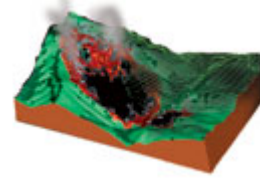**WINNER**

2003 R&D 100 Awards Winner
FIRETEC: A Physics-Based Wildfire Model

FIRETEC is the first physics-based, three-dimensional (3-D) computer code designed to simulate the constantly changing, interactive relationship between fire and its environment. It does so by representing the coupled interaction among fire, fuels, atmosphere, and topography on a landscape scale (hundreds or thousands of meters). FIRETEC combines physics models that represent combustion, heat transfer, aerodynamic drag, and turbulence with a computational fluid-dynamics model that represents airflow and its adjustments to terrain, different types of fuel (vegetation), and the fire itself. Unlike the empirically based models currently used in the field, FIRETEC simulates the dynamic processes that occur within a fire and the way those processes feed off and alter each other. FIRETEC provides a sophisticated analytical tool for fire, fuel, and land managers and has significant potential to help prevent loss of life, property, and natural resources.

Applications
- Predicting wildfire behavior in rugged terrain under various atmospheric conditions
- Optimizing fuel-management strategies
- Investigating how fire interacts with various fuels
- Determining causes of dangerous changes in a wildfire's behavior
- Providing realistic simulations for training inexperienced fire fighters