CLAIMS

1. A system, comprising:

a linear induction motor (LIM) installed in a curved portion of a track;

a ride vehicle disposed upon the track;

one or more reaction plates coupled to a side of the ride vehicle facing the track via a plurality of actuators;

one or more sensors configured to monitor an air gap between the one or more reaction plates and the LIM; and

a processor configured to determine which of the plurality of actuators to actuate and a desired performance of each of the plurality of actuators based on data received from the one or more sensors to bend the one or more reaction plates to maintain the air gap at a desired level throughout traversal of the curved portion of the track by the ride vehicle.

2. The system of claim 1, wherein the plurality of actuators and the one or more reaction plates are configured to cooperate to bend selected reaction plates to match arcs of the curved portion of the track based on actuation of selected actuators as determined by the processor.

3. The system of claim 1, wherein the processor is configured to utilize a closed loop feedback system to determine the desired performance of each of the plurality of actuators as the ride vehicle traverses the curved portion of the track to maintain the air gap at the desired level.

4. The system of claim 1, wherein the LIM includes linear coil windings disposed in a ferrite core and covered by a panel.

5. The system of claim 4, wherein the one or more reaction plates are the same size as the linear coil windings.

6. The system of claim 1, wherein the one or more reaction plates each include a bottom side made of aluminum that faces the LIM and a top backing plate made of iron.

7. The system of claim 1, wherein each of the one or more reaction plates includes four corners, wherein one actuator of the plurality of actuators is disposed in each of the four corners.

8. The system of claim 1, wherein the track comprises two rails and the ride vehicle includes two running bearings secured to the side of the ride vehicle facing the track, one running bearing aligned with each rail of the track and running from the front of the reaction plate to the rear of the reaction plate, that contact a running surface disposed on top of the track throughout the curved portion of the track.

9. The system of claim 1, wherein the curved portion comprises a compound curve and wherein the one or more reaction plates are articulated, flexible, segmented, or a combination thereof.

10. The system of claim 1, wherein the LIM is single sided or double sided.

11. A system, comprising:

a linear synchronous motor (LSM) including a rotor comprising alternating pole permanent magnets installed on vertebrae panels articulated by a flexible substrate, wherein the rotor is installed on two sides of a compound curve portion of a roller coaster track, and a stator comprising linear coil windings secured to the bottom of a ride vehicle disposed on the track, the ride vehicle comprising:

a power source; and

a processor configured to determine how much power to supply to the linear coil windings and when to supply the power to maintain sufficient air gaps between the stator and the rotor vertebrae panels and to cause the power source to supply the power as determined throughout the compound curve.

12. The system of claim 11, wherein the permanent magnet's attraction and repulsion to the magnetic field generated by the linear coil windings cause the rotor vertebrae panels to bend or move via the flexible substrate to match a pitch and a roll experienced by the ride vehicle throughout the compound curve.

13. The system of claim 11, wherein the ride vehicle comprises one or more proximity sensors configured to obtain data related to the air gap between the rotor and the stator and to send the data to the processor.

14. The system of claim 13, wherein the processor is configured to determine how much power to supply to the linear coil windings and when to supply the power to adjust the air gaps based on the obtained sensor data.

15. The system of claim 11, wherein the flexible substrate comprises a cable that enables the rotor vertebrae panels to be positioned in different angles around the compound curve.

16. A system, comprising:

a linear induction motor (LIM) installed in a curved portion of a track;

a ride vehicle disposed upon the track;

one or more reaction plates coupled to a side of the ride vehicle facing the track via a plurality of actuators;

one or more sprayers installed in the track that inject hydraulic fluid between the one or more reaction plates and the LIM to create a hydrodynamic bearing and wall seals that contact the sides of the ride vehicle as it travels throughout the curved portion to retain the hydraulic fluid;

one or more sensors configured to monitor an air gap between the one or more reaction plates and the LIM; and

a processor configured to determine which of the plurality of actuators to actuate and a desired performance of each of the plurality of actuators based on data received from the one or more sensors to maintain the air gap at a desired level throughout traversal of the curved portion of the track by the ride vehicle.