
Engineering the Internet

by Keith B. Price, Jr., PE

Hundreds of thousands of words have been written about the Internet. A survey of any office bookshelf usually reveals several Internet references, reams of paper explaining how to get on the Internet, what the Internet can do for you, or how to market on the Internet. One discipline that has been slower to jump on the Internet band wagon is the engineering field. But, even that is changing. When Anderson and Associates was profiled in the June 1995 issue of *Civil Engineering*, it was one of only a few known engineering firms in the country that had a home page on the Internet. While no reliable figure is available on today's number, it is agreed that it has increased dramatically.

Engineering firms are now using the Internet as a reference source. For instance, an engineer needing information on an environmental engineering question could do a Web search and bring up a list of firms and universities and the papers they have published on a given topic. Web searches can also be done for engineering design standards and practices, analysis and the like.

Digital mapping and computer site simulations make maps accessible in an interactive format. These simulations can be used on large projects, creating 3-D worlds inside the computer for a much more realistic working model than if printed on paper. This model can be accessible to millions of people over the Internet. Interactive map access can become a new way to utilize information on a map, whether in a marketing or engineering application. For instance, this technology could be used instead of blue prints, and could be set up to be accessed only by the clients for whom work is being done. As a marketing application, computer site simulation can be used to market a business park that has not yet been built.

In a different application, the Internet can be used to transmit files, posting to an available place a set of revised maps. Clients can be told that there will always be a current set of plans available at a particular address. In this way, multiple people involved in design and execution would be working on the same data at all times. The plan would be accessible on the Internet server and people could work

collaboratively on the same file. In this way, the Internet becomes a true interactive communication medium in real time, rather than just a medium for storing and transmitting data.

One way Anderson & Associates has used the Internet that is specific to surveying is by accessing data files of the National Geodetic Survey Agency under the Department of Health and Natural Resources. This agency maintains survey control monuments and provides public domain software programs which update the status of monuments that surveyors all over the country use in their work. The Internet also allows access to information about the constellation of GPS satellites, 26 orbiting satellites that transmit signals to a surveyor's position anywhere on earth.

Currently, Anderson & Associates uses the Internet in our marketing effort, both as an information gathering tool and as a means of telling our story. When our marketing staff needs information on an organization, the latest regulations affecting a job we will be involved in, or grant availability and requirements that might affect a government agency that we are working for, they go first to the Internet. When it comes to promotion, the Internet provides an outlet that would be impossible to duplicate any other way.

Shortly after we began our Home Page, a company in Malaysia contacted us about assisting them on a "Smart City" project they were undertaking. While that particular project did not develop, it did serve to demonstrate two important realities: 1) that the Internet has a place in putting together people who have no other practical way of meeting and working together, and 2) that in the future the Internet is helping to shape, physical location will be less and less a factor in how and where work is accomplished and by whom it is accomplished.

There has been some criticism that the information available on the Internet is "uncensored" or unedited and that its reliability is uncertain. To some extent, that is true. People or organizations can put on the Internet whatever information they desire. The information does not go through a filter of and editor trained in journalism who at least in theory is interested in providing some measure of verification of

information and perhaps even a balanced view point. So, the reader must use the same discernment he or she uses in taking in information from other sources, such as general conversation or print publications.

Telecommuting, already a reality within the Anderson & Associates organization, becomes a more and more attractive option with the expansion of the Internet. We have engineers working from their homes a few days a week. They call into the office in the morning, check their E-mail, download from the computer at the office what they need for that day's work and upload back into the computer at the end of the day. For the disciplined and self-directed individual, this provides an efficient and highly productive way of working. Our expanding use of the Internet should allow telecommuting, correspondence and engineering work to expand into a world-wide enterprise.

Perhaps the greatest advantage the Internet brings to communication is its broad accessibility. All that is needed is a phone line, a computer, software and a modem. In fact, there is even an Internet "kit" you can buy for about \$100 that provides everything needed to connect to your computer and your modem. This means that there are few places on the planet where you can't access the Internet.

An interesting case in point is a family member of one of our A&A staff who is involved in economic development for a major chemical manufacturer. This person is planning a 3-month trip to a small third-world country on the other side of the globe. Communication there is primitive by American standards, yet the country has its own Web page, allowing the planning of the trip to be made via E-mail. Once there, the businessman will be able to communicate back to his North Carolina office, his home, or pretty much anywhere interactively using Internet E-mail.

While communication on the Internet can be in *real time*, it is still not as spontaneous as a telephone conversation. Because thoughts must be typed in, the *flow* of the conversation is more like a two-way radio communication than a telephone conversation. Also, there are different levels of communication, some requiring advanced equipment for both users, introducing compatibility questions.

What does the future hold for the Internet? Some Internet users in our office foresee a remarkable change in the way we exchange information. We will be able to make many more contacts in the business year through the Internet than we would have been able to using old technology. We will be able to share overall plans and ideas sitting at our computers where as, with old technology, we would have had to physically assemble together at a conference or seminar for a similar networking opportunity.

As more and more organizations go on-line, the opportunity for using the Internet for such serious conversations and information exchange become a reality. Forward-looking American companies will team up with compatible foreign companies to gain a foothold in international markets. Developing countries will be able to draw quickly on the expertise of more sophisticated nations in meeting their needs.

Geographic location will become increasingly less important as the Internet combines with video conferencing to allow people throughout the world - or just across town - to "meet" without leaving their offices. Many more things will be done remotely via the Internet. There will be shorter waits for documents. Information that now takes time to look up and compile can be accessed immediately.

For instance, if a government agency announced a new standard model for the earth's magnetic field at a conference today, it might take weeks to publish and disseminate that information to all the people who need it. That information could be posted on the Internet that day, making it instantly available to virtually everyone with an interest in it. Already, certain Internet addresses provide such timely updates on current national legislation that the Internet rivals the speed and world-wide accessibility of CNN.

The World Wide Web, a graphical user interface of Internet resources, is attracting more and more attention and use as Internet growth continues to escalate. Obstacles in using the Internet will be overcome as more "search engines" - the card catalogue of the Internet - are developed to make the process of finding information more user-friendly. With constant changes on the Internet, it is difficult to stay current, but at the same time, a new user can start today and not have to worry about Internet history or yesterday's news.

Questions to Ask Internet Service Providers

Here are some of the questions you should ask when considering an Internet Provider:

Reliability

- Does the connection work at all hours of the day?
- Are there peak time overloads?
- Is there a refund for downtime?
- Does the connection support the speeds/types of hardware you have?

Troubleshooting

- Is support part of normal service or an added cost?
- What are the hours of coverage for network operations?

Training/Support

- Is there technical help available via E-mail?
- Is there help and/or manuals available online?
- Is there a user-friendly interface to Internet resources?
- What software is provided?
- Are Internet tools such as E-mail, telnet, FTP, Gopher, WAIS, WWW, and Lynx available?

Business Arrangements and References

- Are free trial connections available?
- What local and 800 phone numbers are available for you to use?
- Are there surcharges for any types of connections or particular hours of the day?
- What kind of contract or service agreement is required?
- What options are available for payment?
- Are there any options that will reduce (or increase) your costs?
- Are group discounts available? (Start your own group!)
- Are there charges for file storage?
- If you travel and want to access the Internet while you are on the road, ask about accessing your ISP from the cities you visit.
- How long has the provider been business?
- Can you get answers to your questions in writing?
- Ask for names of two or three similar users and check with them regarding their experience.

About the Author: Keith B. Price, Jr., PE, is Vice President and Branch Manager for Anderson & Associates, a civil engineering, surveying, planning and landscape architecture firm with offices in Greensboro, NC, Blacksburg, VA, Richmond, VA and Tri-Cities, TN.

Mr. Price is the Chairman for PENC's Public Image Steering Committee. He is an adjunct Civil Engineering instructor for NC A&T State University, Chair of Guilford Technical Community College's Civil Engineering/Surveying Technologies Advisory Committee, Chair of Greensboro National Engineers Week Committee, and a member of the 1996 class of Triad Leadership Network.



Hot Links

Interesting Destinations for Engineers on the Internet

Professional Engineers of North Carolina

<http://www.andassoc.com/personel/penc/penc.html>

National Society of Professional Engineers

<http://www.nspe.org/>

National Engineers Week

<http://www.sme.org/memb/newweek/newweek.html>

NCDOT

<http://www.dot.state.nc.us/DOT/>

United States Department of Transportation

<http://www.usdot.gov/>

North Carolina Department of Commerce

<http://www.commerce.state.nc.us/commerce/>

Engineering Information, Inc.

<http://www.ei.org/>

American Waterworks Association

<http://www.rmii.com/awwa/>

Society for Manufacturing Engineers

<http://www.sme.org/>

Institute of Electrical and Electronics Engineers

<http://www.ieee.org/>

American Society of Civil Engineers

<http://www.asce.org/>

Society of Women Engineers

<http://www.swe.org/>

USA CityLink - North Carolina

<http://www.NeoSoft.com/citylink/nc.html>

State Library of North Carolina

<http://hal.dcr.state.nc.us/ncs/home.htm>

North Carolina State Government Home Page

<http://www.sips.state.nc.us/>

University of North Carolina System

<http://unccecs.edu/>

North Carolina Information Highway

<http://www.ncih.net/>

United States Army Corps of Engineers

<http://www.usace.army.mil/>

FEDWORLD

<http://www.fedworld.gov/>

Inter@ctive Age Top 1000 Companies WWW Addresses

<http://techweb.cmp.com:80/techweb/ia/current>

U. S. Postal Service

<http://www.usps.gov/consumer/ratecas0.htm>

The White House

<http://www.whitehouse.gov/>

United States House of Representatives

<http://www.house.gov/>

Environmental Protection Agency

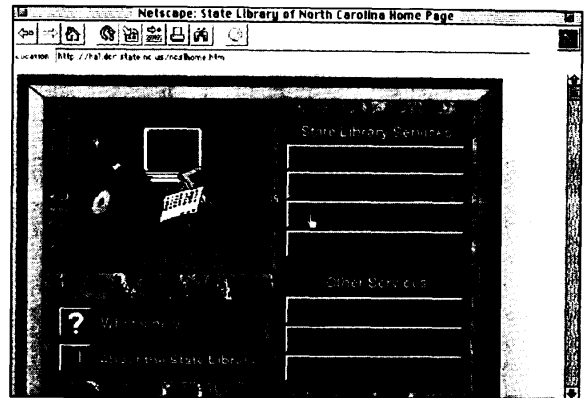
<http://www.epa.gov/>

Worldwide List of Business Education Sites on the Internet

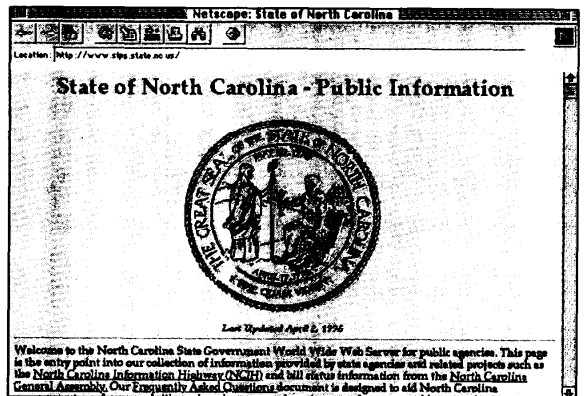
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Anderson & Associates, Inc. Home Page

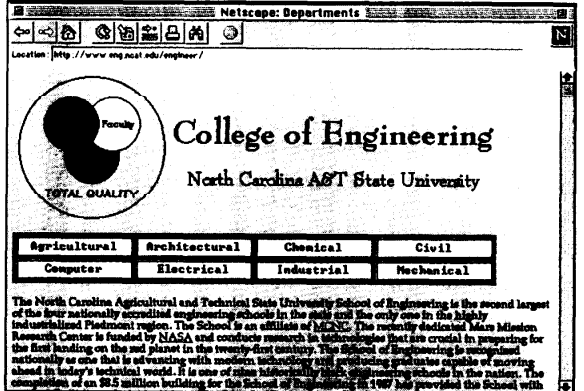
<http://www.andassoc.com/>



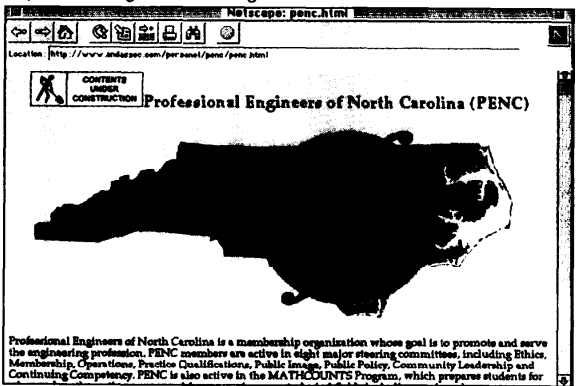
<http://hal.dcr.state.nc.us/ncs/home.htm>



<http://www.sips.state.nc.us/>



<http://www.eng.ncat.edu/engineer/>



<http://www.nspe.org/>