

UCF researchers hope virtual reality can help to prevent wildfires

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In a year when many Americans have experienced first-hand the dangers of raging wildfires, University of Central Florida researchers are preparing to study whether interactive, virtual reality simulations of wildfires can make residents more willing to invest in preventing them.

The UCF research team is developing an interactive simulation of a wildfire spreading through Volusia County. Participants will decide how much they want to invest in prescribed burns and insurance, and their decisions will be contrasted with those who only receive written information about the danger of wildfires.

Researchers Glenn Harrison and Elisabet Rutström of Economics, Charles Hughes of Electrical Engineering and Computer Science and Stephen Fiore of Philosophy and the Institute for Simulation and Training hope this project will demonstrate that virtual reality can be an effective public policy tool that enables residents to see first-hand the long-term effects of economic and political decisions.

“This technology could empower ordinary citizens to make decisions that may be comparable in quality to experts’ and save society from making bad decisions,” Fiore said.

The National Science Foundation provided \$680,000 to fund the research. The simulations should begin within six months, and the first results should become available at the end of 2007. The entire study will take about two years.

The researchers' varied backgrounds will allow them to examine several issues. Harrison and Rutström will focus on the economic decisions that participants make and on why they decide -- or not -- to invest money in prescribed burns or insurance. They will try to determine what factors cause some people to be more averse to risks than others. Their insights could aid in the development of public support for policies that reduce the risks of wildfires.

Fiore will analyze how the decisions of expert participants, such as forestry officials, vary from the decisions of participants without expertise in the subject. He also can examine how decisions may vary for residents who have experienced wildfires first-hand and those who have only seen images of them on television.

Hughes is an expert at designing simulations of complex environments. The forest simulation will be able to model rapidly evolving wildfires, giving participants a realistic look at forests before, during and after fires and prescribed burns.

The simulation will cover about 30 years in an hour. Participants will control how they view the environment, by walking through the forest, flying over it or choosing a predefined path. The simulation will be designed such that if users walk past some trees and turn around or return to that spot later, the same trees will be there. Such persistence is critical in naturalistic environments.

The researchers chose Volusia County because of its 1998 experience with massive wildfires. They wanted an area in which many residents will have lived through them, and they plan to use actual data for topography, weather, roads, housing density and vegetation. Much of the data will be taken from Florida Division of Forestry models, which use the above information and the locations of man-made fire breaks to predict the path, speed and intensity of wildfires. Those models are used

in wildfire policy planning.

Participants will be given about \$100 of real money apiece, because researchers want to simulate spending decisions in a scenario that is as realistic as possible. The amount of money participants keep at the end will depend on the final value of their land. If they invest in prescribed burns and insurance, they will have to give up some of their \$100, but they will have a greater probability of owning more valuable land at the end.

“We believe simulations can help people, because they are seeing the consequences of their actions,” said Hughes, who this year was one of three winners of UCF’s Pegasus Professor Award, which recognizes outstanding teaching, research and service. “There’s a big difference between that and reading a textbook.”

Hughes said he sees a future for these types of simulations in museums, classrooms and other places, especially because the cost of the technology required for such simulations has dropped dramatically in recent years.

Harrison said the team chose fire management policies because of their obvious importance in the state. He said the same technology could be used for other issues, such as hurricane policies, land-use planning or determining the future of the Everglades.

“I like to think about the cost to society of not doing this,” Harrison said. “That cost is society not making better decisions.”

The 2007 wildfires have prompted some changes to the study, primarily increasing the prominence in the simulations of the health effects of smoke from fires.

Source: University of Central Florida

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