



Presentation by

Douglas Few

*“Welcome to the 3D Virtual World of Your Dreams...
or at Least a Place of Interest”*

*Thursday, June 16 -- 4:30 to 6:00 p.m.
at The Zone in Idaho Falls
1505 W. Broadway St.*

Abstract: Nuclear facilities are subject to safeguards via the International Atomic Energy Agency. As a part of these safeguards, the IAEA performs design information verification (DIV) inspections to verify that facilities of interest have not been altered in any safeguards relevant manner that would allow misuse or diversion of special nuclear material. The practice of DIV relies heavily on inspector knowledge and experience, and is performed within a highly information intensive environment. There are two fundamental difficulties when inspecting nuclear facilities. The first is sifting through facility documentation in search of relevant information (i.e. safeguards information) and the second is spatially correlating relevant information to the facility physical design. We propose creating a facility information system (FIS) to address data storage and spatial registration of facility information, coupled with extraction of the relevant information on demand. Inspectors will interact with the FIS through a 3-D digital replication of the facility. 3-D virtual environments (VE) provide rich visual cues, but evidence suggests visual information alone is not sufficient to adequately navigate a VE effectively. Therefore, we will discuss positioning solutions for accurately tracking human movement in GPS-denied areas and use this position information to auto-register the VE perspective to that of the human operator in the physical world as well as: Task analysis of inspector roles, responsibilities, and information requirement; Rapid VE modeling toolkits; Position correlation from physical to virtual environment and; Human Computer Interaction (HCI) research that has informed this effort.

Bio: Mr. Douglas Few graduated with a B.S. in computer science from Keene State College in Keene, NH September of 2003 and a M.S. in computer science from Washington University in St. Louis in Aug. 2008. Currently, Mr. Few is a principal research scientist with the Robotic and Human Systems group at INL and a senior researcher for INL's Intelligent Controls and Information Systems (ICIS) strategic initiative. Mr. Few's interests include human-computer interaction, mixed autonomy robotic systems, generic robot control architectures, and system reliability algorithms. He is currently the technical lead for the US Army's robotic countermine and counterIED efforts for the Advanced Mine Detection System (AMDS) program and a Defense Threat Reduction Agency (DTRA) Rapid Area Sensitive-Site Reconnaissance (RASR) project. Mr. Few's work on the U.S. Army's Advanced Mine Detection Systems program has evolved from laboratory concepts to a field deployable capability slated for use in Afghanistan in FY11. The RASR project is an effort to deliver mixed-initiative robot system control and hazard data fusion with robot generated maps to assist in sensitive sight assessment and exploitation missions.