WHAT IS CLAIMED IS:

1. A chamber system for solid free form fabrication comprising:

one or more independently controlled loading/unloading chambers;

an independently controlled deposition chamber, the deposition chamber including a deposition apparatus and an actuator for controlling the position and movement of a base material;

one or more doors connecting the deposition chamber with each of one or more loading/unloading chambers; and

an independently controlled service chamber connected to the deposition chamber, the service chamber sized to house the deposition apparatus, and being aligned with the deposition chamber, the deposition apparatus and a wire feed to the deposition apparatus such that the deposition apparatus can move in and out of the service chamber without removing or bending the wire feed.

2. The chamber system of claim 1, wherein each of the one or more loading/unloading chambers further comprises:

one or more doors providing access to the loading/unloading chamber;

a conveyor located inside the loading/unloading chamber; and

one or more vents.

3. The chamber system of claim 2, each loading/unloading chamber comprising at least one or more vents located at an upper portion of the loading/unloading chamber and at least one or more vents located at a bottom portion of the loading/unloading chamber;

the one or more vents located at the upper portion being operatively connected to a vacuum pump and to an air supply; and

the one or more vents located at the bottom portion being operatively connected to a vacuum pump and to a source of inert gas or inert gas mixture.

4. The chamber system of any one of claims 1-3, further comprising two loading/unloading chambers with a wall in common between them, and wherein each loading/unloading chamber also has a wall in common with the deposition chamber.

5. The chamber system of any one of claims 1-4, the deposition chamber further comprising one or more vents located at an upper portion of the deposition chamber and one or more vents located at a bottom portion of the deposition chamber;

the one or more vents located at the upper portion being operatively connected to a vacuum pump and to an air supply; and

the one or more vents located at the bottom portion being operatively connected to a vacuum pump and to a source of inert gas or inert gas mixture.

6. The chamber system of any one of claims 1-5, the deposition chamber further comprising one or more viewing portals.

7. The chamber system of any one of claims 1-6, the deposition chamber further comprising a recirculation system comprising a fan and a heat exchanger.

8. The chamber system of any of claims 1 - 7, the service chamber further comprising one or more vents at an upper portion of the service chamber and one or more vents at a bottom portion of the service chamber;

the one or more vents located at the upper portion being operatively connected to a vacuum pump and to an air supply;

the one or more vents located at the bottom portion being operatively connected to a vacuum pump and to a source of inert gas or inert gas mixture.

9. The chamber system of claim 7, the service chamber further comprising an access portal.

10. The chamber system of claim 7, the service chamber further comprising a set of gloves.

11. A method of operating a chamber system for solid free form fabrication comprising:

independently replacing the atmosphere in a deposition chamber of the chamber system with an inert atmosphere; transferring a first holding substrate on an actuator located inside the deposition chamber while maintaining the inert atmosphere in the deposition chamber;

performing solid free form fabrication using a deposition apparatus within the deposition chamber to form a first workpiece; and

transferring the first workpiece out of the deposition chamber while maintaining the inert atmosphere in the deposition chamber;

wherein the chamber system comprises the deposition chamber, at least two loading/unloading chambers, and a service chamber, each of the two loading/unloading chambers and the service chamber being in communication with the deposition chamber through one or more independent openings; and

wherein the service chamber is sized to house the deposition apparatus and being aligned with the deposition chamber, a deposition apparatus within the deposition chamber and a wire feed to the deposition apparatus such that the deposition apparatus can move in and out of the service chamber without removing or bending a wire feed.

12. The method of claim 11, wherein one or more of the deposition chamber, the at least two loading/unloading chambers and service chamber have one or more doors to seal the one or more openings.

13. The method of claim 12, further comprising controlling each of the deposition chamber, first and second loading/unloading chambers and the service chamber independently.

14. The method of claim 13, further comprising monitoring the one or more doors at each of the deposition chamber, first and second loading/unloading chambers and the service chamber using one or more sensors.

15. The method of claim 14, further comprising stopping the solid free form fabrication if one or more sensors detects that a door is not properly sealed closed.

16. The method of any one of claims 11-15, further comprising:

loading a first holding substrate on a conveyor located inside a first loading/unloading chambers;

replacing the atmosphere in the first loading/unloading chamber with the same inert atmosphere as in the deposition chamber; and

maintaining the atmosphere inside the first loading/unloading chamber during transfer of the holding substrate onto the actuator and during solid free form fabrication.

17. The method of claim 16, further comprising:

loading a second holding substrate onto a conveyor of a second loading/unloading chamber while maintaining the inert atmosphere in the first loading/unloading chamber;

replacing the atmosphere of the second loading/unloading chamber with the same inert atmosphere as in the deposition chamber.

18. The method of claim 16, wherein transferring the first workpiece out of the deposition chamber comprises:

transferring the workpiece into the first loading/unloading chamber while maintaining the inert atmosphere in the first loading/unloading chamber;

sealing the first loading/unloading chamber from the deposition chamber;

replacing the inert atmosphere in the first loading/unloading chamber with ambient air; and

unloading the workpiece from the loading/unloading chamber.

19. The method of claim 18, further comprising:

after sealing the first loading/unloading chamber from the deposition chamber, transferring a second holding substrate from a second loading/unloading chamber on the actuator while maintaining the inert atmosphere in the deposition chamber.