## CLAIMS

1. A wireless transceiver station configured to create a plurality of concurrent and independent orthogonal frequency-division multiplexing ("OFDM") wireless links between the wireless transceiver station and a plurality of user devices within a same frequency band, the plurality of wireless links formed over multipath downlink or uplink channels;

wherein the wireless transceiver station comprises one or more computer processors that carry out instructions embodied in a non-transitory computer readable medium so that the wireless transceiver station is configured to create the plurality of concurrent and independent OFDM wireless links using a number of wireless transceiver station antennas equal to more than ten times a number of antennas configured to communicate over at least one of the uplink channels of the plurality of concurrent and independent OFDM wireless links of at least one user device;

wherein the wireless transceiver station is configured to create at least one of the plurality of concurrent and independent OFDM wireless link with at least one user device's antennas in or on an aircraft flying within the coverage area of the wireless transceiver station and at least one of the plurality of concurrent and independent OFDM wireless links with at least one user device's antennas; and

wherein the wireless transceiver station is configured to exploit channel reciprocity by estimating an uplink channel state information (CSI) between the plurality of antennas on the wireless transceiver station and one or more of the antennas of the plurality of user devices and using it to derive a downlink CSI.

2. The wireless transceiver station as in claim 1 wherein the wireless transceiver station is configured to estimate a CSI between the plurality of antennas on the wireless transceiver station and one or more of the antennas of

the plurality of user devices by using pilot tones, channel sounding or training signals.

3. The wireless transceiver station as in claim 1 wherein the wireless transceiver station is configured to estimate a CSI between the plurality of antennas on the wireless transceiver station and one or more of the antennas of the plurality of user devices by training signals that are orthogonal.

4. The wireless transceiver station as in claim 1 wherein the wireless transceiver station is configured to store a CSI estimate between the plurality of antennas on the wireless transceiver station and one or more of the antennas of the plurality of user devices in a channel characterization matrix.

5. The wireless transceiver station as in claim 1 wherein the wireless transceiver station is configured to store a CSI estimate between the plurality of antennas on the wireless transceiver station and one or more of the antennas of the plurality of user devices in a channel characterization matrix comprised of phase and amplitude of the channel.

6. The wireless transceiver station as in claim 1 wherein the wireless transceiver station is configured to direct user devices to transmit training signals.

7. The wireless transceiver station as in claim 1 wherein the wireless transceiver station is configured to direct user devices to transmit training signals that are synchronized.

8. The wireless transceiver station as in claim 1 wherein the wireless transceiver station is configured to update a CSI estimate between the plurality

of antennas on the wireless transceiver station and one or more of the antennas of the plurality of user devices continually or periodically.

9. The wireless transceiver station as in claim 1 wherein the wireless transceiver station is configured to update a CSI estimate between the plurality of antennas on the wireless transceiver station and one or more of the antennas of the plurality of user devices as the user devices move from one location to another.

10. The wireless transceiver station as in claim 1 wherein the wireless transceiver station is configured to create the plurality of concurrent and independent OFDM wireless links via precoding based on a plurality of CSI estimates between the plurality of antennas on the wireless transceiver station and one or more of the antennas of the plurality of user devices.

11. The wireless transceiver station as in claim 1 wherein the wireless transceiver station is configured to divide the user devices into groups.

12. The wireless transceiver station as in claim 1 wherein the wireless transceiver station is configured to divide the user devices into groups and schedule different groups of users by cycling between groups.

13. The wireless transceiver station as in claim 1 wherein the wireless transceiver station is configured to divide the user devices into groups and assign the same or different levels of bandwidth to the user devices.

14. The wireless transceiver station as in claim 1 wherein the wireless transceiver station is configured to divide the user devices into groups and schedule different groups based on relative proximity between the user devices.