CLAIMS

1. A vehicle comprising:

one or more wheels positioned at a bottom side of the vehicle;

a first light detection and ranging device (LIDAR) positioned at a top side of the vehicle opposite to the bottom side, wherein the first LIDAR is configured to scan an environment around the vehicle based on rotation of the first LIDAR about an axis, and wherein the first LIDAR has a first scanning resolution;

a second LIDAR configured to scan a field-of-view (FOV) of the environment that extends away from the vehicle along a viewing direction of the second LIDAR, wherein the second LIDAR has a second scanning resolution that differs from the first scanning resolution; and

a controller configured to operate the vehicle based on the scans of the environment by the first LIDAR and the second LIDAR, and wherein the controller is configured to adjust the viewing direction of the second LIDAR based on data received from the first LIDAR.

2. The vehicle of claim 1, wherein the second LIDAR is positioned adjacent to the first LIDAR at the top side of the vehicle**.**

3. The vehicle of claim 1, further comprising a light filter shaped to enclose the first LIDAR and the second LIDAR, wherein the light filter is configured to allow light within a wavelength range to propagate through the light filter, wherein the first LIDAR is configured to

emit light having a first wavelength within the wavelength range, and wherein the second LIDAR is configured to emit light having a second wavelength within the wavelength range.

4. The vehicle of claim 3, wherein the light filter is configured to reduce an amount of visible light propagating through the light filter.

5. The vehicle of claim 1, wherein the controller is configured to:

determine a three-dimensional (3D) representation of the environment based on data from the first LIDAR having the first scanning resolution;

identify a portion of the 3D representation for scanning by the second LIDAR;

adjust the viewing direction of the second LIDAR to correspond to a particular FOV of the environment associated with the identified portion of the 3D representation; and

update the portion of the 3D representation to have the second scanning resolution of the second LIDAR based on given data from the second LIDAR.

6. The vehicle of claim 1, further comprising a third LIDAR positioned along a given side of the vehicle other than the top side, wherein the third LIDAR is configured to scan a FOV of the environment extending away from the given side, wherein the third LIDAR has a third scanning resolution, and wherein the controller is configured to operate the vehicle based also on the scan of the environment by the third LIDAR.

7. The vehicle of claim 6, further comprising a rear-view mirror, wherein the third LIDAR is mounted to the rear-view mirror.

8. The vehicle of claim 6, wherein the controller is configured to:

detect an object in the environment based on data from the first LIDAR; and

identify the object based on given data from the third LIDAR having the third scanning resolution.

9. The vehicle of claim 8, wherein the controller is configured to:

based on the data from the first LIDAR, determine that a given distance between the object and the vehicle is less than a threshold distance; and

responsively obtain the given data from the third LIDAR to identify the object.

10. A method comprising:

scanning, by a vehicle, an environment around the vehicle based on a first light detection and ranging device (LIDAR) positioned at a top side of the vehicle and configured to rotate about an axis, wherein one or more wheels of the vehicle are positioned at a bottom side of the vehicle opposite to the top side, and wherein the first LIDAR has a first scanning resolution;

scanning, based on a second LIDAR, a field-of-view (FOV) of the environment that extends away from the vehicle along a viewing direction of the second LIDAR, wherein the second LIDAR has a second scanning resolution that differs from the first scanning resolution;

adjusting the viewing direction of the second LIDAR based on data from the first LIDAR; and

operating, by the vehicle, based on the scans of the environment by the first LIDAR and the second LIDAR.

11. The method of claim 10, further comprising scanning, based on a third LIDAR positioned along a given side of the vehicle other than the top side, a FOV of the environment extending away from the given side, wherein the third LIDAR has a third scanning resolution, and wherein operating the vehicle is based also on the scan of the environment by the third LIDAR.

12. The method of claim 11, further comprising:

determining a given distance between the vehicle and an object in the environment of the vehicle based on first data from the first LIDAR, second data from the second LIDAR, or third data from the third LIDAR;

based on the given distance being greater than a first threshold distance and less than a second threshold distance, tracking the object based on the first data from the first LIDAR, wherein the first threshold distance is based on the first LIDAR being positioned at the top side of the vehicle, and wherein the second threshold distance is based on the first scanning resolution of the first LIDAR;

based on the given distance being greater than the second threshold distance, tracking the object based on the second data from the second LIDAR having the second scanning resolution; and

based on the given distance being less than the first threshold distance, tracking the object based on the third data from the third LIDAR positioned at the given side of the vehicle.

13. The method of claim 10, further comprising:

determining a three-dimensional (3D) representation of the environment based on first data from the first LIDAR, wherein the 3D representation has the first scanning resolution of the first LIDAR;

detecting one or more objects in the environment based on the 3D representation;

adjusting the viewing direction of the second LIDAR to correspond to a particular FOV of the environment that includes the one or more objects; and

responsive to adjusting the viewing direction, determining a given 3D representation of the one or more objects based on second data from the second LIDAR, wherein the given 3D representation has the second scanning resolution of the second LIDAR.

14. The method of claim 13, further comprising identifying the one or more objects based on the given 3D representation having the second scanning resolution, wherein operating the vehicle is based on identifying the one or more objects.

15. The method of claim 10, further comprising:

detecting a first object in the environment within a threshold distance to the vehicle based on first data from the first LIDAR, wherein the threshold distance is based on the first scanning resolution of the first LIDAR; and

detecting a second object in the environment at a given distance to the vehicle greater than the threshold distance based on second data from the second LIDAR, wherein detecting the second object at the given distance is based on the second scanning resolution of the second LIDAR.

16. A vehicle comprising:

four wheels positioned at a bottom side of the vehicle;

a dome-shaped housing positioned at a top side of the vehicle opposite to the bottom side;

a first light detection and ranging device (LIDAR) disposed within the dome-shaped housing, wherein the first LIDAR is configured to scan an environment around the vehicle based on rotation of the first LIDAR about an axis, and wherein the first LIDAR has a first scanning resolution;

a second LIDAR disposed within the dome-shaped housing and positioned between the first LIDAR and the top side of the vehicle, wherein the second LIDAR is configured to scan a field-of-view (FOV) of the environment that extends away from the vehicle along a viewing direction of the second LIDAR, and wherein the second LIDAR has a second scanning resolution that is higher than the first scanning resolution; and

a controller configured to operate the vehicle based on the scans of the environment by the first LIDAR and the second LIDAR, and wherein the controller is configured to adjust the viewing direction of the second LIDAR based on data received from the first LIDAR.

17. The vehicle of claim 16, further comprising a stepper motor coupled to the second LIDAR and configured to adjust the FOV of the environment scanned by the second LIDAR.

18. The vehicle of claim 16, wherein the dome-shaped housing comprises:

a light filter shaped to enclose the first LIDAR and the second LIDAR, wherein the light filter is configured to allow light within a wavelength range to propagate through the light filter, wherein the first LIDAR is configured to emit light having a first wavelength within the

wavelength range, and wherein the second LIDAR is configured to emit light having a second wavelength within the wavelength range; and

a dividing structure disposed within the dome-shaped housing and positioned between the first LIDAR and the second LIDAR.