CLAIMS

What is claimed is:

1. A motion assembly configured to produce pitch and roll motions, comprising:

a lower reaction plate;

an upper reaction plate spaced apart from the lower reaction plate;

a pivotable coupling having an upper shaft and a lower shaft extending away from a center of the pivotable coupling and terminating at respective upper and lower shaft ends, the upper shaft end coupled to the upper reaction plate and the lower shaft end coupled to the lower reaction plate; and

at least two linear actuators spaced apart from each other and from the pivotable coupling, and coupled at respective upper ends to the upper reaction plate and at respective lower ends to the lower reaction plate, and configured to extend and retract to pivot the upper reaction plate about the pivotable coupling to produce pitch and roll motions of the upper reaction plate relative to the lower reaction plate.

2. The motion assembly of claim 1, wherein the pivotable coupling is a U-joint.

3. The motion assembly of claim 1, wherein the pivotable coupling is a fixed length.

4. The motion assembly of claim 1, further comprising a rechargeable battery configured as a sole source of operating energy of the at least two linear actuators.

5. A vehicle, comprising:

a chassis;

a first steerable propulsion wheel coupled to the chassis and configured to rotate a first wheel to a first commanded direction and rotate the first wheel at a first commanded speed;

a second steerable propulsion wheel coupled to the chassis and configured to rotate a second wheel to a second commanded direction and rotate the second wheel at a second commanded speed;

a lower reaction plate coupled to the chassis;

an upper reaction plate spaced apart from the lower reaction plate;

a pivotable coupling having an upper shaft and a lower shaft extending away from a center of the pivotable coupling and terminating at respective upper and lower shaft ends, the upper shaft end fixed to the upper reaction plate and the lower shaft end fixed to the lower reaction plate; and

at least two linear actuators spaced apart from each other and from the pivotable coupling and coupled at respective upper ends to the upper reaction plate and at respective lower ends to the lower reaction plate, and configured to extend and retract to pivot the upper reaction plate about the pivotable coupling to produce pitch and roll motions of the upper reaction plate relative to the lower reaction plate.

6. The vehicle of claim 5, wherein the pivotable coupling is a U-joint.

7. The vehicle of claim 5, further comprising:

a slew bearing fixed to the chassis and having a slew bearing gear rotatable with respect to the chassis;

a slew bearing pinion motor having a shaft, the slew bearing pinion motor fixed to the chassis;

a slew bearing pinion fixed to the shaft, the pinion engaging the slew bearing gear and configured to rotate at a commanded slew speed and direction;

wherein the lower reaction plate is coupled to the chassis via the slew bearing by fixing the lower reaction plate to the slew bearing,

wherein the lower reaction plate rotates with the slew bearing and produces a yaw motion of the upper reaction plate with respect to the chassis.

8. The vehicle of claim 5, wherein the vehicle is configured for propulsion in a crabbing motion by:

simultaneously setting the first commanded direction and the second commanded direction equal to an identical commanded direction, θ, where θ is one of $0° < \theta < 180°$ and $180° < \theta < 360°$; and simultaneously setting the first commanded speed equal to the second commanded speed.

9. The vehicle of claim 5, further comprising a rechargeable battery configured as a sole source of operating energy of the vehicle.

10. The vehicle of claim 7, further comprising a rechargeable battery configured as a sole source of operating energy of the vehicle.

11. The vehicle of claim 7, wherein, if the pivotable coupling is oriented vertically, the central axis of the pivotable coupling passes through a point at a geometric center of the slew bearing.

12. The vehicle of claim 5, further comprising a wireless communication interface and a controller, wherein the controller is configured to execute a command received through the wireless communication interface if the command is addressed to a unique address of the vehicle.

13. The vehicle of claim 5, further comprising a passenger platform fixed to the upper reaction plate and at least two rows of seats fixed to the passenger platform.

14. The vehicle of claim 13, wherein if the pivotable coupling is oriented vertically, the central axis of the pivotable coupling passes through a point at a geometric center of the slew bearing and a point on the passenger platform that is between a first and a second one of the at least two rows of seats.

15. A vehicle comprising

a controller;

a memory operationally coupled to the controller;

a communication interface operationally coupled to the controller and configured to communicate with a ride system controller that is remote to the vehicle;

a chassis;

a battery configured as a sole source of operating energy of the vehicle;

first and second independently controlled steerable propulsion wheels fixed to the chassis and configured to propel and steer the vehicle according to commands issued by the controller;

a lower reaction plate coupled to the chassis;

an upper reaction plate spaced apart from the lower reaction plate;

a pivotable coupling having an upper shaft and a lower shaft extending away from a center of the pivotable coupling and terminating at respective upper and lower shaft ends, the upper shaft end fixed to the upper reaction plate and the lower shaft end fixed to the lower reaction plate; and

at least two linear actuators spaced apart from each other and from the pivotable coupling, and coupled at respective upper ends to the upper reaction plate and at respective lower ends to the lower reaction plate, and configured to extend and retract to pivot the upper reaction plate about the pivotable coupling to produce pitch and roll motions of the upper reaction plate relative to the lower reaction plate.

16. The vehicle of claim 15, wherein the pivotable coupling is a U-joint.

17. The vehicle of claim 15, further comprising:

a slew bearing fixed to the chassis and having a slew bearing gear rotatable with respect to the chassis;

a slew bearing pinion motor having a shaft, the slew bearing pinion motor fixed to the chassis and configured to rotate at a commanded slew speed and direction;

a slew bearing pinion fixed to the shaft, the pinion engaging the slew bearing gear;

wherein the lower reaction plate is coupled to the chassis via the slew bearing by fixing the lower reaction plate to the slew bearing,

wherein the lower reaction plate rotates with the slew bearing and produces a yaw motion of the upper reaction plate with respect to the chassis.

18. The vehicle of claim 15, wherein the vehicle is configured for propulsion in a crabbing motion by:

simultaneously setting the first commanded direction and the second commanded direction equal to an identical commanded direction, θ, where θ is one of $0° < \theta < 180°$ and $180° < \theta < 360°$; and

simultaneously setting the first commanded speed equal to the second commanded speed.

19. The vehicle of claim 15, further comprising a rechargeable battery configured as a sole source of operating energy of the vehicle.

20. The vehicle of claim 17, further comprising a rechargeable battery configured as a sole source of operating energy of the vehicle.

21. A vehicle, comprising:

a chassis;

a first propulsion wheel coupled to the chassis;

a second propulsion wheel coupled to the chassis and spaced apart from the first propulsion wheel;

a slew bearing having a first side fixed to the chassis and a second side comprising a slew bearing gear rotatable with respect to the chassis;

a motor configured to rotate the slew bearing gear;

a platform coupled to the second side of the slew bearing, wherein the platform rotates with respect to the chassis by action of the motor; and

seating coupled to the platform, the seating having a front side and a back side, opposite to the front side.

wherein the seating front side can be rotated to point in any direction with respect to the chassis by operation of the motor regardless of any direction of travel of the chassis.

22. The vehicle of claim 21, wherein the first propulsion wheel and the second propulsion wheel are configured to rotate to point toward any direction in a plane of travel of the chassis.

Claims:

1. An invention not claimed in any divisional application.