

A CASE STUDY: NORAD'S ADVANCED VISUALIZATION TOOL 4DX FOR HOMELAND SECURITY SOLUTION

Challenge:

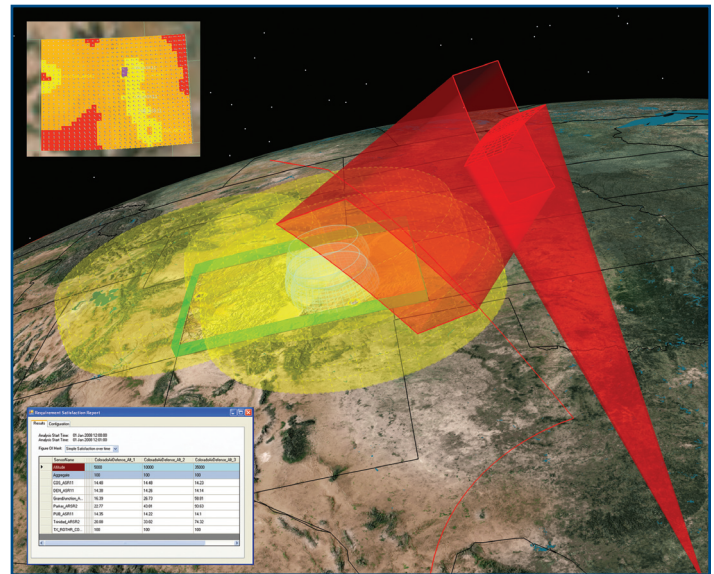
- Find software to analyze and visualize in 3D sensor systems and families, the second phase of NORAD's sensor evaluation program.
- Figure out an efficient way to convey testing/ranking results to leadership.
- Increase consistency in trial and scenario-creation processes.
- Simplify the creation of and eliminate reconstruction of complex scenarios which are often repeated throughout the evaluation process.

Addressing an ever-increasing need for homeland security surveillance options and strategies, the United States and Canada's North American Aerospace Defense Command (NORAD) and US Northern Command analysis division (J84) integrated AGI's STK and 4DX Embedded Technology software products with an in-house tool to create the Advanced Visualization Tool (AVT).

AVT provides 3-D analytical and graphical visualization of families of sensor systems and assesses how each handles multiple NORAD mission requirements against a wide range of air threats. Using the software, analysts advocate the best systems to meet the various requirements and strategically plan the role that sensor architecture will play in the future. This information supports leaders as they advance NORAD's objectives of detecting, validating, and warning against aircraft, missile, or space vehicle attacks on North America.

NORAD's AVT software tool functions in two phases. In the first, analysts use the Microsoft Excel-based Technology Assessment Calculator (TAC) created by NORAD Canadian defense analysts to assess a single sensor's capabilities and utility. TAC stores parametric data of sensor systems and has built-in multi-criteria decision-making algorithms that rank sensors in different scenarios based on varying priorities set by analysts. In the second phase, those sensors with the best application-specific scores are moved on to AVT/STK, the phase that uses STK and 4DX.

Current AGI software users, NORAD analysts integrated STK capabilities—particularly the ability to develop custom Figures of Merit—into AVT with 4DX Embedded Technology. Using pre-set templates and functionalities and AVT's ability to walk step-by-step through complex scenarios, analysts are now able to access stored, common surveil-



AGI's time dynamic 3-D environment allows analysis of geospatial requirements.

lance assets. Using AGI technology, NORAD analysts defined three geospatial requirements—area targets, volume targets, and point targets—and prioritized them. Once the information is entered into AVT, it is displayed in STK, providing analysts with a clearer picture.

AGI technology quickly and cost-effectively:

- **Assists with scenario creation.** Through AVT, results previously in spreadsheet form are inputted to a 3-D visualized environment, mitigating risk and saving time.
- **Provides greater scenario and trial consistency.** Many aspects of assessing sensor systems' scores need to be repeated in every scenario. AVT allows for stored functionalities to be accessed in every scenario, increasing consistency among trials.
- **Increases ease-of-use.** Integration with a step-by-step scenario-building tool reduced training costs, time, and risk of error.
- **Allows for easy information sharing.** STK Professional Edition creates AGI Visual Data Format (VDF) files from scenarios that leadership easily views with free AGI Viewer software.

AVT was developed through SI International's C4I2TSR (Command, Control, Communications, Computer, Intelligence, Information, Technology, Surveillance and Reconnaissance) contract.

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