RADITEK *INC.*

Intelligent Satellite Network Solution
RISNS-NCMS Network Management Control System Supporting MDPC/PDMA

For all solutions, other than the simplest point to point or small networks with high utilization, our Network Management Control System (NMCS) is needed.

1. **Satellite usage efficiency is the best with our solution, due to NMCS' features like BOD (Bandwidth on Demand) and automatic Uplink Power Control to automatically compensate for rain fades.** The maximum bandwidth and uplink power is pre-programmed, of course,

2. **The real time NMCS' processor handles the transponder management and controls the bandwidth assignment, permitting only authorized users to access transponder space. Frequency and bandwidth are assigned on demand by the NMCS based on real-time traffic.**

3. **Raditek's NMCS can handle up to 1,000 simultaneous DAMA mesh and star connections, depending on availability of bandwidth and channel resources.**

4. **The NMCS provides very reliable, always-on network control and monitoring for the network.** With its distributed structural design, the NMCS spreads the network control and processing function across the entire network for improved performance in terms of higher reliability and faster connecting time.

5. **Each NMCS system can be configured with local redundancy** or geographic redundancy.

6. **Powerful NMCS** allows the operator to easily and conveniently manage and operate the network.

7. **DAMA (Demand Assigned Multiple Access)** The system offers network connection management over the satellite, including traffic switching and routing using **DAMA** connections.

8. **RADITEK's network supports mixed topologies.**
   a. Network structures can be programmed by its administrators based on: **The type of connection; User organization; Geographical location; Types of applications; Types of usage etc.**
   b. For each network design, the network administrator(s) can configure multiple subnets, each subnet can operates in a single frequency band over multiple transponders.

9. **SCPC/DAMA (Single Channel Per Carrier)** Raditek's network provides not only the best channel efficiency, but also the most flexible VSAT platform in providing connectivity of all kinds.

10. **RADITEK's network has four levels of hierarchy that the NMCS system is designed to support:**
    a. **Network**-top level, that can include multiple satellites and frequency bands in a single network.
    b. **Subnet**-useful for large networks, across multiple satellites or very large multi MNS networks, each has its own server and signaling channel.
    c. **Group**-Sites with similar properties, topology, QoS, Bandwidth, Application etc. A bank ATM network can form a STAR group, for example, connecting many ATMS and banks to a central Data Center. All traffic within a group stays within the group, and is totally separated from other groups-so has the best possible data security. Each terminal must be assigned to at least one group.
    d. **Terminal**-the lowest level, the terminal can be a member of one or more groups. Can be a single user or subscriber.

11. **Connection Groups** facilitate **dynamic and static routing** of network traffic. Static routes complement the dynamic routing capability to meet each individual user's routing requirements.

12. **The NMCS provides monitor and control functions** intended to provide equipment status and control for **RADITEK's** satellite VSAT terminal as well as common ground communication equipment at remote locations.

13. **The NMCS system is based on client/server technology to meet large VSAT network operation requirements.** Users log on to the NMCS servers at client computers with designated functions and access authorization level according to

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the **operator's management policy**. It is common for a large network, to use the network for multiple operations, allowing technical support technicians access the system simultaneously.

14. **MDPC/PDMA (Multiple Destinations Per Carrier/Packet Division Multiple Access.)**
    a. MDPC/PDMA provides multiple accesses via direct IP packet switching in a VSAT network from one node to another without other layers of multiplexing.
    b. Other types of multiplexing such as TDMA requires additional overhead that consumes more transponder bandwidth.
    c. MDPC/PDMA dynamically allocates bandwidth for each VSAT terminal using DAMA/BOD that is not available in traditional SCPC links.

15. **Advantage of MDPC/PDMA :**
    a. MDPC/PDMA offers the best channel efficiency advantages over other MCPC VSAT platforms based on different technologies including TDMA (Time Division Multiple Acess) and CDMA (Code Division Multiple Access).
    b. There is over 25% channel efficiency improvement over TDMA by eliminating TDMA framing overhead completely. Most TDMA systems still experience unavoidable time slot assignment overhead, the actual improvement in channel efficiency by MDPC/PDMA system is enormous.
    c. MDPC/PDMA provides a dedicated carrier to every VSAT terminal, while TDMA uses a much larger carrier shared among a number of terminals.
    d. Smaller carriers require a smaller RFT (BUC and LNB) and antenna. Depending on the required network traffic, the cost saving of RFT using MDPC/PDMA based system can be very high.
    e. TDMA systems often use burst rates or carrier information rates as a measure of terminal capacity, while MDPC/PDMA systems use underline actual data throughput as measure of terminal capacity.
    f. In TDMA systems, actual client data throughput is only a small percentage of carrier overall rate, especially at lower data rates.
    g. MDPC/PDMA by far is the best technology used to support Internet and IP applications for its multimedia capabilities. It can be integrated with any IP networks for voice, data and video traffic.
    h. Communications implemented with Internet Protocol Security (*IPsec*) or VPN offering secured data transactions.
    i. Broadband applications for E-Commerce are only possible through MDPC/PDMA technology for its mesh connectivity and high rate capacity over satellite.
    j. MDPC/PDMA technology uses traffic intelligence embedded in every IP packet to determine when, what, where, and how satellite channels should be configured in order to maximize transponder bandwidth (BOD) utilization, and in the mean time to provide subscribers with satisfactory service *quality comparable to terrestrial based telecom services*.
    k. The Link QoS is improved for all types of traffic based on weighted and balanced packet priority assignment.

16. **Connectivity and Traffic Management (CTM)**
    a. Single star to multiple star networks can be implemented for large telecom networks and wireless backhaul applications. Traffic between any two nodes of a switched Network can be individually configured without impact to other nodes' hardware configuration.
    b. **Switched Mesh** network offers great flexibility in configuring network structure to suit different connectivity and traffic requirements.
    c. RADITEK's NMCS GUI provides user friendly tools for network engineers to configure and design network connections.
    d. The network provides IP routing over satellite without using other multiplexing such as TDMA to provide multiple access capability.
    e. The network features proprietary **Satellite Dynamic Routing** (**SDR**) protocol to define dynamic routing over satellite.

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