

METHOD OF TRANSMISSION BETWEEN NODES OF A MANET COMMUNICATION NETWORK OPERATING ON AN HF BAND WITH TDMA SHARING OF THE RADIO CHANNEL

Main Technological Area → Telecommunications

Keywords → MANET, TDMA, HF, Network, Radio, Synchronization

The present invention relates to radio communication systems, and more particularly to improvements in method of data transmission and packet collision minimization in a MANET (Mobile Ad-Hoc NETWORK) communication network. Reliable data communication over networks of terminals, such as networks of computers in the possession of professional operators, is advantageously provided by means of wired networks, which include linking sections implemented in fibre optics and paired telephone lines. However, if a wired network structure is unavailable, or if it is not convenient to create a structure of this type between the various terminals without physical work on the structures of the buildings in which they are located, a different transmission means must be used for the data communication, i.e. communication must be provided via radio.

TECHNICAL SPECIFICATIONS

The system relies on data exchange between mobile terminals, each equipped with a radio modem that make the most of the HF radio channel shared between the different nodes. To build a MANET-type network, in addition to the normal modulation/demodulation techniques usually required to transfer information in a point-to-point manner, other techniques are needed by each radio network node in order to access the channel in a mutually exclusive way; the patent provides an access scheme of type TDMA (Time Division Multiplex Access). With the TDMA method a transmission time slot in a transmission frame is allocated to each node of the network; within this time slot, the node can use the channel and data can be transmitted; outside this time slot the node sets itself to receive the data transmitted from the other nodes.

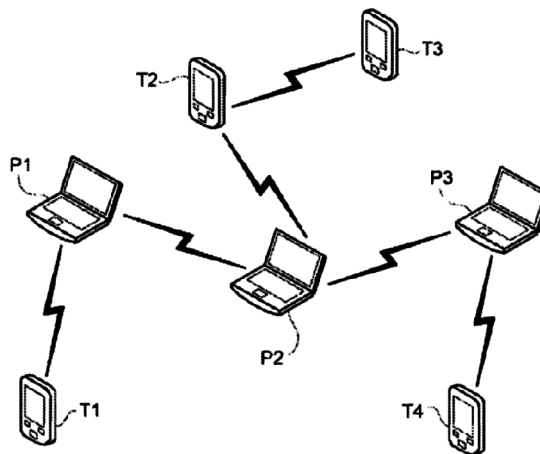


Fig. 1 – MANET topology example

In order to work at its best, maximizing the amount of data exchanged and minimizing the risk of overlapping transmissions that could cause "jamming" to the communication network, every radio node uses a common time reference, ensured by the synchronization with the reference signal that is normally broadcasted by satellite positioning and navigation systems (e.g. GPS system).

Any possible temporary absence of the universal timing signal derived from the geographical positioning means does not compromise the communication, since the time reference clock of each terminal is sufficiently precise to ensure synchronization even in the absence of the universal reference time signal for prolonged periods.



INNOVATION/ADVANTAGES

Innovative mechanisms to strengthen robustness in a MANET are introduced in this patent:

- Suitable arrangements to avoid a loss of synchronization of the clocks at the nodes of the network, these arrangements being adapted to make the transmission method applicable and effective in all circumstances.
- In case of collision, the node which cannot transmit during the time slot assigned to it selects a free transmission slot from a set of allocated, auxiliary, free time slots.

The advantageous impacts of the patented method are:

- Ensuring the robustness of the network, even in case of complex topologies.
- Effective use of the transmission resources available to the network in respect to other known radio communication methods.

FIELDS OF APPLICATION

Tactical communications	Complex networks for high reliability medium/long range communications
Homeland Security	Sensor networks (perimeter intrusion detection, rapid deployment, site surveillance) Emergency communications, disaster response, infrastructure network connectivity interruption

PATENT INFORMATION

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