Claims:

1. A modular polishing system, comprising:

a first modular frame defining a first processing region;

a cleaning system disposed in the first processing region;

a first substrate handler disposed in the first processing region for transferring substrates from a second processing region to the cleaning system;

a plurality of polishing modules disposed in the second processing region, the plurality of polishing modules comprising:

a first polishing module, having a first polishing processing region, is adjacent to a second polishing module, having a second polishing processing region, wherein

the first polishing module and the second polishing module are positioned in a side-by-side arrangement, and

the first polishing module and the second polishing module are coupled to the first modular frame, and

a third polishing module, having a third polishing processing region, is adjacent to a fourth polishing module, having a fourth polishing processing region, wherein

the third polishing module and the fourth polishing module are positioned in a side-by-side arrangement,

the first polishing module is positioned between the first modular frame and the third polishing module, and

the second polishing module is positioned between the first modular frame and the fourth polishing module,

wherein the first, second, third and the fourth polishing modules each comprise:

a polishing platen rotatable around a platen axis;

a carrier loading station, each carrier loading station having a loading station central axis, wherein

the carrier loading station of the first polishing processing region is adjacent to the carrier loading station of the third polishing processing region, and

the carrier loading station of the second polishing processing region is adjacent to the carrier loading station of the fourth polishing processing region; and

a substrate carrier transport system for moving a first substrate carrier assembly and a second substrate carrier assembly between the polishing platen and the carrier loading station, wherein

the substrate carrier transport system positioned between the polishing platen and the carrier loading station,

each substrate carrier transport system having a carrier support module, each carrier support module suspended from a polishing module frame, and

each carrier support module comprising a carrier platform comprising the first substrate carrier assembly and the second substrate carrier assembly, the carrier platform is rotatable about a platform axis by a platform actuator configured to rotate the first and second substrate carrier assemblies between either a first processing mode position or a second processing mode position; and

a second substrate handler disposed in the second processing region and positioned between each first, second, third and fourth polishing processing regions and adjacent each carrier loading station.

2. The modular polishing system of claim 1, wherein

the substrate carrier transport system is configured to concurrently position the first substrate carrier assembly in the first processing mode position and the second substrate carrier assembly in the second processing mode position.

3. The modular polishing system of claim 2, further comprising:

a substrate transfer station is positioned between the first and the second polishing processing regions, wherein the second substrate handler is configured to transfer substrates between each carrier loading station and the substrate transfer station, and wherein the first substrate handler is configured to transfer substrates to and from the substrate transfer station and to and from two or more cleaning stations within the first processing region.

4. The modular polishing system of claim 1, further comprising:

a third processing region disposed between the first processing region and the second processing region;

one or more processing systems disposed in the third processing region, wherein the one or more processing systems comprise one or more location specific polishing modules, one or more metrology stations, one or more buffing stations, or a combination thereof; and

the one or more processing systems in the third processing region are disposed in an arrangement that allows substrates to be directly transferred thereto and therefrom using the first substrate handler.

5. The modular polishing system of claim 1, further comprising one or more processing systems disposed in the first processing region, wherein the one or more processing systems comprise one or more location specific polishing modules, one or more metrology stations, one or more buffing stations, or a combination thereof.

6. The modular polishing system of claim 1, further comprising a plurality of system loading stations, wherein the first processing region is disposed between the plurality of system loading stations and the second processing region.

7. The modular polishing system of claim 1, further comprising a plurality of system loading stations, wherein the first substrate handler is disposed between the cleaning system and second processing region.

8. The modular polishing system of claim 1, further comprising a plurality of upright supports, wherein a plurality of panels are disposed between the upright supports, the panels configured to isolate the each polishing processing region from one another.

9. The modular polishing system of claim 1, wherein the first substrate carrier assembly and the second substrate carrier assembly each comprise:

a carrier head coupled to a carrier shaft,

a rotation actuator coupled to the carrier shaft, and configured to rotate the carrier shaft and the carrier head,

a translation actuator, and

a pneumatic assembly comprising one or more electromechanical components, the pneumatic assembly is in fluid communication with a chamber disposed within the carrier head,

wherein

the translation actuator is configured to cause the carrier head, the carrier shaft and the rotational actuator to translate in a first direction that extends perpendicular from the platform axis, and

the pneumatic assembly is fluidly coupled to the carrier head.

10. The modular polishing system of claim 9, wherein each translation actuator and pneumatic assembly are positioned on the carrier platform.

11. The modular polishing system of claim 1, wherein the plurality of polishing modules each further comprise a polishing module frame that comprises one or more walls that are configured to isolate each of the polishing modules of the plurality of polishing modules from one another.

12. The modular polishing system of claim 1, further comprising:

a plurality of panels are disposed between adjacent corners of each polishing modular frame, the panels configured to enclose and isolate the polishing processing regions from one another; and

a slit shaped opening formed in a panel of the plurality of panels that enclose each polishing processing region,

wherein the slit shaped opening is configured to accommodate the transfer of a substrate into and out of the polishing processing regions by the second substrate handler.

13. The modular polishing system of claim 1, wherein the second substrate handler is suspended from an overhead support of the polishing module frame.

14. A modular polishing system, comprising:

a cleaning system disposed in a first processing region;

a first substrate handler disposed in the first processing region for transferring substrates from a second processing region to the cleaning system;

a plurality of polishing modules disposed in the second processing region, each individual polishing module of the plurality of polishing modules having a first side and a second side which is opposite to the first side, each polishing module comprising:

a polishing platen positioned adjacent to the first side and rotatable around a platen central axis;

a carrier loading station positioned adjacent to the second side, each carrier loading station having a loading station central axis; and

a substrate carrier transport system positioned between the polishing platen and the carrier loading station and configured to move a substrate carrier assembly and a second substrate carrier assembly between the polishing platen and the carrier loading station, each substrate carrier transport system having a carrier support module, each carrier support module suspended from a frame in the second processing region, and each carrier support module comprising a carrier platform comprising a first substrate carrier assembly and a second substrate carrier assembly, the carrier platform is rotatable about a platform axis by a platform actuator configured to rotate the first and second substrate carrier assemblies

between either a first processing mode position or a second processing mode position,

wherein

a first polishing module of the plurality of polishing modules is adjacent to a second polishing module of the plurality of polishing modules,

the first side of the first polishing module and the first side of the second polishing module are positioned adjacent to the first processing region,

a third polishing module of the plurality of polishing modules is adjacent to a fourth polishing module of the plurality of polishing modules,

the second side of the first polishing module is positioned adjacent the second side of the third polishing module, and

the second side of the second polishing module is positioned adjacent the second side of the fourth polishing module; and

a second substrate handler disposed in the second processing region and positioned between each first, second, third and fourth polishing module and adjacent each carrier loading station.

15. The modular polishing system of claim 14, further comprising:

a substrate transfer station positioned between polishing platens of the first and the second polishing modules, wherein the second substrate handler is configured to transfer substrates between each carrier loading station and the substrate transfer station.

16. The modular polishing system of claim 14, wherein each substrate carrier assembly comprises:

a carrier head coupled to a carrier shaft,

a rotation actuator coupled to the carrier shaft, and configured to rotate the carrier shaft and the carrier head,

a translation actuator, and

a pneumatic assembly comprising one or more electromechanical components, the pneumatic assembly is in fluid communication with a chamber disposed within the carrier head,

wherein

the translation actuator is configured to cause the carrier head, the carrier shaft and the rotational actuator to translate in a first direction that extends perpendicular from the platform axis, and

the pneumatic assembly is fluidly coupled to the carrier head.

17. The modular polishing system of claim 16, wherein each translation actuator and pneumatic assembly are positioned on the carrier platform.

18. The modular polishing system of claim 14, wherein the substrate carrier transport system is configured to concurrently position the first substrate carrier in the first processing mode position and the second substrate carrier in the second processing mode position.

19. The modular polishing system of claim 14, further comprising:

a third substrate processing region disposed between the first processing region and the second processing region;

one or more processing systems disposed in the third substrate processing region, wherein the one or more processing systems comprise one or more location specific polishing modules, one or more metrology stations, one or more buffing stations, or a combination thereof; and

the one or more processing systems in the third substrate processing region are disposed in an arrangement that allows substrates to be directly transferred thereto and therefrom using the first substrate handler.

20. The modular polishing system of claim 14, further comprising one or more processing systems disposed in the first processing region, wherein the one or more

processing systems comprise one or more location specific polishing modules, one or more metrology stations, one or more buffing stations, or a combination thereof.

21. The modular polishing system of claim 14, wherein each individual polishing module of the plurality of polishing modules comprise a polishing processing region, and the modular polishing system further comprises:

a plurality of panels are disposed between adjacent corners of each polishing modular frame, the panels configured to enclose and isolate the polishing processing regions from one another; and

a slit shaped opening formed in a panel of the plurality of panels that enclose each polishing processing region,

wherein the slit shaped opening is configured to accommodate the transfer of a substrate into and out of the polishing processing regions by the second substrate handler.