Talk Title: Terabyte Geospatial Datasets for Flight Simulators

Speaker: Steven Nigus

Affiliation: Flight Safety Intl.

Venue: Computer Science Building 209

Time: Feb' 26th Thursday, 12:30 to 1:30pm

Abstract:

Flight simulators used for pilot training place special emphasis on realism. The transfer of skills learned in the simulator to the real aircraft is adversely affected by unrealistic or uncharacteristic simulations. Fortunately, the availability of high-quality, high-resolution, low-cost terrain and image data is rapidly increasing, and we able to present very high fidelity out-the-window training environments to the pilot. High fidelity comes at a cost. We must provide a world-wide dataset with high-resolution data covering hundreds of airports. The dataset must allow seamless flight from any airport in the world to any other airport with enough resolution to provide proper cues to the pilot given the current aircraft altitude. We quickly incur requirements to prepare, configure, render, and manage terabyte datasets organized as a geospatially indexed databases of imagery, terrain elevation, buildings, trees, etc. Simulator realism requirements dictate rendering of 3 million pixel scenes at 60 Hz hard real-time rates.
Military pilot training applications present additional challenges. Special Operations pilots need to rehearse missions in the simulator before going in harm's way. Simulator datasets need to be created for a given mission location and made available for simulator use literally overnight. That data must support simulation of out-the-window scenes as well as night vision goggle, infrared, electro-optical, and radar sensors.
This talk presents architectures and techniques that support the implementation and real-time rendering of terabyte geospatial databases on a flight simulator. Special challenges of data acquisition, data organization, spatial indexing, rendering, rapid update, real-time rendering, and configuration management are addressed.

Bio:

Steve Nigus is Engineering Director at the Visual Simulation Systems division of FlightSafety International in St Louis, MO. He has been designing visual system for 26 years and has authored 10 conference papers on flight simulation. FlightSafety International is the world's largest pilot training organization. FlightSafety owns and operates over 300 simulators in 42 locations around the world and trains over 75000 pilots every year at its facilities. In addition, FlightSafety provides flight simulation equipment to civil and military training organizations covering a wide range of civil and military aircraft.