CLAIMS

1. A print engine of an additive manufacturing system, comprising
   a print station configured to hold a removable cartridge including a sealable chamber having a bed and a laser transparent window, the laser transparent window being mounted to the sealable chamber by a bellows enabling movement of the laser transparent window relative to the sealable chamber;
   a laser engine including a frame to hold at least one removable field replaceable unit that includes at least some laser optics or patterning optics; and
   an optical alignment system attached to at least one of the print station or the laser engine to align the field replaceable unit with respect to the removable cartridge, the laser engine further including a print head configured to mount to the laser transparent window.
2. The print engine of the additive manufacturing system of claim 1, wherein the removable cartridge comprises a powder hopper positioned within the sealable chamber and a powder spreader positioned within the sealable chamber for distributing powder from the powder hopper onto the bed.
3. The print engine of the additive manufacturing system of claim 1, wherein the frame of the laser engine is actively mechanically damped.
4. The print engine of the additive manufacturing system of claim 1, wherein laser light is passed between multiple field replaceable units.
5. The print engine of the additive manufacturing system of claim 1, further comprising connections to a facility station that provides gas, fluid, electrical, control, and database systems to the at least one removable field replaceable unit and the removable cartridge.
6. The print engine of the additive manufacturing system of claim 1, further comprising a print cartridge transporter unit.
7. The print engine of the additive manufacturing system of claim 1, further comprising a field replaceable unit transporter unit.
8. The print engine of the additive manufacturing system of claim 1, wherein the laser engine can direct a two-dimensional patterned laser beam into the removeable cartridge.

9. The print engine of the additive manufacturing system of claim 1, wherein the at least one removable field replaceable unit comprises multiple removable field replaceable units that can direct a laser beam between each other.
10. An additive manufacturing printing method, comprising
positioning a removable cartridge in a print station, the removable cartridge including a sealable chamber having a bed, a laser transparent window, and an internal wiper configured to wipe the laser transparent window;
directing a laser beam from a laser engine including a frame that holds at least one removable field replaceable unit that includes at least some laser optics or patterning optics into the removable cartridge; and
aligning the field replaceable unit with respect to the removable cartridge using an optical alignment system attached to at least one of the print station or the laser engine.
11. The additive manufacturing printing method of claim 10, wherein the removable cartridge comprises a powder hopper positioned within the sealable chamber and a powder spreader positioned within the sealable chamber for distributing powder from the powder hopper onto the bed.
12. The additive manufacturing printing method of claim 10, wherein the frame of the laser engine is actively mechanically damped.
13. The additive manufacturing printing method of claim 10, wherein laser light is passed between multiple field replaceable units.
14. The additive manufacturing printing method of claim 10, further comprising connections to a facility station that provides gas, fluid, electrical, control, and database systems to the at least one removable field replaceable unit and the removable cartridge.
15. The additive manufacturing printing method of claim 10, further comprising a print cartridge transporter unit.
16. The additive manufacturing printing method of claim 10, further comprising a field replaceable unit transporter unit.
17. The additive manufacturing printing method of claim 10, wherein the laser beam is a two-dimensional patterned laser beam.
18. The additive manufacturing printing method of claim 10, wherein the at least one removable field replaceable unit comprises multiple removable field replaceable units that can direct the laser beam between each other.

19. A print engine of an additive manufacturing system, comprising

a print station configured to hold a removable cartridge including a sealed chamber and a laser-transparent window movably mounted to the sealed chamber; and

a laser engine including a frame to hold multiple removable field replaceable units, each field replaceable unit having at least some laser optics or patterning optics to direct a laser beam toward the removable cartridge in the print station, the laser engine including a print head configured to mount to the laser-transparent window such that the laser-transparent window moves with the print head.

20. A print engine of an additive manufacturing system, comprising

a print station configured to hold a removable cartridge including a sealed chamber and a laser-transparent window movably mounted to the sealed chamber; and

a laser engine including a frame to hold multiple removable field replaceable units, each field replaceable unit having at least some laser optics or patterning optics to direct a laser beam toward the removable cartridge in the print station, with the laser beam passing through multiple field replaceable units before direction into the removable cartridge, the laser engine including a print head configured to mount to the laser-transparent window such that the laser-transparent window moves with the print head.