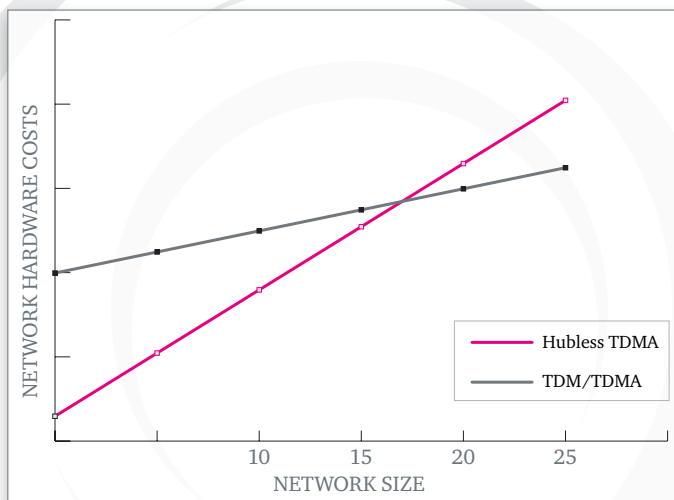


Hubless TDMA

FULL MESH VSAT NETWORK

UHP Hubless TDMA is a versatile VSAT network, operating without a central Hub. It can support any network topology (star or mesh) and is a good fit for many applications. Every Hubless TDMA station has similar architecture and may communicate with the others over a single-hop satellite link, while one station is designated as master and is responsible for maintaining the timing and allocating bandwidth.

The smallest size Hubless TDMA network consists of only two stations which communicate via a common TDMA carrier. This carrier is shared between the stations in a fully flexible fashion. In a given time frame, the whole carrier may even be assigned to the traffic flowing in just one direction.



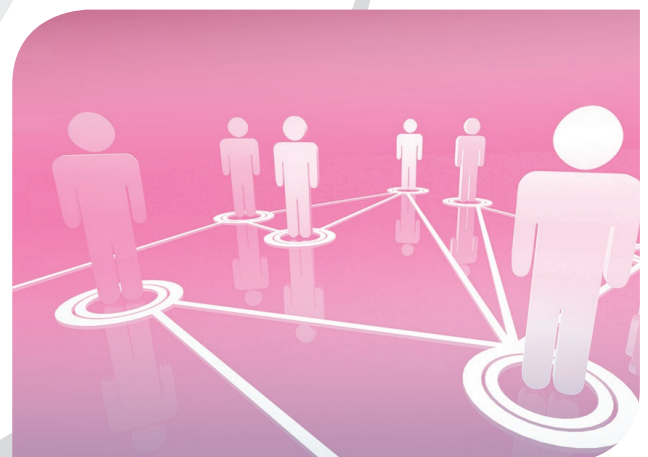
Affordability of the equipment combined with highly-efficient utilization of satellite capacity ensures the best total cost of network ownership. Hubless TDMA is also a good choice rational solution for replacement of obsolete SCPC channels; this can significantly boost the total traffic in the system, due to statistical multiplexing of user traffic with sophisticated QoS policies.

Owing to software-definable architecture of the UHP platform, Hubless TDMA technology can be a good entry solution for a private VSAT network, eliminating the need for expensive central infrastructure at an early stage of network rollout. At any time Hubless TDMA network can be remotely switched to TDM/TDMA mode without replacing any hardware or even visiting the sites.

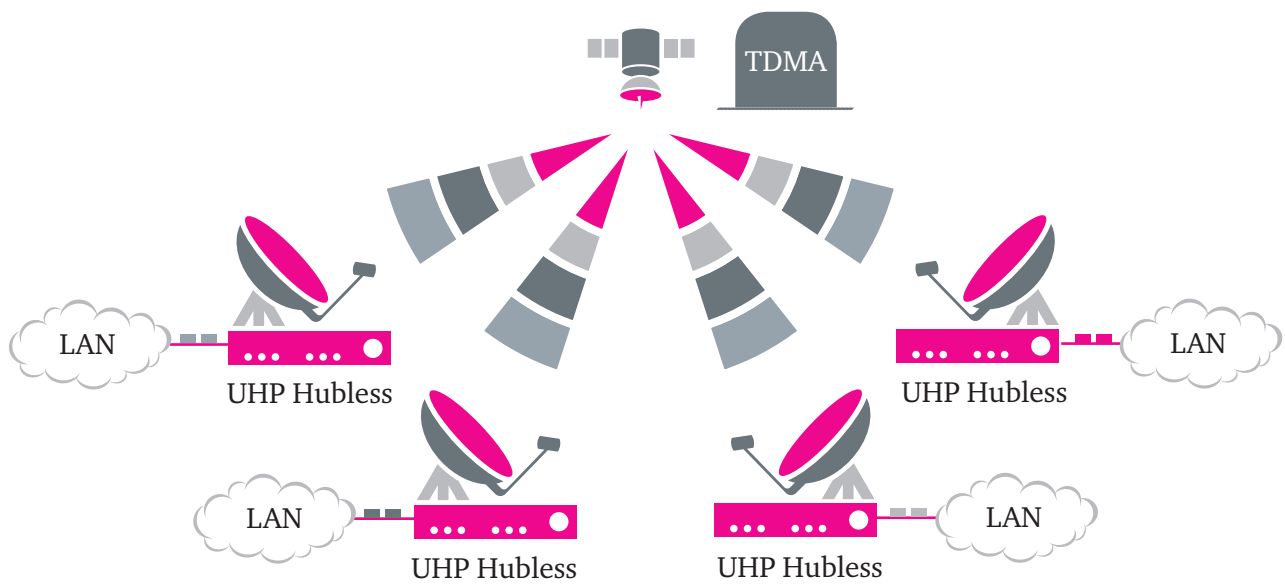
APPLICATIONS

- Videoconferencing and telephony
- Fast-deployable communications
- M2M and SCADA networks
- Backup for terrestrial infrastructure

- Support of various topologies: 'hub and spoke', 'multilevel tree', 'full mesh'
- Innovative TDMA protocol with proven efficiency of 96% vs SCPC
- Various modulations BPSK/QPSK/8PSK and bandwidth-saving LDPC coding
- High-throughput TDMA channels – up to 10 Mbps for 8PSK FEC 5/6
- Ultra-low latency VSAT system with round-trip delay about 570 ms for TDMA mode of operation
- Support of VLAN, multi-level QoS, codec-independent handling of real-time traffic, TCP acceleration
- Fast network startup — network is ready for use in less than a minute upon power-up
- Minimally required bandwidth is just 120 kHz can be shared by more than 1000 stations
- Automatic transmission level control ensures superior reliability of communication
- Various hardware models, including compact, integrated, rack-mountable and outdoor versions
- Compatible with majority of C, Ku and Ka-band RF Systems, supplies power and reference signals



Hubless TDMA Network



UHP Hubless TDMA network consists of peer stations, one of which is acting as a Master in charge dynamic bandwidth allocation, timing and access control. All the stations transmit and receive data using a shared TDMA carrier. This provides the best utilization of satellite bandwidth, which is instantly redistributed between the stations depending on the actual traffic and on the predefined QoS policies. Hubless TDMA network may include more than a thousand stations, all using one common TDMA carrier.

To ensure Full Mesh connectivity of the Hubless TDMA network, its link budget must be calculated so that all the stations receive transmission of other terminals via the shared TDMA carrier. However, the network is operational if the Master station is able to receive bursts from the other stations, while other stations receive the signal from the Master, i.e. there is no need to ensure

the mutual reception of transmission of other stations inbetween. Such network will actually operate in a "hub and spoke" topology with the center point at the Master station.

UHP routers have an additional DVBS2 demodulator, which is not used when operating in Hubless TDMA mode. It can be used for simultaneous reception of additional overlay carrier, e.g. containing some broadcast or broadband data from the center. Such additional carrier can be transmitted using any beam or even another satellite.

Hubless TDMA mode is supported by all models of UHP routers, including compact UHP1000, cardbased UHP-1000CM, outdoor UHP1000OD and rackmountable UHP9000 dual router.

