

Internet Uses Up for Grabs

(Continued from page 1) Engineers discovered recently.

Engineers from Stanford University, the University of Utah, and several other universities and companies teamed up to design, strictly over the Internet, an optical seeker used in laser-guided missiles. The project was part of the Department of Defense Advanced Research Project Agency program.

The disparate group of engineers in more than 10 locations had little experience with optical seekers, and first used the Internet to research and trade information. The group divided up responsibilities and worked together via such Internet tools as

e-mail and video conferences. "That allows real-time synchronous collaboration. We would actually have a live conversation, and multiple parties would be participating," says George Toye, a mechanical engineering research associate at Stanford.

They also used e-mail and the World Wide Web to archive information and track the progress of the project, and other Internet tools such as a kind of design spreadsheet that had enhanced capabilities, he says. The Stanford group produced a model of the device on the Web. "That's also part of living documentation. You can ask, 'What is this part of the model?' and it could dynamically generate that for you," says Toye.

The prototype optical seeker was developed within six months, says Toye, which is con-

siderably faster than with conventional methods. "Obviously, compared with [other] design efforts on this scale, to have people distributed in this fashion working together [without the Internet] would take considerably more time," he says. The process was also cheaper.

Although the results sound impressive, there are certainly other ways to collaborate on such projects, Toye admits. But the Internet allows for much more thorough communication and documentation of design progress. "The key point here is you want to archive and maintain as much of the design rationale as possible when you do a transfer like that. If you are just sending faxes . . . you don't have a rich record of all the design decisions that were previously made," he says.

Some corporations are ex-

perimenting with round-the-clock design over the Internet, but problems still need to be worked out before it becomes more widespread, says Toye. "The difference is really how much can you do and how fluidly can you do it. The problems that exist right now are associated with file and data compatibility. They exist regardless of the Internet," he points out. "For our technology to progress where it actually goes commercial in the data transfer area, I suspect it will take a few more years."

Cyber-Communication

Most engineers probably won't be doing a lot of design over the Internet for a while, but they are using it for other purposes. Professional engineer Ken Anderson, president of Anderson and Associates, a civil engineer-

ing firm in Blacksburg, Virginia, has some big plans for his firm via the Internet. Anderson is one of the few civil engineering firms that has a home page on the World Wide Web. Users can click on different icons to learn more about the company and how it operates. The page also contains an employment application, and an educational section that explains how the firm uses geographic information and global positioning systems.

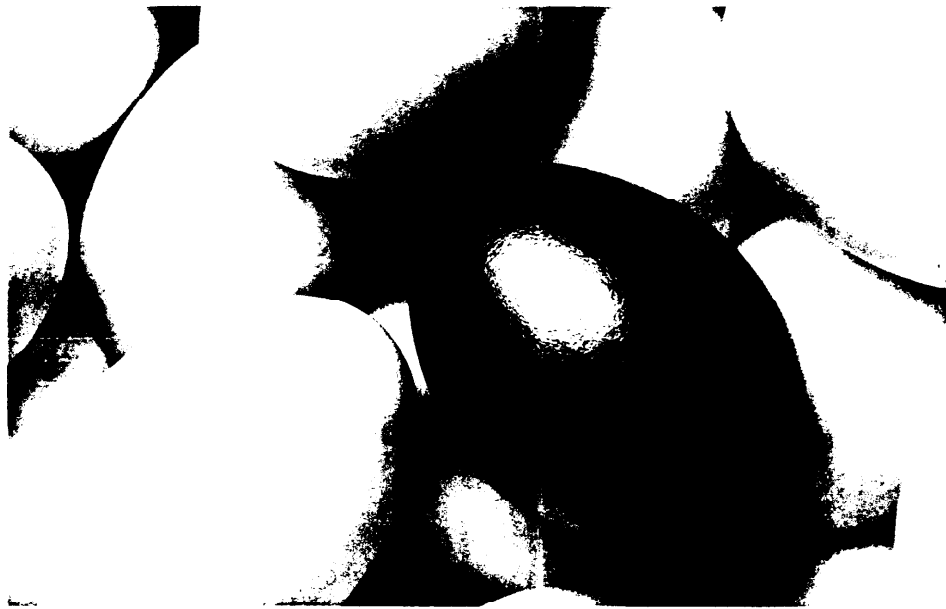
The firm has offices in three cities, and Anderson's employees—and clients—are encouraged to communicate with e-mail as much as possible. "We work interactively with other offices, and our goal is to work with clients in the same way," he says. "We're trying to get to the point where we can do their work, and they receive it on their computers. They communicate with us by electronic mail. We've got a fair number of clients who are already doing that," he says. Although some clients are hooked up through the firm's wide area network rather than the Internet, Anderson believes the latter is preferable. "If you've got an Internet e-mail address, you can communicate with anybody anywhere in the world, very easily."

Anderson is also interested in eventually using the Internet for design purposes, in the same way that his offices work over the firm's network. The firm is working with a graduate student at the University of Virginia whose thesis involves managing a construction project over the Web. The student is translating construction designs, specifications, and correspondence into the Web's language and is planning to put Anderson's AutoCAD files on the Web. "We can keep all of the materials, all of the information, on the home page. It will be available for the designer, the contractor, the owner, everybody. You put it on the home page and it's instantly accessible."

With all of the potential advantages the Internet offers, experienced users are quick to point out that it can't solve every problem. In fact, communicating through the Internet can introduce whole new sets of problems to grapple with. "Design is very much a social activity," points out Stanford's Toye. "Being distributed in time and space makes it more difficult to deal with the social issues," he says.

For example, some people who worked on the optical seeker were attuned to using voice mail, while others used only e-mail. "Learning some of these communication mediums and how people assimilate to them is very important," he says. It's also much harder to get to know each other through the Internet, he says. Body language and tone of voice are often missing. "These little hints about human behavior you don't pick up through some of these mediums," he says. The success of communicating with clients through the Internet often depends on the client's level of sophistication, Anderson says.

Even so, both agree that the Internet may play an increasingly bigger role for engineers. But it should be treated as a tool rather than the solution to every problem. "It's a supplement. I think this expands our capabilities rather than substitutes for them," says Anderson.



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