CLAIMS

1. A system comprising:

a casting assembly;

a computing device; and

a vacuum chamber enclosing a pouring cup and a platform configured to support the casting assembly, wherein:

the casting assembly is configured to hold a plurality of joinable components and includes a mold defining at least one mating groove configured to join at least two joinable components of the plurality of joinable components when occupied with a metal or an alloy, each respective mating groove of the at least one mating groove fluidically connected to a first surface opening and a second surface opening defined by the mold;

the pouring cup is movable relative to the first surface opening and the second surface opening by moving at least one of the pouring cup or the platform to substantially align the pouring cup with the first surface opening and, separately, to substantially align the pouring cup with the second surface opening; and

the computing device is configured to control the pouring cup to pour a respective volume of the molten metal or alloy in the first surface opening separately from the second surface opening and to pour another respective volume of the molten metal or alloy in the second surface opening separately from the first surface opening, wherein the pouring cup is a single pouring cup.

2. The system of claim 1, further comprising a platform controller for moving, under the control of the computing device, the platform by at least one of rotating or translating.

3. The system of claim 1, further comprising a cup controller for moving, under the control of the computing device, the pouring cup by at least one of rotating or translating.

4. The system of claim 2, wherein the platform controller comprises a rotary lift.

5. The system of claim 1, wherein the vacuum chamber comprises a heating zone and a cooling zone, and wherein the platform is configured to move the casting assembly between the heating zone and the cooling zone of the vacuum chamber.

6. The system of claim 1, further comprising a first pour tube connected to the first surface opening and a second pour tube connected to the second surface opening, wherein the movement of at least one of the pouring cup or the casting assembly to substantially align the pouring cup with the first surface opening and, separately, to substantially align the pouring cup with the second surface opening comprises substantially aligning the pouring cup with the first pour tube and, separately, aligning the pouring cup with the second pour tube; wherein the pouring cup is configured to pour the respective volume of molten metal or alloy in the first pour tube and the another respective volume of molten metal or alloy in the second pour tube.

7. The system of claim 1, further comprising at least one of a vacuum chamber controller configured to, under the control of the computing device, at least adjust a pressure within the vacuum chamber, a heating zone controller configured to at least adjust a temperature of a heating zone of the vacuum chamber, or a cooling zone controller configured to at least adjust a temperature of a cooling zone of the vacuum chamber.

8. A method comprising:

substantially aligning a pouring cup with a first surface opening of a plurality of surface openings defined by a mold by moving at least one of the pouring cup or a platform supporting a casting assembly, wherein the casting assembly is configured to hold a plurality of joinable components and the mold, wherein the mold defines at least one mating groove configured to join at least two joinable components of the plurality of joinable components when occupied with a metal or an alloy, wherein each mating groove of the at least one mating groove is fluidically connected to the first surface opening and a second surface opening define by the mold, and wherein a vacuum chamber encloses the pouring cup, the casting assembly, and the platform;

moving the pouring cup to pour a respective volume of molten metal or alloy in the first surface opening separately from the second surface opening;

subsequently substantially aligning the pouring cup with a second surface opening of the plurality of surface openings by moving at least one of the pouring cup and the platform; and

moving the pouring cup to pour a respective volume of molten metal or alloy in the second surface opening separately from the first surface opening, wherein the aligning, the pouring, the subsequent aligning, and the moving are controlled by a computing device, wherein the pouring cup is a single pouring cup.

9. The method of claim 8, wherein substantially aligning the pouring cup with the second surface opening comprises at least one of translating or rotating the platform.

10. The method of claim 8, wherein substantially aligning the pouring cup with the second surface opening comprises at least one of translating or rotating the pouring cup.

11. The method of claim 8, wherein the vacuum chamber comprises a heating zone and a cooling zone, further comprising moving the platform supporting the casting assembly between the heating zone and the cooling zone.

12. The method of claim 11, further comprising cooling the molten metal or alloy in the cooling zone to solidify and join the plurality of joinable components.

13. The method of claim 8, wherein substantially aligning the pouring cup with the first surface opening of the plurality of surface openings comprises aligning the pouring cup with a first pour tube of a plurality of pour tubes, wherein each respective pour tube of the plurality of pour tubes is connected to one of the plurality of surface openings.

14. The method of claim 8, further comprising pre-heating the casting assembly to a predetermined temperature.

15. A computer readable storage medium comprising instructions that, when executed, cause at least one processor of a computing device to:

control at least one of a cup controller to move a pouring cup and a platform controller to move a platform supporting a casting assembly to substantially align the pouring cup with a first surface opening of a plurality of surface openings defined by a mold, wherein the casting assembly is configured to hold a plurality of joinable components and the mold, wherein the mold defines at least one mating groove configured to join at least two joinable components of the plurality of joinable components when occupied with a metal or an alloy, each mating groove of the at least one mating groove fluidically connected to the first surface opening and a second surface opening define by the mold, and wherein a vacuum chamber encloses the pouring cup, the casting assembly, and the platform;

control the cup controller to move the pouring cup to pour a respective volume of molten metal or alloy in the first surface opening separately from the second surface opening;

subsequently control at least one of the cup controller to move the pouring cup and the platform controller to move the platform to substantially align the pouring cup with a second surface opening of the plurality of surface openings; and

control the cup controller to move the pouring cup to pour a respective volume of molten metal or alloy in the second surface opening separately from the first surface opening, wherein the pouring cup is a single pouring cup.

16. The computer readable storage medium of claim 15, further comprising instructions that, when executed, cause the at least one processor to control the platform controller to substantially align the second surface opening with the pouring cup by at least one of translating or rotating the platform.

17. The computer readable storage medium of claim 15, further comprising instructions that, when executed, cause the at least one processor to control the cup controller to substantially align the pouring cup with the second surface opening by at least one of translating or rotating the pouring cup.

18. The computer readable storage medium of claim 15, further comprising instructions that, when executed, cause the at least one processor to control the platform controller to move the platform supporting the casting assembly between a heating zone and a cooling zone in the vacuum chamber.

19. The computer readable storage medium of claim 18, further comprising instructions that, when executed, cause the at least one processor to control a cooling zone controller to cool the molten metal or alloy in the cooling zone to solidify and join the plurality of joinable components.