access to computers, wireless devices (cellular phones or Personal Digital Assistants -- PDAs), telephone lines with special equipment, facsimile devices, or telecommunication devices can request transmission of documents or information or send comments to an agency. Specialized telephone and Internet services deliver pre-recorded answers or responses to common inquiries. Interactive techniques can also be used in conjunction with traditional meetings—by incorporating interactive displays, for instance, that show the steps in a process or describe a project. Or a computer technician at a public meeting can render concepts visually as public participants discuss them.

Several techniques can help improve communication in public involvement, as follows:

- Interactive television;
- Teleconferencing;
- Interactive displays and kiosks;
- Computer presentations and simulations;
- Mapping through Geographic Information Systems;
- 3D Visualization;
- Visual Preference Surveys;
- Handheld Instant Voting;
- Plan or Text Markup Software; and
- Remote Sensing Applications

INTERACTIVE TELEVISION

What is interactive television?

Interactive television is a person-to-person technique that allows two-way communication. Unlike conventional one-way television (TV) or radio broadcasts, most interactive TV enables viewers to respond by voice telephone or computer connected to an appropriate hosting service (Internet Service Provider, special on-line bulletin board, chat room, etc.). A further refinement of the technology uses sophisticated equipment, TV cameras, and special connections at both ends so that participants can see and hear one another. This kind of interactive TV is usually limited to small groups for long-distance conferences.

Interactive television is characterized as follows:

- A television broadcast includes telephone numbers or computer addresses to use in responding;
- Participants use telephones or computers to comment or ask questions; and
- Staff is available to record comments or respond to questions.

Electronic town meetings are a good example, because large numbers of people participate directly from their homes or other designated locations. A meeting, presentation, or panel discussion is held in a central location with an audience, while a TV crew records and broadcasts the proceedings over local cable. Home viewers phone in questions for discussion leaders to answer—a format similar to a talk-radio call-in program. The Southern California Association of Governments uses interactive television to reduce the distance the public has to travel to participate in meetings. Conferencing equipment is placed at central locations in each of the six counties it serves.

Why is it useful?

"A picture is worth a thousand words." Interactive TV provides direct or immediate knowledge of what transpired at a public meeting, which is useful for some people compared with a written summary document. Interactive TV helps people grasp a planning concept, understand complex programs, and absorb large amounts of information quickly. Television is an integral part of many people's lives. It attracts broader participation in a public involvement program. Electronic town meetings, for instance, may actively engage "couch potatoes" who would otherwise not participate in civic affairs.

Electronic town meetings increase awareness about a project or program. They are very useful for developing consensus across a broad range of participants. They provide a large segment of the population with direct, timely access to key decision-makers.

Interactive TV offers the immediacy of a "live" broadcast. During a broadcast, participants at home respond or participate via telephone. They then see and hear that their concerns are being addressed, and possibly respond further.

Town meeting audiences can convene in several locations. With interactive TV, large groups may take part at a central location while numerous individuals or small groups participate from homes or satellite meeting halls. The Central Puget Sound Regional Transit Authority (RTA) in Seattle held a Satellite Summit prior to adopting a proposed ballot measure on a major new transit system. From a central studio, the RTA board addressed audiences at five remote locations as well as home viewers via cable TV. Audience members at remote sites were able to pose questions and offer suggestions directly to the board. A videotape of the event was sent to local libraries for reference by those people unable to participate at broadcast time. (See **Video Techniques**.)

Informal surveys can be a central element in interactive TV. Viewers use telephones to register approval or disapproval on a specific project or issue under discussion. Results are tabulated and shown on the program, perhaps generating additional responses. (See **Public Opinion Surveys**.)

Does it have special uses?

Interactive TV is especially useful for public presentations. Information can be disseminated at regular intervals to the audience at their homes.

Interactive television can target a specific audience. Broadcasts can reach specialized audiences through non-English language or other special media channels or shows. Berks Community Television in Reading, Pennsylvania, is a two-way cable television program designed to reach seniors, a special use of the technology for a targeted audience.

A broadcast helps an agency reach a wider audience than it might otherwise find. It increases both awareness and inclusiveness. Traditional broadcast technology is used for limited educational and outreach purposes, but the incorporation of two-way communication through interactive technology expands the participatory aspect of the medium. To increase public participation in regional transportation planning, Orange County replaced a public hearing with a "Community Dialogue," sponsored by the Huntington Beach City Council Chamber. A talk-show format was used to interview transportation and land use planners about the impact of growth on the future of Southern California. Questions from an in-studio audience and call-in viewers were answered live on television. The show was run from 7:00-9:00 PM on a weeknight and simultaneously cablecast in nine different cities close to Huntington Beach. In addition, the cable company aired the program two more times during the day. The cable company estimated that more than 7,500 people watched the show.

A broadcast allows instant feedback that can be shared with the entire community. Because people participate from their own homes, they do not need to arrange for childcare or worry about transportation or proper appearance.

Who participates? And how?

An interactive TV program involves many people—particularly if the program is well publicized. Broadcasts on a major local or regional channel stand the best chance of reaching many viewers for a program on transportation planning or project development.

Cable TV subscribers are major users. Many public agencies have access to cable TV channels over which electronic town meetings may be carried. Any local person with access to such cable services and a telephone line may participate. Participation is limited in areas without cable access or if people do not subscribe to the service.

Viewers call the TV station during a broadcast to register an opinion or comment. Viewers may call repeatedly if they do not receive a response or if they feel that the response is inadequate.

Viewer responses are recorded on the voice track of a videotape of a program. As a program is being taped, a viewer calls in and converses with an agency person at the TV studio. The video equipment picks up both ends of the conversation. Responses may also be recorded, either automatically by an answering device or in person by agency staff answering telephone calls and recording responses in writing or on computer.

Viewer input may provide immediate feedback. Calls from viewers inform the studio and home audiences of preference responses, survey results, or participant concerns.

How do agencies use the output?

Viewer comments help an agency gauge the level of community interest and concern about transportation issues. Heated, lively debate and strongly worded comments signal a controversial topic and indicate that the agency needs to reach out in other ways to the full array of concerned parties.

Viewer feedback also helps an agency identify community perceptions about critical issues, impacts that are most sensitive, alternatives that are preferred or proposed, and ways to improve plans and make responsive decisions. In metropolitan planning, an agency can use viewers' comments to identify differences of opinion and needs in subareas of a region or among types of interest groups. To get a clear sense of how public opinion is changing over the course of a project, a record of comments serves as a benchmark that can be compared with past or future responses. Such reference points assist an agency in evaluating long-term program goals or objectives and reassessing meeting techniques.

Viewer input may be used to expand mailing lists. To increase the availability of transportation information, for instance, names and addresses of respondents are registered along with their questions and concerns. (See **Mailing Lists**.)

Who leads?

Skilled professionals are required. Interactive TV demands the special technical skills of studio crews and facilitators who coordinate feedback through a telephone company. Although conventional presentation needs and requirements of a public meeting come into play, a skilled moderator for the program is also required.

Agencies sponsor regular programs. Vermont Interactive Television shows live, two-way programs on subjects such as early childhood and family support meetings, technical mathematics, and Vermont history and government. It combines education with participatory technologies to bring together thousands of participants throughout a largely rural State.

What are the costs?

Interactive TV such as an electronic town meeting is expensive. The sophisticated equipment and skilled operator requirements raise costs. Contracting services are necessary for high-speed digital telephone lines to accommodate incoming calls and instantly tabulate data. An agency with access to a public TV channel may be able to reduce costs. For example, community access cable channels and/or schools with broadcast media facilities, both of which have public service missions, may be able to be used.

How is interactive television organized?

Cooperation from a local TV station is essential. A local station such as a local access cable channel or a local government or college station reaches most, if not all, homes in a broad area. A broadcast or town meeting event must be publicized on the station as well as in other print and electronic media so that people know when to tune in. A local TV station may also recommend a prominent media personality to moderate the program, keep discussion moving, and enliven the program. University stations might include student production of public meetings on interactive TV as part of the curriculum.

Technical assistance on broadcasting is essential. Local stations are likely to be conversant with interactive techniques or can help find the right contacts.

Comparison with a public meeting or hearing is useful as a starting point. Many public agencies are versed in the logistical requirements and strategic use of such meetings. (See **Public**

Meetings/Hearings.) A presentation of essential facts about the project or program provides a spring-board from which discussion takes place. However, incorporation of interaction affects the program format and shapes the agenda to reach out to a larger audience.

How is it used with other techniques?

Interactive TV supplements a broader outreach program. It cannot be an agency's sole means of communication with the public. Due to costs and time constraints, interactive TV may accent or bring to culmination a larger effort to inform the public. However, it also can be useful as a survey of public reactions to an issue. (See **Public Opinion Surveys**.) It can function as a large-scale public meeting. (See **Public Meetings/Hearings**.) Savannah, Georgia, broadcasts several meetings on the same topic from different locations with trained facilitators and programmers. Home viewers call in to respond, adding a sense of dynamic energy to the process.

What are the drawbacks?

Perceptions of the meaningfulness of participation via TV vary. Participants may doubt that a TV program has lasting impact. As is true with any new technology, people sometimes resent its use, because they perceive it as a replacement for personal communication.

Imbalance is magnified by live TV. With any project or program, the danger arises that only one or a few interests will participate and that the dialogue will not accurately reflect the full array or relative strength of community opinions. Callers may want to grandstand a particular issue. Agencies can limit speaking times but cannot deny a determined individual the opportunity to speak. This emphasizes the importance of agency outreach to the full array of community interests.

Broadcast adds pressure for quick decisions. Television events often put decision-makers in direct contact with members of the community, and the community may want immediate decisions. One transit agency held an open house for a major investment study that was heavily attended by a community that opposed one alternative. The community group arranged for the meeting with agency and legislative leaders to be broadcast in a hearing format over a local TV channel. During the meeting, a speaker (with vocal support from the crowd) demanded a satisfactory decision from the agency and the legislators in two weeks, rather than the several months scheduled in the study plan.

Input from interactive TV, like that from informal surveys, is not statistically representative. Only interested people participate, and cable viewership in many areas is minimal. Broadcast responses supplement but do not substitute for more formal survey data as an accurate way to gauge public reaction. (See **Public Opinion Surveys**.)

Is interactive television flexible?

Interactive television is inherently flexible for verbal presentations. An agency spokesperson agency can update the community on a project or a planning process. Adding graphics to a presentation, however, requires additional time and effort.

Interactive TV is as flexible as other public meeting formats. However, the sponsoring agency is limited to times available on a station's program schedule.

When is it used most effectively?

Electronic town meetings are most effective at an important juncture when focused, relevant public input is needed. The Central Puget Sound RTA, in partnership with a local commercial station, presented

a two-hour, prime time program on its proposed rapid transit system. Moderated by a local media personality, the program showed features of transit systems from other cities. A 100-person audience was able to show approval or disapproval for various options via hand-held opinion meters that scored opinions on a scale of one to ten. A panel of experts and critics kept the discussion balanced.

Interactive television can continually update transportation information. A cable TV program can offer a telephone number to call for further information. Its use is especially valuable for conveying images or visual representations of ideas, including renderings and animations of existing and potential conditions.

Interactive television can build momentum for or against an improvement. This is particularly important when funding sources are in question. However, project opponents can also "hijack" that momentum. Political leaders who make budget decisions pay attention to high-profile events that reach a broad segment of their constituencies.

For further information:

- Southern California Association of Governments, www.scag.org
- Southern California Association of Governments Case Study, http://www.cerrell.com/casestudies/SCAG.html
- Alaska Department of Transportation, (907) 465-2171
- Berks Community Television, (610) 374-3065
- Central Puget Sound Regional Transit Authority, Seattle, Washington, (206) 684-1357
- Chatham Urban Transportation Study, Chatham County–Savannah, GA, (912) 236-9523
- Georgia Department of Transportation, (404) 656-5269

TELECONFERENCING

What is a teleconference?

A teleconference is a telephone or video meeting between participants in two or more locations. Teleconferences are similar to telephone calls, but they can expand discussion to more than two people. Using teleconferencing in a planning process, members of a group can all participate in a conference with agency staff people.

Teleconferencing uses communications network technology to connect participants' voices. In many cases, speaker telephones are used for conference calls among the participants. A two-way radio system can also be used. In some remote areas, satellite enhancement of connections is desirable.

Radio can also be a component of teleconferencing, especially in areas where there may be impediments to other methods of public involvement. For example, to address the need to involve the largest number of citizens possible when updating the STIP, the Alaska Department of Transportation often uses radio call-ins. This method helps gather input from areas in which no public meeting is held and from people in remote areas of the state that may not even have electricity.

Video conferencing can transmit pictures as well as voices through video cameras and computer modems. Video conferencing technology is developing rapidly, capitalizing on the increasingly powerful capabilities of computers and telecommunications networks. Video conferencing centers and equipment are available for rent in many locations.

Why is it useful?

Teleconferencing reaches large or sparsely populated areas. It offers opportunities for people in outlying regions to participate. People participate either from home or from a local teleconferencing center. In Alaska, where winter weather and long distances between municipalities serve as roadblocks to public meetings, the State legislature has developed the Legislative Telecommunication Network (LTN). As an audio teleconference system, LTN can receive legislative testimony from residents or hold meetings with constituents during "electronic office hours." Although its main center is in the capitol building, it has 28 full-time conference centers and 26 voluntary conference centers in homes or offices of people who store and operate equipment for other local people. The system averages three teleconferences per day when the legislature is in session.

Teleconferencing provides broader access to public meetings, as well as widening the reach of public involvement. It gives additional opportunities for participants to relate to agency staff and to each other while discussing issues and concerns from physically separate locations. It enables people in many different locations to receive information first-hand and simultaneously. (See **Public Meetings/Hearings**.)

A wider group of participants means a broader range of ideas and points of view. Audio interaction makes dialogue more lively, personal, and interesting. Teleconferencing provides an immediate response to concerns or issues. It enables people with disabilities parents with child care conflicts, the elderly, and others to participate without having to travel. (See **People with Disabilities**.) In response to requests from residents in remote rural areas, the Oregon Department of Transportation (DOT) held two-way video teleconferences for its statewide Transportation Improvement Plan update. Two special meetings were broadcast by a private non-profit organization that operates ED-NET, a two-way teleconferencing system. ED-NET provided a teleconference among staff members in one of the DOT's five regional offices and participants at central transmission facilities in a hospital and a community college in eastern Oregon.

Teleconferencing can save an agency resources. Without leaving their home office, staff members can have effective meetings that reach several people who might not otherwise be able to come together. Teleconferencing often enables senior officials to interact with local residents when such an opportunity would not exist otherwise, due to distance and schedule concerns. A teleconference may reach more people in one session than in several sessions held in the field over several weeks. It can be difficult to schedule more than two or three public meetings in the field within one week, due to staff commitments and other considerations. Teleconferencing can connect several remote locations saving several days or weeks of agency resources.

Teleconferencing should not take away from the value of face-to-face contact. While teleconferencing allows for multiple meetings in a short timeframe and can provide access when distances or other conditions limit the ability to travel, they should not be used as a substitute for in-person public contact.

Does it have special uses?

Teleconferencing is useful when an issue is State- or region-wide. The World Bank uses moderated electronic conferences to identify best public involvement practices from front-line staff. The discussion focuses around fleshing out and sharing ideas so that practitioners in different locations can learn from the experiences of others around the world.

Teleconferencing helps increase the number of participants. People may be reluctant to travel to a meeting because of weather conditions, poor highway or transit access, neighborhood safety concerns, or other problems. Teleconferencing offers equal opportunity for people to participate, thus allowing more points of view to emerge, revealing areas of disagreement, and enabling people to exchange views and ask questions freely.

Teleconferencing is used for training. It opens up training hours and availability of courses for people unable to take specialized classes because of time constraints and travel costs. The National Transit Institute held a nationally broadcast session answering questions about requirements for Federal major investment studies (MIS). Over 1,700 people met at 89 teleconferencing sites to participate in the meeting. Feedback from participants was overwhelmingly in favor of the usefulness and practicality of the session.

Teleconferencing is used for networking among transportation professionals on public involvement and other topics. North Carolina State University sponsored a national teleconference on technologies for transportation describing applications of three- and four-dimensional computer graphics technologies. They have been found helpful in facilitating public involvement and environmental analysis.

Who participates? And how?

Anyone can participate. Teleconferencing broadens participation with its wide geographical coverage. People living in remote areas can join in conversations. Participation becomes available even for the mobility-restricted, those without easy access to transportation, and the elderly. Those with limited English proficiency may not participate without assistance. (See **People with Disabilities; Ethnic, Minority, and Low-income Groups**.)

Participants gather at two or more locations and communicate via phone or video. The event requires planning, so that participants are present at the appointed time at their divergent locations.

Participants should know what to expect during the session. A well-publicized agenda is required. It is helpful to brief participants so they understand the basic process and maximize the use of time for their participation. For example, basic concerns like speaking clearly or waiting to speak in turn are both elements of a successful teleconference-based meeting.

How do agencies use teleconferencing?

Teleconferencing elicits comments and opinions from the public. These comments and opinions become part of a record of public involvement. Agencies should plan to record and provide access to public comments, as well as to respond to comments and community input and to address specific concerns.

Teleconferencing offers immediate feedback from agency staff to the community. This feedback is a special benefit for participants in both time savings and satisfaction with agency actions. To assure immediacy, agencies must have staff available to respond to questions at the teleconference.

An agency can tailor its efforts to respond to a range of needs or circumstances, with broad input from diverse geographical and often underserved populations. The Montana DOT will use a teleconferencing network in the state as it updates its statewide plan.

Agencies use teleconferencing with individuals or with multiple groups. The range of participants varies from simple meetings between two or three people to meetings involving several people at many locations. Simple meetings can be somewhat informal, with participants free to discuss points and ask questions within a limited time.

Who leads a teleconference?

A trained facilitator, moderator, or group leader runs the meeting. A moderator needs to orchestrate the orderly flow of conversation by identifying the sequence of speakers. A staff person can be trained to open and lead the teleconference. (See **Facilitation**.)

Community people can lead the conversation. The moderator need not be an agency staff person. If the teleconference is taking place at the request of community people, it is appropriate that a community resident lead the session. Agency staff members should feel free to ask questions of community people to obtain a complete understanding of their point of view.

Each individual meeting site must have a person in charge to prevent the conversation from becoming chaotic. A teleconferencing facility coordinator can train agency staff or community people to lead the process. Appointment of an individual to guide conversation from a specific site should be informally carried out. Community groups may want to have a role in this appointment.

What are the costs?

Teleconferencing costs vary, depending on the application. The costs of installing a two-way telephone network are modest. For complex installations, including television, radio, or satellite connections, costs are significantly higher. Hiring outside help to coordinate equipment purchases or design an event adds to the expense.

For modest teleconferencing efforts, equipment and facilities are the principal costs. Higher costs are associated with higher performance levels of equipment, more transmission facilities, or more locations. Agencies may be able to rent a facility or set one up in-house. The San Diego Association of Governments is building its own central teleconferencing facility to provide increased opportunities for the agency to use this technique.

It is possible to share teleconferencing costs among organizations. Many States have teleconferencing capabilities in State colleges. States may have non-profit organizations with teleconferencing capabilities. Outside resources include cable television stations or donated use of private company facilities. Agency staff time devoted to the event may be a significant expense.

How is teleconferencing organized?

One person should be in charge of setting up a teleconference. That individual makes preparatory calls to each participant, establishes a specific time for the teleconference, and makes the calls to assemble the group. The same person should be in charge of setting an agenda based on issues brought up by individual participants.

Equipment for a telephone conference is minimal. Speakerphones allow several people to use one phone to listen to and speak with others, but they are not required. Individuals can be contacted on their extensions and participate fully in the conversations. While the basic equipment does not require an audiovisual specialist to operate, a technician may be required to set up equipment and establish telecommunications or satellite connections, particularly in more sophisticated applications.

Video conferencing needs are more complex. Basic equipment can involve:

- Personal computers;
- A main computer control system;
- One or more dedicated telephone lines or a satellite hook-up;
- A television or computer monitor for each participant or group of participants; and
- A video camera for each participant or group of participants.

More sophisticated facilities and equipment are required if a number of locations are interconnected.

An individual or group rents a private or public videoconference room in many cities. Private companies often have in-house videoconference rooms and systems. The Arizona DOT is considering establishing a mobile teleconferencing facility that can travel throughout the State. Many public facilities, particularly State institutions such as community colleges, have set up teleconference facilities.

Teleconferencing can kick off a project or planning effort and continue throughout the process. Teleconferences are targeted to a particular topic or address many areas, depending on the need for public input and participation.

Adequate preparation is critical to success and optimum effectiveness of a teleconference. The funding source for the teleconference must be identified and a moderator designated. The time and length of the teleconference must be established and an agenda prepared to organize the meeting's content and times for speakers to present their views. Participants should be invited and attendance confirmed. This is a critical step, since there is little flexibility in canceling or postponing the event—there just are no second chances. Also, less than full participation means that important voices are not heard.

It is important to provide materials in advance. These include plans of alternatives, reports, evaluation matrices, cross-sections, or other visuals. (See **Public Information Materials**.) For videoconferences, these materials may be on-screen but are usually difficult to read unless a participant has a printed document for reference. A moderator must be prepared to address all concerns covered by the written materials. Preparation smoothes the way for all to participate in the teleconference. Without adequate preparation, teleconferences may need to be repeated, especially if all questions are not addressed thoroughly.

The technical set-up is crucial. Teleconferencing equipment and its several locations are key to the event's success. Equipment must be chosen for maximum effect and efficiency in conducting a meeting between a central location and outlying stations.

Equipment must be distributed well. Because equipment is needed at each site, housing facilities for equipment must be identified. If multiple parties will be attending a teleconference or videoconference from one location. seating may need to be arranged to maximize participation. A test-run of the equipment and the set-up for participants is important. The moderator may want to arrive early and practice using the equipment. Organizations can also subscribe to teleconferencing services. These

services have the ability to host numerous lines and allow participants to join in from any telephone with a correct dial-in number and passcode.

The moderator sets ground rules for orderly presentation of ideas. The moderator introduces participants in each location and reviews the objectives and time allotted for the meeting. Participants are urged to follow the moderator's guidance for etiquette in speaking. They should follow basic rules: speak clearly, avoid jargon, and make no extraneous sounds, such as coughing, drumming fingers, or side conversations.

The meeting must follow the agenda. It is the moderator's responsibility to keep the teleconference focused. In doing so, she or he must be organized, fair, objective, and open. The conference must be inclusive, providing an opportunity for all to register their views. The moderator must keep track of time to assure that the agenda is covered and time constraints are observed. It may be appropriate to have a staff person on hand to record action items, priorities, and the results of the teleconference.

How is it used with other techniques?

Teleconferencing is part of a comprehensive public involvement strategy. It can complement public information materials, smaller group meetings, open houses, and drop-in centers. (See **Public Information Materials; Small Group Techniques; Open Forum Hearings/Open Houses; Drop-in Centers, Public Opinion Surveys**.)

Teleconferencing participants can serve as a community advisory committee or task force meeting. It can cover simple items quickly, avoiding the need for a face-to-face meeting. For major issues, it is a way to prepare participants for an upcoming face-to-face discussion by outlining agendas, listing potential attendees, or describing preparatory work that is needed. (See **Civic Advisory Committees; Collaborative Task Forces**.)

Teleconferencing is a method for taking surveys of neighborhood organizations. It helps demonstrate the array of views within an organization and helps local organizations meet and determine positions prior to a survey of their views. (See **Public Opinion Surveys**.)

Teleconferencing is used in both planning and project development. It is useful during visioning processes, workshops, public information meetings, and roundtables. (See **Visioning; Conferences, Workshops, and Retreats**.)

What are the drawbacks?

Teleconferences are somewhat formal events that need prior planning for maximum usefulness. Although they require pre-planning and careful timing, teleconferences are conducted informally to encourage participation and the exchange of ideas.

A large number of people is difficult to manage in a single teleconference, with individuals attempting to interact and present their points of view. One-on-one dialogue with a few people is usually preferable. Widely divergent topics are also difficult to handle with a large number of people participating in a teleconference.

Costs can be high. Costs are incurred in equipment, varying sites for connections, transmission, and moderator training. Substantial agency staff time to coordinate and lead is likely.

Teleconferences take time to organize. Establishing technical links, identifying sites and constituencies, and coordinating meetings can be time-consuming. Materials need to be prepared and disseminated. However, teleconferencing saves time by being more efficient than in-person meetings, and the savings may offset staff efforts and other costs.

Staffing needs can be significant. Personnel such as technicians and agency staff to set up and coordinate meetings are required. Training to conduct a conference is necessary. However, staff time and resources may be significantly less than if personnel have to travel to several meetings at distant locations.

Agencies need to consider the difficulties in accommodating people with hearing impairments or with limited English proficiency with real time translation. Teleconferencing should supplement, not replace, direct contact with community members.

Community people are alienated if a meeting is poorly implemented or if anticipated goals are not met. People need to be assured that the project and planning staff is mindful of their concerns. Technical and management difficulties, such as poor coordination between speakers or people being misunderstood or not heard, result in bad feelings.

Teleconferencing reduces opportunities for face-to-face contact between participants and proponents of plans or projects. It cannot replace a desirable contact at individual meetings between stakeholders and agency staff in local sites. Effective public involvement includes meetings in the community to obtain a feel for the local population and issues. (See **Public Meetings/Hearings; Non-traditional Meeting Places and Events**.) A teleconference supplements rather than replaces direct contact with local residents and neighborhoods. Video conferencing, by contrast, enhances opportunities for face-to-face exchange.

The goals of a teleconference must be clear and manageable to avoid a potential perception of wasted time or frivolous expenditures.

Is teleconferencing flexible?

Teleconferencing lacks flexibility of location and timing. A teleconference among several people must have a well-established location, time, and schedule, publicized prior to the event. An agenda must be set well in advance of the meeting, with specific times set aside to cover all topics, so that people at different sites can follow the format of the meeting. The New York State DOT held a teleconference/public hearing for the draft State Transportation Plan. The well-defined agenda scheduled registration and a start time that coincided with a one-hour live telecast from the State capital, which included a roundtable discussion with the DOT Commissioner.

Videoconferencing can be flexible if it is a talk arranged between two locations. With few people, it may be as simple to arrange as a telephone call. With additional participants, it becomes less flexible.

Teleconferencing offers opportunities for participants who can't travel to become involved. Enabling people to stay home or drive to a regional site offers flexibility in childcare, transportation, and other factors that affect meeting attendance.

When is it used most effectively?

Teleconferencing is effective when participants have difficulty attending a meeting. This occurs when people are widely dispersed geographically and cannot readily meet with agency staff. Teleconferencing also serves people with disabilities, the elderly, and others who may have difficulties with mobility. (See **People with Disabilities**.)

Teleconferencing is effective when it focuses on specific action items that deserve comment. Teleconferences aid in prioritizing issues and discussing immediate action items. Detailed, wide-ranging discussions may be more properly handled with written materials and in-person interaction.

Teleconferencing helps give all participants an equal footing in planning and project development. Teleconferences overcome geographic dispersal and weather problems to aid contact with agency staff.

For further information:

- Alaska Department of Transportation, Division of Statewide Planning, 907-465-6988, http://www.dot.state.ak.us/index.html?stwdplng/stip/need_stip.html~mainFrame
- Alaska Legislative Telecommunications Network (907) 465-4648
- Iowa Department of Transportation, (515) 239-1101
- Metropolitan Council, Minnesota, Jody Hoffman, (612) 291-6423
- Montana Department of Transportation, (406) 444-7692
- New York State Department of Transportation, (518) 457-5672
- North Carolina State University Institute for Transportation Research and Education, (919) 878-8080
- Oregon Department of Transportation, (503) 378-6526
- Savannah/Chatham County Metropolitan Planning Organization, (912) 236-9523

INTERACTIVE VIDEO DISPLAYS AND KIOSKS

What are interactive video displays and kiosks?

Interactive video displays and kiosks are similar to automatic teller machines, offering menus for interaction between a person and a computer. Information is provided through a presentation that invites viewers to ask questions or direct the flow of information. Viewers activate programs by using a touch-screen, keys, a mouse, or a trackball. Software used in interactive video displays and kiosks is highly specialized, storing information on hardware that allows retrieval of specific information based on directions from the viewer.

Interactive displays and kiosks:

- Deliver information to the user;
- Offer a variety of issues to explore, images to view, and topics to consider;
- Elicit specific responses, acting as a survey instrument;
- Enable the user to enter a special request to the sponsoring agency or join a mailing list;
- Are used in a variety of locations and may be either stationary or mobile; and
- Receive and store user input.

Interactive displays take advantage of evolving video and communications technologies. The Massachusetts Turnpike Authority has installed interactive tourist information kiosks at each of its ten rest areas. The kiosks have a constantly-running video designed to attract passers-by. During the loop presentation, viewers touch the screen to activate certain modules of information such as museums or other attractions by region or for any part of the Commonwealth.

Why are they useful?

If well-sited, interactive programs reach people who do not normally attend hearings or meetings. Visual communication is very powerful, delivering large amounts of information in a relatively short period of time. Interactive displays help people understand plans and complex programs. They raise public awareness about projects or programs and reassure people that their government is listening. A public involvement technique using interactive video may be very successful in attracting broader participation.

Strategic siting of interactive programs is imperative. They should be located where large numbers of people gather—for instance, in shopping malls, community colleges, and government buildings. They are placed where people naturally congregate to talk, shop, or socialize, or—in airline terminals—where they wait for arriving or departing planes. Displays are also set up at non-transportation special events. The Colorado Governor's Office initiated a program of touch-screen informational displays in shopping centers.

Interactive displays can supplement other methods of obtaining public input. If an interactive display is part of an open house, participants may be able to provide written comments based on the interactive display program. Kiosks in a shopping mall or other similar setting may be equipped with comment cards in a pocket or tray and a mailbox type container in which to deposit the cards. Project staff would collect these comment cards periodically. Agencies use feedback from interactive video displays just as they use public input obtained by more conventional means.

Interactive displays are useful in explaining a project and its implications. The New York State Urban Development Corporation developed an interactive video for public distribution to help explain the Miller Highway Relocation Project in New York City. The video offers highly-developed video images and animations to explain various project alternatives and their environmental implications. Users see the different alternatives from a variety of perspectives and enter their reactions. (See **Computer Presentations and Simulations; Visual Preference Surveys; 3-D Visualization**.)

Do they have special uses?

Interactive displays provide the public with access to areas that are distant or dangerous to visit. The Tennessee Valley Authority and the Florida Power and Light Company use video displays to illustrate the workings of nuclear power facilities.

Interactive displays elicit preferences from people who do not otherwise participate. Displays are used to collect comments and public input. They are useful for disseminating detailed information or generating interest in transportation planning. They are used to expand mailing list databases. (See **Mailing Lists**.)

Interactive displays complement staff availability. As agency resources become more scarce, the City of New York Human Resources Administration is expanding its use of interactive terminals to assist social service clients. Interactive terminals are appropriate as a primary or initial contact and cost-effective for answering requests for general information. For specific responses or more detailed information delivery, other public involvement techniques are probably required. Video displays should not be used to avoid face-to-face contact with the public.

Interactive displays can provide printed messages. Supporting machines record the information requested by a user from the screen and dispense it in printed form. Automatic teller machines are common examples. Rental car agencies provide driving directions to local destinations on video terminals with full-color maps of selected destination areas. The Texas Employment Commission now has 44 easy-to-use kiosks in public locations around the State with interactive displays that print out hundreds of job openings. The kiosks are already tapped an average of 60,000 times a month.

Who participates? And how?

People of all ages participate. Children, adults, and the elderly are encouraged to use displays, ask questions, and retrieve available information. Interactive displays in public places allow an agency to reach people who otherwise would not participate in transportation processes.

Interactive displays reach people at a variety of education or computer-literacy levels. Physical and program designs should encourage broad use, since children and some disabled people may not be able to reach or use equipment. Designs should facilitate ease of operation to encourage people without computer experience to interact with the program. The Arizona Supreme Court has developed interactive displays, called Quickcourt terminals, to assist people in understanding how to navigate through the judicial system. On-screen text is written at a fourth-grade reading level, and a narrator gives audio direction. Key words and numbers flash in synchronization with the narration to assist users with poor reading skills. In the first year of operation, almost 24,000 Quickcourt transactions were conducted, and only a handful of users had to seek further help.

Interactive displays are often multi-lingual. New York City installed 62 bilingual (English and Spanish) kiosks throughout the city to inform people about city services.

Interactive displays and kiosks provide an opportunity to search for information of specific interest to an individual user. Users interact by touching the screen. Software programs allow computers and video monitors to react to touch and respond with information or questions relevant to the user's request. These programs can lead a user through a great deal of available information to find a specific answer. The display and kiosk may also display a point of contact for further information.

Users find interactive displays in a variety of public places. The Arizona Quickcourt system has used locations such as shopping malls, schools, and government offices. Orange County, California, uses a movable kiosk display to show transit project information on a touch screen.

How do agencies use the output?

Interactive displays provide information from an agency to the public. This method of displaying information supplements other methods of dissemination, thus conserving staff resources. (See **Public Information Materials**.) The Smithsonian Institution added an interactive kiosk about transportation to an exhibit at the Museum of American History in Washington, D.C. The kiosk allows visitors to ask questions about public transit, commercial vehicle operations, traffic management, traveler information, and accident prevention. It gives information about transportation and, in doing so, exhibits the use of technology for a larger exhibit, "The Information Age."

Interactive displays collect information from the public for agency analysis. Output from an interactive display can be used to record preferences or to recognize and respond to specific participant concerns. It is also used to expand mailing list databases. (See **Mailing Lists**.)

Displays offer agencies flexibility in controlling and directing where a message goes. As with commercial video productions, specific audiences can be targeted. A program can be designed to appeal principally to adults who seldom go to public meetings or to parents of children who delight in observing different modes of transportation. When presentation information is developed to appeal to that audience, the interactive feature of a touch screen adds a means of collecting reactions from the audience. Targeted marketing by local governments, according to *Indiana Business Magazine,* has the potential to increase an audience's retention of information by 50 percent.

Who leads?

Software experts design and develop interactive displays. These sophisticated computer programs are usually produced by special contractors. Preparation, distribution, and maintenance of interactive displays, collection of stored data, and reprogramming of machines require special technical and logistical skills. One company is developing an electronic panning camera system that allows people in separate locations to view a scene from an infinite number of perspectives. These sophisticated techniques require special equipment and contact with vendors that market these tools.

What are the costs?

Costs associated with kiosks and interactive displays can be broken down into hardware, software, updates, and maintenance. Purchasing the hardware (e.g., enclosure, CPU, touch screen, keyboard, laser printer) and installing a kiosk (e.g., site negotiation, electrical and telecommunication connections) may cost an agency between $12,000 and $20,000 per unit. In most cases, agencies purchase kiosks, rather than lease them. They may however reprogram kiosks after a project is complete to fit a new information need.

The cost of software for kiosks is highly variable. It often depends on the complexity of the graphics and interaction screens and on whether or not information and photographs to be used are readily available. For a relatively simple interface and with pre-existing information and photos, software development could cost an agency approximately $40,000. More extensive graphics and sound, graphics that must be designed by the vendor, and original video footage would add significantly to the cost.

Costs to update the content of the video display or kiosk could range from a few hundred dollars for simple text-based changes to thousands of dollars for new, motion-based video screens. These costs could be avoided or reduced by having an agency manage the updates. If the kiosk design involves a central computer controlling the display and software created in a common development language like HTML, agency personnel may be easily able to make updates to the kiosk information.

Kiosks and interactive video displays also need regular maintenance including cleaning, refilling paper, and stocking extra parts for quick repairs. Agencies can reduce the cost of maintenance by

assigning on-site staff to be responsible for maintenance. Alternatively, the kiosk vendor may charge several hundred dollars per month for maintenance services. An agency also may have professional staff accompany interactive displays to assist users. The State of Vermont has an advanced computer-based survey instrument with full-color graphics, photographs, and video segments, accompanied by two to four survey attendants to guide respondents through a questionnaire. Such additional staffing requirements should be considered in the cost equation.

How are interactive video displays and kiosks organized?

Interactive displays are usually independent, free-standing installations. A television monitor is required, operated by either touching the screen or using a keyboard. Depending on the anticipated level of use, a touch screen is sturdier than most peripherals. Interactive displays are best situated in places where they will attract users. A minimal need is connection to a reliable power source for the electricity required by the monitor, the driver, and the computer. Displays are frequently linked to terminals in a central location that monitor their continued performance and reliability.

Interactive displays may be operated as a network of terminals, like automatic teller machines (ATMs) or the Arizona Quickcourt system. The Central Puget Sound Regional Transit Authority (RTA), in Seattle, has developed a fiber-optic based "Interpretive Display" formatted around a map of the region. The RTA uses it, without staff, to reach people in shopping malls and other high-traffic areas and get them involved.

The decision to use kiosks is highly dependent on the nature of the project, other public involvement techniques being used, community norms, and available resources. In the mid-1990s because of a confluence of computer technologies and public outreach needs, a number of projects employed kiosks as one of many outreach techniques. However, since that time, alternative forms of disseminating information have emerged (e.g., Internet, community-access television, etc.). In addition, because of the visual sophistication of the public, given the pervasiveness and societal influence of mass media and advertising, there may be expectations on the part of the public for high quality and completeness. The public may dismiss the visual content because the renderings or presentation are not developed to a comparable level of detail and quality they are used to viewing in the print and visual mass media.

Consequently, it is not possible to offer reasonable "rules of thumb" on key issues of number of kiosks, location, message content, etc. Because of the cost individual kiosks, if an agency is going to seriously consider kiosks or interactive video displays as part of a public involvement program, a separate study should be conducted to confirm expected use, types of information perceived to be valued by the public, candidate locations, message content and format.

How are they used with other techniques?

Interactive displays are stationary components of a larger outreach program. They cannot be an agency's sole means of public communication. Instead, they offer a dynamic and potentially absorbing method for expanding public involvement. Innovative use of this technology offers a new way to meet an old goal: sharing information with the public.

What are the drawbacks?

Any new technology involving machines may cause unease. People resent the use of machines as a perceived replacement for personal communication. Interactive displays, like ATMs, offer people added convenience and the appearance of one-on-one interaction. However, frustration with menu-driven machines and the tedium of struggling through pre-programmed displays alienate some people.

Software purchase is a high up-front cost. Moreover, the software package needs to be updated regularly to keep it fresh.

Maintenance costs are incurred. Screens get dirty, especially touch-screens, and may need daily cleaning if usage is high.

Potential vandalism is a factor in site selection, the type of equipment selected, and the location of the power source. The installation should be designed and sited to help its maintenance crew cope with defacement and abuse.

Liability issues may be associated with location of displays. Movable displays, in particular, should be insured to relieve property owners of responsibilities for incidents that occur where they are parked. Stationary displays should also be insured.

For further information:

- Bellcore, (201) 740-4762
- City of New York, Department of Information, Technology, and Telecommunications, (718) 403-8011
- New York State Urban Development Corporation, (212) 930-0431
- Portland Metro, Public Involvement Office, Portland, Oregon, (503) 797-1746
- Quickcourt, Arizona Supreme Court, Phoenix, Arizona, (602) 542-9300

COMPUTER PRESENTATIONS AND SIMULATIONS

What are computer presentations and simulations?

Computer presentations and simulations are electronic displays of information. Their power derives from a computer's ability to provide quick access to enormous stores of data and its capacity to display and rearrange images on demand.

A variety of computer media and methods are available for use in interacting with the public with computer-based information:

- **Computer graphics** aid public understanding through simplification of data or alteration of images. Computer-generated graphics show tables, graphs, diagrams, or charts in dramatic and understandable ways. They become part of printed reports and are shown on computer screens or television monitors. They can incorporate videos or video simulations of proposals, programs, or projects.

- **Digitized photographic stills** are photos that have been converted into computer data so they can be readily modified. They can portray the "before-and-after" of a proposed project from a single vantage point. This enables agencies or community members to consider a number of alternatives or fine nuances of detail when discussing a particular site and how a transportation project or program affects it.

- **Photo mosaics** use a computer to combine photographs. Individual photos of a site are scanned into a computer, then digitized and assembled into a single image as a basis for portraying existing or potential sites. As digitized photographs, mosaics are used in preparing video simulations.

- **Geographic information systems (GIS)** store data about sites at many different levels of detail. The data can be combined and presented in a great variety of maps, tables, or graphs to aid in understanding a proposal or project. (See **Mapping Though Geographic Information Systems**.)

- **Video brochures** are videotapes that explain specific projects or outline long-range plans. Tables, charts, and images are often incorporated into video brochures. They are designed and distributed to community members, and agencies deposit copies in local libraries for people to borrow and view at home on television.

- **Video simulations** are animations or moving images that convey a computerized view of real or potential changes. Generally displayed on either a computer or a television monitor, simulations can depict transportation projects both before and after construction or simulate a trip through a site. They allow a viewer to see a site as though standing in one location and making a 360-degree turn. They show the components of an agency's broad responsibilities, programs, or capabilities.

- **Visualizations** are applications of three- and four-dimensional computer graphics technologies. A number of agencies use this relatively new technology to facilitate public involvement and environmental analysis. Usage is expected to grow rapidly as transportation departments seek more effective ways to design and communicate information about transportation to the public. (See **3-D Visualization**.)

Why are they useful?

Computer-generated images provide information in a stimulating, visual way. Images are more effective, immediate, and powerful than words in conveying a message. Visual images are universally understood and help surmount language barriers. Whether people are computer-literate or not, they readily respond to the visual images of computer presentations. With an image at hand, discussion among members of the community and relevant public agencies moves beyond conjecture to more substantial issues and concerns. (See **People with Disabilities; Ethnic, Minority, and Low-income Groups**.)

Computer presentations and simulations enhance interactive communication. Images are used to accommodate and incorporate community suggestions over a series of meetings. Community leaders explore "what if" scenarios and investigate the potential for change. Geographers at the University of Illinois have developed GIS systems for use by county planners. The system employs an interactive planning system that coordinates related information. On a computerized county map, users gain access to detailed maps or photographic images of a site. They sketch in suggestions and make copies of images, attaching text, audio, or graphic annotations. Users' suggestions are then compared directly to the original image.

Computer images convey complex information in easily-digested segments. Individualized pieces of data on demographics or economic impacts can be turned into graphics for participants to discuss. They can present environmental and esthetic impacts. Simulations can give a bird's-eye, pedestrian's, or passenger's view, standing still or in motion.

Showing a potential facility in a familiar context enhances understanding. Digitized photographic images help overcome misconceptions and serve as a check against distortion or misrepresentation by either promoters or critics. Digitized before-and-after photos have been used by the Connecticut Department of Transportation (DOT), the New York State DOT, and the Massachusetts Highway Department to demonstrate how high-occupancy vehicle (HOV) lanes would look if applied in specific corridors. The Finnish National Road Administration has used this technique in developing its master plan for Helsinki.

Do they have special uses?

Computer-generated visual aids can be a useful aid in resolving conflicts. New York's New School for Social Research used simulations to resolve a dispute between the Newark Water Commission and several New Jersey towns about growth in the city's watershed. The Commission, State, city, and town representatives and local civic and conservation groups reviewed computer models of various scenarios for preserving the watershed lands.

Computer graphics convey complicated information simply and attractively. Graphics are projected onto walls or screens, using a portable computer and projection equipment. Data, charts, and graphs from computer-based systems can illustrate data or survey results. The Lexington–Fayette Urban County Government (Kentucky) has used lap-top computers at public meetings to project tables, diagrams, and charts to explain travel demand models, level-of-service issues, and highway capacity.

Video simulations illustrate details of future projects. New York's Urban Development Corporation used video simulations to show community members that the Riverside South residential and park project could be enhanced by altering the elevated Miller Highway between 57th and 72nd Streets in Manhattan. A video kiosk with multiple choices showed the project from a variety of perspectives. Its use helped the agency and the community move the discussion beyond conjecture and toward concrete issues. (See **Interactive Video Displays and Kiosks**.)

Computer illustrations facilitate discussion of details. Computer images are used to illustrate specific impacts and visual characteristics. Video animations or photo mosaics facilitate discussions concerning:

- Light and shadow issues;
- Perceptions of motion and movement;
- Architectural integrity; and
- Contextual suitability.

Computer images improve upon traditional scale models. Architectural scale models are limited in scope and context. They show one project alternative and cannot easily be used to portray a variety of alternatives. Scale models are delicate, do not travel well, and cannot be modified or rearranged without incurring large costs. Computer images, by contrast, have few of these difficulties.

Computer simulations reach a variety of audiences. The Portland, Oregon, Metro holds an annual Winter Transportation Fair with speakers, booths, and computer-generated exhibits and simulations about transportation. Child-care services for small children are available and include a popular computer simulation game about city planning.

Who participates? And how?

Technical committees, elected officials, community groups, and others use computer-generated illustrations as a presentation technique or work tool for public meetings, agency reports, or public documents. No computer skills are required to view a computer operator's products.

Computer-generated data and images communicate effectively to special groups. Community members with hearing disabilities are reached through annotated visual images with text. People with limited reading skills easily understand a videotape filled with images and an explanatory voice track. (See **People with Disabilities; Ethnic, Minority, and Low-income Groups**.)

People view computer-generated materials either at meetings or at home. They see them on a wall or on large video monitors at public meetings. They use interactive compact disks or video cassettes at home or at places such as public libraries and schools. People also receive computer-generated information through electronic on-line services or via cable or public television.

People review proposals and projects at their convenience; for instance, by viewing reports that incorporate computer-generated graphics or showing video animations on home monitor screens. Dallas, Texas, Area Rapid Transit (DART) produced a bi-monthly video news magazine with computer graphics for local cable television that reached people in 14 cities within its service area.

People discuss projects or plans based on computer-created images—for instance, long-range plans, special studies, and state transportation improvement plans. The University of Miami, Florida, Center for Urban and Community Design used a simulation model to help a community task force generate recommendations for a new residential design code. Concerned that a hurricane protection policy requiring new buildings to be raised six to eight feet above street level would result in the replacement of traditional bungalows with larger houses, the task force viewed a simulation to understand how changes in building height and setback would shape the character of new development.

How do agencies use the output?

Computers involve people in a public process, helping them understand the details and context of a specific transportation issue, an infrastructure project, or a transportation program. The use of computer imaging gets people energized, heightens a public meeting's activity level, and adds excitement. Most people react strongly to images, and images are often cited as the most memorable part of a presentation or report.

Images and graphics convey a great deal of information efficiently, so that agencies do not dominate a discussion in a public meeting. Computers can enhance information used in a planning process or explain the scope of a project. Use of photographs, drawings, diagrams, or graphs makes a point effectively and drives home its most important components. The Metropolitan Transportation Authority (MTA) in Los Angeles County, California used photographic images for the Wilshire/Vermont station on its Red Line. The MTA worked with University of California at Los Angeles design staff to show potential station designs and illustrate design concepts for public reaction and comment.

An agency can communicate quickly and receive rapid responses from participants. Presentations of data or study findings can be sent between departments, between agencies, and to participants in a process. Transmissions take place by exchange of floppy or CD-ROM disks or by modem via national and international networks. (See **On-line Services**.) Through such speedy transmission, agencies send out up-to-date information and keep themselves informed of quickly-developing issues or participants' concerns.

Who leads?

Agency staff often initiate and manage computer images for presentation graphics. Simple graphics prepared with common software packages are placed in documents or projected onto screens using either overhead projectors or a computer projection machine. The process uses now-familiar technologies, including computer-aided drawing and design (CADD), geographic information systems (GIS), and transfer of information to video tapes.

Sophisticated computer simulation graphics need specialized staff. Computer simulations are complex to create and may require the expertise of computer specialists, along with special equipment. Agencies may need to hire professional consultants who specialize in environmental simulation, computer graphics, computer animation, or digitized photographs. Environmental simulation labs at research institutions offer not only video simulations but also three-dimensional, virtual-reality presentations. These techniques can link changes in physical form to traffic, utility demand, and fiscal impacts.

What are the costs?

Computer costs are based on hardware, software, and staff time. Many agencies now have computer hardware available and assign staff to operate the machines. With computers on hand, agencies are able to take advantage of various appropriate software programs at nominal cost.

Staff time is required for learning software programs. While prices for software packages are relatively low, time for staff to learn and operate programs is often substantial.

Costs of computer materials for presentations depend on the complexity and sophistication of the presentation. A lap-top computer and a projection machine facilitate effective presentations but drive their cost up substantially. Agencies with limited budgets for presentations often transfer computer-generated images or text to printed materials or video.

Data costs dictate the usefulness of some applications. Sophisticated computer applications such as simulations are expensive, and their use may be limited to large, complex projects or issues. Simulations are relatively new and still costly, and the process of loading and manipulating appropriate data, formatting it, integrating it with other data, and meeting other programming requirements is labor-intensive.

How are computer presentations and simulations used with other techniques?

Computer graphics are integrated with other elements of a public involvement program. As with any presentation materials, the content of a presentation must be determined well before production of the graphics or simulation model. Materials are designed in formats that accommodate additions and changes due to public comment or suggestions. (See **Public Information Materials**.)

Computer graphics are used with many other public involvement techniques. GIS products, computer simulations, and travel demand forecasting models are used directly with community people. The products of these analysis tools—data or maps portraying population and employment information or transportation usage forecasts—provide useful information to the public.

Computer applications are used in surveys. University of California researchers used computer simulations to study the market potential of transit-oriented land development. Four development scenarios were simulated, with variations on transit access, commercial and retail services within walking distance, and community open space. They were shown to survey preferences of 170 residents of the San Francisco Bay Area. (See **Public Opinion Surveys**.)

Computer images can be part of an interactive display, whether stationary or mobile. Interactive displays for presentations and open houses use touch screens to get or give information. Computer images are central to messages or data agencies deliver on-line for inquiring participants. (See **Interactive Video Displays and Kiosks**.)

Media campaigns utilize computer-generated images and data. Public service announcements incorporating computer images are broadcast on television as part of an information campaign. (See **Media Strategies**.)

What are the drawbacks?

Illustration techniques should be used judiciously, since they are not appropriate for all projects or programs. Using such relatively new and impressive technology subjects an agency to criticism about spending limited public funds on expensive and flashy "toys." The Twin Cities, Minnesota, Metropolitan Council used GIS images in presentations, only to find that people were more interested in the data than the overall concepts illustrated. The Pennsylvania DOT found that the technologies may not be cost-effective in attracting interest and getting people involved.

Images are powerful, and they are sometimes misunderstood. For controversial subjects, computer images may suggest that an agency is biased toward one alternative. If illustrations are perceived as deceptive, the agency or the discussion process is open to question. If possible, an agency consults with people representing many positions prior to developing computer images or illustrations.

Computer illustrations usually show only two dimensions. Computer images give an idea of depth, but with some limitations. Simulations offer three dimensions, but some older programs have difficulty capturing the nuances of ambient light and depth of view. However, the technology continues to improve.

Agencies need to consider how to provide information to people who are sight impaired. (See **People with Disabilities**.)

Are computer presentations and simulations flexible?

Flexibility is usually related to software costs. While computer simulations can be designed for great variation and manipulation, some programs are quite limited or relatively static. More complicated software programs allow an agency to not only prepare images and simulations for public presentation

but also give some leeway to project designers and technicians working on-the-spot to accommodate design suggestions from the audience.

Once in place, computer graphics programs can be used repeatedly and in new ways. A complex transportation issue generates many potential solutions before reaching a set of final alternatives. Throughout this process, participants need help visualizing and understanding the characteristics of alternatives. Computer images potentially provide such visual aid.

Computer-generated images are used, modified, and re-used. Once the images and other computer materials have been made, agencies can be flexible in their use and distribution. The Orange County (California) Transit Authority made computer-generated images of alternatives for its projects. These images are used in video brochures available for borrowing. They are also used in mobile kiosks that bring interactive touch-screen programs to various areas of the county.

When are they used most effectively?

Visual images are effective at nearly any stage in a process. A visual depiction of possible changes in a transportation system can be used to acquaint community people with an agency's tasks. Computer images work especially well when used for people with limited language skills or for groups that speak several different languages.

Computer images have particular application to alternatives, helping people visualize potential impacts and operations. They are used in corridor studies, long-range planning, transportation improvement programs, or other program or project tasks. Visual communication is very useful at the beginning of a project or at a critical time when decisions are being made.

For further information:

- Center for Urban and Community Design, University of Miami, Coral Gables, Florida, (305) 284-2031
- Dallas Area Rapid Transit Dallas, Texas, (214) 749-3278
- Environmental Simulation Center, New School for Social Research, New York, New York, (212) 229-5408
- Environmental Simulation Laboratory, Institute of Urban and Regional Development, University of California, Berkeley, California, (510) 642-2961
- Lexington–Fayette Urban County Government Planning Division, Lexington, Kentucky, (606) 258-3160
- New York State Urban Development Corporation, New York, New York, (212) 930-0431
- Orange County Transportation Authority, Orange, California, (714) 560-5725
- Portland Metro, Portland, Oregon, (503) 797-1743
- Texas Transportation Institute, Texas A&M, (409) 845-1711
- Twin Cities Metropolitan Council, Saint Paul, Minnesota, (612) 291-6423
- Urban Innovations Group, University of California at Los Angeles, Los Angeles, California, (310) 825-4321

MAPPING THROUGH GEOGRAPHIC INFORMATION SYSTEMS (GIS)

What is a geographic information system?

Geographic Information Systems (GIS) combine traditional maps with layers of related information in an electronic format. A GIS assembles, stores, manipulates, and displays data that is identified by location and can relate information from different sources. Any variable that can be located spatially can be input to a GIS. Location may be annotated by x, y, and z coordinates of longitude, latitude, and elevation, or by such systems as ZIP codes or highway mile markers. A GIS can also convert existing digital information into forms it can recognize and use. In addition, census or other tabular data can be converted to map-like form, serving as layers of thematic information in a GIS.

A GIS stores maps and files layers of information in a way that makes it possible to perform complex analyses. For example, a GIS user can query a specific location, object, or area on the screen to retrieve recorded information about it from off-screen files. A GIS can also recognize and analyze the spatial relationships among mapped phenomena to determine adjacency (what is next to what), containment (what is enclosed by what), and proximity (how close something is to something else). It is also possible to assign values such as direction and speed to simulate movement through a network. GIS also has the ability to produce graphics on the screen or on paper that convey the results of analysis to people who have input to and make decisions about resources.

Some of the many broad uses of GIS include:

- Mapmaking – Incorporating the mapmaking experience of traditional cartographers into GIS technology for the automated production of maps.
- Site Selection – Analysis of multiple physical factors when they must be considered and integrated over a large area.
- Emergency Response Planning – Analysis of the impacts of natural disasters on surface structures, size of affected populations, and emergency response time and available routes.
- Simulating Environmental Effects – Realistic, three-dimensional "before and after" perspective views of the environmental impacts of a given project.

Source: Geographic Information Systems, U.S. Department of the Interior, U.S. Geological Survey, ***http://www.usgs.gov/research/gis/title.html***

Why is it useful?

GIS provides a richness of data that is unlike traditional paper maps. Complex information can be presented graphically in one place. In addition, GIS maps will typically have more depth of information. For example, while a paper map may show where toxic sites are located, a GIS map of the same information will often be backed up by a full database of information on those toxic sites. Information from a GIS may also be more current than a paper map. While paper maps may be updated on a regular schedule (e.g., annually), recent satellite or aerial photos could be digitized for GIS use to create "up to the minute" maps of an area.

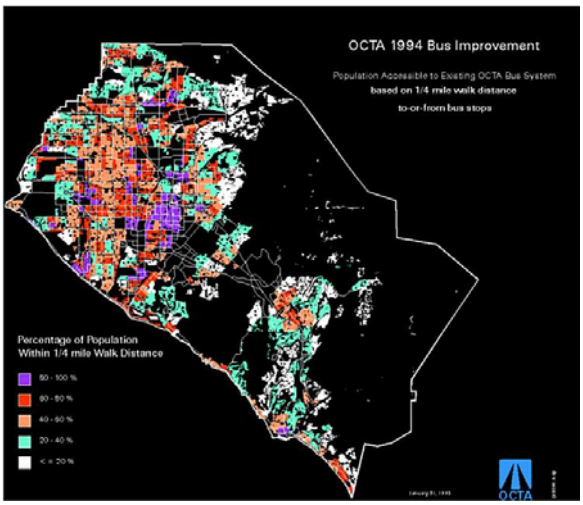
GIS offers public involvement professionals flexibility in displaying information. Users determine how and at what levels associated information is displayed. As a result, maps can be quickly customized to a particular purpose. Maps can also be used interactively with the public to gather input and display the possible scenarios resulting from that input in a real-time setting.

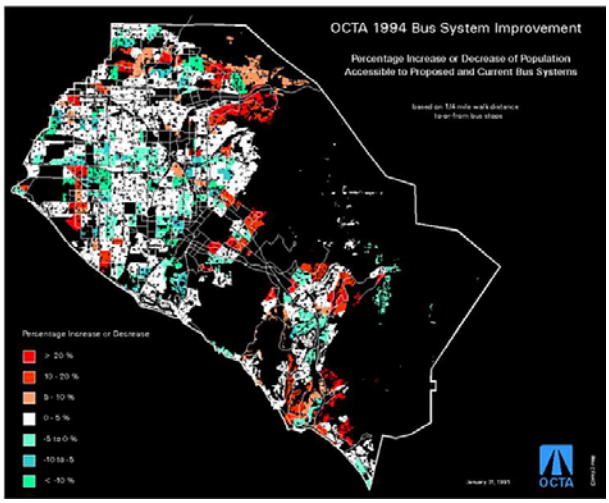
GIS also allows conditions to be analyzed over time. For example, the San Diego Association of Governments (SANDAG) has been using GIS for over 25 years to assist in regional and local planning efforts. By working with its partners, SANDAG has developed cost efficient techniques to update its land use database on a regular schedule. SANDAG's GIS website also offers interactive maps that can be

customized to demographic, economic, transportation, and trans-border themes; downloadable GIS files, and access to printed maps.

Does it have special uses?

GIS can be used in participatory/collaborative mapping. For example, practitioners and community residents can collaboratively sketch community boundaries, as seen by local residents and identify important community assets and liabilities (e.g., cultural resources, historic sites, toxic sites). GIS also supports "what-if" scenario planning. Mapping of roads, bus routes, pedestrian paths and bikeways commonly can help assess those used and/or preferred by local residents. The results can be overlaid with current and proposed transportation projects for a quick snapshot of potential impacts and can be ultimately integrated with new projects. The following example shows the results of a GIS analysis done by the Orange County (CA) Transportation Authority (OCTA) to determine what effect a proposed change in bus service would have on accessibility to the new service. OCTA used a variety of information, including population density, land use, and "catchment" areas (i.e., the area from which potential riders would be willing to walk to and from the stop) to develop this analysis. The first figure shows population accessible to the existing bus system. The second shows the change in accessibility based on a proposed change. Additional examples from OCTA can be found in FHWA's Toolbox for Regional Policy analysis, Orange County Case Study, http://www.fhwa.dot.gov/planning/toolbox/orange_overview.htm.





A GIS can be used to survey residents about their local environments (cross-link to section in guide on surveys). For example, a the National Science Foundation has funded a project at the University of Illinois at Urbana-Champaign to help in understanding of elements of local environments that are important to people's lives. Through a face-to-face interview, participants are asked to assess perceptions about a neighborhood's boundaries, services, strengths and assets, problems and deficiencies. The interview uses a GIS interactively to plot responses on a map and prompt follow-up questions, as well as to present study findings.

GIS also provides information to citizens about community information, services, and projects. On its communityWEBpages, the City of Vancouver hosts a "Projects and Construction" section that includes information about city initiatives, projects, development proposals, construction and roadwork. Information is searchable by community, department, project type, street name or location, and project dates. This information is also mapped using VanMap, a city-wide map application that also provides information on property lines, zoning information, sewer and mains, addresses, and public places.

Other examples of GIS used to provide information to the public include:

- "Seattle's Neighborhoods – A Graphical Guide to Services and Activities" maps neighborhoods by census tract. It provides information on City of Seattle services within tracts, as well as brief demographic information.
- North Central Texas COG Transportation Improvement Program Information System provides information about transportation improvement plan projects in the Dallas-Ft. Worth metropolitan planning area through an interactive map.
- The EPA Enviromapper maps various types of environmental information, including air releases, drinking water, toxic releases, hazardous wastes, water discharge permits, and Superfund sites. Maps can be created at the national, state, and county levels.

Who participates? And how?

GIS can be used interactively with participants at public meetings, open houses, and small group meeting. Practitioners may engage participants as a group or in a one-to-one setting. In addition, the GIS tool could be set up as a stand-alone interactive display for meeting participants to review and comment on proposed plans or analysis. GIS products could also be part of interim and final project or plan documents.

A GIS tool can also be part of a website. Like many of the community information services described in the preceding section, individuals who are computer-oriented are most likely to participate. Usage would be limited to those with access to computers and Internet connections. However the public would have the convenience of accessing information from their homes at any time. Agencies must publicize the availability of on-line material. (See **On-line Services**.)

A GIS may also be available for plan or text mark-up software. For example, GIS images of proposed routes or service corridors may be placed on a website and through appropriate mark-up software, the public would be able to comment from remote locations at prescribed review cycles. (See **Plan Or Text Mark-Up Software**).

How do agencies use the output?

Agencies can use GIS to gather community reaction and obtain community opinion on projects and plans. Through GIS, agencies may gain a better understanding of importance of neighborhood/community elements to public. GIS may also assist with joint-decision making and empathy building. Interactively mapping scenarios can help all parties better understand each other's interests and concerns.

Also, because of the electronic interchangeability of the GIS data files, agencies may save time and resources once a final concept is approved by using the same materials for the next stages of the project or plan development using materials developed, in part, for public involvement purposes.

What are the costs?

Costs to implement GIS systems may be high depending on the strategic interest and information technology resources of the agency. In some cases, a project may already have a GIS component. In addition, agencies may have the necessary hardware and software, as well as professionals trained in GIS on staff and available to assist in its use for public involvement. If not, staff training or hiring consultants may be necessary.

GIS does involve a substantial time commitment on the part of the agency. Depending on data sources available, maps may have to be generated for intended purposes. In most case, information for public display would need to be customized to the particular project.

If a GIS is to be available via the Internet, some type of outreach may be beneficial to advertise the service and ensure return on investment. In addition, set-up and/or licensing costs may apply.

How is it used with other techniques?

GIS can be used to:

- Enhance public meetings, small group meetings, open houses, conferences, and workshops by conveying complex information in manageable layers of information (See **Public Meetings/Hearings; Small Group Techniques Open Houses; Conferences, Workshops, and Retreats**.);
- Facilitate activities like brainstorming, charrettes, and visioning to develop better, community-based concepts (See **Brainstorming; Charrettes; Visioning**.); and
- Provide additional features to and comment opportunities through on-line services (See **On-line Services**).

What are the drawbacks?

As mentioned above, cost and training may be a drawback to using GIS. If the hardware, software, and personnel capabilities do not exist in the agency, or are not being currently employed on the project, significant costs can be incurred to purchase computer equipment and train staff, or hire consulting expertise. The availability of datasets and compatibility of data may also impact the cost of using GIS.

Because of its electronic format, GIS has the potential for mass media appeal and distribution. However, agencies must take care to ensure that false impressions are minimized through accurate representations.

If a GIS tool is to be web-based, project staff needs to consider that the use of on-line services is limited due to access, expense, and skill requirements (See **On-line Services**). As a result, web-based GIS should be used with other public involvement techniques (i.e., meetings, other on-line services).

When is it used most effectively?

GIS is most effective when there is:

- A need to convey complex information graphically;
- Information that can be tailored to particular users or audiences; and
- Support or complementarities from other public involvement techniques.

For further information:

- San Diego Association of Governments GIS Resources, http://www.sandag.org/index.asp?classid=21&fuseaction=home.classhome
- FHWA's Toolbox for Regional Policy Analysis, Orange County Case Study, http://www.fhwa.dot.gov/planning/toolbox/orange_overview.htm
- FHWA's Toolbox for Regional Policy Analysis, San Francisco Case Study, http://www.fhwa.dot.gov/planning/toolbox/sanfrancisco_overview.htm

- FHWA Transportation Case Studies in GIS, http://tmip.fhwa.dot.gov/clearinghouse/docs/gis/
- "Neighborhood Evaluation using GIS", Dr. Emily Talen, University of Illinois at Urbana-Champaign, http://www.urban.uiuc.edu/faculty/talen/GISweb/summary.html
- City of Vancouver, communityWEBpages http://www.city.vancouver.bc.ca/community_profiles/index.htm
- "Seattle's Neighborhoods – A Graphical Guide to Services and Activities" http://www.pan.ci.seattle.wa.us/don/neighmap.htm
- North Central Texas COG Transportation Improvement Program Information System http://dfwinfo.com/trans/tipins/index.html
- EPA Enviromapper, http://maps.epa.gov/enviromapper/
- Community University Regional Consortium for Regional Environmental Justice http://www.danj.org/~gelobter/cucrej/
- Integrated Approaches to Participatory Development http://www.iapad.org/
- Hillsborough Project http://www.eos.ncsu.edu/eos/info/ce400_info/roundabout/index.html
- "The World of E-Planning", Karen Finucan, Planning, July 2001, pp 4-9. Also provides a reference to the public access GIS in Milwaukee and a public participation website for Indianapolis.

3-D VISUALIZATION

What is 3-D Visualization?

Three-Dimensional (3-D) Visualization is a process in which flat images are enhanced or manipulated by an artist to impart the illusion of depth. 3-D visualization may be still, i.e., no motion associated with the image, or may include motion, in which case the technique is usually referred to as 3-D animation.

Flat images, such as illustrations, photographs, films, and graphics in a display area or on a computer screen, can be manipulated through one of several techniques to create the illusion of depth. These techniques include special viewing lens worn by the viewer to make flat images appear with depth. Computer illustration and animation techniques can also provide depth to an image through special techniques of shading, perspective, motion, and possibly sound. When using a computer-based technique, it is possible to select certain viewing points or environmental conditions to examine the images or objects of interest. For example, a 3-D visualization of a project may be created using a morning, mid-day, and evening context to get a sense of the scale, utilization, and appropriateness of a proposed project in a community setting. All of these techniques have the intended effect of making the objects appear to be "life-like", extending flat images out of the paper, print, film, or screen on which they appear.

Three-dimensional (3-D) animation, the dynamic version of 3-D visualization, creates the illusion of motion by viewing a succession of 3-D still images or computer-generated still images. Prior to the advent of computers, animation was achieved by videotaping or filming a sequence of still images or painted sequences one at a time on plastic or paper surfaces. When played back, the sequence of still images give the impression of motion. When first used, computers controlled the movements of the artwork and the camera using this traditional method. Now computers create the artwork and simulate the motion effects.

Why is it useful?

Many individuals visually perceive the world and the objects in three dimensions -- length, width, and depth. Because this is a natural state of observing and viewing our world, information conveyed with this technique does not require extensive translation or adjustment from our normal visual mode of sensing. The advertising industry for years has relied heavily on visualizations (and increasingly 3-D visualizations) to convey messages about products or services, educate the public, or encourage purchases.

3-D visualization are able to convey in a succinct manner the forms and shapes of an interim or final project design or concept. This enables the public to better understand the implications of a potentially complex project or plan and enhance their ability to provide review and comments.

Does it have special uses?

People perceive the world and objects in three dimensions. Accordingly, information conveyed with 3-D visualization does not require familiarity, training, or extensive translation or adjustment on the part of the public.

Computer animation can be used to create special effects and to simulate images that would be impossible to show with non-animation techniques, such as the look and feel of walking through a community after a large-scale facility such as a replacement bridge or new transit system has been built. Computer animation can also produce images from scientific data. It has been used to visualize large quantities of data, such as those gathered through remote sensing applications such as weather systems

(See **Remote Sensing Applications**). Computer animation can also be used to create a sense of the operations of a proposed facility or system, including representation of vehicular and people movement in a project study area.

Who participates? And how?

Almost anyone can participate in the use of 3-D visualization. However, agencies using this technique should consider alternate methods for involving people with visual impairments.

The technique can be used during various stages of a plan or project. Typically 3-D visualization is used after a set of solution options or alternatives have been sufficiently defined and greater insight into the environmental, community, social, and visual impact is desired.

Because many of the 3-D visualization technique now involve the use of computers, the 3-D products may be shared over a wide range of media outlets, including the Internet, kiosks, CDs, display tables, VCRs, TV programs, and similar means. Static displays, such as special display boards, may be used at public forums. This static format provides the opportunity for a project representative to offer an explanation of the technique and solicit comments from viewers. On the other hand, 3-D visualization, when coupled with sound, may allow for a self-standing display, requiring no project representative. Self-standing displays may be used in kiosks, on the Internet, or on appropriate broadcast media (as PSAs, for example). (See **On-line Services; Interactive Television; Interactive Video Displays and Kiosks; Public Information Materials**.)

How do agencies use the output?

3-D visualization is a natural way of viewing the potential effects and outcomes of a proposed plan or project. The visualization may also be used to create a futuristic or a "desired outcome" vision for a project or plan, which is not necessarily tied to any proposed solution idea. In either case, once the public has had a chance to understand and review the 3-D visualization, agencies may use the technique to:

- Gather community reaction.
- Obtain community opinion on projects and plans.
- Be a catalyst for further discussion, analysis, or refinement of a proposed alternative.
- Be the basis for an honest and valid sample of community opinion.

What are the costs?

While commercial software is readily available to support 3-D visualization, highly skilled techniques and specialized computer equipment are needed to develop quality 3-D visualizations. The costs may range from several hundred dollars to several thousand, depending on the number of 3-D visualizations required, the extent of animation, and the resolution, source materials, and complexity of the images being developed. Because this is such a specialized skill and the visualization equipment is somewhat unique for these visualization functions, consultant services are usually required.

How is it used with other techniques?

3-D visualization can augment a variety of other techniques. It is especially useful when describing a complex alternative or plan, in which case it can augment text-based or other image-based techniques. 3-D visualization is also useful in providing a baseline or common reference point for soliciting public opinion and comment on a project or plan. (See **Briefings; Public Meetings/Hearings; Open Houses; Conferences, Workshops, and Retreats**.) 3-D visualization may also be used for brainstorming concepts or creative activities, such as a design charrette or community visioning exercise. (See

Brainstorming; Charrette; Visioning.) Depending on the acceptability and appropriateness of the 3-D visualization, it may become a "logo" or shorthand representation for a particular project or plan.

What are the drawbacks?

3-D visualization is a costly and potentially time-consuming technique. Care must be taken to ensure that the investment is beneficial to the overall public involvement goals. Because of its electronic-format, it does have the potential for mass media appeal and distribution. However, agencies must take care to ensure that false impressions are minimized through accurate representations. In addition, proper use of this technique is required to effectively gather accurate and representative public comment.

When is it used most effectively?

3-D visualization is used most effectively when a small number of complex plans or project alternatives are under consideration for review and/or selection. The visualization, when used in conjunction with other techniques, provides a context for enhanced public understanding, review, and comments.

For further information:

- Washington State DOT – Design Visualization. www.wsdot.wa.gov/eesc/cae/desvis.htm
- University of Wisconsin Forest Visualization Project. www.landscape.forest.wisc.edu/Projects/projects.html
- Engineering News Record article on 3-D visualization and public involvement. www.enr.com/new/coverstry_81301.asp
- Taking architectural views to the community with 3D Visualization. www.datacad.com/news/articles/hmfhfin.htm
- TxDOT Project: Cross-town Interchange Public Involvement Features 3D/4D Visualization. http://www.dot.state.tx.us/insdtdot/geodist/crp/xtown/xtown.htm
- Maglev Corridor Transit Project – Baltimore-Washington proposed project using advanced magnetic levitation technologies. http://www.bwmaglev.com/
- Honolulu Rapid Bus Transit project – Summary document with maps and photos of the BRT concept and proposed project. http://www.oahutrans2k.com/factsheet.pdf

VISUAL PREFERENCE SURVEYS

What is a visual preference survey?

A visual preference survey is a technique that assists the community in determining which components of a plan or project environment contributes positively to a community's overall image or features. As the name implies, the technique is based on the development of one or more visual concepts of a proposed plan or project. Once the visual concepts are developed, they are used in a public forum or other specialized public gathering to provide the public with an opportunity to review, study, and comment on their preferences for the features depicted by the visual representations. Typical uses of visual preference surveys include helping the community define the preferences for architectural style, signs, building setbacks, landscaping, parking areas, size/scope of transportation facilities, surfaces finishes, and other design elements.

The format for the preference survey can be a written ballot, a structured set of self-administered questions, a facilitated discussion, a focus group format, an open semi-structured forum, or used as part of another preference collection approach, e.g., handheld/instant voting techniques.

Why is it useful?

Visual preference surveys are helpful since they provide the public with a broad and relatively inexpensive range of options for depicting community features for a proposed plan or project. The actual technique may rely on sketches, photographs, computer images, or similar techniques to provide the basis for participants to rate or assess each visual depiction on a preference scale, such as a five-point scale. As a result, participants can express judgments and possibly reach a consensus about a visual design, architecture, site layout, landscape, and similar design features, which may be incorporated in the goals, objectives, design guidelines, enhancement/mitigation measures, and/or recommended standards for a study, plan or project.

Does it have special uses?

Visual preference surveys can assist agencies in the understanding and development of:

- Community and urban design features
- Transportation sub-area or corridor studies
- Transportation alternatives development and analysis
- Large-scale regional planning efforts
- Visioning exercises (See **Visioning**)
- Design charrettes (See **Charrettes**)

Who participates? And how?

Public participation will be dependent on the type of visual preference survey technique employed. For example, if a focus group format is used, then some public selection process must be used to include a set of individuals who are representative of the views and interest of the larger community. At other times, the visual preference survey may be included as part of a public hearing or public meeting process, with one of several "stations" or display areas containing the visual options. At the display area some means of collecting feedback from interested viewers will be needed, such as responses to a structured interview administered by staff or the completion by the viewer of a preference rating form.

How do agencies use the output?

The results of the survey will provide insights and direction to the agency on the preference of the sampled group. Based on the objectives of the survey and the representation of the community in the sampled group, the agency may make key decisions on the preferred types of project design features, studies, or plans. The results of the survey are also helpful in focusing community opinion on projects and plans, being a catalyst for further discussions, helping to educate the public about the design or plan choices, and offering an alternative form of collecting public or community opinion and feedback. Because of the visual basis of this technique, concepts and survey results are easily conveyed in the mass media.

What are the costs?

The cost for the visual preference surveys are usually a few hundred to a few thousand dollars, depending on the range of visual options to be displayed, the desired sample size, and the method(s) of collecting and analyzing public preferences. This techniques can be implemented using agency personnel and resources or through consulting services.

How is it used with other techniques?

Visual preference surveys can complement other survey techniques. (See **Public Opinion Surveys**.) It can also be used as part of a wider set of techniques to help educate the public about key features of a project or plan and to assist in the development of ideas or concepts. Consequently, visual preference surveys can be used in conjunction with public meetings or hearings, activities involving vision development, design charrettes, and focus group discussions or small group meetings. (See **Public Meetings/Hearings; Visioning; Charrettes; Focus Groups; Small Group Techniques**.)

What are the drawbacks?

Visual preference surveys are time consuming since they will require the development of one or more visual renderings of options or design features under consideration. This set-up time may require several weeks of preparation, depending on the availability of data, the skills of the artist, and the desired size and level of detail for the visual rendering.

Agencies using this technique will need to consider alternative methods for involving people with visual impairments. (See **People with Disabilities**.)

Because of the visual sophistication of the public, given the pervasiveness and societal influence of mass media and advertising, there may be expectations on the part of the public for high quality and completeness. The public may dismiss the visual content because the renderings or presentation are not developed to a comparable level of detail and quality they are use to viewing in the print and visual mass media.

It is also possible for the public to develop false expectations based on the visual rendering. Agencies need to ensure that a designer's visualizations are true.

When is it used most effectively?

Visual preference surveys are most effective when major design feature decision needs to be made. The technique is also valuable in helping to build a community consensus and momentum on a preferred design or study approach. Because of its visual nature, this technique is also most effective when complex issues and concepts can be depicted visually.

For further information:

- "Shaping Dane" Pilot Project, Citizen-Based Land Use Planning in Dane County, Wisconsin, Electronic Planning Facilitation, http://www.lic.wisc.edu/shapingdane/welcome.html
- UrbanSim software based simulation model, Paul Waddell, 206-221-4161, pwaddell@u.washington.edu, http://www.urbansim.org/
- Envision Utah, http://www.envisionutah.org/
- FHWA's Toolbox for Regional Policy analysis, Envision Utah Case Study, http://www.fhwa.dot.gov/planning/toolbox/utah_application.htm
- Florida House Institute for Sustainable Development, Tools for Community Design and Decision Making, Inventory of Place-Based Planning Tools, http://www.i4sd.org/tools-2.htm
- City of Mankato, MN Urban Design Framework Manual, Visual Preference Survey (Chapter 2), http://www.ci.mankato.mn.us/urbandesign/chapter2/2.php3

HANDHELD/INSTANT VOTING

What is handheld/instant voting?

Handheld/instant voting is a means by which participants may express a preference for an issue or idea under consideration and have their preferences recorded, usually anonymously and instantaneously. In typical public involvement practice for example, participants are provided a paper feedback form or ballot to indicate a preference for one or more alternatives of a plan or project. These paper ballots are collected and tallied at a later time with the summary results usually shared with the public through a newsletter, report, website posting, or other means. Improvements in technology allow for more advanced tally techniques, such as an optical scanner, to automate and reduce tabulation errors. More recent technical advances have allowed participants the opportunity to cast their preferences via handheld devices, sometimes using wireless communication systems at a specially arranged location. Some companies are beginning to develop Internet-based instantaneous voting approaches, which allow for a decentralized collection of votes. Wireless companies with their cellular phones or PDAs now allow mobile users to connect to the Internet or e-mail providers and cast preferences for products and services.

The handheld/instant voting technique is not widespread, primarily due to cost, but may offer a dramatic improvement in the ability of agencies to collect public preference, especially if electronic voting systems are employed in other forms of democratic processes, such as local, state, or federal elections. Past efforts have been attempted in on-line voting (Cube system tried in Columbus, Ohio during the mid-1970's), but did not success due to technical awkwardness, lack of trust in an accurate vote tally, and minimal social acceptance of this form of democracy.

Why is it useful?

The advantages of the direct-recording electronic systems, where the participant (voter) does not fill out a paper ballot and simply touches a screen or pushes buttons, is that there is no voter intent problem (was a ballot marked correctly), the preferences are captured quickly, and physical presence at a public involvement site/event is not required, only some form of electronic access and validation of the voter. In addition, handheld voting allows for immediate feedback and quick iterations and refinements. Some experts believe the electronic voting systems could enhance the democratic process by enabling referendums or preference surveys to be conducted more often and at less cost. Some studies have indicated the lack of public involvement may be due to the inconvenience of going to the public involvement site, which would be overcome with a handheld/instant or electronic voting system. On the other hand, despite elaborate software safeguards against hackers and fraud, even electronic voting techniques must first gain enough public trust in the techniques security for them to be effective. Most tests so far have involved computers in public buildings with access monitored by vote monitors.

Does it have special uses?

Handheld/instant voting is useful when seeking preferences quickly from an audience. However, care must be taken to understand the nature of the voting group so that results are carefully analyzed and inferences correctly drawn about preferences for more general populations or groups.

Who participates? And how?

Participants in handheld/instant voting techniques may be selected to be representative of a special subpopulation (e.g., a community-based survey) or representative of the more general population (urban, suburban, rural communities in a metropolitan area across all demographic characteristics). At other times, there maybe no pre-selection or screening of voters and those who have access to the devices or

voting sites are allowed to cast a preference. The choice of technique and who participates depends on the objectives of the public involvement process.

A typical use of handheld/instant voting involves having the audience express preferences to several scenarios. They press buttons corresponding to questions associated with the scenario, using a preference scale to respond to a question, e.g., high to low, like to dislike, one to five, etc. The questions have been carefully selected and sequenced to allow analysts to infer preferences and/or special interests among the scenarios and discussion topics. From the voting, reports may be provided instantaneously or only votes collected instantaneously, with the results presented at a later time through a pre-arranged feedback mechanism. More sophisticated methods allow for the real-time adjustment of subsequent scenarios based on the immediate responses of voters.

Other types of handheld/instant voting techniques would allow the public to express preferences through touch screens on kiosks or similar computer-aided devices. The preference results would typically be downloaded to a central tally location periodically (hourly, daily, etc.) depending on the polling location of the kiosk, perceived interest in the topic, and cost.

In any case, issues of voter fraud, double counting, and ease of access will need to be addressed. Some techniques use identifying numbers, letters, or similar techniques.

How do agencies use the output?

The results are used in a manner similar to those of conducting a survey or preference expression technique. In general, the output allows for a means of rapidly getting public (or some subpopulation's) reaction to a project or plan, obtaining community preferences for selected scenarios, helping to educate the public about a particular project or plan, and encouraging participation through the fundamental democratic principle of voting.

What are the costs?

Handheld/instant voting systems are expensive, costing anywhere from a few thousand dollars up to several thousand dollars for each portable (wireless) unit. Vendors do provide rental systems, but the costs usually can be several hundred dollars per user, depending on the intended use, number of voters, duration of the rental, and the complexity of the survey. Technology advances will help drive these costs lower.

How is it used with other techniques?

Handheld/instant voting can be used with other parts of the project or plan development cycle to improve the agency's understanding of community preferences. Whenever the public involvement process calls for the expression by the public of a preference for an idea, options, or alternative, handheld/instant voting is a candidate technique.

What are the drawbacks?

Drawbacks of the handheld/instant voting technique include:

- Potentially high initial cost or rental cost;
- Only takes the opinions of those voting, which may cause for skewed interpretation of preferences and results; and
- Participants may be reluctant to use the devices for fear of new technology, accuracy, anonymity, or similar factors.

When is it used most effectively?

When a rapid response of preferences is required.

For further information:

- Characteristics of a good electronic voting system. http://www.acm.org/crossroads/xrds2-4/voting.html
- The case of electronic voting. www.wired.com/news/politics/0,1283,40141,00.html
- Transportation Blueprint for the 21st Century: MTC Forum Involving Electronic Voting. www.mtc.ca.gov/projects/blueprint/bp_findings.htm
- Internet Voting Technology Alliance for Public Involvement. www.iap2.org/PINlinks/pinlinks.html

PLAN OR TEXT MARK-UP SOFTWARE

What is Plan or Text Mark-up Software?

Plan or text mark-up software is a computer application that allows the user to provide comments, notes, hyperlinks, or other text or graphical modifications to an existing drawing, plan, document, graphic, or other form of electronic media. As visual renderings become more computer-based, a software application that allows for easy mark-up of visual concepts or text is desirable as a public involvement technique. Such a software tool would enable the public to directly comment on plans and ideas without detailed knowledge of the underlying visualization or text generation software. With advances in telecommunications, the mark-up software can be done remotely and through individual feedback or through structured group activities.

Why is it useful?

The plan or text mark-up software would allow for multiple reviewers to comment in an efficient and effective manner, usually from a remote location, on current plans, concepts, visuals, and ideas. Because the technique is computer based, it is available just about anytime from anywhere. Therefore, it provides an opportunity for a large number of individuals with access to the software and source documents or images to provide feedback and comment.

Does it have special uses?

It provides a means for a large segment of the population comment on current plans or ideas. It is a technique that may complement more traditional methods of convening a public meeting or discussion forum, helping to attract public participants who may not be able to participate due to distance or time constraints.

Who participates? And how?

Comments could be accepted from anyone who has access to the plan or text mark-up software. The software could be made available through on-line services or the Internet at little or no cost and could be developed and configured to operate on a variety of computer systems, e.g., Javascript.

To participate, a commenter would have to have access to the source document or images and have access to appropriate mark-up software that can operate with the source documents or images. Once this compatibility and connectivity is established, the commenter would provide one or several rounds of comments on the source materials. These comments would be reviewed and considered by the agency that would periodically receive the comments electronically. The agency would need to implement a plan for document version control and tracking.

How do agencies use the output?

Agencies would be able to collect public comments electronically on plans or other source documents associated with a project or plan. Because commenters provide their reactions in electronic form, an automatic record of participation is generated and provides an audit trail of public comments for future reference, as needed. Moreover, several cycles of comments can be gathered with successive cycles containing an updated version of the document or plan. This technique provides a direct means of gather public comment from those who wish to and are able to respond.

What are the costs?

There is an initial setup cost for establishing the protocols and procedures for the management of the electronic documents. The mark-up software would also have to be purchased and made available to users, usually through an Internet connection. The costs for the software may range from several hundred to several thousand dollars, depending on the formats and software used to generate the reference documents or plans. In some cases the text mark-up software is already available as part of a computer operating system. For example, Windows 2000 provides NetMeeting software which allows for text or plan mark-up in a group setting. After the initial setup expenses, the primary operating costs become the staff time required to manage the comments and updates to the electronic documents which have been made available for review and comment.

How is it used with other techniques?

Plan or text-markup software is not helpful when starting to develop a document or image, but instead can better assist the agency when soliciting comments and feedback on more mature concepts and ideas contained in the document or images. Consequently, the plan or mark-up software can be used after face-to-face meetings or activities in which initial concepts and trust have been developed. The software then provides an efficient means of maintaining public contact and gathering comments and feedback as the project advances. While this is an efficient means of collecting feedback, it should be consider as one of several techniques to be used, since face-to-face meetings are still invaluable for unambiguous communications and maintaining community interest and trust.

What are the drawbacks?

In addition the potential high costs of the software, there may be a "learning curve" for the commenter based on his experience with the software and the document or images on which comments are offered. If this learning curve is too steep or the software is not "user friendly" the commenter may get frustrated and not provide feedback due to technical difficulties. Moreover, the comments are received primarily from those who are able to work with the software and may not be a representative sampling of the general public. Therefore, interpretation of the comments will need to be done carefully.

When is it used most effectively?

Plan or text mark-up software is effective when used in conjunction with other feedback techniques. Plan or text mark-up software can also be used with small groups, such as advisory or technical panels, and with stakeholders. (See **Small Group Techniques; Civic Advisory Committees; Collaborative Task Forces**.) It should be used selectively since it is highly dependent on the software skills and capabilities of the commenter. Therefore it should not be the primary means of gathering feedback, but as a complementary approach to reach special audiences who may not be able to comment through conventional means.

For further information:

The evolution of plan or text markup software is episodic. Text software has existed for approximately 25 years on personal computers and has incorporated increasingly sophisticated means of editing and "redlining" text. Recent efforts have been devoted to plan mark-up languages, but the multitude of graphic (plan) formats, the increased technical complexity of graphics software, and the computer processing needs have not allowed plan mark-up software to advance to the same state as text mark-up software.

Using most modern day text software, an authorized user is able to redline or mark-up electronically the text during reviews or edits. The changed text usually appears in a different color or format. Upon saving, other reviewers may also mark-up the text, including edits from previous reviewers. All changes are usually tracked by different colors and/or formats and include author and time/date stamps. After a review cycle of the text is complete, the original author can see and review the marked-up text and accept, modify, or reject the proposed changes. These text mark-up features are usually included in the basic text software.

Recently, plan mark-up software is emerging in one of two forms. The first form is similar to text mark-up software. An authorized user is able to modify the plan through special editing tools, which are displayed on the plan as different colors and/or formats. As with text mark-up, several reviewers are able to provide graphical comments on the same original plan. Upon review, the original planner or designer is able to selective accept, modify, or reject the proposed changes. The second form is more interactive and allows several planners or designer to collaborate with one another over the Internet. In this configuration, plans are stored in a central computer (known as a server) and reviewers with authorized access are able to view and edit the plans using specialized software. Software achieving both of these features has been announced, but no commercial available and certified products have been identified to date.

REMOTE SENSING APPLICATIONS

What are Remote Sensing Applications (RSA)?

Remote Sensing Applications (RSA) refer to the combination of hardware and software that allows for the processing of information about land, water, or an object, without requiring any physical contact between the sensor and the subject of analysis. The term remote sensing most often refers to the collection of data by instruments carried aboard aircraft or satellites. However, remote sensing is also conducted through a land-based network of environmental sensing stations maintained by a variety of federal, state, and local agencies. Such remote sensing may track weather conditions, measurements of air and water conditions and quality, or other specialty data. Remote sensing applications are commonly used to survey, map, and monitor the resources and environment. Examples of images taken from remote sensing, organized by categories such as agriculture, human dimensions (e.g., environmental impact, population), land surface, and oceans, can be found at NASA's Visible Earth site, **http://visibleearth.nasa.gov/.**

There are several different types of remote sensing devices and applications. Many systems take photographs with cameras, recording reflected energy or images in the visible spectrum. Other systems record electromagnetic energy beyond the range of human sight, such as infrared radiation and microwaves. Still other systems employ a network of distributed electro-mechanical sensors and a central location for collecting, transforming, and summarizing the remote sensor data.

RSAs are varied and include archeological research, geologic investigations, mapmaking, meteorology, mining, volcanic activity, oceanography, and atmospheric and aquatic studies. Once data has been collected, verified, and stored, RSAs may be able to develop summaries and trends for the subject of analysis or topic of interest. For example, information about air quality for a metropolitan area could be collected and summarized by specialized RSAs. The analysis could provide information about compliance with federal air quality standards and the range of feasible transportation projects for that area. Another common use of RSA is photogrammetry or the science of taking measurements from photographs or other types of images to make physical maps, including topographic maps. The maps are generally developed from photographs taken by a special camera on an airplane.

Why is it useful?

RSA is valuable since it provides a means of collecting and analyzing environmental data at low cost and relative convenience. As a public involvement technique, RSA is useful to help the public understand the past and current environmental conditions in a particular study area or region. RSA also provides first-hand access to data that may be used to help educate the public, build confidence in other analytic methods, and foster a more active public role in the project or plan development.

Does it have special uses?

Because of the potential large-scale coverage of RSA techniques, the public is able to develop a firsthand appreciation of the macro and micro environmental features of a study area which would not have been possible until recently. Depending on the availability of quality data, a RSA could be useful in the various stages of a project, such as issue identification, development of options, and the selection of a preferred course of action.

Who participates? And how?

RSA are usually developed and managed by agencies. However, special interest groups may also use basic data from remote sensors to analyze and summarize their findings. Data sources are becoming increasingly available and without cost on public websites.

To conduct a remote sensor analysis, one needs access to the data and the conditions under which the data was collected. The data is then processed through specialized software, which has been developed and tested by experts. The results are verified, summarized, displayed, printed, and/or summarized for further interpretation and use. A variety of these collection and analysis activities are conducting between commercial firms and academic or non-profit organizations. For example, ESRI (a private firm engaged in GIS systems) maintains a Conservation Research Program that provides industry-academic-nonprofit collaboration on a variety of environmental and community remote sensing projects. These projects range from studies in conservation biology to environmental justice assessments (e.g., http://www.conservationgis.org/links/justice.html.)

How do agencies use the output?

Products from RSAs are used in four primary ways:

- To educate the public about baseline environmental conditions and trends;
- To analyze and develop findings of community and environmental impacts of a proposed plan or project;
- To assist in displaying or conveying complex environmental information; and
- To obtain public comments or reactions.

What are the costs?

Because of the specialized nature of RSAs and the extent of the sensing network, the costs can vary significantly. Some data and information can be low cost because data and analyses are available through specialized Internet sites. If analyses or findings are not available, then RSAs may need to be developed to meet a specific project need. Sometimes this expertise is available within an agency. Consequently, the costs may vary from a few hundred dollars to several thousands, depending on the objectives of the RSA, the level of precision required, and the complexity and scope of the sensing data and subsequent analysis.

How is it used with other techniques?

RSAs complement other environmental data collection techniques. RSA is most effective when macroscale surveys of environmental data are required and the hardware and software for data collection, analysis, and reporting have been developed and verified. The data and findings can be used to assist or augment other public involvement techniques such as using reports and display materials to impart a baseline knowledge of environmental conditions, identifying issues/concerns, developing solution alternatives, selecting among alternatives, and communicating/displaying data, information, and knowledge.

What are the drawbacks?

RSA techniques are relatively straightforward, but the complexity of the process from sensing data to the communicating of findings is highly complex and may not be “transparent” to a non-specialist. This may create some issues of credibility and validity of the findings. Also, the cost of RSAs may be relatively high, although increased use of RSA during the past 20 to 30 years has helped to lower the user costs.

When is it used most effectively?

RSA are most effective when the technique is somewhat familiar to the public, e.g., weather sensing, the analysis process is relatively intuitive and straightforward, and the findings contribute to additional understanding and interpretation of the issues or discussion topics at hand.

For further information:

- The National Aeronautic and Space Administration's Observatorium offers education resources about remote sensing. http://observe.arc.nasa.gov/nasa/entries/entry_7.html
- "Remote Sensing Imagery: Making Sense Of Available Data," by Alex de Sherbinin, Environment, Volume: 44 Number: January 1, 2002.
- Integrated Global Observing Strategy is a major partnership of data providers and data users focused on atmospheric, oceanographic, and land-based observations. See http://www.igospartners.org/
- NASA's Visible Earth provides an excellent array of imagery grouped conveniently into categories such as agriculture, biosphere, human dimensions, and oceans. See http://visibleearth.nasa.gov/