

RISNS: Intelligent Satellite Network Solution Overview



1. Offers almost 100% efficiency on the satellite, this is over 25% channel efficiency improvement over TDMA by eliminating TDMA framing overhead completely.
2. Has the lowest possible latency by any means, with only one hop maximum
3. Works with Internet Protocol Security (IPsec) or VPN offering secured data transactions.
4. Uses actual data throughput as measure of terminal capacity. (In TDMA systems, actual client data throughput is only a small percentage of carrier overall rate, especially at lower data rates).
5. Is designed to provide Total Telecom Services over a VSAT based platform, which is:
 - a. Self healing - Communications are not affected by failure of nodes
 - b. Low latency and bandwidth using continuous wave carriers without TDMA framing overhead
 - c. Single hopping mandatory in all end to end connections
 - d. Dynamic and static traffic routing

Unlike traditional VSAT platforms, which are commonly restricted to only one solution. Raditek's solution has no application limits. Its flexible architecture enables it to serve as a **full mesh voice network** or a **star rural telephone network**. Its multicast capability allows any remote station to receive multiple video channels without needing additional equipment. Its high performance signaling channel handles DAMA call setup in the shortest possible time. Thin route traffic from SCADA application to broadband data distribution are all efficiently routed

Wireless Mesh satellite networks mainly comes in two types, Switched Mesh and Shared Mesh.

Switched Mesh uses multiple links (carriers) to connect with neighboring nodes in the mesh. Here all of the available bandwidth of each separate link is dedicated to neighboring nodes. Each dedicated mesh link is on a separate channel, ensuring that forwarded traffic does not use any bandwidth from any other link in the mesh. As a result, a **Switched Mesh** is capable of much higher capacities and transmission rates than a **Shared Mesh** and grows in capacity as nodes are added to the mesh.

Shared Mesh uses a single link (carrier) to communicate to all the neighboring nodes in the mesh. Total bandwidth of the links is shared between all neighboring nodes in the mesh. The capacity of the channel is further consumed by traffic being forwarded from one node to the next, which reduces end-to-end traffic that can be passed. Because bandwidth is shared amongst all nodes in the mesh, and because every link in the mesh uses additional capacity, this type of network offers much lower end to end transmission rates than a **Switched Mesh** and degrades in capacity as nodes are added to the mesh network.

Satellite Shared Mesh implementation usually involves routing IP packets over separate time slots on a single shared link to allow multiple access by remotes

RISN is a Switched Mesh network with centralized network control server and terminals with integrated modems and routers routes network traffic to proper destination via dedicated channels selected by IP routing algorithm. The benefit of using such direct IP routing to provide multiple access services is to maintain a single and 100 percent IP platform throughout the entire network for better bandwidth efficiency and integration with external IP networks.

Traffic between any two nodes of a switched Network can be individually configured without impact to other nodes' hardware configuration. **Switched Mesh** network offers great flexibility in configuring network structure to suit different connectivity and traffic requirements. Our NCMS GUI provides user friendly tools for network engineers to configure and design network connection

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Raditek Intelligent Network Solution products optimize satellite transponder usage efficiency. Advanced networking concept and technologies are incorporated in connectivity design while taking advantages of available cost efficient COTS components in the industry.

Raditek's current offering includes the following product lines:

HUBS	
1	<u>RISN-4SC-BT Base Terminal, Smart IP Switched, Router Modem</u> 8MB up and down 4 slot Chassis: each slot takes up to 4x2 way channels, or 8x1way channels
2	<u>RISN-1000-BRT Base (Mini Hub)</u> 8MB up and down <i>for small network / stand alone system, NO NCMS, working to RISN-99VRT or Remote Terminal, Smart IP Switched, Router Modem</i> for 2 and 4 channels and can be field upgraded to 6 and 8 channels by adding "QOR" card, ie 1:1 to 1:4 and 1.5 to 1:8 1 slot Chassis: takes up to 4x2 way channels, or 8x1way channels 70M IF 32 remotes or L band 4 remotes <i>Commonly used in point-to-multi-point MCPC links or simply a mesh node with the capability to provide switched connections</i>
REMOTES	
3	<u>RISN-88-VRT VSAT Remote Terminal</u> , Smart IP Switched, Router Modem 1 channel: 2M up and 8M down Needs NCMS (not stand alone) cheapest Low cost <i>Single channel SCPC VSAT terminal/router. It is commonly used in a simple star network and it reduces carrier bandwidth up to 50% compared with TDM/TDMA terminals with similar data throughput.</i>
4	<u>RISN-99-VRT VSAT Remote Terminal</u> , Smart IP Switched, Router Modem Remote, 4 channels: 8M up and down, stand alone for point -point <i>SCPC/MCPC router modem/terminals with 2 and 4 channels and can be field upgraded to 6 and 8 channels. They are commonly used in point-to-multi-point MCPC links or a mesh node with the capability to provide switched connections.</i>
5	<u>RISN-99-DVB-S2 VSAT Remote Terminal</u> , Smart IP Switched, Router Modem DVB-S2 4 channels: 8M up and down, stand alone for point -point with DVB-S2
6	<u>RNCMS Network Management Control System (NMCS)</u> For all solutions, other than the simplest point to point or small networks with high utilization, our NMCS is needed. <i>The NMCS is based on distributed computing architecture using a separate real-time processor for each subnet with the option of three levels of high availability redundancy.</i> <i>Its main function in the Raditek Intelligent Network Solution includes network traffic engineering and control, network structure configuration, connectivity management, satellite resources management, user accounts, and remote M&C.</i>

45MS @ QPSK is 2 Bits / symbol (45x2=90MB) at $\frac{3}{4}$ coding factor (90 x $\frac{3}{4}$ =67.5MB)

45MS @ 8PSK is 3 Bits / symbol (45x3=135MB) at $\frac{3}{4}$ coding factor (135 x $\frac{3}{4}$ = 100MB)