CLAIMS

1. An apparatus comprising:

a substrate;

an electronic assembly;

a nested enclosure assembly consisting of an outer enclosure and an inner enclosure, wherein the outer enclosure encloses the inner enclosure, wherein the inner enclosure encloses at least the electronic assembly and wherein a low emissivity material is disposed on or next to an inner surface of the outer enclosure;

an insulating medium disposed within a cavity between an outer surface of the inner enclosure and the inner surface of the outer enclosure; and

a sensor assembly communicatively coupled to the electronic assembly, wherein the sensor assembly includes one or more sensors, the one or more sensors disposed at one or more locations of the substrate, wherein the one or more sensors are configured to acquire one or more measurement parameters at the one or more locations of the substrate, wherein the electronic assembly is configured to receive the one or more measurement parameters from the one or more sensors.

2. The apparatus of claim 1, wherein the one or more sensors comprise:

one or more temperature sensors configured to acquire one or more parameters indicative of temperature.

3. The apparatus of claim 2, wherein the one or more temperature sensors comprise:

one or more thermocouple devices.

4. The apparatus of claim 2, wherein the one or more temperature sensors comprise:

one or more resistance temperature devices.

5. The apparatus of claim 1, wherein the one or more sensors comprise:

one or more pressure sensors configured to acquire one or more parameters indicative of pressure.

6. The apparatus of claim 1, wherein the one or more sensors comprise:

one or more chemical sensors configured to acquire one or more parameters indicative of a presence of a targeted chemical.

7. The apparatus of claim 1, wherein the one or more sensors comprise:

one or more radiation sensors configured to acquire one or more parameters indicative of a presence of radiation.

8. The apparatus of claim 1, wherein the electronic assembly comprises:

one or more processors;

communication circuitry;

memory; and

a power source.

9. The apparatus of claim 1, further comprising:

a dummy enclosure assembly, wherein the dummy enclosure assembly is disposed at a position on the substrate to maintain a center of mass of the apparatus at a center of the substrate during rotation on a rotatable platform.

10. The apparatus of claim 1, wherein the insulating medium comprises:

a porous solid material.

11. The apparatus of claim 10, wherein the insulating medium is opaque.

12. The apparatus of claim 11, wherein the insulating medium is absorptive.

13. The apparatus of claim 10, wherein the insulating medium comprises:

an aerogel.

14. The apparatus of claim 10, wherein the insulating medium comprises:

a ceramic material.

15. The apparatus of claim 1, wherein the insulating medium comprises:

one or more gases.

16. The apparatus of claim 15, wherein the one or more gases is maintained at a pressure less than atmospheric pressure.

17. The apparatus of claim 16, wherein the one or more gases is maintained at a pressure less than ambient pressure.

18. The apparatus of claim 1, further comprising:

one or more support structures supporting the inner enclosure on the inner surface of the outer enclosure.

19. The apparatus of claim 18, wherein the one or more support structures are formed from a thermal insulating material.

20. The apparatus of claim 1, further comprising:

a layer of thermal insulating material disposed between an outer surface of a bottom portion of the inner enclosure and an inner surface of a bottom portion of the outer enclosure.

21. The apparatus of claim 1, further comprising:

one or more support structures for supporting the outer enclosure on the substrate.

22. The apparatus of claim 21, wherein the one or more support structures are formed from a thermal insulating material.

23. The apparatus of claim 1, wherein the inner enclosure is formed from at least one of a metal, an alloy or a composite.

24. The apparatus of claim 23, wherein the inner enclosure is formed from at least one of an iron-nickel-cobalt alloy, an iron-nickel alloy, or an iron-carbon alloy.

25. The apparatus of claim 1, wherein the inner enclosure is formed from one or more crystalline materials.

26. The apparatus of claim 25, wherein the inner enclosure is formed from at least one of sapphire or crystalline quartz.

27. The apparatus of claim 1, wherein the outer enclosure is formed from a material having a contamination rate below a selected level.

28. The apparatus of claim 1, wherein the outer enclosure is formed from at least one of a ceramic, a cermet, a crystalline material, or a glass.

29. The apparatus of claim 28, wherein the outer enclosure is formed from at least one of silicon, silicon carbide, silicon nitride or silicon dioxide.

30. The apparatus of claim 1, further comprising:

a high reflectivity layer disposed on the outer surface of the inner enclosure.

31. The apparatus of claim 30, wherein the high reflectivity layer includes at least one of gold, silver or aluminum.

32. The apparatus of claim 30, wherein the high reflectivity layer is a stacked dielectric film comprising at least one of an oxide, a nitride or a carbide.

33. The apparatus of claim 1, wherein the electronic assembly is configured to calculate one or more values from the one or more acquired measurement parameters.

34. The apparatus of claim 1, further comprising: a remote data system communicatively coupled to the electronic assembly, wherein the electronic assembly is configured to transmit the one or more measurement parameters to the remote data system.

35. A method comprising:

acquiring, with an electronic assembly disposed within a nested enclosure assembly, a plurality of measurement parameters from a plurality of sensors disposed at a plurality of locations across a substrate, wherein the nested enclosure assembly consists of an outer enclosure and an inner enclosure, wherein the outer enclosure encloses the inner enclosure, wherein a low emissivity material is disposed on or next to an inner surface of the outer enclosure, wherein the inner enclosure encloses at least the electronic assembly; and

storing, with the electronic assembly disposed within the nested enclosure assembly, the plurality of measurement parameters.

36. The method of claim 35 further comprising:

transmitting the plurality of measurement parameters to a remote data system.

37. The method of claim 35 further comprising:

calculating a value for at least some of the plurality of measurement parameters.