CREATE ACCURATE SENSOR SCENES FOR VISUALIZATION

Presagis Sensor Products enable the creation of state of the art correlated OTW and physics based sensor visualization applications based on Vega Prime.

The preparation and creation of sensor textures for use by the scene generation software are part of any sensor visualization application development workflow. These sensor textures are used to accurately render the material-based characteristics of the sensor scene.

Since achieving the most accurate sensor scenes requires the proper preparation of the virtual environment, Presagis has developed CTS Sensors and the Texture Material Mapper (TMM), tools with the capability to automate sensor texture generation for large areas and to perform entity material classification.

Presagis Sensor products are comprised of three integrated Vega Prime modules (for sensor rendering, sensor effects, and radar) and three off-line scene preparation tools, Texture Material Mapper (TMM), MOSART Atmospheric Tool (MAT), and Creator Terrain Studio (CTS) Sensors.

The scene preparation tools are used in pre-processing operations prior to the realtime simulation. The purpose of the TMM and CTS Sensors tools is to allow the user to assign material properties to textures that are applied to all models in the scene. The MAT tool generates atmospheric quantities and surface temperatures for scene materials at varying times of day.

BENEFITS

The MAT and TMM modules are essential in the definition of the environment for correlated sensor view generation:

- **Material Textures**
  Textures are generated from RGB colors or intensities using the TMM tool to material-classify each photographic texture used in the scene into a linear combination of one, two, or three materials (option choice) per texel.

- **Atmospheric and Surface Temperature Database**
  The MAT tool takes as input the spectral response of the sensor and the latitude, longitude, date, and weather chosen by the user and computes a 24-hour time period of atmospheric conditions and surface temperatures. The atmospheric database is specific to the sensor’s spectral response function.
VISUALIZATION \ SENSOR MATERIAL PREPARATION TOOLS

DEVELOP MATERIAL REALISM FOR YOUR WORLD

TMM (Texture Material Mapper) is an optional tool that makes it possible to material-classify all of the textures in a visual/IR database. Just as color textures add realism to the simulated visual world, TMM is designed to help add detail and realism to the simulated sensor scene.

The materials themselves are contained in a user-extensible database that includes descriptions in terms of wavelength-dependent reflectance, heat-transfer, and radar properties. Both Vega Prime IR Scene and Vega Prime Radar use these material-classified textures to determine the material properties of the visual database.

TMM allows all textures in the visual database to be material classified. Material classifications can be used to provide texel-level detail throughout the entire Sensor Prime product suite. TMM includes a comprehensive, extendable sample materials database out-of-the-box.

To generate accurate classifications, TMM can classify individual texels with composite materials comprised of up to three individual materials at user-defined ratios. The Smart Create feature can be used to perform automated classification of a texture when provided with a set of user-specified training texels.

TMM SAMPLE MATERIALS

- Soil
- Vegetation
- Construction
- Composites
- Paint

TMM BENEFITS

- **Unparalleled Performance**
  Create texel radiance calculations specific to the time of day.

- **Maximum Productivity**
  Facilitates cross-platform realtime 3D application development and deployment.

- **Added Value**
  Unmatched experience providing realtime 3D simulation solutions.

PRE-LIVE THE FUTURE.
GENERATE ATMOSPHERIC AND MATERIAL TEMPERATURE

MAT (MOSART Atmospheric Tool) is an optional module that generates time-of-day dependent atmospheric and material temperature databases for a wide variety of conditions, geographic locations, times of the year, and materials lists. Vega Prime IR Scene accesses the databases at runtime to produce accurate calculations of radiances in the IR scene.

MAT employs Moderate Spectral Atmospheric Radiance and Transmittance (MOSART), a derivative of MODTRAN, and Terrain Temperature (TERTEM). Both are DoD-standard software programs. MOSART determines the amount of solar or lunar illumination that falls on a given location on the earth at a given time of day and year and under a given set of atmospheric conditions. TERTEM determines the temperature of a material based on the amount of solar and lunar illumination falling on it. This two-step procedure enables the creation of atmospheric and material temperature databases that Vega Prime IR Scene can access at runtime.

MAT BENEFITS

- **Unparalleled Performance**
  Create texel radiance calculations specific to the time of day.

- **Maximum Productivity**
  Built to meet the stringent requirements of cross-platform realtime 3D application development and deployment.

- **Added Value**
  Unmatched experience in realtime 3D simulation solutions.
CTS SENSORS FEATURES

- **The CTS Integrated Module**
  Leverages the Creator Terrain Studio terrain and imagery generation infrastructure and provides workflows and tools designed for large area Virtual Texture applications.

- **TMM GUI-based Tools**
  Designed for entity and small area geo-typical material classification.

- **I-24 Sensor Textures**
  Sensor textures support all times of day, all altitudes, all materials, and all orientations for up to 4 atmospheric states in a single dataset and provide the highest available accuracy for realtime sensor simulation applications.

- **Cognitive Color Material Classification Assessments**
  CTS Sensors provides the ability to render material classification to a color display with overlaid visual imagery for assessing viability during production, which significantly reduces complexity and increases quality assurance.

- **Accurate Materials Database**
  Includes a verified and extendable materials database that provides over 160 accurate real-world materials ready for use.

- **Multiple Wavebands**
  Supports IR and NVG Sensor texture generation.

- **Integration**
  Integrated with Presagis Content Creation software, as well as with Vega Prime and Sensor Prime, thereby ensuring compatibility with, and access to, a wide range of solutions from Presagis.

ADVANCED TEXTURE PREPARATION FOR SENSOR APPLICATIONS

Any sensor simulation development workflow includes the preparation and creation of sensor textures for use by the scene generation software to accurately render the characteristics of the sensor scene. CTS Sensors accurately generates large area geo-specific IR and NVG capable Virtual Textures and also includes geo-typical sensor texture generation tools. CTS Sensors includes Creator Virtual Texture Studio, a Creator Terrain Studio module, and the TMM GUI-based sensor texture generation tools.

CTS Sensors provides users with a proven, consistent methodology for automatically generating sensor textures and with the ability to assess the viability of the material classification prior to sensor texture generation. This enables even non-experts to achieve and validate results, which helps to reduce errors and to increase productivity. CTS Sensors is the most effective solution available for the preparation of geo-typical and geo-specific Virtual Textures for sensor applications.

BENEFITS

- **Results Oriented Workflow**
  With little manual effort, quickly generate either radiance or reflectance sensor textures for small entities and sites or sensor Virtual Textures for large areas of terrain.

- **Consistent Methodology**
  Consistent workflow and methodology for either OTW or sensor texture generation reduces complexity and production time.

- **Ease of Use**
  Wizard-based workflow provides optimal ease of use within an accessible infrastructure designed for flexibility.

- **Accuracy**
  Extremely effective use of commercial 4-band satellite imagery yields accurate results and optimal visual quality.

- **Correlation**
  Use and re-use of high resolution OTW imagery as source for sensor textures ensures correlation and reduces costs and complexity in the sensor texture generation process.