SCALABLE ADVANCED GRAPHICS ENGINE – AIR

RICH VISUALS FOR INCREASED REALISM IN FLIGHT TRAINING SIMULATION

LOCKHEED MARTIN

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SAGE – SCALABLE ADVANCED GRAPHICS ENGINE: AIR

Lockheed Martin's Scalable Advanced Graphics Engine (SAGE)-Air is a hybrid gaming visual solution that provides richly detailed images and motion for increased realism in flight simulation. Combining more than 35 years of Lockheed Martin image generation flight experience, SAGE-Air combines image generation algorithms proven on numerous military training and rehearsal simulators with open-architecture gaming technologies. The software is designed to run on the Linux operating system and will run on a broad range of hardware configurations from embedded vehicle trainers to high end multi-GPU, multi-projector dome full mission flight trainers.

Operational Aspects

- Selectable deterministic image update rates (15Hz, 17.5 Hz, 30 Hz, 60Hz)
- Flat earth or geocentric earth model (WGS84)
- Multi-channel (2 - 256) with Frame Lock and Genlock
- 80+ miles of terrain visibility
- Night light mapping
- Dynamic synthetic environment (bomb craters, building damage)
- Vehicle headlights, steerable landing lights,flares
- Three-dimensional sea states (including wind speed and direction)
- Ship bow and stern wakes
- Missile contrails
- Mission Functions (height above terrain (HAT), height of terrain (HOT), laser range, line-of-sight (LOS), collision detection)
- Electro-Optic (EO) simulation
- Night vision (NVG) stimulation or simulation
- Patent pending real-time physics-based thermal (IR) sensor simulation using per pixel material based texture maps
- Sensor effects (noise, motion/ optical blurring, depth-of-field, level, gain, polarity, digital zoom, and AC banding)
- Extensive library of vehicle and flight sensor reticles/ symbology
- Network communication using Lockheed Martin's NxView interface, the industry standard CIGI interface, DIS interaction, and SAGE API

Environmental Details

- Real-time generation of flight databases from commercial source materials (DTED, ESRI Shapefile, GeoTIFF)
- Baseline support for 256 (configurable to 5000) 6-DOF moving models @ 60 Hz
- Continuous ephemeris model for sun and moon position, sunrise and sunset glow, horizon glow, stars, and moon phase with realistic ambient moon lighting conditions for NVG operation
- Regional weather–atmospheric fog, haze, sandstorm, rain and snow
- Multi-layered 3D volumetric clouds and fog
- Thunderstorm cell, with lighting and precipitation effects
- Runway contaminant layers, including sand, wet surface, snow and ice
- Particle-based special effects
- Attachable light sources for night operations, including headlights, spotlights and flares
- Dynamic moving model shadows
- High-performance skeletal mesh characters rendering with a wide variety of motion-captured animations

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