The SAR simulator has three main modules which are described below with key features.

(A) Scenario modeling

- Supports different aerial platforms such as aircraft, helicopter, UAV and Satellites through default library options.
- The aerial vehicle 3D trajectory (linear and nonlinear) can be set with mouse clicks on GUI. The speed profile over the flight can be set.
- Default satellite orbit configuration is provided.
- The trajectory smoothening can be enabled to simulate the realistic trajectory.
- The platform dynamic position along the flight path and its radiation pattern covering target area will decide the echo and image formation.
- Terrain of selection region can be loaded with its DEM data.
- Target objects buildings, vehicles, ships, planes, helicopters and tanks can be placed with mouse clicks. User defined targets loading is also supported.
- Both Bistatic and Monostatic modes are configurable.

(B) Radar waveform & Echo simulation

- The Radar waveform can be set among continuous and pulsed LFM and NLFM types.
- The Frequency, power, PW and PRI can be set through GUI options.
- The radiation pattern of antenna and its orientation with respect to platform are configurable.
- Spot-light, Strip map and user defined scan pattern with configurable squint angle are supported
- The SAR resolution at target echo modeling level is configurable.
- The channel modeling effects including ionosphere models are provided.
- The echo of real or IQ can be saved to different files.

(C) Echo processing and Image generation

- Echo processing with SAR algorithms (Range-Doppler, Omega-K) and image generation is provided.
- Different options related to time, frequency and space parameters for SAR image generation are user settable.
- The post processing options on the image are provided. A full set of image operations are offered with simple GUI button clicks.
- Measurements on image for object marking and labeling are supported.
- Optimal post processing options can be saved as best working configuration, which can be loaded on further runs of simulation
- Comparison among multiple online or offline images based on user options, towards end performance aspects.
- Images can be saved in different image standards.

The simulator offers terrain (DEM based) loading feature of selected region. The aerial vehicle trajectory can be defined in 3D. The target area can be configured with required objects on terrain consisting of buildings, vehicles, tanks etc. The simulator in run mode generates the real time echo IQ and also shows the SAR image formed, based on RADAR and scenario parameters.

Applications

- SAR performance analysis for given waveform parameters
- Testing different algorithms for SAR image creation.
- Platform specific performance analysis for SAR
- SAR RADAR injection mode simulation (with additional UTS HW emulator option)

Ordering Information (Part number)

1. Scenario modeling and Radar waveform & Echo simulation modules
   UTS-SARS-E-R2.4
2. Echo processing and Image generation module
   UTS-SARS-P-R2.4
3. Both the above two modules
   UTS-SARS-EP-R2.4

Other RADAR & EW Products

- RADAR target & ECM simulator
- RADAR environment simulator (for DBF RADAR testing)
- RADAR signal simulator (ELINT testing)
- Communication EW scenario simulator (COMINT testing)

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