

## ABSTRACT

In this research, some studies on the throughput, delay and topological design aspects of terrestrial/satellite (mixed-media) computer communication networks are carried out.

The analysis and design of a cost-effective small-scale mixed-media network is given. The performance of the network on the basis of average delay and throughput is evaluated. To minimize the network design cost, a starting topology algorithm for terrestrial networks is presented.

For increasing the channel capacity of satellite networks, the Satellite-Switched/Time-Division Multiple Access (SS/TDMA) technique is studied. An Improved SS/TDMA Time Slot Assignment (TSA) algorithm is developed. The improvement is achieved over an algorithm available in the literature. The present algorithm is applied for the design of packet-switched networks.

To minimize the topological design cost of large-scale mixed-media networks, hierarchical clustering and topological structures are constructed. Also, a hierarchical routing method is illustrated. Finally, in the design of a large-scale mixed-media network, a limited-scan spot-beams satellite system is used to achieve higher transponder utilization efficiency.