CLAIMS

1. A vehicle comprising:

a first camera mounted in order to capture images of an environment of the vehicle, the first camera having a first exposure time and being without an ND filter; and

a second camera mounted in order to capture images of the environment, the second camera having a second exposure time that is greater than or equal to the first exposure time and having an ND filter.

one or more processors configured to:

capture images using the first camera and the first exposure time;

capture images using the second camera and the second exposure time;

use the images captured using the second camera to identify light from at least one light emitting diode (LED);

use the images captured using the first camera to identify a location of an object including the at least one LED; and

use the identified LED and the identified location of the object to control the vehicle in an autonomous driving mode.

2. The vehicle of claim 1, wherein the first camera and the second camera each include a near infrared filter.

3. The vehicle of claim 1, wherein the second exposure time is on the order of milliseconds.

4. The vehicle of claim 3, wherein the second exposure time is at least 5 milliseconds and the first exposure time is no greater than 5 milliseconds.

5. The vehicle of claim 1, wherein the ND filter is selected according to the second exposure time.

6. The vehicle of claim 1, wherein the ND filter is implemented at a pixel level for the

second camera.

7. The vehicle of claim 1, wherein the LED is part of a traffic signal, a light of a second vehicle, or a light of a traffic sign.

8. The vehicle of claim 7, wherein the light of a second vehicle is one of a turn signal, a brake light, a headlight, a daytime running light, or a reverse light.

9. The vehicle of claim 7, wherein the traffic sign is one of a construction sign, a speed limit sign, or direction of traffic sign.

10. The vehicle of claim 1, wherein the second exposure time is selected in order to enable the one or more processors to identify text in the images captured using the second camera.

11. The vehicle of claim 1, wherein the second exposure time is a fixed exposure time.

12. The vehicle of claim 1, wherein the first exposure time is a variable exposure time that is adjusted according to ambient lighting conditions.

13. The vehicle of claim 14, wherein the second exposure time is always greater than the first exposure time.

14. The vehicle of claim 14, wherein the second exposure time is a variable exposure time.

15. The vehicle of claim 1 wherein the second camera further comprises:

a set of photodiodes, the ND filter being arranged to filter light before the light reaches the set of photodiodes; and

a controller configured to expose the set of photodiodes using a fixed exposure time of at least 5 milliseconds in order to capture an image, wherein the exposure time allows the camera to capture light from a PWM light source during the exposure time, the PWM light being located in an environment of the vehicle.

16. The system of claim 15, further comprising a near-infrared filter arranged to filter light before the light reaches the set of photodiodes.

17. The vehicle of claim 1, wherein the second camera further comprises:

a set of photodiodes, and the ND filter being arranged to filter light before the light reaches the set of photodiodes; and

a controller configured to expose the set of photodiodes using a fixed exposure time of at least 5 milliseconds in order to capture an image, wherein the exposure time allows the camera to capture light from a light source which flickers at a rate defined by a power grid that supplies power to the light source, the light source being located in an environment of the vehicle.

18. The vehicle of claim 17, wherein the second camera further comprises a near-infrared filter arranged to filter light before the light reaches the set of photodiodes.

19. The vehicle of claim 1, wherein the second camera includes an aperture that is smaller in diameter than an aperture of the first camera.