CLAIMS

1.- A method for transmitting information in an ad hoc network comprising at least two transceiver nodes able to receive and transmit information and communicating with each other by sending information in random access time slots organized in frames,

wherein the nodes of the network are broken down into groups according to a distribution rule, the nodes of each group only having the right to transmit information in a predefined subset of frames specific to the group,

characterized in that:

- each node defines (phase 24) a constraint (*neighborConstraint*) for the neighboring nodes, and

- each node transmits (phase 24) the defined constraint (*neighborConstraint*) to the neighboring nodes, and

- each node (phase 26) defines the group to which it belongs according to the distribution rule as a function of the constraints (*neighborConstraint*) received from the neighboring nodes.

2.- The method according to claim 1, wherein the distribution rule of a node in a group takes into account the number of neighbor or interfering transmitting nodes that the neighboring nodes of the considered node have.

3.- The method according to claim 1 or 2, wherein the node defines (phase 26) the group to which it belongs according to the distribution rule as a function of the constraint (*neighborConstraint*) received from the neighboring nodes leading to the lowest transmission frequency.

4.- The method according to claim 3, wherein the step for defining a constraint (*neighborConstraint*) by a node for the neighboring nodes includes a first step (50) for estimating the number of neighboring and interfering nodes that transmit for a given frame, a second step (56) for estimating the total number of neighboring or interfering transmitting nodes, a third step (58) for smoothing the total number of neighboring or interfering transmitting nodes, and a fourth step (58) for establishing the constraint (*neighborConstraint*) as a function of the smoothed total number of neighboring or interfering nodes and a target minimum probability (p_{Seuil}) that the neighbors of the node can transmit information without collisions

5.- The method according to claim 4, wherein the step (50) for estimating the number of neighboring or interfering nodes that transmit for a given frame is based on measuring the number of time slots on which: no transmission has been detected, a single transmission has been received, and more than two transmissions generating a collision have been detected.

6.- The method according to claim 4 or 5, wherein the step (56) for estimating the total number of neighboring or interfering transmitting nodes includes a summation (56) of the number of neighboring or interfering nodes having transmitted messages in each of the frames corresponding to the set of distribution groups of the nodes according to the constraint (*neighborConstraint*) defined by the node and transmitted to its neighboring nodes

7.- The method according to claim 6, wherein the step for calculating the total number of neighboring or interfering transmitting nodes by a node includes a weighting (58) of the calculated total number of current transmitting or interfering nodes, by the total number of neighboring or interfering transmitting nodes previously calculated for that node.

8.- The method according to any one of the preceding claims, wherein each node defines the group to which it belongs according to the distribution rule by subjecting itself to a constraint (*ownConstraint*) among the constraints of the neighboring nodes (*neighborConstraint*) and in which the calculation of a constraint (*ownConstraint*) specific to a node is only done if at least one of the following three conditions is met:

- there are no higher constraints (*neighborConstraint*) received from a neighboring node (69),

- the neighboring node having defined the constraint (*ownConstraint*) to which the considered node subjects itself has transmitted a lower constraint (72),

- the expiration of a predetermined period of time (*TimeToLive*, 74).

9.- The method according to any one of the preceding claims, wherein each node defines the group to which it belongs according to the distribution rule by subjecting itself to a constraint (*ownConstraint*) among the constraints of the neighboring nodes (*neighborConstraint*) and in which each node transmits (step 24) the constraint (*ownConstraint*) to which it subjects itself (*msgConstraint*).

10.- The method according to claim 9, characterized in that a node having transmitted a constraint (*neighborConstraint*) to a preceding frame determines whether the constraint to which a neighboring node subjects itself (*ownConstraint*), and that it has received from that neighboring node, is below the constraint (*neighborConstraint*) that it transmitted and whether the constraint (*ownConstraint*) to which the neighboring node subjects itself is below the constraint (*neighborConstraint*) that it has transmitted, then the node does not take into account the estimating elements of its neighborhood calculated during the current frame.

11.- The method according to claim 9 or 10, characterized in that a node imposing a constraint (*neighborConstraint)* on its neighbors determines whether a same

neighboring node transmits at least twice during n consecutive frames, n being the constraint (*neighborConstraint*) imposed on the node, and if the neighboring node transmits at least twice during n consecutive frames, the node only takes the neighboring node into account a single time to define its number of neighboring or interfering transmitting nodes.

12.- The method according to any one of the preceding claims, characterized in that the transmissions between the nodes lack messages dedicated to the signaling to reduce the number of collisions in the network.

13.- An ad hoc network including a set of transceiver nodes able to receive and transmit information and communicating with each other by sending information in frames, characterized in that each node includes means for implementing the method according to any one of the preceding claims.

The invention claimed is:

1. A method for transmitting information in an ad hoc network comprising at least two transceiver nodes able to receive and transmit information and communicating with each other by sending information in random access time slots organized in frames, wherein the nodes of the network are broken down into groups according to a distribution rule, the nodes of each group only having the right to transmit information in a predefined subset of frames specific to the group, comprising the steps of:

defining, at each node (phase **24**), a constraint (neighborConstraint) for the neighboring nodes, and transmitting, at each node (phase **24**), the defined constraint (neighborConstraint) to the neighboring nodes, and

defining, at each node (phase **26**), the group to which it belongs according to the distribution rule as a function of the constraints (neighborConstraint) received from the neighboring nodes;

wherein defining a constraint (neighborConstraint) by a node for the neighboring node includes estimating (**56**) the total number of neighboring or interfering transmitting nodes, and establishing (**58**) the constraint (neighborConstraint) as function of the smoothed total number of neighboring or interfering nodes and a target minimum probability (P_{Seuil}) that the neighbors of the node can transmit information without collisions.

2. The method according to claim **1**, wherein the distribution rule of a node in a group takes into account the number of neighbor or interfering transmitting nodes that the neighboring nodes of the considered node have.

3. The method according to claim **1**, wherein the node defines (phase **26**) the group to which it belongs according to the distribution rule as a function of the constraint (neighborConstraint) received from the neighboring nodes leading to the lowest transmission frequency.

4. The method according to claim 3, wherein the step for defining a constraint (neighborConstraint) by a node for the neighboring nodes further comprises a step of: estimating the number of neighboring and interfering nodes that transmit for a given frame, and

smoothing the total number of neighboring or interfering transmitting nodes.

5. The method according to claim 4, wherein the step of estimating the number of neighboring or interfering nodes that transmit for a given frame is based on measuring the number of time slots on which: no transmission has been detected, a single transmission has been received, and more than two transmissions generating a collision have been detected.

6. The method according to claim 1, wherein the step of estimating the total number of neighboring or interfering transmitting nodes includes a summation (56) of the number of neighboring or interfering nodes having transmitted messages in each of the frames corresponding to the set of distribution groups of the nodes according to the constraint (neighborConstraint) defined by the node and transmitted to its neighboring nodes.

7. The method according to claim 6, wherein the step of calculating the total number of neighboring or interfering transmitting nodes by a node includes a weighting of the calculated total number of current transmitting or interfering nodes, by the total number of neighboring or interfering transmitting nodes previously calculated for that node.

8. The method according to claim 1, wherein each node defines the group to which the each node belongs according to the distribution rule by subjecting the each node to a constraint (ownConstraint) among the constraints of the neighboring nodes (neighborConstraint) and in which the calculation of a constraint (ownConstraint) specific to a node is only done if at least one of the following three conditions is met:

there are no higher constraints (neighborConstraint) received from a neighboring node (**69**),

the neighboring node having defined the constraint (ownConstraint) to which the considered node subjects itself has transmitted a lower constraint (**72**),

the expiration of a predetermined period of time (TimeToLive, **74**).

9. The method according to claim 1, wherein each node defines the group to which the each node belongs according to the distribution rule by subjecting the each node to a constraint (ownConstraint) among the constraints of the neighboring nodes (neighborConstraint) and in which each node transmits (step **24**) the constraint (ownConstraint) to which it subjects itself (msgConstraint).

10. The method according to claim 9, wherein a node having transmitted a constraint (neighborConstraint) to a preceding frame determines whether the constraint to which a neighboring node subjects itself (ownConstraint), and that it has received from that neighboring node, is below the constraint (neighborConstraint) that it transmitted and whether the constraint (ownConstraint) to which the neighboring node subjects itself is below the constraint (neighborConstraint) that it has transmitted, then the node does not take into account the estimating elements of its neighborhood calculated during the current frame.

11. The method according to claim 9, wherein a node imposing a constraint (neighborConstraint) on its neighbors determines whether a same neighboring node transmits at least twice during n consecutive frames, n being the constraint (neighborConstraint) imposed on the node, and if the neighboring node transmits at least twice during n consecutive frames, the node only takes the neighboring node into account a single time to define its number of neighboring or interfering transmitting nodes.

12. The method according to claim 1, characterized in that the transmissions between the nodes lack messages dedicated to the signaling to reduce the number of collisions in the network.

13. An ad hoc network including a set of transceiver nodes able to receive and transmit information and communicating with each other by sending information in frames wherein the nodes of the network are broken down into groups according to a distribution rule, and each node of the network only has the right to transmit information in a predefined subset of frames specific to the group, comprising the steps of:

defining, at each node (phase **24**), a constraint (neighborConstraint) for the neighboring nodes;

transmitting, at each node (phase **24**), the defined constraint (neighborConstraint) to the neighboring nodes;

defining, at each node (phase **26**), the group to which it belongs according to the distribution rule as a function of the constraints (neighborConstraint) received from the neighboring nodes;

wherein defining a constraint (neighborConstraint) by a node for the neighboring node includes estimating (**56**) the total number of neighboring or interfering transmitting nodes, and

establishing (**58**) the constraint (neighorConstraint) as function of the smoothed total number of neighboring or interfering nodes and a target minimum probability (p_{Seuil}) that the neighbors of the node can transmit information without collisions.