

**WHAT IS CLAIMED IS:**

1. A wireless network with dynamic transmission control comprising an arbiter and a plurality of client nodes, the arbiter being configured to control an operation of the client nodes by defining communications operation cycles and allocating a bandwidth to each of the plurality of client nodes on a cycle by cycle basis in response to requests for bandwidth from the plurality of client nodes, wherein the arbiter is configured to vary the operation cycles based the requests for bandwidth.
2. The wireless network of Claim 1, wherein the arbiter is configured to prioritize the requests for bandwidth from the plurality of client nodes and to allocate bandwidth in an operation cycle based on a priority of each request.
3. The wireless network of Claim 1, wherein the arbiter is configured to prioritize the requests for bandwidth from the plurality of client nodes and to allocate bandwidth in an operation cycle based on a priority of each request.
4. The wireless network of Claim 1, wherein the arbiter is configured to relinquish control as session arbiter to another node upon request.
5. The wireless network of Claim 4, wherein the arbiter is configured to transmit an arbiter table upon request prior to relinquishing control as session arbiter.
6. The wireless network of Claim 1, wherein each operation cycle is divided up into a set of time segments, and wherein allocating the bandwidth comprises assigning a transmission start time and a transmission duration for each of the plurality of client nodes requesting bandwidth and changing the transmission start time and the transmission duration for each of the plurality of client nodes requesting bandwidth in response to the requests for bandwidth from the plurality of client nodes.
7. The wireless network of Claim 1, wherein the arbiter comprises a ground station and the plurality of client nodes comprises an unmanned vehicle.
8. The wireless network of Claim 1, wherein the plurality of client nodes comprises a plurality of unmanned vehicles.
9. The wireless network of Claim 1, wherein the arbiter comprises an unmanned vehicle and the plurality of client nodes comprises a ground station.

10. The wireless network of Claim 1, wherein the plurality of client nodes further comprises an unmanned vehicle.

11. The wireless network of Claim 1, wherein the arbiter is configured such that allocating the bandwidth comprises assigning a transmission start time and a transmission duration to the plurality of client nodes and changing the transmission start time and the transmission duration for the plurality of client nodes in response to requests from the plurality of client nodes.

12. The wireless network of Claim 1, wherein the arbiter is configured such that assigning the bandwidth comprises assigning the bandwidth in response to an operator.

13. The wireless network of Claim 12, wherein the arbiter is configured such that assigning the bandwidth comprises controlling the video quality transmit by each of the plurality of client nodes.

14. The wireless network of Claim 13, wherein the arbiter is configured such that assigning the bandwidth comprises allocating bandwidth for at least one of: a) full video; b) degraded video; c) still pictures; or d) no video imagery for a client node requesting bandwidth.

15. The wireless network of Claim 1, wherein the nodes comprise transceivers controlled by an operating system.

16. A wireless network with dynamic transmission control comprising an arbiter and a plurality of client nodes, the arbiter being configured to control an operation of the client nodes by defining communications operation cycles and allocating a bandwidth to each of the plurality of client nodes on a cycle by cycle basis in response to requests for bandwidth from the plurality of client nodes, wherein the arbiter is configured to relinquish control as session arbiter to another node upon request, and wherein the arbiter is configured to transmit an arbiter table upon request prior to relinquishing control as session arbiter.

17. A wireless network with dynamic transmission control comprising an arbiter and a plurality of client nodes, the arbiter being configured to control an operation of the client nodes by defining communications operation cycles and allocating a bandwidth to each of the plurality of client nodes on a cycle by cycle basis in response to requests for bandwidth from the plurality of client nodes, wherein the arbiter is configured such that assigning the bandwidth comprises assigning the bandwidth in response to an operator, and wherein the arbiter is configured such that assigning the bandwidth comprises controlling the video quality transmit by each of the plurality of client nodes.

18. The wireless network of Claim 17, wherein the arbiter is configured such that assigning the bandwidth comprises allocating bandwidth for at least one of: a) full video; b) degraded video; c) still pictures; or d) no video imagery for a client node requesting bandwidth.

19. A method for communicating on a wireless network having a plurality of nodes, the method comprising:

selecting a node to function as an arbiter for controlling communication of at least one non-arbiter node of the plurality of nodes on the wireless network;

receiving at the arbiter requests for a desired bandwidth from the at least one non-arbiter node;

adjusting dynamically the bandwidth allocated to the at least one non-arbiter node based on the requests, comprising using the arbiter to define operation cycles and assign a transmission start time and duration for each cycle to the at least one non-arbiter node; and

wherein selecting a node to function as an arbiter comprises powering up a node and monitoring for an existing DDL session and assuming the role of arbiter if no DDL session is in progress.

20. The method of Claim 19, wherein monitoring for an existing DDL session comprises monitoring within a channel, and wherein assuming the role of arbiter comprises initiating a DDL session within the channel if no DDL session is detected within the channel.

21. The method of Claim 19, wherein selecting a node comprises selecting one of: (a) a ground unit; (b) a unmanned vehicle; or (c) a manned vehicle.

22. The method of Claim 20, and wherein selecting a node comprises selecting an unmanned vehicle as the arbiter.

23. The method of Claim 19, wherein selecting a node to function as an arbiter comprises transferring duties of the arbiter to a non-arbiter node to provide a new arbiter for the session.

24. The method of Claim 23, wherein transferring the duties to the new arbiter is in response to a request from the non-arbiter node.

25. The method of Claim 19, further comprising relaying data between at least two non-arbiter nodes using the arbiter.

26. The method of Claim 25, wherein relaying data between at least two non-arbiter nodes comprises relaying data comprising at least one of: (a) vehicle controls; (b) video, (c) other sensor or sensor derived data; (d) voice; (e) instant messaging; or (f) mission information.

27. The method of Claim 26, wherein adjusting the bandwidth further comprising prioritizing the data for relaying and controlling the flow of the data based on a priority of the data.

28. The method of Claim 26, wherein adjusting the bandwidth further comprising prioritizing requests for bandwidth and allocating bandwidth in an operation cycle based on a priority of the data.

29. The method of Claim 19, wherein adjusting the bandwidth further comprising prioritizing requests for bandwidth and allocating bandwidth in an operation cycle based on a priority of each request.

30. The method of Claim 19, wherein adjusting the bandwidth comprises using the arbiter to define the operation cycles comprising dividing the operation cycles into a set of time segments and assigning to the at least one non-arbiter node in the wireless network a starting time segment and a number of time segments.

31. The method of Claim 19, wherein the at least one non-arbiter node comprises multiple non-arbiter nodes such that selecting comprises selecting a node to function as an arbiter for controlling communication on the wireless network of the multiple non-arbiter nodes, and receiving comprises receiving at the arbiter requests for a desired bandwidth from the multiple non-arbiter nodes, and adjusting comprises adjusting dynamically the bandwidth allocated to the multiple non-arbiter nodes based on the requests, comprising using the arbiter to define operation cycles and assign a transmission start time and duration to each cycle of each of the multiple non-arbiter nodes.

32. A method for communicating on a wireless network having a plurality of nodes, the method comprising:

selecting a node to function as an arbiter for controlling communication of at least one non-arbiter node of the plurality of nodes on the wireless network;

receiving at the arbiter requests for a desired bandwidth from the at least one non-arbiter node;

adjusting dynamically the bandwidth allocated to the at least one non-arbiter node based on the requests, comprising using the arbiter to define operation cycles and assign a transmission start time and duration for each cycle to the at least one non-arbiter node; and

wherein receiving requests comprises receiving an initial request for the desired bandwidth allocation from a non-arbiter node and granting bandwidth allocation in response to the initial request to allow the requesting non-arbiter node to join a DDL session.

33. The method of Claim 32, wherein the arbiter is an unmanned vehicle and the non-arbiter node is a ground unit, and further comprising receiving vehicle control commands for the unmanned vehicle from the non-arbiter node and maneuvering the arbiter according to the vehicle control commands from the non-arbiter node.

34. The method of Claim 32, wherein the arbiter is a first unmanned vehicle and the non-arbiter node is a ground unit, and further comprising receiving vehicle control commands for a second unmanned vehicle from the non-arbiter node and passing the vehicle control commands to the second unmanned vehicle.

## WHAT IS CLAIMED IS:

1. A wireless network with dynamic transmission control comprising an arbiter and a plurality of client nodes, the arbiter being configured to control an operation of the client nodes by defining communications operation cycles and allocating a bandwidth to each of the plurality of client nodes on a cycle by cycle basis in response to requests for bandwidth from the plurality of client nodes, wherein the arbiter is configured to vary the operation cycles based the requests for bandwidth, and wherein the arbiter is further configured to define a duration of an operation cycle by varying a frame length in response to requests for bandwidth from the plurality of client nodes and to begin a new frame if a client node does not need an entire slot.

2. The wireless network of Claim 1, wherein the arbiter is configured to prioritize the requests for bandwidth from the plurality of client nodes and to allocate bandwidth in an operation cycle based on a priority of each request.

3. The wireless network of Claim 1, wherein the arbiter is configured to prioritize the requests for bandwidth from the plurality of client nodes and to allocate bandwidth in an operation cycle based on a priority of each request.

4. The wireless network of Claim 1, wherein the arbiter is configured to relinquish control as session arbiter to another node upon request.

5. The wireless network of Claim 4, wherein the arbiter is configured to transmit an arbiter table upon request prior to relinquishing control as session arbiter so as to allow a new session arbiter to assume a role of arbiter without forcing the client nodes to check-in.

6. The wireless network of Claim 1, wherein each operation cycle is divided up into a set of time segments, and wherein allocating the bandwidth comprises assigning a transmission start time and a transmission duration for each of the plurality of client nodes requesting bandwidth and changing the transmission start time and the transmission duration for each of the plurality of client nodes requesting bandwidth in response to the requests for bandwidth from the plurality of client nodes.

7. The wireless network of Claim 1, wherein the arbiter comprises a ground station and the plurality of client nodes comprises an unmanned vehicle.

8. The wireless network of Claim 1, wherein the plurality of client nodes comprises a plurality of unmanned vehicles.

9. The wireless network of Claim 1, wherein the arbiter comprises an unmanned vehicle and the plurality of client nodes comprises a ground station.

10. The wireless network of Claim 1, wherein the plurality of client nodes further comprises an unmanned vehicle.

11. The wireless network of Claim 1, wherein the arbiter is configured such that allocating the bandwidth comprises assigning a transmission start time and a transmission duration to the plurality of client nodes and changing the transmission start time and the transmission duration for the plurality of client nodes in response to requests from the plurality of client nodes.

12. The wireless network of Claim 1, wherein the arbiter is configured such that assigning the bandwidth comprises assigning the bandwidth in response to an operator.

13. The wireless network of Claim 12, wherein the arbiter is configured such that assigning the bandwidth comprises controlling the video quality transmit by each of the plurality of client nodes.

14. The wireless network of Claim 13, wherein the arbiter is configured such that assigning the bandwidth comprises allocating bandwidth for at least one of: a) full video; b) degraded video; c) still pictures; or d) no video imagery for a client node requesting bandwidth.

15. The wireless network of Claim 1, wherein the nodes comprise transceivers controlled by an operating system.

16. A wireless network with dynamic transmission control comprising an arbiter and a plurality of client nodes, the arbiter being configured to control an operation of the client nodes by defining communications operation cycles and allocating a bandwidth to each of the plurality of client nodes on a cycle by cycle basis in response to requests for bandwidth from the plurality of client nodes, wherein the arbiter is configured to relinquish control as session arbiter to another node upon request, and wherein the arbiter is configured to transmit an

arbiter table upon request prior to relinquishing control as session arbiter so as to allow a new session arbiter to assume a role of arbiter without forcing the client nodes to check-in.

17. A wireless network with dynamic transmission control comprising an arbiter and a plurality of client nodes, the arbiter being configured to control an operation of the client nodes by defining communications operation cycles and allocating a bandwidth to each of the plurality of client nodes on a cycle by cycle basis in response to requests for bandwidth from the plurality of client nodes, wherein the arbiter is configured such that assigning the bandwidth comprises assigning the bandwidth in response to an operator, and wherein the arbiter is configured such that assigning the bandwidth comprises controlling the video quality transmit by each of the plurality of client nodes, and wherein the arbiter is further configured to define a duration of an operation cycle by varying a frame length in response to requests for bandwidth from the plurality of client nodes and to begin a new frame if a client node does not need an entire slot.

18. The wireless network of Claim 17, wherein the arbiter is configured such that assigning the bandwidth comprises allocating bandwidth for at least one of: a) full video; b) degraded video; c) still pictures; or d) no video imagery for a client node requesting bandwidth.

19. A method for communicating on a wireless network having a plurality of nodes, the method comprising:

- selecting a node to function as an arbiter for controlling communication of at least one non-arbiter node of the plurality of nodes on the wireless network;

- receiving at the arbiter requests for a desired bandwidth from the at least one non-arbiter node;

- adjusting dynamically the bandwidth allocated to the at least one non-arbiter node based on the requests, comprising using the arbiter to define operation cycles and assign a transmission start time and duration for each cycle to the at least one non-arbiter node; and

- wherein selecting a node to function as an arbiter comprises powering up a node and monitoring for an existing DDL session and assuming the role of arbiter if no DDL session is in progress; and

- wherein selecting a node to function as an arbiter comprises selecting an unmanned vehicle as the arbiter.

20. The method of Claim 19, wherein monitoring for an existing DDL session comprises monitoring within a channel, and wherein assuming the role of arbiter comprises initiating a DDL session within the channel if no DDL session is detected within the channel.

21. The method of Claim 19, further comprising relaying data between at least two non-arbiter nodes using the arbiter.

22. The method of Claim 21, wherein relaying data between at least two non-arbiter nodes comprises relaying data comprising at least one of: (a) vehicle controls; (b) video, (c) other sensor or sensor derived data; (d) voice; (e) instant messaging; or (f) mission information.

23. The method of Claim 22, wherein adjusting the bandwidth further comprising prioritizing the data for relaying and controlling the flow of the data based on a priority of the data.

24. The method of Claim 22, wherein adjusting the bandwidth further comprising prioritizing requests for bandwidth and allocating bandwidth in an operation cycle based on a priority of the data..

25. The method of Claim 19, wherein adjusting the bandwidth further comprising prioritizing requests for bandwidth and allocating bandwidth in an operation cycle based on a priority of each request .

26. The method of Claim 19, wherein adjusting the bandwidth comprises using the arbiter to define the operation cycles comprising dividing the operation cycles into a set of time segments and assigning to the at least one non-arbiter node in the wireless network a starting time segment and a number of time segments.

27. The method of Claim 19, wherein the at least one non-arbiter node comprises multiple non-arbiter nodes such that selecting comprises selecting a node to function as an arbiter for controlling communication on the wireless network of the multiple non-arbiter nodes, and receiving comprises receiving at the arbiter requests for a desired bandwidth from the multiple non-arbiter nodes, and adjusting comprises adjusting dynamically the bandwidth allocated to the multiple non-arbiter nodes based on the requests, comprising using the arbiter

to define operation cycles and assign a transmission start time and duration to each cycle of each of the multiple non-arbiter nodes.

28. A method for communicating on a wireless network having a plurality of nodes, the method comprising:

selecting a node to function as an arbiter for controlling communication of at least one non-arbiter node of the plurality of nodes on the wireless network;

receiving at the arbiter requests for a desired bandwidth from the at least one non-arbiter node;

adjusting dynamically the bandwidth allocated to the at least one non-arbiter node based on the requests, comprising using the arbiter to define operation cycles and assign a transmission start time and duration for each cycle to the at least one non-arbiter node;

wherein receiving requests comprises receiving an initial request for the desired bandwidth allocation from a non-arbiter node and granting bandwidth allocation in response to the initial request to allow the requesting non-arbiter node to join a DDL session; and

wherein the arbiter is further configured to define a duration of an operation cycle by varying a frame length in response to requests for bandwidth from the at least one non-arbiter node and to begin a new frame if a client node does not need an entire slot.

29. The method of Claim 28, wherein the arbiter is an unmanned vehicle and the non-arbiter node is a ground unit, and further comprising receiving vehicle control commands for the unmanned vehicle from the non-arbiter node and maneuvering the arbiter according to the vehicle control commands from the non-arbiter node.

30. The method of Claim 28, wherein the arbiter is a first unmanned vehicle and the non-arbiter node is a ground unit, and further comprising receiving vehicle control commands for a second unmanned vehicle from the non-arbiter node and passing the vehicle control commands to the second unmanned vehicle.