C L A I M S

1. A wireless communication apparatus which establishes a multi-hop wireless network together with other apparatuses, and makes wireless communication with the other apparatuses in a predetermined cycle including a plurality of time slots, comprising:

a wireless unit configured to transmit/receive a radio signal via an antenna;

a storage unit configured to store timetable information indicating a time slot for performing transmission/reception of the radio signal with the other apparatuses;

a communication control unit configured to control transmission/reception of the radio signal according to the timetable information that is shared with the other apparatuses; and

a task assigner configured to assign a transmission task for the other apparatuses to a first empty time slot for which no task is assigned in the timetable information, and to assign a reception task for the other apparatuses to a second empty time slot which is subsequent to the first empty time slot~~.~~

~~2. The wireless communication apparatus according to claim 1~~, wherein

the task assigner~~wireless communication apparatus operates as a main arbitration apparatus,~~ initially starts assignment of the transmission/reception tasks, and assigns the transmission/reception tasks in an order of neighboring apparatuses within a radio access range.

2~~3~~. The wireless communication apparatus according to claim 1~~ or 2~~, further comprising an influence range confirmation unit configured to acquire influencing apparatus information required to confirm existence of other apparatuses which exist within the radio access range,

wherein the task assigner assigns the transmission/reception tasks so as not to cause any communication collision based on the influencing apparatus information.

3~~4~~. The wireless communication apparatus according to claim 1~~ or 2~~, wherein the timetable information further includes influenced apparatus information of the transmission/reception tasks for respective time slots to which the transmission/reception tasks are assigned, and

the task assigner assigns the transmission/reception tasks so as not to cause any communication collision based on the influenced apparatus information.

4~~5~~. The wireless communication apparatus according to claim 3~~4~~, wherein the task assigner redundantly assigns, to a time slot to which the transmission/reception task has already been assigned, a transmission/reception task between apparatuses which do not correspond to influenced apparatuses in that time slot in the timetable information.

5~~6~~. The wireless communication apparatus according to claim 1, further comprising a maximum update cycle input unit configured to input a maximum update cycle to be satisfied by the timetable information,

wherein the communication control unit determines whether or not a total required time of the timetable information exceeds the maximum update cycle.

67. The wireless communication apparatus according to claim 56, wherein when the total required time of the timetable information exceeds the maximum update cycle, the communication control unit redundantly assigns, to time slots to which the transmission/reception tasks have already been assigned, transmission/reception tasks between apparatuses which do not correspond to influenced apparatuses in these time slots of the timetable information until the total required time of the timetable information falls below the maximum update cycle.

78. The wireless communication apparatus according to claim 12, wherein, a topology of the multi-hop wireless network is a tree type topology centering on the main arbitration apparatus.

89. The wireless communication apparatus according to claim 1, wherein upon completion of assignment of the transmission task and the reception task, the task assigner transmits the timetable information to other wireless communication apparatuses having wireless communication paths with the wireless communication apparatus.

910. A wireless communication system comprising a plurality of wireless communication apparatuses according to any one of claims 1 to 89.

1011. A computer-readable recording medium for executing processes of respective units of a wireless

communication apparatus according to any one of claims 1 to 8~~9~~.

11~~12~~. A wireless communication method used in an apparatus, which establishes a multi-hop wireless network together with other apparatuses, and makes wireless communication with the other apparatuses in a predetermined cycle including a plurality of time slots, the method comprising:

transmitting/receiving a radio signal via an antenna;

storing timetable information indicating a time slot for performing transmission/reception of the radio signal with the other apparatuses;

controlling transmission/reception of the radio signal according to the timetable information that is shared with the other apparatuses; and

assigning a transmission task for the other apparatuses to a first empty time slot for which no task is assigned in the timetable information, and to assign a reception task for the other apparatuses to a second empty time slot which is subsequent to the first empty time slot, wherein

the assigning initially starts assignment of the transmission/reception tasks, and assigns the transmission/reception tasks in an order of neighboring apparatuses within a radio access range.