CLAIMS

WHAT IS CLAIMED IS:

1. A deployable measurement system comprising:

a housing configured to be coupled to a frame of a vehicle that is configured to move along a railroad track having a pair of running rails and a conducting rail;

a reflecting assembly coupled to the housing such that the reflecting assembly is movable between a stored position and a deployed position, the reflecting assembly including a reflective element that is configured to reflect electromagnetic radiation incident thereon;

a movement assembly coupled to the housing including an actuator, the actuator ~~and~~ being configured to cause the reflecting assembly to move automatically (i) from the stored position to the deployed position, (ii) from the deployed position to the stored position, or (iii) both (i) and (ii) in response to an electrical signal; and

an optical measurement system disposed within the housing and being configured to receive electromagnetic radiation that is reflected by the reflective element, the received electromagnetic radiation being associated with one or more parameters related to the conducting rail.

2. The system of claim 1, wherein at least a portion of the reflecting assembly is positioned outside of the housing when the reflecting assembly is in the deployed assembly.

3. The system of claim 1, wherein the housing is movable between a stored position and a deployed position.

4. The system of claim 1, wherein the housing includes a base that forms an opening with a lip about at least a portion of the periphery of the opening.

5. The system of claim 4, wherein the reflecting assembly includes an aperture plate having one or more apertures, the aperture plate having a flange about at least a portion of the periphery of the aperture plate that is configured to engage the lip of the opening in the base of the housing in response to the reflecting assembly being in the deployed position.

6. The system of claim 1, wherein the reflective element is positioned at a non-zero angle relative to horizontal in response to the reflecting assembly being in the deployed position.

7. The system of claim 6, wherein the reflective element is generally horizontal in response to the reflecting assembly being in the stored position.

8. The system of claim 1, wherein the reflecting assembly includes a base plate, an aperture plate, and first and second side bracket, the first side bracket being coupled to a first end of the aperture plate and a first end of the base plate, the second side bracket being coupled to a second opposing end of the aperture plate and a second opposing end of the base plate.

9. The system of claim 8, wherein the first and second side brackets are configured to detach from the aperture plate in response to a force being imparted on the base plate, the first side bracket, the second side bracket, or any combination thereof.

10. The system of claim 9, wherein the force is greater than a detachment threshold, and wherein the detachment threshold is sufficient such that the first and second side brackets do not detach from the aperture plate in the absence of an impact between a foreign object and the base plate, the first side bracket, the second side bracket, or any combination thereof, and such that the first and second side brackets do detach from the aperture plate response to an impact between a foreign object and the base plate, the first side bracket, the second side bracket, or any combination thereof.

11. The system of claim 1, wherein the movement assembly includes a retraction assembly configured to apply a retraction force on the reflecting assembly to bias the reflecting assembly to the stored position, and a deployment assembly configured to impart a deployment force on the reflecting assembly to overcome the retraction force and move the reflecting assembly to the deployed position, the retraction assembly moving the reflecting assembly to the stored position responsive to the deployment assembly ceasing to impart the deployment force on the reflecting assembly.

12. The system of claim 1, wherein the optical measurement system includes an electromagnetic radiation source and an optical sensor.

13. The system of claim 12, wherein when the reflecting assembly is in the stored position, a field of view of the optical sensor does not include the rail, and wherein the angle at which the reflective element is positioned at is selected such that when the reflecting assembly is in the deployed position, the field of view of the optical sensor includes the rail.

14. The system of claim 12, wherein the electromagnetic radiation source is configured to emit electromagnetic radiation through one or more apertures in the reflecting assembly such that the emitted electromagnetic radiation reflects off of the reflective element and travels toward the rail when the reflecting assembly is in the deployed position.

15. The system of claim 14, wherein the optical sensor is configured to receive electromagnetic radiation reflected off of the rail through the one or more apertures in the reflecting assembly when the reflecting assembly is in the deployed position.

~~16. A deployable measurement system configured to be coupled to a vehicle configured to move along a railroad track, the system comprising:~~

~~a housing;~~

~~a reflecting assembly coupled to the housing such that the reflecting assembly is movable between a stored position and a deployed position;~~

~~a deployment assembly coupled to the housing and being configured to cause the reflecting assembly to move from the stored position to the deployed position such that at least a portion of the reflecting assembly is positioned outside of the housing; and~~

an optical measurement system disposed within the housing and being configured to receive electromagnetic radiation that is reflected by the reflecting assembly in response to the reflecting assembly being in the deployed position.

17. A deployable measurement system for analyzing a rail of a railroad track, the deployable measurement system comprising:

a housing configured to be coupled to a frame of a vehicle that is configured to move along the railroad track, the housing being movable between a stored position and a deployed position, the housing including a base, two opposing side walls, two opposing end walls, and a lid, the base of the housing having an opening that forms a lip about at least a portion of the periphery of the opening;

a reflecting assembly coupled to the housing such that the reflecting assembly is movable between a stored position and a deployed position, the reflecting assembly including:

a base plate;

a reflective element coupled to the base plate, the reflective element being positioned at a non-zero angle relative to the base of the housing when the reflecting assembly is in the deployed position;

an aperture plate having one or more apertures, the aperture plate having a flange about at least a portion of the periphery of the aperture plate that is configured to engage the lip of the opening in the base of the housing in response to the reflecting assembly being in the deployed position; and

a first side bracket coupled to (i) a first end of the aperture plate via one or more first fasteners and (ii) a first end of the base plate via one or more second fasteners;

a second side bracket coupled to (i) a second opposing end of the aperture plate via the one or more of the first fasteners and (ii) a second opposing end of the base plate via one or more of the second fasteners, the one or more first fasteners being configured to permit the first and second side brackets to detach from the aperture plate in response to a first force greater than a first detachment threshold force being imparted on the base plate, the first side bracket, the second side bracket, or any combination thereof;

a retraction assembly coupled between the housing and the reflecting assembly such that the retraction assembly imparts a retraction force on the reflecting assembly to bias the reflecting assembly to the stored position;

a deployment assembly coupled to the housing and being configured to exert a deployment force on the aperture plate of the reflecting assembly that is sufficient to overcome the retraction force of the retraction assembly and cause the reflecting assembly to move from the stored position to the deployed position; and

an optical measurement system disposed within the housing, the optical measurement system being configured to generate data indicative of one or more parameters related to the rail.

~~18~~16. The system of claim 1, further comprising one or more sensors configured to detect foreign objects, wherein responsive to the one or more sensors detecting one of the foreign objects and responsive to a determination that the detected one of the foreign objects is within a threshold distance from the vehicle, the railroad track, or any combination thereof, causing (i) the reflecting assembly to move to the stored position, (ii) the housing to move to the stored position, or (iii) both (i) and (ii).

~~19~~17. The system of claim 1, further comprising one or more sensors coupled to the vehicle, wherein responsive to the one or more sensors detecting a foreign object adjacent to the vehicle, causing (i) the reflecting assembly to move to the stored position, (ii) the housing to move to the stored position, or (iii) both (i) and (ii).

~~20~~18. The system of claim 1, wherein at least a portion of the reflecting assembly is configured to break away from the housing in response to being impacted by a foreign object positioned along the railroad track.

19. The system of claim 1, wherein the electrical signal is generated based on operator input.