STK RADAR

Radar provides thorough analysis and graphic displays of radar systems

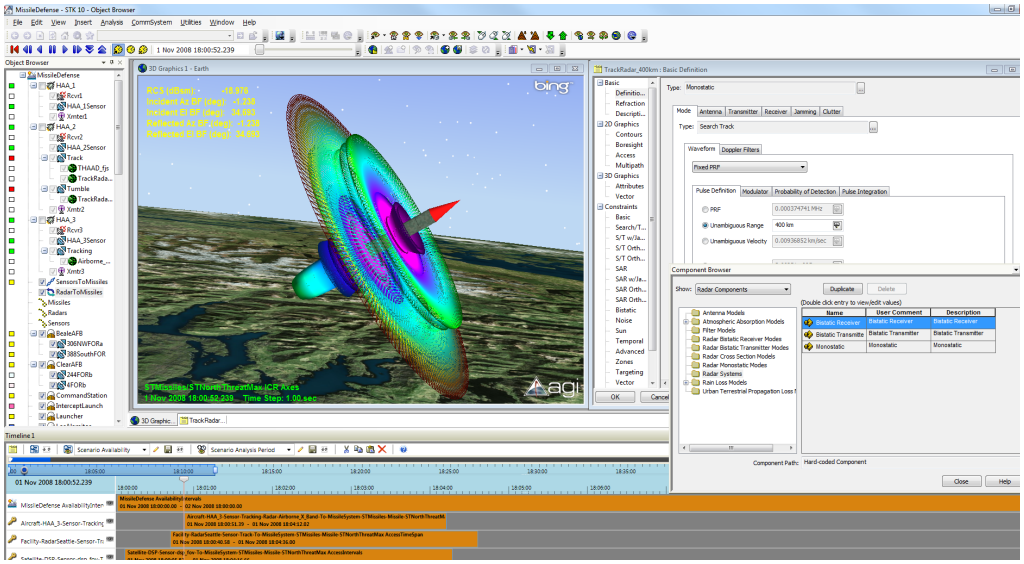
A radar can be attached to an STK vehicle, facility, place, target, or sensor. Radar types and modes are:

Model types. Monostatic Radar, Bistatic Receiver Radar, Bistatic Transmitter Radar, and Multifunction Radar.

Operational modes. Search/Track Radar, Synthetic Aperture Radar (SAR), and Radar Advanced Environment (RAE).

Multifunction radar. Models multiple radar beams and supports:

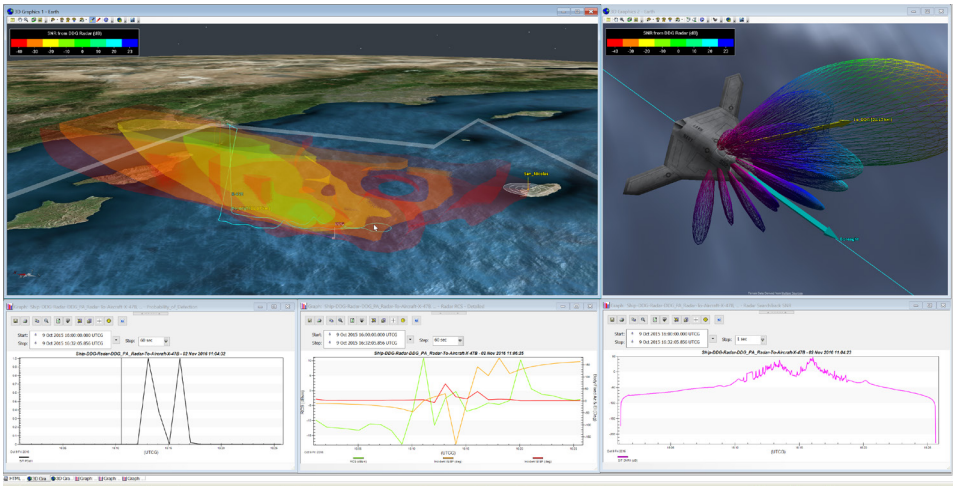
- Simultaneous handling of tasks by multiple beams, such as scanning search zones or tracking targets as directed by a user-specified schedule.
- Dynamic waveform switching for each of the active beams. Each beam selects and uses an appropriate waveform based on a target's range from the radar system.



Radar components

Radar Receiver

- Model orthogonal RF polarized channel
- Model receiver specs
- Radio frequency filter
- Single or dual polarization channels
- System noise temperature
- Radar Sensitivity Time Control (STC) attenuation
- Additional gains and losses
- Constant false alarm rate (CFAR) algorithm
- Cell-Averaging (CA-CFAR) and Ordered Statistics (OS-CFAR) algorithms for CFAR and Probability of Detection (PDet) computations
- User plugins for adding custom CFAR and PDet algorithms



Radar Transmitter

- Model orthogonal RF polarized signal
- Model transmitter specs
- Radio frequency filter
- Single or dual polarization channels
- Additional gains and losses

Antenna

- 60+ antenna models are easily accessible and editable using the Component Browser
- Antenna model types include Bessel, Cosecant, Cosine, Diploe, GPS, Gaussian, Helix, Hemisphere, ITU, Isotropic, Parabolic, Pencil Beam, Phased Array, Rectangular Beam, Simple Optical, Sinc, Square Horn, Uniform Aperture, and user-defined

STK RADAR

Bistatic transmitters

Both Monostatic and Bistatic Transmitter Radar systems can be used as the Bistatic Transmitter for the Bistatic Receiver Radar system.

Jammers

Radar enables you to identify RF transmitters and other radars as jammers and assess their impact on the performance of a radar system. Signal spectrum power spectral Density (PSD) of these jamming sources can be computed across radar receiver bandwidth for high fidelity analysis.

Clutter

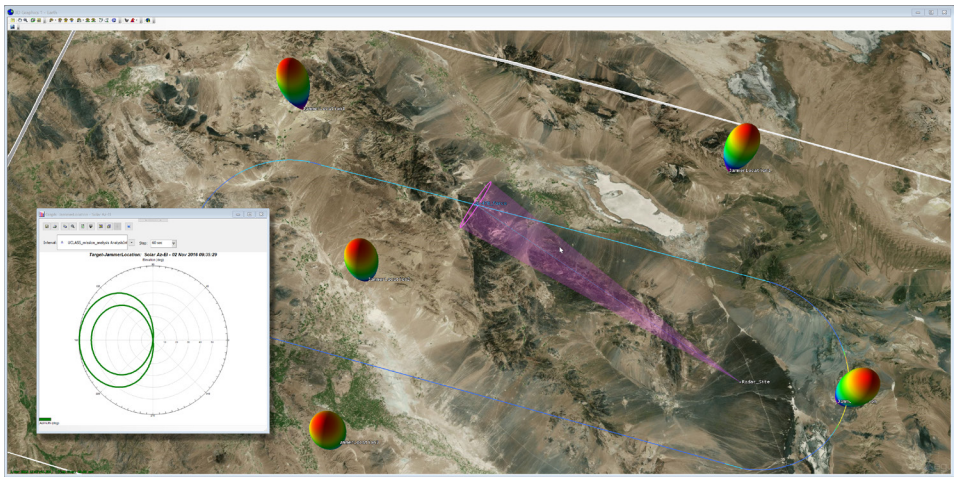
The clutter geometry algorithm determines the location of each clutter point relative to the radar, and displays it as a single clutter point on the target or displays clutter over a smooth or oblate Earth. A Clutter Geometry Model plugin is also available.

Custom clutter models may be added by a user to enhance clutter computations

Radar Cross Section (RCS)

Radar enables you to specify an important property of a potential radar target - its radar cross section (RCS). RCS can be a constant value, an aspect dependent real or complex valued matrix. It can also be an aspect dependent complex scattering block matrix. The Bistatic radar model supports bistatic RCS for a target. Bistatic RCS can be of types listed above.

A plugin RCS module option for user specified RCS computations allows addition of dynamic or adaptive RCS algorithms.



Radar constraints

- Search/Track, Search/Track with Jamming, Search/Track OrthoPol, and Search/Track OrthoPol Jamming
- SAR, SAR with Jamming, SAR OrthoPol
- Bistatic, Noise, Sun, Temporal, Zones, Targeting, Vector, and plugins
- New RF-based Access constraints applicable to Multifunction radars

Model atmospheric refraction using three models

- Effective Earth Radius
- ITU-R P.834
- Satellite Control Facility (SCF)

RF Propagation models

A full range of environment models is provided:

- **Rain models**. Crane 1982, Crane 1985 and ITU-R P.618, as well as user-definable outage percentage and rain rate
- **Atmospheric absorption models**. Atmospheric absorption models – ITU-R P.676-9 and Simple Satcom. ITU-R P1814 for laser receivers.
- **Clouds and fog models**. ITU-R P.840 recommended for attenuation due to clouds and fog
- **Tropospheric scintillation model**. ITU-R P.618 model with option to compute deep fade
- **Ionospheric fading model** ITU-R P.531 for space based radars or targets. Uses the International Reference Ionosphere (IRI-2016) based algorithms and ionospheric electron and ion content data updates
- **Custom loss plugin models**, such as launch vehicle plume attenuation and aspect dependent antenna radome attenuation
- **Object specific losses** such as local surface atmosphere and system temperature

Terrain Integrated Rough Earth (TIREM) model

TIREM adds fidelity to the calculation and dynamic modeling of point-to-point, line-of-sight effects for link performance, by taking into account the effect of irregular terrain, sea water, and non-line-of-sight effects. The maximum height for these models is 30 km.

Reports and graphs

A wide variety of radar data providers are available for generating custom reports and graphs

Radar Advanced Environment (RAE) extension for Radar

Extends the capabilities of Radar by introducing ground reflectivity as a contributing factor in dynamic radar assessments.