

What is claimed is:

1. A lift assembly, comprising:
a base bracket;
a pedestal assembly carrier configured to support a pedestal assembly comprising a stem and a pedestal; and
three or more servo motor assemblies that are each attached to the base bracket via pivot joints and to the pedestal assembly carrier by three or more bearing assemblies, each bearing assembly comprises:
a guide adaptor connected to a guide actuator and the pedestal assembly carrier of the lift assembly; and
a bolt and a spring inserted through a pocket in the guide adaptor to connect a bearing to the pedestal assembly carrier, the bearing having an inner race and an outer race, the inner race forced against the pedestal assembly carrier and the outer race forced against the guide adaptor.
2. The assembly of claim 1, wherein the bolt and spring are axially preloaded.
3. The assembly of claim 2, wherein the bolt and spring are axially preloaded with about 3 pound-force (lbf) to about 200 lbf.
4. The assembly of claims 1, 2, or 3, wherein the lift assembly is configured to repeatedly move with 3 degrees of freedom with a positional resolution of less than 0.001".
5. The assembly of claims 1, 2, 3, or 4, wherein each pivot joint has one degree of rotational freedom.
6. The assembly of claims 1, 2, 3, 4, or 5, wherein the bearing is a spherical thrust bearing.
7. The assembly of claims 1, 2, 3, 4, 5, or 6, wherein the bearing is an angular contact spherical bearing.

8. The assembly of claims 1, 2, 3, 4, 5, 6, or 7, wherein the inner race forced against the pedestal assembly carrier and the outer race forced against the guide adaptor provides nominal clearance between the inner race and outer race.
9. The assembly of claims 1, 2, 3, 4, 5, 6, 7, or 8, wherein the inner race and the outer race are configured to slide on each other without radial motion.
10. A spherical thrust bearing assembly, comprising:
 - a guide adaptor connected to a guide actuator and a pedestal assembly carrier of a lift assembly, the lift assembly comprising:
 - a base bracket;
 - a pedestal assembly carrier configured to support a pedestal assembly comprising a stem and a pedestal; and
 - three or more servo motor assemblies, each servo motor assembly attached to the base bracket via pivot joints and to the pedestal assembly carrier by a bearing assembly; and
 - a bolt and a spring inserted through a pocket in the guide adaptor to connect a bearing to the pedestal assembly carrier, the bearing having an inner race and an outer race, the inner race forced against the pedestal assembly carrier and the outer race forced against the guide adaptor.
11. The assembly of claim 10, wherein the bolt and spring are axially preloaded.
12. The assembly of claims 10 or 11, wherein the lift assembly is configured to repeatedly move with 3 degrees of freedom with a positional resolution of less than 0.001".
13. The assembly of claims 10, 11, or 12, wherein each pivot joint has one degree of rotational freedom.
14. The assembly of claims 10, 11, 12, or 13, wherein the inner race forced against the pedestal assembly carrier and the outer race forced against the guide adaptor provides nominal clearance between the inner race and outer race.

15. A chamber, comprising:
- a chamber lid;
 - a plurality of chamber walls;
 - a chamber base;
 - a process region defined by the chamber lid, the plurality of chamber walls, and the chamber base; and
 - a lift assembly, the lift assembly comprising:
 - a base bracket;
 - a pedestal assembly carrier configured to support a pedestal assembly comprising a stem and a pedestal, the stem positioned through an opening of the chamber base and the base bracket, and the pedestal disposed in the process region; and
 - three or more servo motor assemblies that are each attached to the base bracket via pivot joints and to the pedestal assembly carrier by three or more bearing assemblies, each bearing assembly comprises:
 - a guide adaptor connected to a guide actuator and the pedestal assembly carrier of the lift assembly; and
 - a bolt and a spring inserted through a pocket in the guide adaptor to connect a bearing to the pedestal assembly carrier, the bearing having an inner race and an outer race, the inner race forced against the pedestal assembly carrier and the outer race forced against the guide adaptor.