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## The Hardest Working Elves in Cyberspace

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Milind Tambe and members of his research group in the Intelligent Systems Division are using themselves as guinea pigs for a new system of computer software "agents," which they whimsically call Elves.

In coming years, more and more working people may find themselves, as Tambe's team does, in a continuous dialog with similar agents, residing in palmtop computers or cellular phones. Tambe's efforts have already been widely reported on in USA Today, the Associated Press, and numerous other media.

The Elves arrange human meetings by consulting among themselves, without human intervention. Using global positioning system equipment carried by the humans, the elves keep track of the location of each member of Tambe's group, sending messages warning other participants that their human will be late when the GPS data shows them too far afield to reach a scheduled destination on time.

When, for example, team leader Tambe recently went to the airport to pick up a visitor, the GPS functioned up the fact that he was held up in traffic, and would be unable to arrive in time for a meeting. Without Tambe intervening in any way, the Elf signaled its peers and the meeting was postponed an appropriate length

Elves also sign their humans up for tasks, such as giving speeches, on the basis of who is ready (or sh ready) to present material, and who has been longest since a presentation. They can also get their human excused from a presentation.

And of course, they know what their humans like to eat and can send out for lunch.

The Defense Advanced Projects Planning Agency (DARPA), which is funding the project, is interested in the possible role of Elves to keep track of individual soldiers and sailors in massive maneuvers involving thousands of troops, or even on the battlefields of the future



Milind Tambe's research group is guided by intelligent agents resident in PDA and other

But that future is now for the ISI research team, which invented and programmed the system, and has using the Elf system to guide its own interactions uninterruptedly since the beginning of June 2000.

"Our Elves have shown that they can handle the professional lives of our 9-person group over an extended period of time," says Tambe, who is also a research associate professor in the USC computer science department.

"They work with existing computers -- ordinary PCs, Palmtop computers, GPS systems and Cellular phones. We would expect that, given the potential advantages for organizations, that systems like these will be in the marketplace and on the job soon."

Tambe's Elf-handled group includes Dr. David Pynadath, Hyuckchul Jung, Takayuki Ito, Pragnesh "Jay" Ranjit Nai, Shrinivas Kulkarn, and Chandrashekhar Ramanan.

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