CLAIMS

1. A robotic machine apparatus for movement within an environment, said robotic machine including a movement navigation system including at least one signal transmitting means to emit a signal from internally of the apparatus and through a protective window to the said environment, at least one receiving means located internally of the apparatus to receive a return signal which has passed through said protective window or another protective window from an object in and/or a surface of said environment, and signal processing means to allow the said received signal to be processed and used to determine the position of the robotic machine with respect to said object and/or surface of said environment and so allow the guidance of the movement of said apparatus and wherein, said protective window has internal and external surfaces and at least one of said surfaces is curved, said protective window having a suitable thickness and curvature to provide the required level of protection, causing deviation of the transmitted and/or received signal away from the receiving means, and wherein at least one corrective lens is positioned intermediate the said at least one transmitting means and said protective window and/or intermediate said protective window and said receiving means, said at least one corrective lens having a focal length sufficient to correct the deviated signals such as to allow the received signal to be aligned to the receiving means.

2. Apparatus according to claim 1 wherein said at least one corrective lens is provided in addition to further optical lenses provided between the said transmission means and protective window and between the said receiving means and protective window.

3. Apparatus according to claim 2 wherein the said at least one corrective lens is located intermediate the said further optical lenses and the protective window and/or other protective window.

4. Apparatus according to claims 1-3 wherein the said at least one corrective lens is provided to correct or at least reduce distortion of the transmitted and/or the received signal caused by the same passing through the said at least one protective window.

5. Apparatus according to any of the preceding claims wherein the said at least one corrective lens is a cylindrical lens.

6. Apparatus according to claim 5 wherein the said at least one corrective lens is a plano-convex cylindrical correction lens.

7. Apparatus according to any of the preceding claims wherein a said corrective lens is provided and located between the protective window and said optical lens for signal transmission means and a corrective lens is provided and located between said protective window and the optical lens for said signal receiving means.

8. Apparatus according to any of claims 1-6 wherein a said corrective lens is positioned so that the same lens is positioned intermediate the optical lens for signal transmission means and the protective window and the optical lens for the signal receiving means and the protective window.

9. Apparatus according to any of the preceding claims wherein the said transmitted signal is a laser beam.

10. Apparatus according to any of the preceding claims wherein the said at least one protective window is formed with at least first and second layers.

11. Apparatus according to claim 10 wherein the first layer is provided as an infrared bandpass filter and the second layer is provided as a protective layer.

12. Apparatus according to any of claims 10-11 wherein the first layer forms an internal surface of the protective window and the second layer forms an external surface of the protective window.

13. Apparatus according to any of claims 10-12 wherein the first and second layers are separated by an air gap.

14. Apparatus according to any of the preceding claims wherein a head is located internally of the said apparatus.

15. Apparatus according to claim 14 wherein any or any combination of the transmitting means, receiving means and at least one corrective lens are located on the said head.

16. Apparatus according to any of said claims 14-15 wherein the said at least one protective window is cylindrical with a longitudinal axis which is coplanar with a centre axis of said head.

17. Apparatus according to claim 16 wherein at least the said transmitting means and receiving means are rotatable about said centre axis.

18. Apparatus according to claim 17 wherein the said head and at least one corrective lens also rotate about said centre axis.

19. Apparatus according to any of claims 14-18 wherein the said head is, or is provided as part of, a protective housing for said movement navigation system.

20. Apparatus according to any of the claims 14-19 wherein the said head is provided with a counterweight located at the opposing side of the head from that on which the said at least one corrective lens is located.

21. Apparatus according to claim 20 wherein the weight of the counterweight is selected to counter the weight of the at least one corrective lens and allow substantially uniform rotation of the head when in use.

22. Apparatus according to any of the preceding claims wherein the movement navigation system is connected to control drive means connected to a plurality of wheels or rollers to enable the guided travel of the apparatus across a surface of the said environment and allow the control and guidance of the movement to be performed remotely from the location of said apparatus.

23. Apparatus according to any of the preceding claims wherein the movement navigation system is an autonomous movement navigation system.

24. Apparatus according to claim 23 wherein the autonomous movement navigation system is a Light Detection and Ranging (LiDAR) navigation system.

25. A movement navigation system to allow the remote control of the movement of a robotic machine within an environment, said system including at least one signal transmitting means to emit a signal from internally of said robotic machine and through a protective window to the said environment, at least one receiving means to receive a return signal internally of said robotic machine and which signal has passed through said protective window or another protective window from an object in and/or a surface of said environment, and signal processing means to allow the said received signal to be processed and used to determine the position of the robotic machine with respect to said object and/or surface of said environment and wherein, said protective window has internal and external surfaces and at least one of said surfaces is curved, said protective window having a suitable thickness and curvature to

provide the required level of protection, causing deviation of the transmitted and/or received signal away from the receiving means, and wherein at least one corrective lens is positioned intermediate the said at least one transmitting means and said protective window and/or between said protective window and said receiving means, said at least one corrective lens having a focal length sufficient to correct the deviated signals such as to allow the received signal to be aligned to the receiving means.

26. A method for the remote control of the movement of a robotic machine within an environment, said method comprising the steps of emitting a signal from signal transmitting means located within said machine and through a protective window to the said environment, at least one receiving means located within the machine to receive a return signal and which signal has passed through said protective window or another protective window from an object in and/or a surface of said environment, and processing said received signal to determine the position of the robotic machine with respect to said object and/or surface of said environment, wherein said protective window has internal and external surfaces and at least one of said surfaces is curved, said protective window having a suitable thickness and curvature to provide the required level of protection, causing deviation of the transmitted and/or received signal away from the receiving means, and positioning at least one corrective lens intermediate the said at least one transmitting means and said protective window and/or between said protective window and said receiving means, said at least one corrective lens having a focal length sufficient to correct the deviated signals such as to allow the received signal to be aligned to the receiving means.