CLAIMS

1. A robot comprising:

a mobile base having a rectangular shape;

a turntable rotatably coupled to the mobile base, the turntable having a circular shape inscribed within the rectangular shape of the mobile base;

a robotic arm operatively coupled to the turntable; and

at least one directional sensor, wherein an orientation of the at least one directional sensor is independently controllable.

2. The robot of claim 1, further comprising a perception mast operatively coupled to the turntable, the perception mast comprising a plurality of sensors including the at least one directional sensor.

3. The robot of claim 2, wherein the perception mast is rotatably coupled to the turntable.

4. The robot of claim 3, wherein the turntable is configured to rotate relative to the mobile base about a first axis, wherein the perception mast is configured to rotate relative to the turntable about a second axis, and wherein the first and second axes are parallel.

5. The robot of claim 2, wherein the robotic arm is kinematically constrained to avoid collisions with the perception mast.

6. The robot of claim 1, further comprising a vacuum-based end effector operatively coupled to a distal portion of the robotic arm.

7. The robot of claim 6, further comprising an on-board vacuum source operatively coupled to the vacuum-based end effector.

8. The robot of claim 7, wherein the on-board vacuum source is configured to rotate with the turntable when the turntable rotates relative to the mobile base.

9. The robot of claim 1, wherein the robotic arm is a six degree of freedom robotic arm.

10. The robot of claim 9, wherein the robotic arm comprises three pitch joints and a spherical three degree of freedom wrist.

11. The robot of claim 9, wherein the robotic arm comprises:

a first joint comprising a first actuator configured to rotate a first link of the robotic arm relative to the turntable about a first axis;

a second joint comprising a second actuator configured to rotate a second link of the robotic arm relative to the first link about a second axis; and

a third joint comprising a third actuator configured to rotate a third link of the robotic arm relative to the second link about a third axis;

wherein the first, second, and third axes are parallel.

12. The robot of claim 9, wherein the robotic arm comprises:

a link;

an end effector; and

a spherical wrist coupling the link and the end effector, the spherical wrist comprising:

a first actuator configured to rotate the end effector relative to the link about a first axis;

a second actuator configured to rotate the end effector relative to the link about a second axis; and

a third actuator configured to rotate the end effector relative to the link about a third axis,

wherein the first, second, and third axes are mutually perpendicular, and wherein the first, second, and third axes intersect.

13. The robot of claim 12, wherein:

a first rotation axis of the first actuator is offset from the first axis;

a second rotation axis of the second actuator is offset from the second axis; and

a third rotation axis of the third actuator is offset from the third axis.

14. The robot of claim 13, wherein the end effector is a vacuum-based end effector, and wherein vacuum tubing coupled to the vacuum-based end effector is routed through the spherical wrist.

15. The robot of claim 14, wherein the vacuum tubing is routed through the intersection of the first, second, and third axes of the spherical wrist.

16. The robot of claim 14, wherein the spherical wrist comprises one or more vacuum slip rings.

17. The robot of claim 1, wherein the mobile base comprises a holonomic drive system.

18. The robot of claim 1, wherein the mobile base comprises a plurality of distance sensors.

19. The robot of claim 18, wherein the plurality of distance sensors comprise a plurality of LiDAR sensors.

20. The robot of claim 18, wherein the mobile base is rectangular, and wherein each side of the mobile base is associated with at least one of the plurality of distance sensors.

21. The robot of claim 20, wherein the mobile base is square.

22. The robot of claim 7, wherein the on-board vacuum source is disposed within the end effector.