A Delaware Policy Forum

# Changing Technologies:

## Mapping the Future of Lifestyles, Work, and Business in Delaware

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As the director of the Institute for Public Administration (IPA), I am pleased to provide this report on the 1998 Delaware Policy Forum "Changing Technologies: Mapping the Future of Lifestyles, Work & Business in Delaware." Held in Dover, the forum was sponsored by the Institute in cooperation with the Delaware Department of Transportation and the State Office of Planning Coordination. The goal of this forum was to focus on ways in which rapidly changing technology can affect lifestyles, work, and business in the First State. Topics addressed include:

- Lifestyle, Work, and Economic Transformations in the 21st Century
- The Electronic Village: Impact on the Form & Function of Local Communities and Implications for Planners, Public Managers, and Community Leaders

I wish to acknowledge those who contributed greatly to this forum. My colleague, Dr. Robert Warren, was principally involved in the planning of this forum. I would like to especially thank Representative Roger Roy for his ideas and support for the forum as well as Ralph Reeb and David S. Hugg III for their introductory remarks. I want to acknowledge our speakers, Mitchell Moss and Ray Quay for their keynote addresses. Martha Gilman, R. Thorpe Moeckel, William Osborne, and Representative Donna Stone served on the reaction panel and moderated general discussion. I would also like to thank Dan Rosen for his audiovisual assistance and Gloria Wilkins for providing exceptional staff support for this project.

I also want to recognize the valuable contributions of the following individuals involved in producing this report. Dr. Robert Warren presented an introduction to the major issues involved. Lisa Moreland drafted the report and coordinated the overall effort to produce the final printed document. In addition, Pamela Belmont provided the design and formatting for the report.

*Ralph Reeb, Assistant Director, Division of Planning, Delaware Department of Transportation:*

For those of you who do not know me, I am in the business of developing transportation systems. There are three basic approaches you can take to building a transportation system. You can muddle through incrementally making one small decision at a time, you can extrapolate from past events, or you can build towards a transportation picture that you prefer.

Muddling through one small decision at a time is something we have all experienced and it has created aesthetic wonders such as Route 13 through Dover, State Route 1 to the beaches, and Kirkwood Highway. However, it is not something we really want to do in the future. It is not something we can afford to do.

Extrapolation is something I learned from Mark Twain. Referring to the Mississippi River, he says that if we listen to scientists Champaign, Illinois and New Orleans, Louisiana are growing closer to each other by about two miles a year. So, eventually they will be neighbors. He said that if you run that logic in reverse, about 200 years ago the Mississippi River stuck out over the Gulf of Mexico! I understand the logic, but the image is impossible. I think we have learned that extrapolation does not work.

That leaves us with the third option, building towards some particular picture or vision, as you may have heard some people call it, about the future. Although we all have been involved in creating visions, I think we are getting tired of the word. Visioning exercises involve collectively taking what we know of the world, polishing it to the best of our ability, and saying this is what we expect or want in the future. However, taking that approach, we run the risk that the computer industry will be our model, even as the year 2000 is sneaking up on us and with it the potential for the shutdown of the information superhighway. Now, you have to ask the question, in the 1960s or 1970s—when all of the computer programs were being written—didn't anybody think there might be a year 2000 or 2001? I do not want to pick on the computer industry too much, but some of you might be surprised to know that initially it was expected that there would be a world market for 10 mainframe computers. Well, I will bet there are 100 people in this room alone who own personal computers! We do not want to make the same mistakes.

Instead, we need to get a sense of where things are going, how fast things are moving, and in what direction–in terms of technology, sociology, and biology. So, from our perspective, we are very interested in understanding what is coming down the road, no pun intended. We are interested in understanding how these advances will affect our customers and we are interested in planning and creating a vision with those changes in mind. With that, I will turn the discussion over to Bob Warren.

*Robert Warren, Professor, School of Urban Affairs and Public Policy, University of Delaware:*

I think Ralph has given us a very good road map of what we were thinking when we were planning this forum. There exists the problem of trying to anticipate the future. We hope we are a little beyond reading tea leaves, but sometimes the future is not clear because there is so much going on and so many new and amazing innovations.

Part of the problem is keeping tabs on what is currently happening, what will likely happen, and sorting out all the things that are good ideas but are not going anywhere. The second important aspect is being able to see at how diverse things are related. As Ralph indicated, we are not only interested in the big picture, but what is in the picture and how the various, very disparate pieces relate to one another. If you read the newspaper, you get a corner-of-the-eye view of the future. You can get a "futurist's" pronouncement–there is an industry of people writing and talking about the future. The problem is that futurists tend to be either too optimistic or pessimistic about what is going to happen.

Looking at what has happened recently, Singapore announced that in a couple of years half of their nation's homes would be hooked up to a nationwide multimedia network. Their network will allow users at home to do anything from buying groceries to paying annual taxes to studying for a degree. Also, we have intelligent homes and computer systems that adjust to your mood. These systems will turn the coffeepot on in the morning and clean your house during the day. We have intelligent buildings and security systems that detect who should and should not be in the building. Also, we have done highways, I am sure many of you have heard about, that do a variety of things. For instance, vehicles can be put on automatic pilot and you move along at the control of the computerized highway system.

Businesses are exploring 24 hours a day, seven days a week cyber-sales options. Predictions are being made that auctioneers who do not operate on the Internet will be out of business in five years. There is evidence to suggest that there is some truth to that. Currently, there is $8.7 billion dollars worth of business auctions conducted on-line. It is expected that by the year 2002 this will be $52 billion.

There are an estimated 800,000 soft drink vending machines in Japan that have a microchip in them. They are part of an electronic system that allows a

vender to have a real time record of what is being sold from every machine as it happens. Another company has put a chip in hotel workers' uniforms. These chips electronically transmit information about the uniform's last washing: to whom it is issued and how frequently it has been washed. It allows the company to know when the uniforms need washing or replacing, and whether or not they have been pilfered.

All this is fine but, on the other hand, we find that some of these breakthroughs are not as problem-free or as certain as hyped. There is tremendous anticipation of how electronic commerce is going to grow. Retail Internet sales are anticipated to explode in volume. Still, one of the difficulties is that nobody has quite figured out how to profitably deliver these products to customers' homes. All kinds of things are being proposed such as supermarket depots where you can get on-line goods delivered, even at night and or on the weekend, by the postal service.

The Internet has its problems, however. A book titled *Data Smog* argues the problem with this explosion of information is that a lot of it is irrelevant, erroneous, and does not help much. How do you deal with search engines that retrieve 30,000 possible hits for your inquiry? In addition, there is a psychiatrist at the University of Cincinnati who has studied 14 people who were "addicted to the Internet," a disorder similar to an impulse control in the same category as kleptomania, compulsive shopping, and compulsive gambling. This can have real life effects. Recently, a mother was convicted of child neglect because she was spending too much time "surfing the 'Net" and not paying attention to her kids.

Today what we hope to accomplish is to look at some of the less visible aspects of change–beyond simply the telecommunications and information infrastructure– and how these things are playing out in the day-to-day lives of people and business. We will try to gain some perspective on what is likely to occur, what the intended and unintended consequences will be, and what kind of responses we should be making to enhance life, work, and business in Delaware as technology rapidly evolves.

Our first speaker, Mitchell Moss, is director of the TAUB Center for Urban Research at New York University. He is one of the leading researchers in the country on technological change. With that, I would like to introduce Mitchell Moss as our next speaker.

# Lifestyle Work and Economic Transformations in the 21st Century

*Mitchell Moss, Director of the TAUB Center for Urban Research, New York University:*

Allow me to talk to you about how I think advances in technology are affecting simple ideas like time, place, and cities. I want to raise two key ideas. One idea is that the use of new information technology is eroding our initial idea of what constitutes time–morning, afternoon, and evening–and what activities occur during certain time frames to which we have become accustomed. Also, how information technology has changed the significance of certain places such as the office, the home, and even the beach.

This is a particularly good time to discuss this subject because recently I was watching a Philadelphia Phillies game and I was struck by the fact that when I was growing up baseball was a game which was played during the day. Kids used to be able to go to the games during the afternoon. Now they are played at night and that is for two reasons. One is that most of the teams make their money from television, and the television audience is largely at night. The New York Yankees make $44 million dollars a year for selling their television rights. As a team, they cover their entire salary from television revenue.

Baseball teams have learned that their stadiums can be small because they would rather have more revenue per seat than a large number of seats. This is why Camden Yards only has 150,000 seats. Now, the purpose of the baseball stadium is not so much to bring in as many fans as it is to bring in as much revenue as possible. The game has changed from day to evening and, of course, the nature of baseball itself has changed. The bulk of the revenue comes from corporate box sales. Basically, the corporate office has moved to the baseball diamond. If you have a customer and you put them in a clubhouse situation for 3-4 hours, you will most likely make a transaction. This helps to explain why they give the worst viewing seats the highest ticket price. In the corporate boxes, you cannot see the game very well but you can eat, talk, drink, and conduct business. Since baseball is so slow there is nothing really that cannot be seen in the replay. Because of

that, we have changed the nature of sports. The nature of the experience has changed. We have taken a daytime, attendance-driven, family sport and have made baseball into a sport largely viewed on TV at home and financed though television and corporate box revenues. It is now a site of business transactions.

We are seeing similar kinds of changes in other activities and I just want to go through some of those experiences. When I was growing up, banking was a very, very rigid activity. First, it was not just a bank. Banks looked like marble temples. You went to the bank and felt secure that your money was safe. The bank was a real estate distribution system. The way banks made money was by establishing personal relationships in the communities. A banker was a person of high status. Banks were only open from 9 to 3 and from 6 to 8 on Fridays for check cashing purposes.

What has happened to banking? Now it is a 24-hour experience. Today when I arrived at the Christiana Hilton I saw an ATM right in the lobby. So, the banking business has virtually eliminated their neighborhood branches. They have a vast electronic network. It is all phone-based and about to be Internet-based and we can access our money in many more locations with much less or no human interaction.

What is most interesting, especially as it relates to Wilmington, is we have seen the idea of banking change from a situation when banks had employees who would learn information about your credit line by your behavior. Traditionally, they relied on their judgment at a local level to make loans. What occurred then, with the advance in computer modeling and centralized scoring systems, is we have seen banks change from manual information gathering to one where information is collected by computers.

We have seen the role of Charlotte, North Carolina and Wilmington, Delaware emerge as major banking capitals. Bank America, which was once the pride and joy of California, is now run out of Charlotte, North Carolina. I don't think anybody thought that would happen. Philadelphia is finding out that CoreStates Bank has also become a cog of Charlotte's banking world.

What is striking is the heart of the bank is centralized credit control through credit scoring. That has allowed credit cards and banking systems to be centralized and placed in states that have the most favorable laws and labor as well as the best environment to attract workers. As a result, cities that

once had their own banks have become basically satellites run out of New York City, Wilmington, or Charlotte.

The Federal Reserve's branches were created in 1914. You may not remember, but there were 12 of them. For example, there was one in Philadelphia and one in San Francisco. These branches were the banking capitals. Although the Federal Reserve is still in place physically, banking capitals are not located where those branches are located.

The concepts of time and place have really changed with sports and banking, but the industry that has really changed the most for me is shopping. I think we all know that supermarkets are a 24-hour experience. In many cases, the idea of a supermarket makes enormous sense. You can shop at all hours of the day. What has occurred in supermarkets, however, is now mundane compared to what has occurred in terms of on-line retail.

Every major store has realized they must have an electronic distribution system because consumers will just as soon shop at an on-line bookstore and browse through all different kinds of products. You can now buy almost anything on-line you could get in a store. That is where the growth is, and it is simple. An on-line store has to absorb the cost of a web site in contrast to a retail outlet that has land and building costs.

The benefit for customers is they can shop at any hour. They can pick up a catalogue, find the unit number, and go to a web site. Customers have more control over their time. They can shop at their convenience as opposed to when the store sets their hours. The time activity occurs is no longer governed by the traditional business clock. Instead, it is governed by each individual's clock. I want to point out we have much more control over when things are done in terms of banking, shopping, and even educating.

Sooner or later, schools will face the fact that it is inefficient to build facilities that are only open for a limited number of days each year. I consider public education to be an anachronism. The infrastructure is designed to be open for roughly 170 hours a week, but schools are only open from 9 a.m. to 3 p.m., 5 days a week. So, schools have real estate that is only available 6 hours a day. We are building public infrastructure in schools that is only available 6 hours a day to people between the ages of 5 and 18 and can only be staffed by individuals who are licensed by a highly rigid public authority. I do not think there is any other facility in the world where the use, time,

and activities are so tightly limited.

When I arrived at the Sheraton Hotel this morning, I saw an enormous amount of information exchange and activity going on here. When most people look at a hotel, they think of it as a set of rooms. When I look at a hotel, I see an information hub. Food is delivered and prepared in the back, people come in through the front door, and there are meetings going on. More education has probably occurred in hotels than in most of our high schools in big cities.

So, I want to point out the concept of time is no longer governed by institutions. Individuals govern the timing of activities. It is also governed by the mass media's desire to reach you. There was a time when you had to be home at 7 o'clock to watch the news, but today you can watch the news 24 hours a day. MSNBC and CNN provide news to all of us whenever we want it, sometimes when we do not want it. What I want to highlight is that in the past you had to be present at a certain time and place to get the information you wanted. Now we have channels solely designated to provide information about sports, entertainment, finance, and even information about the latest scandal in Washington, D.C.

I think all of this is indicative that time is no longer defined by social systems and it is no longer defined by institutions. It is defined by the individual's capacity to access different events and activities through media with phone lines and modems. I also want to talk about the concept of *place*. We think of the word community as if it is a fixed place where people live and work. They may share the same values and, in many cases, they share the same interests.

A place may be identified in a number of different ways. Twoof the most powerful identifiers of a place, for many people, are the telephone area code and the postal ZIP code. They often become the symbols of a place. In fact, the ZIP code 90210 is currently the name of a television program. So, ZIP codes and area codes tend to be important identifiers. One thing we have found is that area codes are no longer stable identifiers of places. In many parts of the country, a city that has had one area code for years now may have five or six. So, the fundamental identity of sections of the country that was established for decades by area codes has been wiped out because of increased phone traffic due, in part, to the Internet.

What is more important, however, is that the concept of place has changed because the activity that occurs in places has changed. The home is the principle capital investment for every person in America. Houses are the center of social and emotional life.

In this regard, I like to see what products for the home are sold in the newspaper because they tell me what is important to America's homeowners. In today's newspaper, Sears Roebuck has a full-page advertisement for the most important new home appliance–the $199 home security system. This is installed in many houses in the country because no one is physically at home any more. That is our reality. There is no one at home, so every home is protected by a security system. I am going to tell you the features of these systems and you will see their significance. These home security systems have flood sensors. They have indoor motion and outdoor motion detectors, remote sirens, smoke sensors for fires, freezing sensors, and carbon monoxide sensors. All of these features are built into the same chip. The best part, of course, is that they feature latch key child monitors. This feature notifies parents by phone if their child does not come home on time.

Also, we are building more information into the house for when people are physically at home. More activities are occurring in the house. In this way, the traditional house is no longer solely a center for family life. Let me tell you why. The home has become the center for many other activities, including work and entertainment. Homes are equipped with satellite dishes, phones, and cable. This morning BellSouth announced they are providing wireless television in four cities across the country that will bring television and movies into the home. Of course, we still have the traditional ways of doing things such as mail delivery and other kinds of activities like gardening. However, I think is important to note that we do have expanding activities in the home.

For one, we are providing home electronic confinement. For nonviolent offenders, it is cheaper to have a person electronically monitored than confined to a prison. Why should we, as taxpayers, pay for very expensive prison cells when offenders can be electronically imprisoned in their own home? At the same time, you can bank from home. Every bank has figured out it is cheaper to allow customers to bank from home than mailing them a bank statement every month.

By the year 2000, I suspect we will be looking at homes in terms of not just how big they are but by the speed of their connection to the information superhighway. The questions we will be asking are: Is the speed of the dial on connection sufficient that I can get entertainment when I want it? Can I get my tax statement when I want it? These demands may sound extreme, but remember that it was only 25 years ago when federal government approval was required if you wanted to have an answering machine attached to your phone. And for those who grew up with the rotary phone, there was only one choice–either a black rotary phone or a princess phone. Well, today there are many more options for your phone service.

I suspect that providing infrastructure and information to the home is going to be the greatest new source of capital investment for both developers and for residents because most of our housing sites are physically in place. So we have to modernize the physical plan, not just with the wireless home security system, but with the capacity to get new kinds of information, entertainment, banking, and even retail into the house.

Another interesting response to recent advances in technology is the demand for home shredding machines. We have shredders in our offices and homes because of the exchange of secured information–there is a fear of unsavory people rifling through one's trash. For example, Caroline Harris opens her mail, sorts it, and shreds what she does not need in the $29.00 personal shredder sitting on top of her wastebasket. She does this because last fall she watched a story on NBC news that described how thieves need only a name and address to steal someone's identity to set up fraudulent credit cards. The popularity of personal shredders has increased tremendously in the past several years and it is the home office device most in demand after fax machines.

The home as a center of emotional life has declined. It has declined because people are doing everything at home but are not relating to each other. They watch television, they shred bills, they surf the Internet, or they are physically not at home. This leads us to the question preoccupying adults: Where are the kids? Often, they are at home–at least we hope they are at home. The way we are going to know their whereabouts is to either give them beepers, which many children already have these days, or to install home devices which will automatically notify parents by electronic sensor if their child is not home by a certain time. So, we are doing more individual activities in the home–less collective activities–requiring more informational

infrastructure and monitoring, as well as much more shredding.

I would argue that we have not begun to see what is going to happen when wireless telecommunications towers are fully built up in this country. I am sure you are aware of the proliferation of antennas. Communities around the country are leasing the highest space in their area. Once telecommunications infrastructure or antennas are fully in place, much more activity will occur in the home.

Now, I could not come to Delaware and not talk about the issue of recreation, given the importance of the state's beach communities. The entire concept of time and leisure activity is, in part, a product of the federal government. Thirty years ago, holidays occurred on certain days. So, everyone knew when holidays occurred because there was some meaning to their placement on the calendar such as George Washington's birthday, which is now observed as President's Day. You knew that the Fourth of July was July 4. Today, the Fourth of July is observed on the first Monday of the month. In fact, we have created an entire industry around the concept of Monday. I always wondered why it was not Friday but I suppose that Friday, for most people, is far less productive than Monday. In any case, the three-day weekend is the creation of the federal government.

This creation has influenced the travel patterns of Americans because in the New York region–and there are highway planners here who will correct me if I am wrong–we used to plan our infrastructure according to the journey to work. Now, it is focused on the journey to play. I think this year's Memorial Day weekend set a new record for the Newark International Airport. They never had so many people fly in and out of the airport as they did this year.

So, holiday travel, as a result of the federal government's intervention in making Monday the day we observe a holiday, has done several things. One, it created a travel industry because basically you have three days off, which means you take a fourth day for travel. We only have three holidays on their true dates left I think. Thanksgiving is the fourth Thursday in November, Christmas is December 25 and January 1 is New Year's Day. Everything else is negotiable.

So, we have changed the way in which we organize our travel and leisure time. It is no longer based on a holiday, but rather it is based on the three-

day weekend. Ten years ago it was easy for transportation planners to say that they could always repair and repave roads on weekends. You cannot do that any more. Weekends are sacred time. You cannot repair roads when their peak use is on July 3, 4, or 5. Last year, the mayor of New York told the governor of New York that he could not close down the mid-town tunnel during the summer because that is when people come in and out of New York City to go to Broadway shows and have dinner.

The calendar for maintaining our infrastructure has been switched to the winter. It is better to have construction during the workday of the winter than during leisure time of the summer. I think that is a big change in the way public policies are set. We are now organizing our infrastructure to accommodate leisure time as opposed to work time. So, time is no longer governed by traditional rules and place is no longer governed by traditional activities.

Some of the most urban activities, drug sales and prostitution, have become electronically accessible. This is happening around the world. What is interesting is that today drug traffic does not involve standing on a corner, but instead is operated by people walking around with their business cards. When someone beeps their pager number, they make a delivery to that client's house. There is a whole code–one or two beeps are signals used to camouflage the transaction. So telecommunications has found its way into the underworld very quickly, so quickly that it has become very, very powerful. Time Magazine wrote about this subject recently. On-line sex is another industry. The oldest profession, streetwalking, has become an activity available on the Internet. People can buy sex with a credit card over the Internet–women feel safer and men feel more private.

Gambling also needs mention. In 1966, toll-free calls totaled $60,000,000. By 1998, it was over $600,000,000. The FBI, during the height of the SuperBowl, logged about 40,000 calls to 14 different firms dealing in on-line gambling. These firms promoted and advertised their businesses on web sites. There is an enormous sector taking bets over the phone line. For some states, revenue is being lost because the state has its own gambling system, which now has to compete. The entire process is being done–money is being transferred by Western Union, credit cards, or bank wire transfers–through the Caribbean and parts of Central America where there are no gambling laws. Why is this important? Well, it is important because the traditional revenue sources on which states have relied have gone from the property

tax to sales taxes and gambling fees. Over 35 states have different ways of collecting revenues from lotteries and gambling and telecommunications advances are threatening their systems.

The inability of states and municipalities to put a tax on Internet sales is seen as a major problem. They want to get that revenue. Sales tax is not really relevant in Delaware. Other communities, however, are going to find out that previously taxable transaction revenues increasingly will be non-geographically based and difficult or impossible to tax.

With these advances our traditional view of planning and zoning has even come into question. Traditionally, zoning has been based on the separation of work and home, yet today those barriers are eroding quickly. The home and workplace do not really have boundaries if employees are always accessible by a telephone line, beeper, computer, and modem.

The office building is probably the place of work for most of us. Briefly, I just want to describe some of the changes to this norm. The first thing, of course, is that the office is the cathedral of 1990 America. It is also the hub of information. This is because the office is where infrastructure is built for computers, banks, and high-speed networks. It is also where people are located. The most important information exchange in offices today occurs in conference rooms with face-to-face activity. A large number of employees are working in settings where they have terminals and access to phones. When you want to meet with someone, often you have to do it in a conference setting because the size of offices has been cut down. There used to be enough room for two chairs in an office and now there is only room for one.

However, it is also important to note that the office itself is beginning to decline into a club environment. By club environment I mean that there is a lot of flexible space for meeting and talking. The offices of individual workers have shrunk quite a bit and, as a result, when you want to talk to someone you have to get up and go to a conference room. This is how offices are being designed. They are providing places for face-to-face activity because we spend so much of our lives isolated in cars, on boats, or in our cubicles. The office has become more important for coordinating and sharing activities.

Now we have companies where literally there are no walls. The theory is that employees want to have as much spontaneous interaction as possible–such as chance meetings at the water cooler. These are the ways in which new ideas percolate. An open design allows for as much interaction as possible with one's fellow workers.

I want to note some other examples of the changes taking place. One is the emerging goals of cities is to become centers of business and culture. Cities were built originally around points of water where the shipment of goods and raw materials could take place. Now, we are seeing cities built up around airports, freeways, and some are still, of course, built around harbors. Today's cities are centers of information, production, and function. It is important to understand that a city is not defined by activity, but by its relation to information.

Let me try to explain what I mean. Today, when I visit a city today for a visit, it is called tourism. Tourism is information gathering behavior. I learn something by experiencing different activities available in different locales. For example, if I go to Philadelphia I want to see art because I can access information about 19th century painters that I could not see anywhere else. Access to culture is information-seeking behavior. Cities and Chambers of Commerce try to make this as attractive as possible by marketing packages for hotels and related events. People are visiting information based activity centers.

Cities are expanding their function as places to attract consumer and tourist dollars. One result is the hall of fame industry. Every city has a hall of fame. If I want to learn about rock and roll, I will go to the Rock and Roll Hall of Fame. The basketball hall of fame is in Springfield, Massachusetts, the football hall of fame is in Canton, Ohio, and Cooperstown has the baseball hall of fame. Beyond that, you have the historic car hall of fame and the stamp collector's hall of fame. A hall of fame for people who should be in a hall of fame is the next to come!

Every city is trying to find ways to become an information hub. In some cases they do it with aquariums or they build convention centers. The city that has been most the successful at this is Las Vegas, Nevada. Las Vegas does it with gambling. But for a while, Las Vegas has not had a monopoly on gambling because of recent legalization in other states. So, they have expanded into family entertainment. What Las Vegas and Orlando, Florida

have done is provide a substitute for visiting other places through simulation. For example, if you go to Orlando, you can now experience the benefits of being in California at MGM or Universal Studios Disney World has a new African theme park, so you do not have to go to Africa. Therefore, you can go to Disney World and experience a presumably safer, healthier safari without any risk of infection or disease. Orlando and Las Vegas have created cities that virtually did not exist 40 years ago.

So we have changed the function of cities. Today, when you look at cities around the world, they are no longer places that are defined strictly by their traditional function of goods production, but they are places where information is exchanged. So, if I can produce information, in terms of films or television, it becomes an export product. The United States is the leading producer of entertainment for the rest of world. If you go to South Africa you will find out that the first television channel brought in from America was MTV. It was MTV because the network showcased profoundly revolutionary music, but it did not necessarily have a profoundly revolutionary political message. So, one of America's growth industries is the export of entertainment. That is likely to promote the film industry in cities around the country. The idea here is that television and movies are sold to other locations because they are made here in America. Our cultural exports tend to be very valuable. In Tokyo, you can observe it is the hottest fashion for teenagers is to dress up like today's American urban youth.

Another area of activity important to our culture and entertainment is the enormous growth related to software and hardware. If we were to look at the variety of the cities involved in their production, we would find Salt Lake City, Austin, Seattle, San Diego, San Francisco, and Boston. These are places involved in the use of information and generating new kinds of software or physical equipment. This is due, in part, to the role of universities in economic development. Universities tend to be incubators of talent and ideas. Therefore, many advances in economic development are generated there.

Today's most successful universities are much more externally oriented. When I saw that the University of Delaware is ranked sixth in the country for having a wired campus, I knew they were ahead of NYU. I went to teach a class at NYU on the Internet and I thought I was on a farm. They had a phone jack, a terminal, and a light switch and none of them coordinated with each other. Then, I arrived at the University of Delaware

and noticed that the facilities are much more attractive than those in my own institution. I believe that in 10-15 years students will pick the campus that gives them the best web site information and best infrastructure. They will be choosing places in which to live and work that have both quality information infrastructure and an easy way of accessing it.

So, I have tried to point out that the way in which we define cities is changing. As a result, there will always be some cities that will do extraordinarily well and some cities that will not do as well. Some cities have not yet recognized their changing function. We are going to see a great differentiation between places that are able to accommodate a user space technology in terms of their urban and young growth and those that are not. For instance, when I want to select a vacation destination, I will go to the World Wide Web to learn and select among places rather than going to a travel agent. This is what I mean by individuals demanding information rather than to going through an intermediary.

Another point I would like to make is that, in terms of shaping policy, the way in which we define the future is not going to be predictable. Much of what has occurred was propelled by market forces, not because of public investment. Most of the things we think about are the result of technological advancement, not because of centralized decisions. I remember President Clinton and Vice President Gore saying that they were going to propose the installation of V-chips in television sets. I thought that they were really out of touch. That a parent would be able to program television sets so the child could not master it violated every norm I know about human behavior. That is, children know more than adults do when it comes to programming–they learn it from Nintendo!

The other thing I want to mention is that 100 years ago the automobile was invented. It was called a horse-less carriage and it was viewed as a substitute for the horse. But the horse-less carriage is far more than a carriage without a horse. I guarantee that you can do much more in a car. I think we have come to realize that the way information is occurring is in some respects more profound and revolutionary in allowing us to have more control over our day-to-day lives and activities than was the invention of the automobile.

With the car we had greater mobility but the ways of getting around were still tied to the road system. Well, telecommunications technology is giving

us that mobility even more quickly and without the kinds of constraints that we saw before. Under the deregulation of telecommunications, investments are going where technology is headed–and that is not necessarily in the same direction where the political system has determined. This is true despite the fact that there are policies and issues that attempt to govern telecommunications advances.

Lastly I want to mention that Jerry Brown was recently elected mayor of Oakland. When he was governor of California, he said that the state would put its own satellite in place so it could communicate with the rest of the world. He was probably 30 years ahead of his time, because in city planning today, one of the great concerns is how to make sure we have adequate information infrastructure. There are some people who argue that cities should put out their own satellites so that they can guarantee their access to the world's information–to ensure they are not shut out if the phone company decides not to wire them. Sometimes ideas that seem unreasonable when they are introduced turn out to be quite plausible 30 or 40 years later.

*David S. Hugg III, Director,*
*Office of State Planning Coordination, State of Delaware*

The models we have used previously to explain how growth is going to occur and the kind of economic development that we want to pursue just do not fit any more. As we just heard, these models were built on a home, work, family, travel, and recreation paradigm that has changed dramatically. When I think about the changes, I think about my grandfather who was born in the 1890s in Kent County, Delaware and of all the things that happened in his lifetime. In his 96 years, he saw wonders such as indoor plumbing and putting a man on the moon. Although he did not actually believe there was a man on the moon. He thought it was Hollywood playing a game on us! As a planner, these changes give me pause to wonder what the next 100 years or 50 years or even 30 years are going to look like. So this is an important series and an important dialogue into issues regarding our living conditions. The concept of *home* has taken on a whole different meaning. I also often wonder how the aging of our population will change our way of life. The various peak-hour calculations we worry about are not going to make a whole lot of difference when half the population is retired and can shop whenever they want. Our whole way of thinking about the future has to change. Technology will drive a lot of the change for better and for worse. With that, I want to introduce our next speaker. His biography is in your packet. When I asked him what he wanted me to say about him today, he said, "Here's Ray!" So, without much introduction, "Here's Ray!"

# The Electronic Village: Impact on the Form and Function of Local Communities and Implications for Planners, Public Managers, and Community Leaders

*Ray Quay, Assistant Director of Planning,*
*City of Phoenix, Arizona*

I have put together a presentation about the electronic village in terms of the future. *Electronic village* is a term that was coined to describe a phenomenon of electronic communications as it applies to our local communities as opposed to electronic communications for the economy or virtual type communities. I am going to talk a little about the trends in electronic communications. I am going to talk about trends that are measured in months not years. What are those trends? We heard about the impact that electronic communications are having on our activities and sense of place, but these trends are also impacting the forms and functions of our communities. What are some of the implications of these changes?

There is an article available on-line which covers most of the things I am going to talk about today and I'll give you the URL for that web site (www.asu.edu/caed/proceedings97), so you can review this information at your convenience. I've also created a special web site for this presentation (www.asu.edu/caed/evc/delaware). I will talk a little about what you will find on that site.

The technologies that we are talking about are not really new. They have been progressing over the last 10-30 years. Some technologies you are already familiar with are faxing, paging, high-speed analog modems, analog cellular phones, ISDN, and central optical fiber. These are old technologies now. They were put in place over the last ten years.

There are newer technologies just recently coming onto the scene. We have begun to experience digital cellular and most of us are converting our analog cellular phones to digital cellular. We have digital radios coming into play. In addition, we have seen the introduction of cable modems and low cost, one-

way satellite communication systems are becoming fairly prevalent. We can also see into the near future. For instance, we are anticipating low cost, two-way satellites. Currently, satellites provide us with the communications. That is, one-way communications. We are getting information from a satellite and that information is being sent out through a phone line. Very soon, we will see low cost, two-way satellite communication. Also, we are beginning to see optical fibers used. Optical fiber is an older technology that is not typically located to the curb for most buildings within our communities. We are beginning to see that becoming standard. We are witnessing new, higher capacity copper wire technologies using existing telephone lines. You heard about Sprint's services and other new communications servers that will be running IC access through traditional copper wire.

Bandwidth is increasing, particularly in the area of radio. The federal government has auctioned off several of their very high-speed spectrums that will increase the bandwidth of telecommunications. Generally, these trends are doing two things. First, there is a move from analog to digital. A lot of the technologies currently in use are analog-based. In other words, information that is created digitally is converted to an analog current and sent out and converted back to digital. Now, we are moving to technologies where information is exchanged in solely a digital form. For a number of years, we had small incremental increases in bandwidth and speed. Now we are seeing enormous and rapid increases. So these are the trends that are beginning to change the technologies in our communities today. Technology, both past and current, has expanded the number of places where we can have rich and high-speed communications and has increased the distance over which we can have those rich, high-speed communications.

Changes are also occurring in our concept of time. The time frame in which communications can occur has been enhanced. One of the big changes is that we can have a very rich, personal communication with people and we do not even have to interact directly at the same time. I can send a message to you today and you can receive it tonight and respond to it whenever you want. We are not limited to "business" hours. So, time frame is personal, you have control over it. Instead of plodding through inclement weather to find information at the library, I can stay home and research my information on-line. If I want access to shopping, I am not limited to shopping only when stores are open. Again, I can get on-line and shop.

There is also an increase in the quality, quantity, and variety of information that can be transmitted in this new time frame. So now we are beginning to see a very large content of applications such as video and radio being delivered through digital lines.

These changes in communications technology are changing our communities in a variety of ways. I am going to focus on the changes occurring in the workplace, residential, and community communications. By community communications, I mean how the media in local communities exchange information and engage in dialogue with each other.

One spatial effect involves *telecorridors.* In some cities, businesses are aggregating around very high-speed access facilities. Basically, companies that need high bandwidth telecommunications capability, which is not available through the traditional means, aggregate around a facility that can provide high-speed access. These facilities exist in certain corridors and businesses are clustering there to cooperate in telecommunications ventures. Dedicated, proprietary systems are being created to connect one or more companies, enabling them to exchange information at very high-speeds and extremely high volumes. However, this phenomenon is fairly restricted to the number of companies that need these types of facilities and it is not happening in all communities. It constitutes a fairly small percentage of growth and future employment, but it is something that is happening in terms of change in office location.

In addition, the fact that some places have access to high-speed telecommunications and some do not can raise questions of economic advantage and disadvantage. Those having high-speed access are going to be targets for office building locations while most areas without this access will not be. Telecorridors, although they represent a small portion of the employment, can play a strategic role in terms of economic development. We may also see a reduction in the demand for "Class A" space. As offices begin to move more towards virtual space, the demand for Class A space becomes less important. This trend is especially good for our older and rapidly growing communities because, as you may know, Class A space is often new or renovated space. Older buildings do not function as Class A space but as Class B. With less demand for Class A and more demand of Class B and C space, older office buildings will have a longer life span.

Among the major changes occurring is the use of telecommunications in conducting business. These changes have developed very rapidly and recently because of a much greater acceptance of technology by businesses. The workplace topics I am going to talk about are telecommuting and concepts in the virtual office.

Telecommuting is something that has recently come into its own. It has been around for a while but has not really played a significant role in how businesses operate. That is changing. Communities are beginning to look at telecommunications as a tool. Telecommunications can be used to reduce trips. Trip reduction techniques are being used increasingly by communities because they are inexpensive. They do not require a lot of investment in mass transit. They give back a certain amount of return with very little investment. Corporations have discovered telecommuting workers are more productive than are non-telecommuting workers. That can be shown by an increase in their bottom line. Now that we have been able to study telecommuting over time, we can clearly demonstrate that workers who telecommute are more productive in their workplace. Now management has embraced telecommuting as an accepted practice. For a long time, there was some reluctance by managers to encourage telecommuting. They asked, "How can I manage someone who is not in the office?"

Another area concerns our time demanding lifestyles. Our lives are becoming much more complicated. Time is a critical factor to us. As commute times increase, we spend more and more time on the freeway. Telecommuting provides us time, it gives us more control. There is a great desire on workers' part to be able to telecommute.

One of the events leading to this acceptance was the earthquake in Los Angeles, California. There is nothing like urgency to make us change our minds about things. When the earthquake shook the city in 1996, it shut down many of the major freeways. The major overpass of one of the key freeways feeding Los Angeles collapsed and there was no way for people to get from a major suburb area into Los Angeles. Immediately, many of the corporations responded by setting up electronic telecommunications. Several of the telecommunications companies in Los Angeles began giving out free modems to people. As they did, an amazing amount of business suddenly began to occur from telecommuting overnight. Businesses began to realize the applications of it beyond emergency situations–the effectiveness of it.

## Telecommuting

**Four major forces:**

- community desire to reduce trips and therefore air pollution;
- corporate desire to improve productivity and economics of labor;
- personal desire to regain control over stress and time; and
- management and employee acceptance of electronic communications.

So, telecommuting has a variety of forces causing it to expand. We really do not know how many people are currently telecommuting. We estimate 5% of the workforce is telecommuting. Typically, surveys come back showing most people are telecommuting one to two days a week. Very few people are telecommuting five days a week. The growth rate in telecommunications depends on the person with whom you talk. Some people say the growth rate is 20% per year. Some people say that by the year 2000, 15% of the workforce will be telecommuting but such projections are difficult to make with precision.

There are some limitations to telecommuting. It is not going to be the solution for everyone. Not everybody can telecommute. Obviously, there are a lot of jobs that just cannot be done remotely. Factory employees working on a machine line are not going to be able to telecommute. The man or woman cooking burgers at McDonald's also is not going to be able to telecommute. So, there are a number of jobs that are not suitable for telecommunications. When we look at the workforce and at the nature of jobs, probably the maximum you will ever see telecommuting will be 50%. So there are limitations. Also, what we have found is that the ideal schedule is to telecommute two to three days a week. This means that not all trips are going to be replaced with telecommunications. So, the most we are likely to see, in terms of reduction in reduction of trips, will be 25% or less. That is still significant, however. For transportation planners, a 15%-25% reduction in congestion is noticeable.

Another trend is the virtual desktop. Essentially, the virtual desktop that is being talked about is the actual place where people work, which is not a fixed office. Some companies have fully embraced this. First, computers are beginning to manage our communications. Before we had a telephone, a fax

machine, and maybe a computer that you used to print out reports and so forth either at your desk or in the next room but they were not really integrated. Now, we are beginning to see integrated communication services. Probably a good number of you currently send faxes from your computer rather than a separate fax machine. Fax machine companies are not happy with that because obviously it affects the number of fax machines that are sold. However, it is much easier and convenient to send faxes from the computer than to print something out and walk over to the fax machine.

## Virtual Office

**Virtual Desktop:**

- Computer manages communications
- Groupware manages work flow
- Reference materials and forms on-line
- E-mail backbone of personal communications
- Work environment virtual, moves with worker
- Physical space less critical than virtual space

We are also witnessing the introduction of *GroupWare*. Essentially, GroupWare is software that allows large, diverse groups to work on common projects simultaneously. The software actually manages the workflow on documents, particularly word processing. Those applications allow people to work on projects via their personal computer. So, we are seeing the coordination of the actual workflow and communications on the computer.

A lot of tools and materials are now available on-line. Major companies have created Intranets. They are providing access to documents and forms on-line. These documents and forms often do not exist in paper form any more. Manuals, software, and technical documents are available on-line. All of these documents and software applications are available on a server somewhere. So, whatever computer you are using, you have access to the same software and the same materials.

One thing is for certain, e-mail is becoming the backbone of personal communications. I do not know how you feel, but I would be lost in my office today without e-mail. I rarely use the telephone to call my peers in the office. I communicate with them through e-mail. Why? I use it because

I hate leaving messages on voice mail. Many companies have internal e-mail systems. Now that companies are tapping into the Internet, e-mail is being exchanged between corporations as well. What this means is that the work environment is changing.

It is becoming much more versatile. It does not matter where you sit. You still have access to your software, e-mail, phone messages or voice mail, fax capabilities, as well as your projects. They are available to you at any computer. So, office space becomes much more virtual in nature and less of a physical experience. This means that the physical space where you work is less critical to your work productivity than the virtual space you have available. This has created what we call the *virtual office*.

**Workplace**

**Changes in activities, management and location:**

- "Hoteling" or Shared Office Space
- Telecommuting Centers
  –suburban locations - meeting rooms, copying, printing, office services
- Mobile Offices - service industries

The virtual office is driving a variety of phenomena in the work sector. Companies have discovered that they can schedule multiple shifts. They can schedule three shifts in a 24-hour period. This means that companies can get three times as much production within the same physical space. Therefore, a lot of companies have embraced "hoteling," particularly companies that are involved in telemarketing–asking if you want to apply for a credit card, condo, or whatever–by assigning offices that different people occupy during various shifts. We are beginning to see companies that are using this concept to share office space. Also, companies that allow their employees to telecommute 2-3 days a week are more likely to institute resource sharing rather than have an office site that is vacant for part of the week. So, one day I may be sitting at a desk in an office building and the next day somebody else may be sitting there.

We are also witnessing the development of telecommuting centers. There are many things that can be done from home. Still, there are a lot of things that cannot be done at home. For example, your company probably will not

provide you with a high-speed, high volume photocopier, as they are very expensive. However, you may still need that service. There are other services that you need such as printing, filing services, and, perhaps, meeting facilities when you have 5-6 people coming together and you do not want them to see your house because it is a mess.

Telecommunications centers fill that niche. They provide services such as photocopying, meeting services, and other types of services that were traditionally done at the office. Some companies are setting up satellite offices that may consist of two conference rooms and a secretary's office to provide central services to telecommuting employees. Employees can make use of that "telecenter" resource. There has been an increase, especially in the service industry, of employees who work out of a vehicle instead of an office. They have a cellular phone, pager, and laptop computer in the vehicle. They do everything through a cellular phone link. Documents for work-in-progress are available on-line. In effect, they work totally out of the vehicle and they do not need to go to the office at all. The reason is that it is more effective to move from contact to contact than if they had to go back to a central location.

One of the major negative impacts that can result from this is that, for a variety of reasons, we are probably going to see an undesired increase in trips on the local and secondary infrastructure systems. One reason is that there will be more deliveries within residential areas for business purposes. Also, telecommuters are still going to want to socialize and, therefore, will want to go out for lunch. They also are going to go to meetings, which means they will be driving. So, we will see an increase in trips in some areas because more people are working from home.
One of the interesting things too, is the concept of trips. As our places of employment are located farther away from our residences, our trips get longer and longer. The average commute is between 45-60 minutes. As commute times increase, people start to make serious decisions about where they live and work. Telecommuting offers people an opportunity to avoid this drive time to and from work each day. As a result, people are going be more likely to tolerate long commutes because they will not have to drive it as often. So, we are probably going to see a continued increase in trip length.

An advantage of having people working at home is security. We heard earlier about how our homes are essentially abandoned while we are at the

office. Ultimately, telecommuting brings people back into the neighborhoods and security is increased with their presence. I was surprised to find out there are many communities that have zoning ordinances prohibiting employment in the home. In fact, home employment activities are prohibited in Los Angeles. This has created an enormous conflict because people who are operating businesses from home are in violation of their city's zoning ordinance. All you need is an unhappy neighbor who reports you to the police for violating the zoning ordinance and you have a problem.

Many communities are beginning to discover they have this conflict with their zoning ordinances and are trying to get that resolved. It will be difficult because even though there are a number of us who would like to work at home and view telecommuting as a desirable trend, neighborhood groups are generally scared of it. They are afraid that almost any type of business allowed in the residential area will negatively affect housing value. It is not going to be an easy issue to deal with in terms of zoning ordinances.

I want to talk a little bit about *push* versus *pull.* All of these trends are having an unusual effect on our environment. They are pushing and pulling certain things at the same time. Trends are pushing centrality, but at the same time they are encouraging dispersion. We have some trends encouraging fewer trips and we have other trends encouraging more trips. What will happen? I do not want to speculate on that, but I can tell you the concept of having a central location to do business has become less important. Traditionally, companies centrally located themselves so they were physically next to each other for faster information exchange, but the benefits of centrally locating operations are no longer tied to physical propinquity.

At the same time, we are finding that people are willing to accept longer commute times. One reason some corporations moved to the suburbs is that they had a hard time recruiting skilled people to work in the core of the city.

In addition, because office space is becoming smaller, companies can make more efficient use of their existing office space rather than expanding. So, at the same time we are experiencing trends making travel time less important, we are seeing trends promoting the maintenance of centralized locations. The fact of the matter is that new or expanded businesses will locate themselves based on quality of life and employment matters rather than

centrality. Existing businesses and headquarter-type offices still find agglomeration benefits in the central business district.

## Office Location and Space Needs

**Trip Reduction versus Trip Rates:**

- Fewer peak trips
- Space per employee Declining, Trips per Sq. Ft. Increasing
- Extended transit needs to earlier and later hours

Telecommuting and the concept of shared office space initially are going to reduce the number of peak hour trips. People working from home and increased employment during evenings and off-hours will result in less peak hour trips, thereby delaying or eliminating the need for capacity improvements. At the same time, however, we are going to see an increase in the density of employment since office space will be occupied by more than one person in different time frames. The number of trips generated for these uses is going to increase. So while we will see a decrease in peak hour trips, we also will see an increase in trips being generated to facilities. An existing business that converts to a shared office space business may negatively impact transportation facilities that were geared to handle a certain number of trips.

We are also going to see an increase in the need for transit service at extended hours. Bus service typically runs in peak hour periods. Many municipalities do not have evening bus service. As transportation needs for work begin to shift to different hours, transit services will have to be spread out over a 24-hour workday.

My focus on telecommunications to this point has been on cities. Telecommuting is also going to have a big impact in rural communities. First of all, as mentioned previously, not everyone is going to telecommute five days a week. In fact, the vast majority of people will not. There is a small part of urban workforce, however, that will be able to telecommute and will not need to go to the office at all or very rarely. Their business is very much separated from their place of work in terms of the types of activities they are conducting. Some of these people will decide to leave the urban area–they do not like where they are living, they do not like the urban area. The urban areas are not going to see any drastic reductions in

employment, but the small percentage of people telecommuting and relocating in rural communities will impact these areas in terms of number and local infrastructure and service demands. These "invaders" are going to be seeking rural communities with higher quality of life characteristics.

**Telecommuting and Rural Communities**

- Not all rural communities will experience such a migration
- Rural telecommuters seeking high quality of life locations
- Places with perceived quality of life amenities

In Arizona, there are communities such as Prescott, which is north of Phoenix, and Tucson, which is to the south, that are beginning to see an influx of urban professionals. These are cities that enjoy a number of high quality of life amenities. We are beginning to see an influx of people into Santa Fe. Santa Fe has been changed totally by an influx of urban professionals. The influx of urban professionals is going to result in a variety of impacts for these areas. These areas are going to see growth and with it an increased need for infrastructure, water, and sewer. It is also going to impact their traffic management and air and water quality.

One of the things that inevitably will happen, and has happened in Santa Fe, is that you will begin to see a mix of socioeconomic characteristics in the communities. The socioeconomic characteristics of the in-coming people will be different from the people who resided there originally. Often, this results in cultural conflicts within these communities. In some cases, the communities actually shift from one type of culture to another because their influx is so drastic.

These communities also experience an increased demand for the amenities of the city. The in-coming people left urban areas because they did not like the quality of life in the city, but the city offered amenities that they did like. They liked going to the opera, seeing shows, and the shopping opportunities. These areas will see an increase in the demand for office-related services, particularly those services that can be delivered. This is going to have an impact in terms of commercial development in these cities. If the community's economy has been agriculturally oriented, they will see a

## Telecommuting and Rural Communities

### Impact

- Typical growth issues: infrastructure, traffic, and air and water quality
- Socio-economics of new residents likely different than existing residents
- People escaping "evils" of the city, will want "benefits" of the city

shift towards commercial services.

There will be a need for enhanced regional transportation services. This professional influx will need to travel and have access to travel services. They will need to be able to go from Santa Fe to New York for a meeting. One thing that has happened over the past few years is that many of the smaller air service providers that connected our communities are gone. It is hard now to find accessible air services within rural communities. There will be an increased demand for air shuttle service to nearby major facilities. Lastly, there will be a demand or a need for enhanced communication infrastructure within the village.

I am going to talk more about residential areas in terms of telecommuting, but one of the things that I have found is that as bandwidth begins to increase and the demand for bandwidth increases, we are going to find residential areas that are going to face retrofitting issues. Retrofitting residential areas with high bandwidth technologies is expensive. We are going to find that many areas are not capable of bringing in that technology.

For instance, how many of you have bought a 56K modem? Most people cannot use the 56K modems. The only way a 56K modem will work is if there is a high bandwidth digital connection. In older portions of the communities, they have not put in that infrastructure; it is expensive to retrofit systems and the analog systems are working perfectly fine for other purposes. Whether or not companies will come in and retrofit the systems is a matter of economics. In addition, even if you have digital switches where you have copper wire connections, you are still not going to be able to get the super high bandwidth technologies. We are going to see areas of residential communities that are not providing high bandwidth technologies disadvantaged in terms of telecommuting and evolving services.

Cable companies are one of the few telecommunications service providers that local communities can still regulate. In many communities, cable is becoming one way to provide high bandwidth technologies. Many communities are talking to cable companies about providing universal or high-speed access. They are talking about requiring high-speed access in return for allowing cable providers to operate within their communities.

As technology is changing, companies are going to put in fiber. When they do this, they install a conduit and push fiber through it to provide access in that area. Different telecommunications companies are providing that fiber. The issue that will arise concerns deregulation. With deregulation, many companies will be able to provide telecommunications services and they are going to lobby for fiber installation.

It is expensive to come into an area and retrofit when you have to dig up the conduit from the ground. Once you have the conduit, you can easily move wire through it. If you want to exchange, go to a higher capacity fiber wire, it is easy to get that fiber through the conduit. But who should construct the conduit? Who owns it? Frequently, it is in the public right of way. Does that mean anyone can use the telephone company's conduit? Currently they cannot. Should local governments control ROW for telecommunications? As we begin to see more companies getting involved, this will become a bigger issue.

I want to talk a little bit more about residential areas and cellular towers in particular. If you think there are a lot of cellular towers now, look out! Their numbers are going to increase, perhaps double. A couple of things, technology-wise, are going to result in more cellular towers.

First, it is more cost efficient for a company to provide new telephone service to areas using digital radio technology than it is to run copper wire in the ground. In Phoenix, companies are increasingly providing telephone service to new residential areas through radio technology. They are putting up very tall towers to provide radio service to stationary systems within the communities. The demand for high bandwidth will increase, not only in new and growing areas but it is also going to increase in existing areas. Putting up cellular towers is likely to be less expensive than revamping copper wire within cities.

Not everyone is going to ask for high bandwidth technology, but a few individuals are going to ask for it. Rather than installing an extensive network of infrastructure to support the entire neighborhood, they can provide radio access to individuals, thereby confining the cost. What this means is that you will begin to see a lot more towers that are not providing cellular service but are simply providing digital radio services. Another thing in terms of bandwidth is that digital radio use may increase the number of towers needed to provide higher speed access in commercial and residential areas. The FCC has auctioned off new bandwidths that are going to allow even higher amounts of information to be transferred. So, there are emerging technologies that will increase the need for the towers.

Another thing that will emerge is remote monitoring. Now that they have been deregulated, power companies will want to monitor use. This brings up issues in terms of who supplies your power, how you pay for it, the time of the day it is delivered, and how is it delivered. Companies are very interested in managing peak hour consumption in the home. So, they are very interested in remotely monitoring and controlling your usage. Digital radio provides an inexpensive way to do that.

Earlier, we heard about home security systems. Security systems are much easier to manage now. One of the big things in security is video–the ability to "see" your house wherever you are, even if you are at work. For example, a big contributor to non-production in companies is that people have to take time off from work in order to be home when their appliances are being fixed. Repairmen, as you know, say, "I will be there sometime between 8 a.m. and 5 p.m." Video technology will allow someone to come to the house without the need for your presence. The security system will notify you that someone is at your door. At this point you could ask to see their identification badge and, if you are satisfied, you would be able to remotely open the door so that he or she can go into your house, repair the appliance, and leave.

Video technology is going to be used for day care. Parents will be able to see their child's daycare operation any time of the day. If you feel those heart strings tug, you miss your child, and you wonder what he or she is doing, you will be able to go on-line and see your child. Digital radios are providing the most cost-effective way to provide that.

So, what does this mean? It means more towers, everywhere. Cellular towers are a hot topic across the country. There is a tremendous policy struggle between federal regulators who want to protect the airways and local communities wanting to maintain telecommunications.

Another development with regard to residential communities is the community information server that typically centers on planned developments. Many of the larger planned developments around the country are beginning to provide their own Internet systems. They are providing high-speed access capability. In some cases, these developments are actually becoming Internet providers enhancing communication to local schools, churches, businesses, and residents. Perhaps the main reason they are doing it is not so much community spirit, but marketing. They see it as a tremendous tool to showcase the community. They can market the community as "telecommuting ready," seeing into the future, and being digitally connected. We are seeing more developments begin to include this infrastructure within their community. What are the implications?

Earlier, I talked about basic phone service. At some point in time, we are going to see a policy conflict between telephone companies interested in providing basic service using digital radio technology and communities tired of all the cellular towers in their neighborhoods. Until cellular technology, the only way to deliver cellular service was through the airways. Congress, under the guise of protecting the airways, has limited the communities' ability to regulate cellular towers. Therefore, questions are going to arise around the use of digital airways versus putting wires in the ground as was done traditionally.

I suspect we are going to see a test case in the courts arguing the balance between protecting the rights of the airways with tower regulations and providing basic service through digital radio service. Something that communities are learning about is stealth technology for towers. Stealth technology essentially means incorporating cellular towers into existing construction and hiding it in some way. There is a company in California that makes cellular towers that look like palm trees. We also have a company in Arizona that constructs cellular towers that look like cacti.

In terms of residential construction, we are seeing a lot of houses that are pre-designed to include office space and communications wiring (coaxial, fiber optic, and twisted pair cable). This means that typically rooms have additional wiring and separate electrical circuits and conditioning systems. They also will have direct access to the front door in some way. So, if someone comes to your office they will not have to walk through your kitchen or bedrooms.

We are also beginning to see the introduction of a family information center. Typically it is located in the kitchen. Many of you probably have a place in your kitchen where you keep your phone and you may have added an answering machine. A little bit later, you may have added Caller ID, a fax machine, and perhaps even a computer. Eventually, that little space for the telephone is cluttered with all these gadgets and is actually an information center. These information centers are becoming full-fledged business centers. In the not so distant future, you will see cable run throughout the house. It may even be a fiber optic cable. In some of the upper-end homes I have seen them put in conduits. We are beginning to see dedicated phone lines. We are also seeing central information servers that manage all of the communications in the house. It may manage the television, particularly if it is cable, digital radio type operations, and even the satellite link. All communications go back out through a central information server.

**Access To Infrastructure**

- Existing cable or wire technology
  - is a barrier to increasing the speed/band width
- Conduit
  - who should construct it, who owns it, and who controls access to it?
  - can/should local governments control ROW for telecommunications

All of this technology is going to increase the cost of the house anywhere from a mere $500 to as much as $10-$50,000. Everything I have described (fiber, cable, and information servers) is extremely difficult to retrofit into existing houses. At some point, we will see technology applied to existing homes. Currently, however, these technologies are not in place.

Developers are beginning to provide conduit to the curb as part of new developments. This brings fiber optical wire right up to the curb of your house. This is pretty

new and provides homes with connection to higher bandwidth. Although some telecommunications companies are bringing fiber to the curb, a conduit is more likely going to be put in place by the subdivision developer. Home access raises a number of questions. Who owns the conduit? Is it privately owned? If not, can any company that wants to provide service to that community be able to use that conduit? Even though it is in the right of way, will the community acquire access from the developer? As of yet, these are questions that do not have answers. In addition, issues of equity are going to arise when neighborhoods that provide this access are located next to communities that lack access. Will access be granted to adjacent, perhaps older, neighborhoods? If so, how will it be provided to those neighborhoods?

I would like to talk more in depth about the electronic village. I told you earlier the electronic village is a term that was coined to describe local communications technology as opposed to global telecommunications. But it is really more than that. The electronic village represents an on-line environment where people go to get information about their local community in terms of news, government and organization information, and information about private sector services. It is an electronic local "place" where people can meet and communicate about a community's physical places and activities. The goal of electronic villages is to create a sense of community that is greater than the electronic or physical community. Electronic villages are actually more prevalent in smaller communities than it is in larger ones. It seems that smaller communities are better able to manage and market the kind of information they want to bring on-line than larger communities.

Electronic villages have common characteristics. First, they all have some type of e-mail function. Whether their e-mail is going through an Internet provider or whether the community itself provides e-mail, citizens have a mechanism to engage dialogue with each other. It must be remembered that the electronic village is not meant to replace face-to-face interaction but to enhance communication. For example, you have read about people who have met on-line. But this is how it really happens. They meet on-line, begin exchanging e-mails, and decide they like each other. They both seem to be nice people and eventually their e-mail results in an exchange of photos, probably electronically; they each want to see how the other looks physically. If they are physically attracted to each other, they may decide they are going to meet somewhere. So, they may decide on a place to meet

and then they say let's get married. Then what do they do? Does one person live in Minnesota and the other in Japan? I do not think so. They decide to locate in a common space somewhere–that is generally what happens when people get married. There are advantages to doing that.

Essentially electronic communications may have gotten them together but it resulted in some type of physical activity. Many people communicate through e-mail about something that relates to physical activity. You are going to meet for lunch. Someone will deliver something to you. Their communications have a very strong physical component.

**The Electronic Village**

An electronic local "place" where people can meet and communicate about a local community's "physical" places and activities.

The goal, create a sense of community that is greater than either the "electronic" or "physical" community.

The other characteristic that these electronic villages have in common is public forums. These are places where people can engage in open dialogue about community issues. They also provide on-line information about communities. So, if you want information about your community it is fairly easy for you to find it. You can go to the community web site rather than having to go through a search engine. You may be able to communicate on-line with your local city hall and ask questions about building inspection, water service, or find out about a loan, library hours, or bus schedules. These systems can also transcend political boundaries and serve a region rather than a single city.

There are advantages to using the electronic village to communicate with clientele. These advantages enhance government's ability to deliver services. One thing that is really nice is that governments will be able to deliver current information. For instance, if a community currently wants to make a change in its zoning ordinances they need to provide people with copies of the zoning ordinances. Well, people do not want to buy a new zoning manual every 15 days or 30 days after a change in the ordinances. Often, therefore, the zoning ordinance they are using is out of date. So,

they may go to get a permit to build based on an old zoning ordinance. A lot of time is spent trying to keep people up to date. In fact, it is not just true of zoning ordinances. There are many instances when information changes rapidly. On-line services provide a means to distribute timely information. Rather than buying a paper-based manual to research a city's zoning ordinances, people will go on-line and look at the zoning ordinances. It is also more convenient for clients to get information without contacting you; they also do not have to wait for service through the mail. People do not have to conduct their business during traditional business hours. They can download copies of the documents that interest them. They can do it conveniently within their own time frame. On-line community information networks are increasing the amount of available information. There are a number of individuals and groups that have information about communities that is not available to everybody because delivery is difficult. Many non-profit groups have information about organizations that is just too difficult to deliver to the community at large. We will see an increase in the number of information sources because it will be easier for them to "publish" their documents electronically. It is also a lot cheaper.

There are several basic types of electronic village systems. There are systems that are government or institutionally sponsored. In fact, most of the early systems were this type. The second most prevalent are volunteer systems called free nets. The first free net was created out of Cleveland. Currently, there are hundreds of *free nets* across the United States. These are created by people who provide free Internet access. Volunteers, or the equivalent of volunteers, run the whole system.

There are private national commercial services. These have come and gone. America Online, Inc. (AOL) is probably the largest commercial service today. These are basic services that provide more than just the Internet connection. They provide access to organized information and information that is not available through any other source, such as e-mail.

There are some regionally focused commercial services. California has a number of these providers. Some Internet-based systems are just simply servers. They do not provide Internet service or e-mail. They just offer content. We are going to see a lot of mixed systems that provide a variety of things, a combination of commercial Internet type servers. Some free nets have shifted and are now providing limited free service and some paid services.

What does all this mean? In terms of communities, we are going to witness an increased demand for electronic communications. And, professionals are going to need information technology skills to be able to function effectively. The clients you work with are going to request e-mail. How many of you who work for state and local government can get outside Internet e-mail? That is becoming widespread, but until recently a lot of governments would not allow it because they were afraid that their employees would visit inappropriate sites. But offering employees e-mail is becoming more prevalent and you are going to see employees and customers communicating with e-mail.

In addition, people will begin demanding electronic commerce. One of the disadvantages for governments is that commercial sectors are always doing things ahead of us–making everything seem wonderful. Oh, how neat it is to do banking on-line and such! People become accustomed to that. When you tell them they have to come to a government office between the hours of 8 a.m. and 3 p.m. on Monday and Wednesday and stand in line to get a permit, they are not happy. They have seen private services delivered electronically. If this is to happen in the public sector, standards are something that managers will have to work on. For example, people want to submit their forms electronically. Well, what electronic system should cities use? Are we going to require secured servers? Will clients be required to have a browser to support security? These are issues that we will encounter in area of public service delivery.

An area that especially concerns me is the issue of universal access. Yes, electronic villages are great, wonderful places and they are going to really enhance our physical communities, but not everybody is able to access to these technologies. There are segments of our communitiesæ geographic and socioeconomic portions–that do not have access to these facilities. Therefore, for a number of reasons, ranging from simply lacking the knowledge to access these services to lacking the money to lacking infrastructure, they are disadvantaged.

Beyond the widely discussed problems of minority groups, this can be especially true in the elderly segments of our communities. Typically, they are not technologically astute. It is hard to get them on-line. Also, some segments of the community may lack the financial resources to purchase a computer or $20 a month needed for Internet access. There are also parts of communities that do not have the high-speed backbone they need to

conduct electronic commerce and communications and, if it is left to the corporate sector, they may never get it. This issue of universal access is something to be concerned about. As we are moving towards using the electronic village to work with our clients, elicit public comment, and deliver community information, we do not want to have segments of our community that are disadvantaged.

So, what can I tell you? If you do not have information skills, you need to get them. This is the direction the world is heading in terms of providing services and information. People need to have information skills. Without these skills, eventually people are going to find themselves at a disadvantage. Proficiency of these skills will become a necessity to remain effective in today's workforce. Public sector managers need access to these skills. They need to learn how to provide this type of on-line communication. It will be easier for employees to provide timely information and it will be easier to contact clients. Lastly, there is a tremendous cost advantage in using this technology.

In conclusion, many changes are occurring in communications. The evolution of communications is changing the form and function of communities and the way residents communicate. If communities want to remain competitive and protect and improve their quality of life, they need to place themselves on the leading edge of these technologies. In addition, planners, public managers, and community leaders need to keep pace with technology to help their communities. Ultimately, it is up to you whether you surf or sink. This presentation is on-line at www.asu.edu/caed/evc/delaware. On this site, I will provide this presentation, links to local activities, some of the community information networks that are springing up in Delaware, and resources that are regionally appropriate. I can be contacted at rquay@ci.phoenix.az.us.