CLAIMS

1. A modular inspection vehicle for travelling a surface, comprising:

a chassis, in which the chassis comprises first and second chassis sections, each of the first and second chassis sections are coupled to a respective one of a first wheel and a second wheel, the sections being connected via a linkage that permits a degree of freedom of movement between the first and second chassis sections and maintains the first and second wheels in contact with the surface on which the inspection vehicle is traveling;

a first motion module, the first motion module including:

the first wheel mounted to the first chassis section for rotation about a first axis, in which the first wheel is a magnetic driving wheel;

a second motion module, the second motion module including:

the second wheel mounted to the second chassis section, the second wheel being arranged to rotate about a second axis that is nominally perpendicular to the first wheel for orthogonal rotation with respect to the rotation direction of the first wheel, and in which the second wheel is a magnetic omni-wheel that permits the vehicle to change direction;

an inspection module connected to the chassis configured to collect inspection data related to the vehicle's environment;

a communication module connected to the chassis configured to transmit and receive data;

at least one power module connected to the chassis configured to provide power to the vehicle and its modules; and

a control module connected to the chassis configured to receive the inspection data and in which the control module is configured to prepare the inspection data for transmission via the communication module.

2. A modular inspection vehicle according to Claim 1, further comprising a navigation module connected to the chassis configured to collect position data related to the position of the vehicle.

3. A modular inspection vehicle according to Claim 2, in which the control module is configured to associate the inspection data with received position data that corresponds to the inspection data collected at a corresponding position, and in which the control module is configured to prepare the associated data for transmission via the communication module.

4. A modular inspection vehicle according to Claim 1, in which the linkage is a hinge.

5. A modular inspection vehicle according to Claim 1, in which the omni-wheel comprises a plurality of rollers located around a periphery of the omni-wheel, in which the plurality of rollers are mounted on the omni-wheel for passive rotation in the rotation direction of the driving wheel as the driving wheel is driven, and in which the omni-wheel is configured to be driven for orthogonal rotation with respect to the rotation direction of the first wheel thereby causing the vehicle to change direction.

6. A modular inspection vehicle according to Claim 5, in which the first motion module is a driving module and the second motion module is a steering module, and in which the first and second wheels can be driven one or more of: separately and at the same time to effect different types of steering of the vehicle

7. A modular inspection vehicle according to Claim 1, in which at least one of the first and second wheels include a magnet.

8. A modular inspection vehicle according to Claim 7, in which the magnet is a high temperature magnet.

9. A modular inspection vehicle according to Claim 1, in which the inspection module includes a sensor to detect at least one of a material thickness, fault, and anomaly.

10. A modular inspection vehicle according to Claim 1, in which the inspection module includes an ultrasonic transducer.

11. A modular inspection vehicle according to Claim 10, in which the ultrasonic transducer is a dry coupled probe.

12. A modular inspection vehicle according to Claim 10, in which the ultrasonic transducer is a wet coupled probe.

13. A modular inspection vehicle according to Claim 12, further including a fluid dispensing module.

14. A modular inspection vehicle according to Claim 10, in which the ultrasonic transducer is a high temperature probe.

15. A modular inspection vehicle according to Claim 10, in which the ultrasonic transducer is supported by a mount that is biased to maintain the ultrasonic transducer in contact with and normal to a surface to be inspected.

16. A modular inspection vehicle according to Claim 1, further including a marking module for dispensing a marking material at a desired location.

17. A modular inspection vehicle according to Claim 1, in which the vehicle includes a plurality of mounting points that are sized and shaped to receive a plurality of modules.

18. A modular inspection vehicle according to Claim 1, in which the vehicle includes at least one of a robotic arm module, a gas sensing module, and a temperature sensing module.

19. A modular inspection vehicle according to Claim 1, in which the power module receives power from onboard batteries.

20. A modular inspection vehicle according to Claim 1, in which the power module receives power through a tether.

21. A modular inspection vehicle according to Claim 1, in which a single power module provides power to each of the other modules that require power.

22. A modular inspection vehicle according to Claim 1, further comprising a plurality of power modules, in which a power module is associated with each of the other modules that require power to condition power for each respective module.

23. A modular inspection vehicle according to Claim 22, in which the power modules are incorporated into each of the other modules that require power, respectively.

24. A modular inspection vehicle according to Claim 22, in which the power modules are separate modules that are associated with each of the other modules that require power, respectively.

25. A modular inspection vehicle according to Claim 22, in which the power is supplied by onboard batteries.

26. A modular inspection vehicle according to Claim 22, in which the power is supplied by a tether.

27. A modular inspection vehicle according to Claim 1, in which the communication module is configured to wirelessly transmit and receive data.

28. A modular inspection vehicle according to Claim 1, in which the communication module is configured to transmit and receive data via a tether.