

The Federal Aviation Administration Chooses VR-TheWorld for NextGen Projects

The Federal Aviation Administration (FAA) is using its Next Generation Air Transportation System to transform the world of flight management and operation as we know it.

NextGen is an ongoing overhaul of our current National Airspace System (NAS), planned and demonstrated to enhance safety, reduce delays, and save fuel - all while diminishing aviation's negative impact on the environment. The initiative uses new and existing technologies, including satellite navigation and advanced digital communications, to connect airports and aircraft in our NAS with continually shared real-time information.

The NextGen Integration and Evaluation Capability (NIEC) Laboratory is the FAA's research platform to explore, integrate, and evaluate NextGen concepts through simulation activities. It has chosen VT MAK's VR-TheWorld as the streaming terrain server to stream imagery and elevation data into several of these NextGen simulations, including Aircraft Access to SWIM, or System Wide Information Management, (AAtS), and a Weather Technology in the Cockpit (WTIC) study.

Aircraft Access to SWIM (AAtS)

Promoting collaborative decision-making among all players in air traffic management, AAtS will increase the efficiency of air traffic operations by sharing relevant information to flight crews through a common information source. It will evaluate pilot situational awareness (SA), workload, and voice communications, in addition to the strategic planning of increased and more timely delivery of weather, flight, and aeronautical information to the cockpit through day-flight simulations. The FAA's first study using VR-TheWorld, this human-in-the-loop experiment features the Dallas Fort Worth International Airport inset into the VRTheWorld database.

Aircraft Access to SWIM is the flight deck extension of SWIM, which provides an open, flexible, and secure information management architecture for sharing NAS advisory data and enabling increased common situational awareness and improved NAS agility.

Weather Technology in the Cockpit (WTIC)

In an effort to better understand pilot decision-making in adverse weather conditions during flights through the Inter-tropical Convergence Zone (ITCZ), the FAA, in partnership with the National Centre for Atmospheric Research (NCAR), are developing a cockpit flight simulator for conducting experiments for NextGen pilot aids. They are using VR-TheWorld for a level 4 fixed-base flight training device. The goal is to determine how auxiliary avionics – in the form of an electronic flight bag, an electronic display system used primarily in the cockpit or flight deck– can boost the safety of transoceanic flights.

The study will include two airline crews flying simulated moonless night missions from Miami to Lima, Peru to investigate methods of displaying satellite-based weather in the cockpit. The fixed-base simulator used an Airbus A320 cockpit with sidestick, rudder pedals, flight management system and ACARS thermal printer, but with reconfigurable displays featuring touchscreen controls to model other avionics and hardware.

Why VR-TheWorld

Delivered with a global base map, VR-TheWorld can be easily populated with custom source data through a web-based interface. The server can be deployed on private, classified networks to provide streaming terrain data to a variety of simulation and visualization applications behind a firewall. MAK's most recent release, VR-TheWorld 2.0, adds the ability to store and stream feature data including roads, buildings, and trees to multiple applications simultaneously. The amount and quality of imagery and elevation data included with the server has been expanded, and also allows the user to add geospatial data to distribute in real-time.

By using VR-TheWorld, the FAA and the NIEC Laboratory have the most accurate feature and elevation data of the "virtual globe" at their fingertips, helping them to determine the most cost-effective and practical methods of bringing satellite-linked systems to all of the National Airspace System.