

# SynQ

SynQ is a 3D network emulation tool that provides analysis of the entire OSI stack, including high-fidelity physical layer analysis. This ability to do virtual networking is both cost-effective and practical in planning and evaluating wired or wireless networks.



## Integrating STK & QualNet

SynQ combines the power of STK and QualNet into a user-friendly, seamless integration program. SynQ merges the continuous calculations of STK with the discrete event-driven system of QualNet. The combination of these two tools' capabilities into SynQ results in a realistic simulation of live ground, air, and space-based systems.



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# Overview

SynQ was developed to make it easy to create scenarios and conduct analyses on real-time systems or ad-hoc networks. The tool works with scenarios created in both STK and QualNet, and allows users to merge scenarios that exist in both tools. The following are the main features of SynQ, as well as the graphical user interface (GUI) and analysis/reporting features.

## Main Features

### 3D visualization of network topology

Users can now simulate and visualize a network in 3D.

### Choices in physical layer calculations (use STK or QualNet)

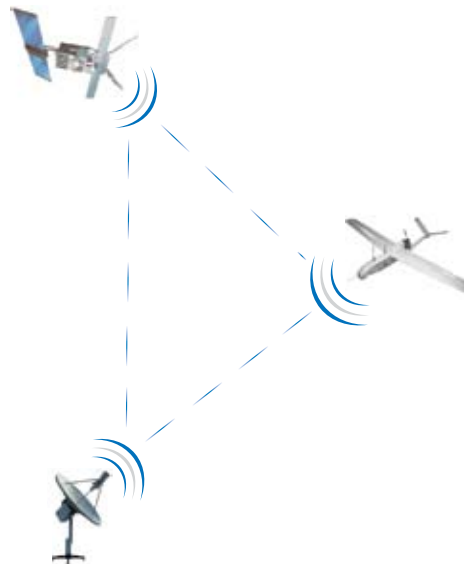
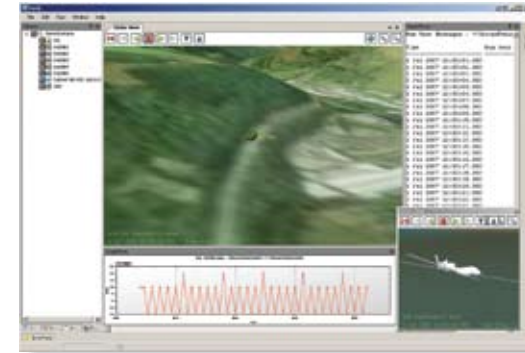
Users can utilize STK's high fidelity physical layer calculations. This allows users to calculate a network's bit-error rate, signal-to-noise ratio, antenna gain, and access or closure.

### Complete analysis of the OSI stack

Users can conduct analysis of the entire OSI stack by taking advantage of STK's great physical layer calculations, and QualNet's ability to calculate the other six layers of the protocol stack.

## Analysis & Reporting Features

- High fidelity motion propagators for satellite & aircraft
- Time-based replay of scenarios: play, rewind, & step through communication calculations
- Summary reporting & detailed time dependent reporting
- Calculate terrain, atmosphere, & weather effects on communication
- Exportable graphs & reports
- Save scenario in free portable format (VDF)
- Integrated reporting shows results of STK & QualNet analyses together



## Uses

- Simulate mobile ad-hoc network to determine network success/failure through route-finding
- Assess the quality of messages sent via a network through the hardware-in-the-loop (HWIL) feature
- Determine quality of network sent via a router or relay on a UAV
- Build application or background traffic like VOIP, CBR, FTP, or more
- Calculate loss of coverage & buffering packets for communication nodes
- Utilize advanced physical layer calculations, including bit-error rate, signal-to-noise ratio, antenna gain, & line-of-sight

## GUI Features

- Drag & drop interface to create network topology
- User customization of windows & edit screens
- Quick & easy to use edit screens
- Multi-object editing options
- Use of imagery & terrain

