STK for Electronic Warfare – Radar Jamming

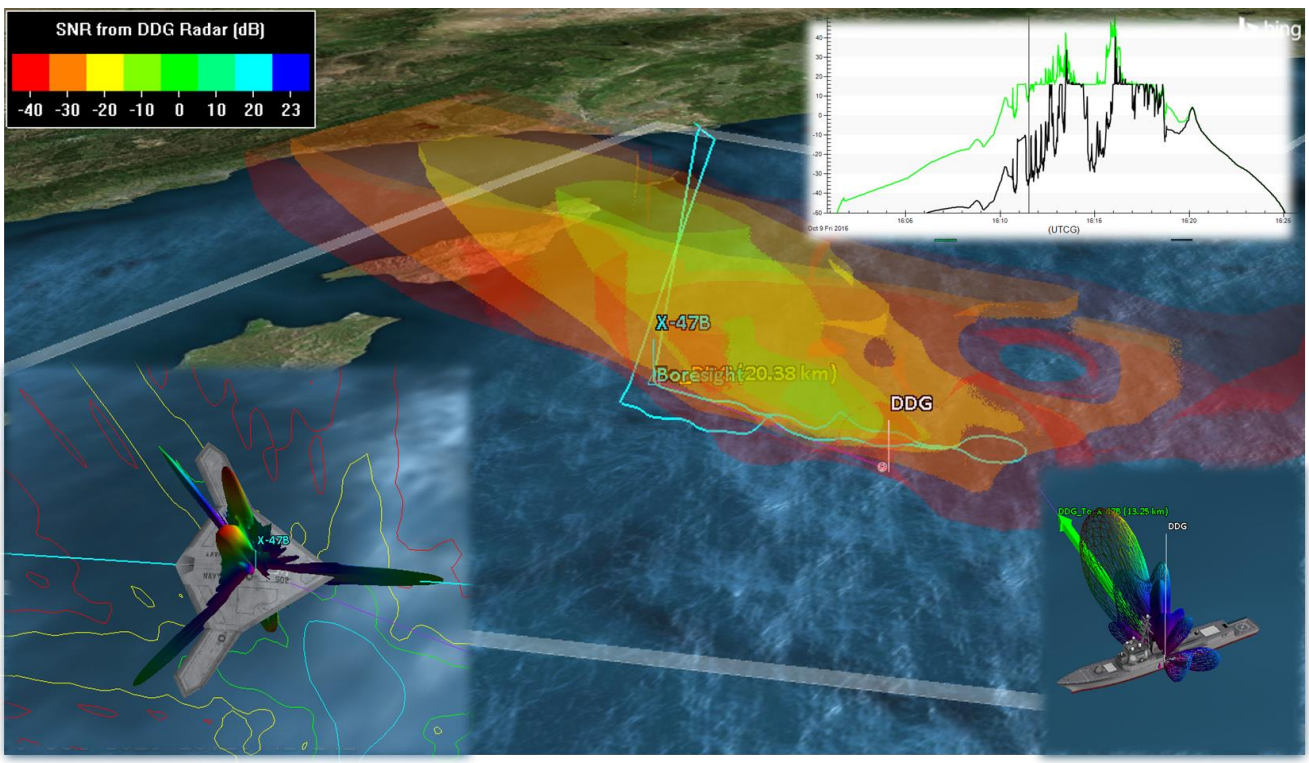
Required Licenses:

STK Pro | Analysis Workbench | Coverage | Radar | Aviator

Introduction:

STK supports Electronic Warfare (EW) mission planning and operations. Engineers and system planners can leverage STK's extensive analytical capabilities to promote an integrated picture of their EW mission in one tool, allowing them to optimize and more effectively manage electronic assets during a mission.

This scenario models the detection and jamming of a next generation UAV from a ship-based radar.



Related Tutorials:

This scenario was built using the following tutorial:

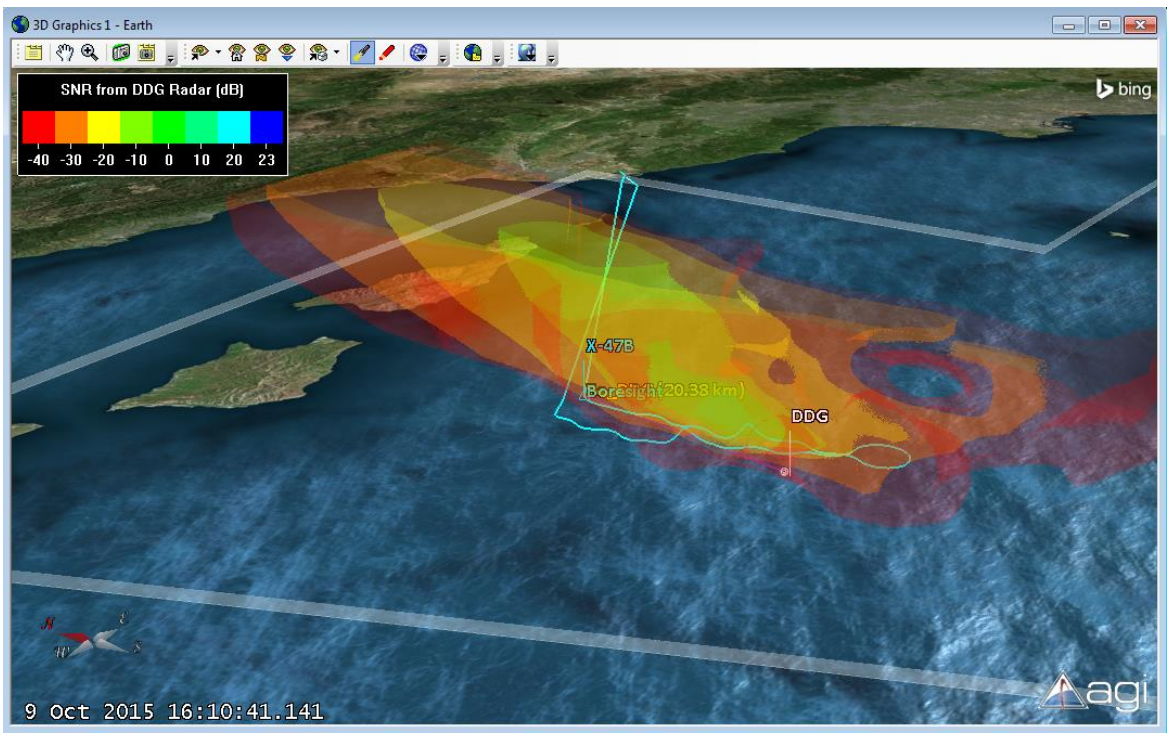
http://help.agi.com/stk/11.0/index.htm#training/STK11NewFeaturesTutorial.htm

Exploring this demo:

- Use the Animation toolbar to put the scenario into motion: 

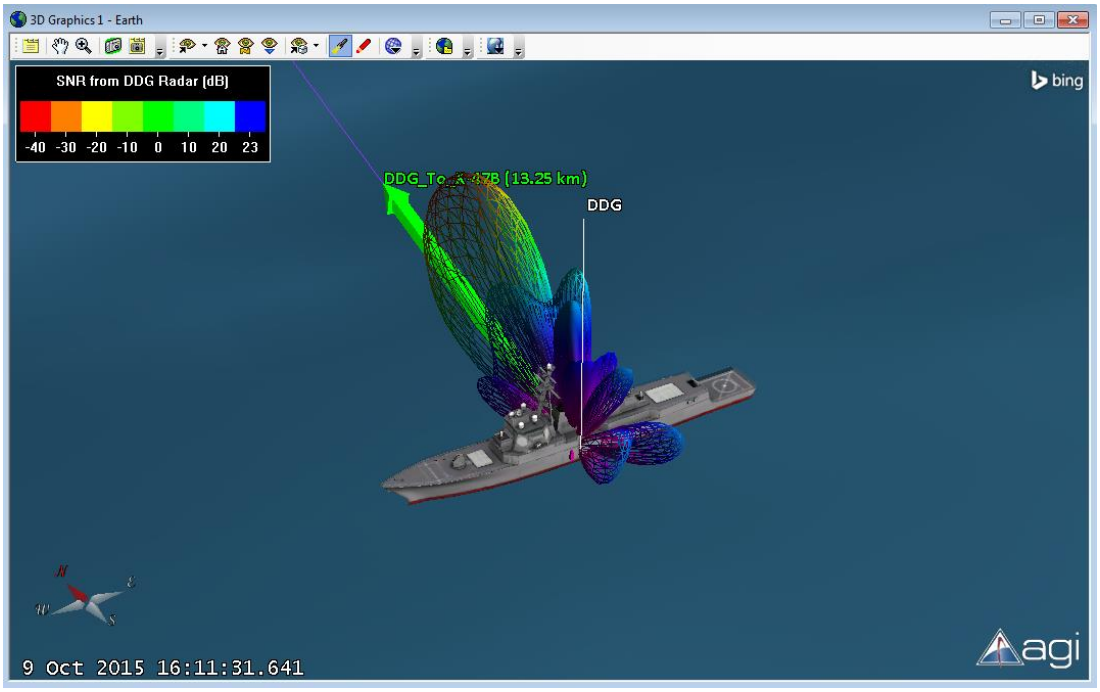
- Use Stored Views to visualize each section
- Use Quick Reports to evaluate each section
- Toggle the various object graphics in the STK object browser:
    - X-47B_RCS
    - Vol_SNR
    - Vol_SNR_Jamming

Stored View: The scenario opens with the "RegionView" stored view:



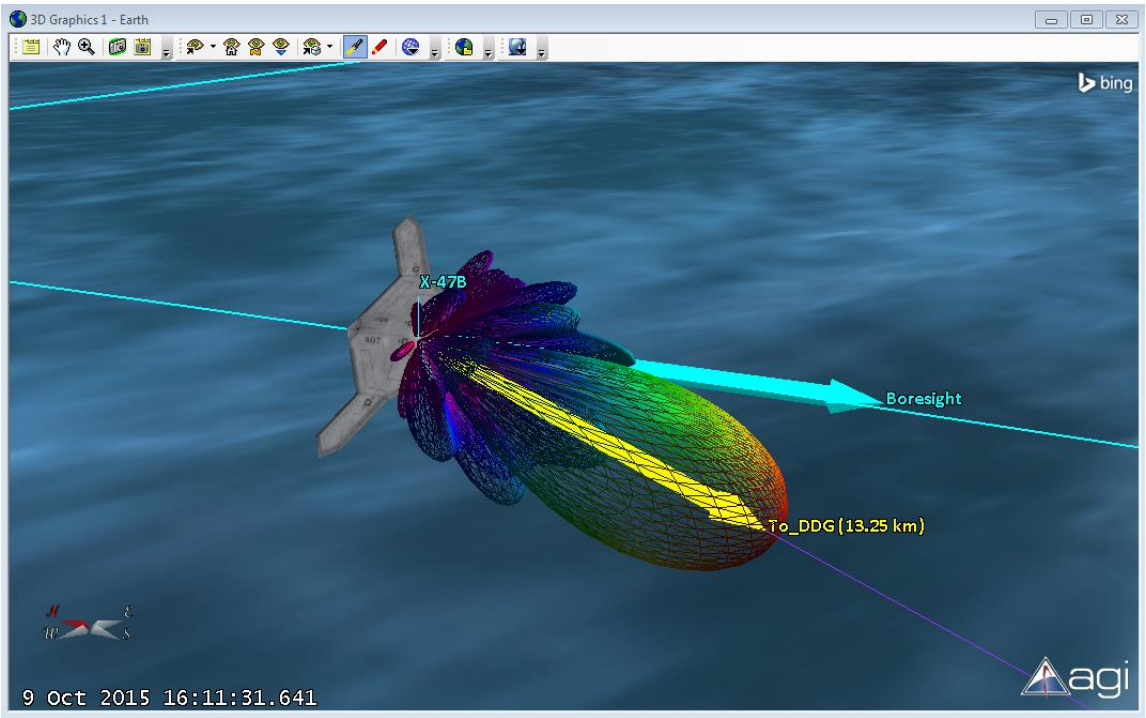
This image shows the SNR from the DDG to the airspace as the ship tracks the UAV.

Stored View: Jump to the "ShipView" stored view:



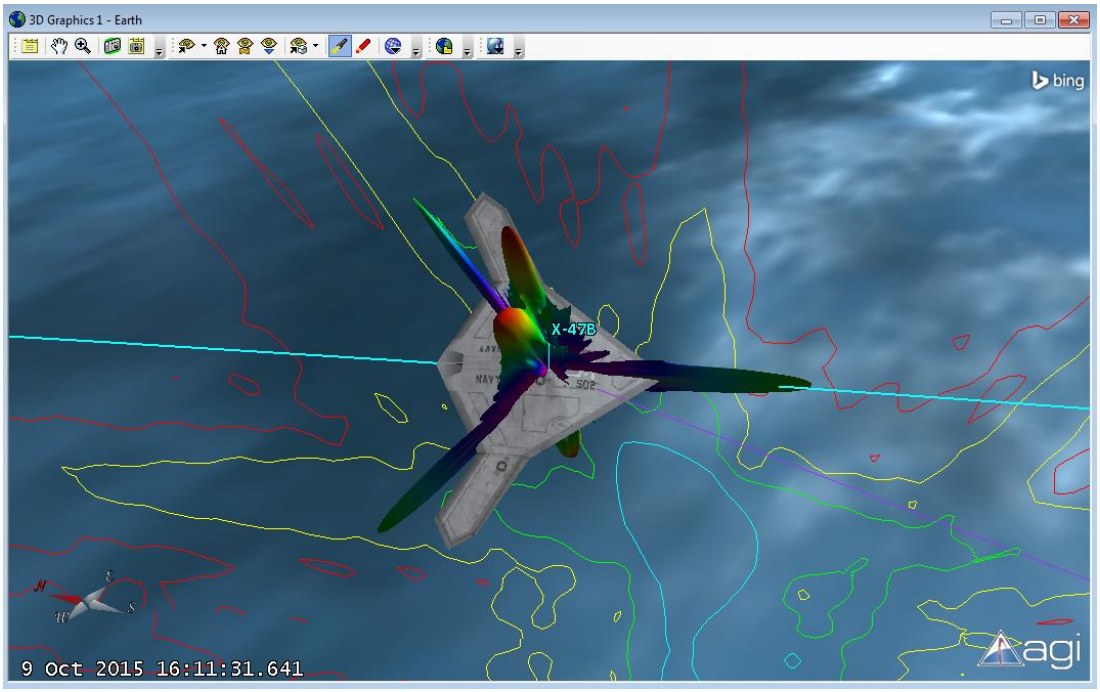
This image shows the antenna pattern for the phased array antenna that the ship's radar is being used to track the aircraft.

Stored View: Jump to the "AircraftView" stored view:



This image shows the aircraft and the pattern for the phased array antenna that is being used to jam the ship. Additionally, the boresight of the phased array antenna is being displayed along with the displacement vector from the UAV to the ship.

Enable the graphics for X-47B_RCS

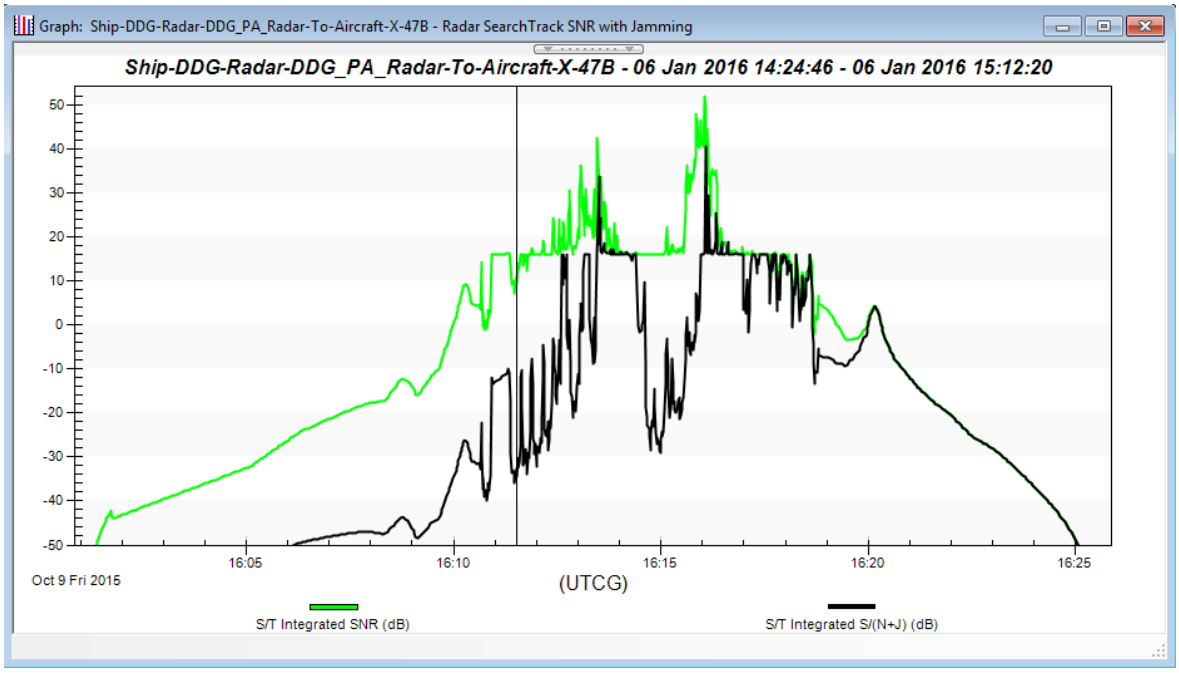


This image shows the RCS pattern of the aspect dependent Radar Cross Section file being used. Additionally, the projected contours are displayed on the surface of the Earth. All of these factors get taken into account in STK's Radar Calculations.

$$SNR_1 = \frac{P_t \lambda^2 G_t G_r \sigma G_0}{(4\pi)^3 R_t^2 R_r^2 N_p L_{AT} L_{AR} L_r}$$

http://help.agi.com/stk/11.0/index.htm#comm/CommRadarA-06.htm

- **Quick Report:** Select the "Radar Search Track Signal to Ratio with Jamming" quick report to generate the following graph:



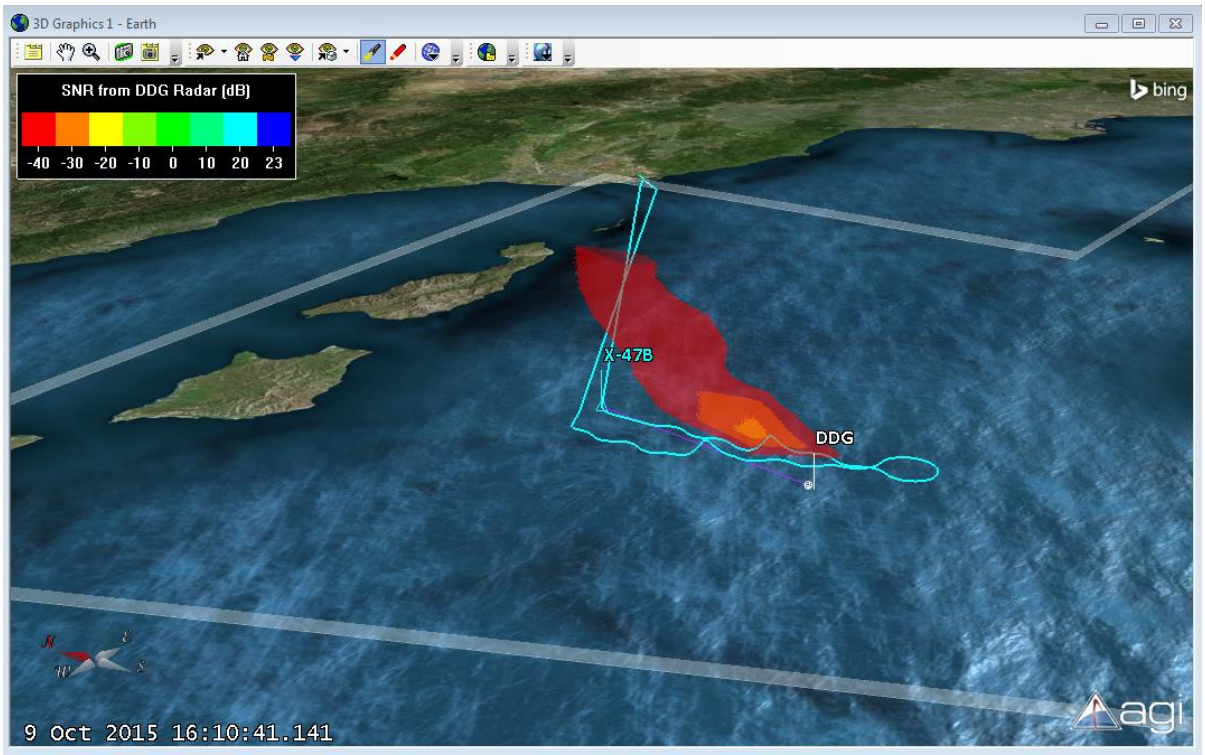
Volumetric Coverage:

STK 11 introduced a new capability for Volumetric coverage that allows users to compute spatial calculations to user-defined 3D grids.

Stored View: Return to the original "RegionView" stored view:

Disable the checkbox for X-47B_RCS , then enable the checkbox for Vol_SNR

Toggle the checkbox for Vol_SNR_Jamming



This shows the same SNR metric as before, but using the Jammer on the UAV.