STK RAE

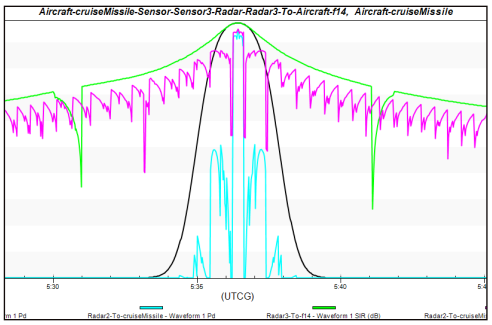
Radar Advanced Environment (RAE) extension for Radar adds ground reflectivity to dynamic radar assessment.

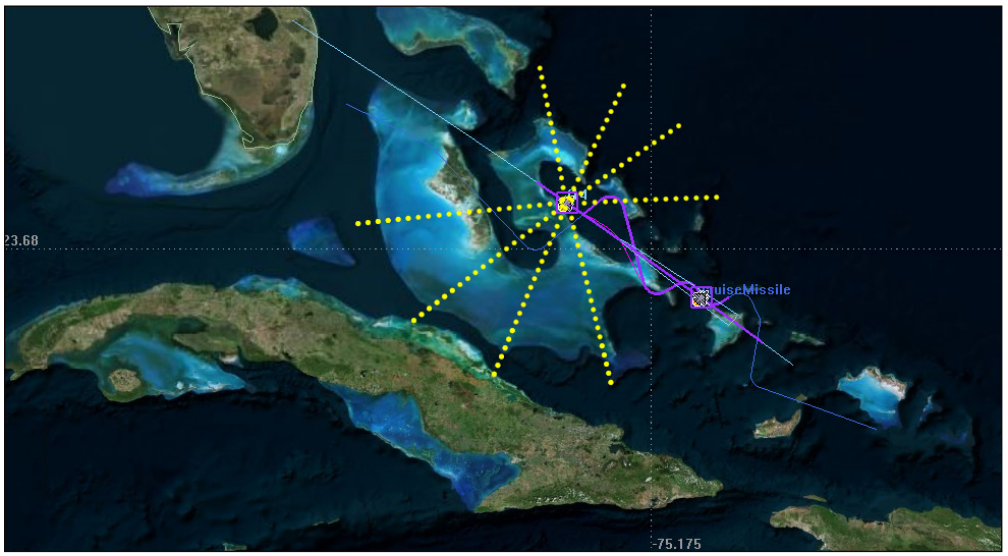
RAE enhances modeling, analysis, and visualization of the Radar module. With RAE, you can:

- Model pulse Doppler radars.
- Analyze important characteristics, such as clutter, noise, system parameters, radar cross section (RCS), and antenna type.
- Generate reports and graphs of the radar performance.
- Display RCS maps of user-determined areas on the Earth in 2D and 3D.

Simulates monostatic pulse Doppler radars

- Defines radar performance using key radar parameters, such as transmit power and waveform.
- Performs signal-to-interference and probability of detection analysis on user-selected targets using an advanced physics-based frequency domain radar model.
- Determines the clutter at the target's apparent range and Doppler frequency. The model considers range and Doppler ambiguity in its processing.





Advanced Environment clutter map

Computes and displays the ground reflectivity in a user-specified area. Clutter maps are derived from a global 4.0 km resolution database and are updated dynamically during animation to reflect the changing position of the radar platform.

Modeling of various radars

You can tailor the system performance of a radar by using a wide variety of system parameters:

- Radar parameters, such as transmitted power, bandwidth, and pulse compression ratio.
- Antenna parameters, such as gain and sidelobes.
- Number of waveforms that are to be used and the frequency, pulse repetition frequency (PRF), and number of transmitted pulses for each. Frequencies from UHF to Ku, and PRFs from low through high, are supported.

Deterministic clutter

The radar model computes clutter that interferes with target detection. The relative geometry of the radar, target, and the Earth are determined, including grazing angle to the patches on the Earth that are generating the clutter. Appropriate statistics governing the clutter behavior are applied and mapped into the target's Doppler filter.

Radar system trade-offs

STK reports and graphs are used to compare different radar system configurations. Tradeoffs of transmitted power, antenna size, and waveforms are reflected in the signal-to-interference ratios and probabilities of detection. Blind speeds as a function of waveforms and target geometries can be studied.

Deterministic clutter map

The calculation of the RCS or clutter maps is supported by a global database with a resolution of 4km at the equator. The clutter at a given pixel in the map is a function of the radar to pixel geometry, pixel altitude and slope, a backscatter value as a function of frequency and statistical variation. Radar Advanced Environment distinguishes between water and land, and makes appropriate adjustments to the computation of the pixel RCS values.