

CLAIMS

1. An amusement park tracking and control system, comprising:
 - a plurality of retro-reflective markers positioned within a guest attraction area;
 - an emission subsystem configured to emit electromagnetic radiation toward the plurality of retro-reflective markers;
 - a detection subsystem configured to detect reflection of electromagnetic radiation from the plurality of retro-reflective markers resulting from electromagnetic radiation emission by the emission subsystem, wherein the detection subsystem comprises at least one detection camera configured to detect reflection from the plurality of retro-reflective markers resulting from the electromagnetic radiation emission by the emission subsystem, a first set of retro-reflective markers of the plurality of retro-reflective markers are positioned on a wall of the guest attraction area, and wherein the at least one detection camera is positioned to obtain an elevational view of the retro-reflective markers positioned on the wall; and
 - a control system communicatively coupled to the detection subsystem and comprising processing circuitry configured to monitor the reflection from the plurality of retro-reflective markers and evaluate information relating to a person in the guest attraction area based on changes in the monitored reflection, to evaluate a size of one or more persons in the guest attraction area by performing an evaluation routine comprising comparing a pattern of reflection observed from the elevational view by the at least one detection camera with a stored pattern of reflection, and correlating differences between the pattern of reflection and the stored pattern of reflection to identify which of the retro-reflective markers positioned on the wall are blocked by the one or more persons.
2. The system of claim 1, wherein a second set of retro-reflective markers of the plurality of retro-reflective markers are positioned on a floor of the guest attraction area, and wherein an additional detection camera of the at least one detection camera is positioned to obtain an overhead view of the second set of retro-reflective markers positioned on the floor.
3. The system of claim 2, wherein the overhead view is a plan view.
4. The system of claim 2, wherein the processing circuitry of the control system is configured to evaluate a position of one or more persons in the guest attraction area by performing an evaluation routine comprising comparing a pattern of reflection observed from the overhead view by the additional detection camera of the at least one detection camera with a stored pattern of reflection, and correlating differences between the pattern of reflection and the stored pattern of reflection to identify which of the retro-reflective markers

positioned on the floor are blocked from view by the additional detection camera of the at least one detection camera by the one or more persons.

5. The system of claim 3, wherein the processing circuitry of the control system is configured to trigger an automated device based, at least in part, on the identification of blocked retro-reflective markers.

6. The system of claim 1, wherein the processing circuitry of the control system is configured to trigger an automated device based, at least in part, on the identification of blocked retro-reflective markers.

7. An amusement park tracking and control system, comprising:

a plurality of retro-reflective markers comprising a first set of retro-reflective markers positioned within a predetermined distance of a ride vehicle in a guest attraction area and a second set of retro-reflective markers positioned outside of the predetermined distance of the ride vehicle; and

a control system comprising processing circuitry configured to receive data indicative of electromagnetic radiation reflection from the plurality of retro-reflective markers and to monitor the electromagnetic radiation reflection by the plurality of retro-reflective markers for a change from a first pattern of electromagnetic radiation reflection by the plurality of retro-reflective markers to a second pattern of electromagnetic radiation reflection by the plurality of retro-reflective markers; and

wherein the processing circuitry of the control system is configured to evaluate information relating to a person in the guest attraction area based on changes in the monitored electromagnetic radiation reflection, to generate an output to control automated equipment within the guest attraction area based on the evaluated information, and to determine whether any of the first set of retro-reflective markers or the second set of retro-reflective markers are blocked from receiving or reflecting emitted electromagnetic radiation based on the change from the first pattern of electromagnetic radiation reflection to the second pattern of electromagnetic radiation reflection.

8. The system of claim 7, wherein a third set of retro-reflective markers of the plurality of retro-reflective markers is positioned on environmental elements of the guest attraction area, and wherein the processing circuitry of the control system is configured to assume that a change from the first pattern of electromagnetic radiation reflection by the plurality of retro-reflective markers to the second pattern of electromagnetic radiation reflection by the

plurality of retro-reflective markers corresponds to a change in positioning of the person relative to the environmental elements.

9. The system of claim 7, wherein a third set of retro-reflective markers of the plurality of retro-reflective markers is positioned on environmental elements of the guest attraction area, and the processing circuitry of the control system is configured to evaluate the information by correlating portions of the first pattern of reflection no longer present in the second pattern of reflection to the information relating to the person in the guest attraction area.

10. The system of claim 9, wherein the processing circuitry of the control system is configured to correlate the portions of the first pattern of reflection no longer present in the second pattern of reflection to a grouping of retro-reflective markers within the third set of retro-reflective markers of the plurality of retro-reflective markers that are blocked from receiving or reflecting emitted electromagnetic radiation by the person in the guest attraction area.

11. The system of claim 9, wherein the processing circuitry of the control system is configured to identify a position of the person in the guest attraction area based on a stored position of the grouping of retro-reflective markers that are blocked from receiving or reflecting emitted electromagnetic radiation by the person in the guest attraction area, and to trigger an attraction feature based on the identified position.

12. The system of claim 9, wherein a third set of retro-reflective markers of the plurality of retro-reflective markers is positioned on environmental elements of the guest attraction area, wherein the processing circuitry of the control system is configured to trigger an attraction feature based on an identified position of the person by performing a process in which the control system compares the identified position to a proximity region of the attraction feature, the proximity region comprising a subset of retro-reflective markers of the third set of retro-reflective markers having a predetermined range of distances from the attraction feature.

13. The system of claim 12, wherein the processing circuitry of the control system is configured to automatically trigger a show effect, dispatch a ride vehicle, or open an access gate, once the identified position is within the proximity region.

14. The system of claim 13, wherein the processing circuitry of the control system is configured to automatically trigger the show effect, dispatch the ride vehicle, or open the

access gate, once the identified position is determined to have first been inside of the proximity region, and then moved outside of the proximity region.

15. The system of claim 7, wherein when the control system determines that at least some of the retro-reflective markers within the predetermined distance are blocked, the control system has a first output that prevents departure of the ride vehicle, and when the control system determines that none of the retro-reflective markers within the predetermined distance are blocked, the control system has a second output that automatically causes departure of the ride vehicle.

16. A method of operating an amusement park attraction, comprising:

flooding a guest attraction area of the amusement park attraction with electromagnetic radiation using an emission subsystem comprising one or more emitters;

reflecting the electromagnetic radiation from the emission subsystem using a first retro-reflective marker and a second retro-reflective marker disposed within the guest attraction area, wherein the first and second retro-reflective markers comprise different retro-reflective coatings such that different wavelengths of the electromagnetic radiation are reflected by the first and second retro-reflective markers to produce a first pattern of reflection and a second pattern of reflection, respectively;

detecting wavelengths of electromagnetic radiation retro-reflected from within the guest attraction area while filtering wavelengths of electromagnetic radiation not retro-reflected from within the guest attraction area using a detection subsystem having one or more optical filters;

tracking changes in the reflected electromagnetic radiation to evaluate information relating to one or more persons in the guest attraction area with a control system communicatively coupled to the detection subsystem; and

controlling automated equipment within the guest attraction area based on the evaluated information using the control system.

17. The method of claim 16, wherein controlling automated equipment within the guest attraction area based on the evaluated information comprises controlling the automated equipment based on an evaluated position of the one or more persons in the guest attraction area, wherein the evaluated position is determined by the control system based on the tracked changes in the reflected electromagnetic radiation.

18. The method of claim 17, wherein tracking changes in the reflected electromagnetic radiation comprises determining a pattern of reflection from within the guest attraction area

and comparing the determined pattern with a previously determined pattern to identify differences between the determined pattern and the previously determined pattern, and correlating the identified differences to movement of the one or more persons.

19. The method of claim 18, comprising reflecting the electromagnetic radiation from the emission subsystem using third retro-reflective markers positioned on wearable items worn by individuals in the guest attraction area, and estimating changes in respective positions of the third retro-reflective markers based on the identified differences between the determined pattern and the previously determined pattern using the control system.

20. The method of claim 19, comprising triggering an attraction feature based on an estimated position of the third retro-reflective markers using the control system.

21. The method of claim 18, comprising reflecting the electromagnetic radiation from the emission subsystem using third retro-reflective markers positioned on environmental elements in the guest attraction area, and estimating respective positions of the one or more persons based on the identified differences between the determined pattern and the previously determined pattern using the control system.

22. The method of claim 21, comprising triggering an attraction feature based on the estimated respective positions of the one or more persons using the control system.

23. The method of claim 21, comprising causing a surveillance system to automatically observe a controlled access zone using the control system when the control system determines, based on portions of the previously determined pattern no longer present in the determined pattern, that certain of the third retro-reflective markers are blocked by the one or more persons are located within the controlled access zone.

24. The method of claim 17, wherein tracking changes in the reflected electromagnetic radiation comprises determining a pattern of reflection from third retro-reflective markers and comparing the determined pattern with a previously determined pattern to identify differences between the determined pattern and the previously determined pattern, and correlating the identified differences to a length of a queue of guests waiting to purchase an item from a kiosk comprising control circuitry that controls a quantity of the item able to be purchased, and updating the quantity, using the control system and the kiosk, based at least in part on the determined length of the queue.

25. The method of claim 16, comprising:

reflecting the electromagnetic radiation from the emission subsystem using third retro-reflective markers positioned on environmental elements in the guest attraction area;

estimating one or more parameters of the one or more persons based on an identified difference between a detected pattern of reflection from the third retro-reflective markers and a stored pattern of reflection from the third retro-reflective markers using the control system;

correlating the one or more parameters to a size requirement of an amusement ride using the control system;

providing an advisory, using a guest advisory system and the control system, to the one or more persons if the one or more parameters are not in compliance with the size requirement.

26. The method of claim 16, comprising:

reflecting the electromagnetic radiation from the emission subsystem using a plurality of sets of retro-reflective markers, each set of retro-reflective markers of the plurality of sets of retro-reflective markers being positioned at a different respective location on a stage of the guest attraction area;

monitoring, using the control system, the plurality of sets of retro-reflective markers for changes in reflective patterns from each of the sets of retro-reflective markers to evaluate whether actors on the stage are appropriately positioned relative to an attraction feature;

controlling the attraction feature based on the changes in the reflective patterns using the control system .

27. The method of claim 16, comprising:

reflecting the electromagnetic radiation from the emission subsystem using a plurality of retro-reflective markers disposed on a control panel of an attraction area to produce reflective patterns;

monitoring reflection of the electromagnetic radiation from the plurality of retro-reflective markers for changes in the reflective patterns indicative that one or more retro-reflective markers are covered by an operator;

comparing, using the control system, identified changes in the reflective patterns to patterns stored in a memory of the control system to determine whether the identified changes are indicative of a control input;

controlling an attraction feature, using the control system, when the control system identifies that the changes are indicative of the control input.

28. The method of claim 16, wherein:

tracking the changes in reflected electromagnetic radiation to evaluate information relating to one or more persons in the guest attraction area comprises monitoring the first and second patterns of reflection for changes using the control system;

controlling the automated equipment within the guest attraction area based on the evaluated information comprises controlling an attraction feature, using the control system based on an identified change in the first pattern of reflection or the second pattern of reflection, or both.