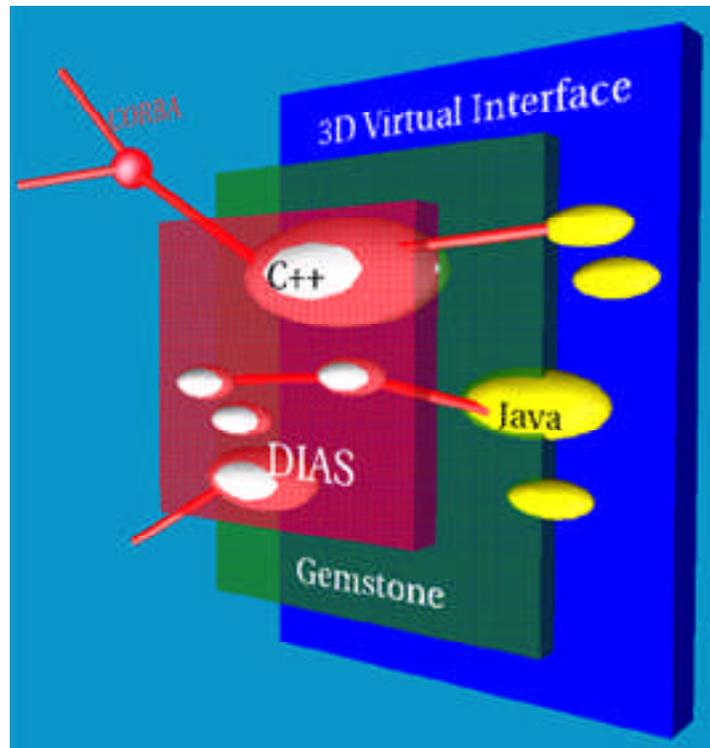


Antiterrorist Software

In light of the escalation of terrorism, the Department of Defense spearheaded the development of new antiterrorist software for all Government agencies by issuing a Broad Agency Announcement to solicit proposals. This Government-wide competition resulted in a team that includes NASA Lewis Research Center's Computer Services Division, who will develop the graphical user interface (GUI) and test it in their usability lab. The team launched a program entitled Joint Sphere of Security (JSOS), crafted a design architecture (see the following figure), and is testing the interface. This software system has a state-of-the-art, object-oriented architecture, with a main kernel composed of the Dynamic Information Architecture System (DIAS) developed by Argonne National Laboratory. DIAS will be used as the software "breadboard" for assembling the components of explosions, such as blast and collapse simulations.

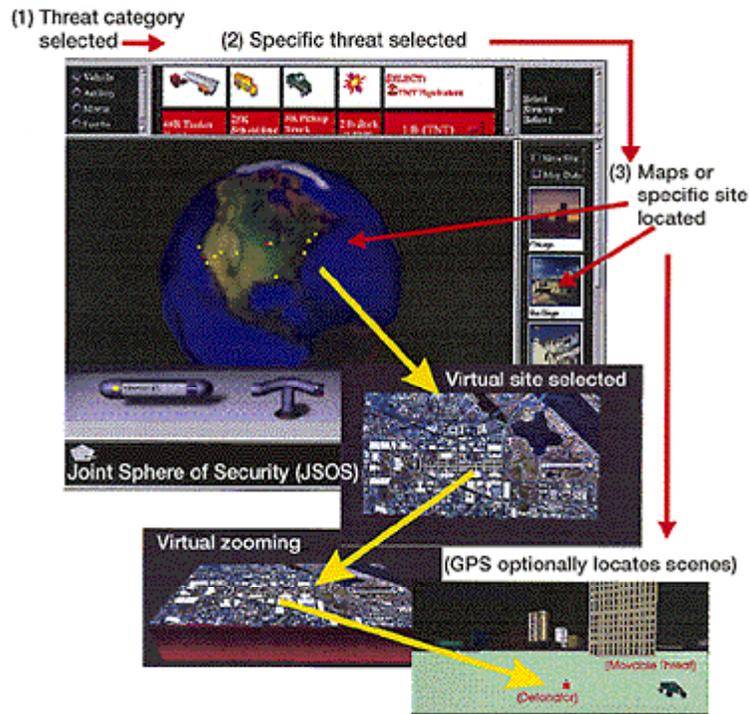


JSOS object-oriented architecture.

Embedded in DIAS are C++ objects that represent state-of-the-art simulations developed at sundry laboratories with various areas of expertise. DIAS uses Gemstone, a middleware product that facilitates the use of CORBA and Java. CORBA allows distributed applications to talk across networks irrespective of language or operating system. Java applications and applets process queries and results from DIAS objects and display the results on the virtual interface. The Virtual Reality Modeling Language VRML2 is the outer software "wrapper" that allows simulations to be visualized in a full three-dimensional, interactive and intuitive interface.

Designed to be used by security officials who must deal with the threat of explosions, the

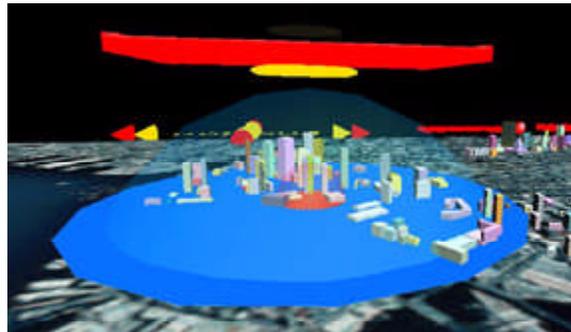
JSOS interface can currently model blasts. A prototype scenario is depicted in the following screen capture from JSOS:



Prototype scenario.

Menu choices lead users from categories of threats to specific threats. Users then define the scene by either selecting thumbnail photos that represent specific locations or by progressively zooming into a three-dimensional virtual world. The large database of sites available can be expanded to fit an agency's or center's needs after its requirements are analyzed. Global positioning systems (GPS's) can be used to assist in pinpointing locations. Once a scene is defined, the user positions a particular threat in the virtual environment. Because JSOS immerses users in the scene, this interface will be intuitive and natural for trial-and-error exercises, briefings, and presentations.

After defining the threat scene, the user can precipitate the destructive action by selecting the *detonate* button, whereby calculations are performed and results are illustrated (see the following damage analysis from JSOS).



JSOS damage analysis.

The inner circle represents the region where death would occur, and the outer circle represents the region where there would be injury (e.g., due to window breakage). Audio prompts help users explore the scene. Currently the project is being developed to operate with an Internet browser to facilitate an application-on-demand paradigm (i.e., Java applets).

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