

GUIDEWAY TRANSPORTATION SYSTEM

Field of the Invention

[0001] The present invention relates to a guideway based transport system. In particular, this invention relates to a guideway based transport system having angular berthing stations and sharp turning capabilities.

Background of the Invention

[0002] Mass Transit systems are well known in the art, and some examples of which are subways and railway based train systems. These Mass Transit systems are capable of transporting large numbers of passengers from one fixed location in the system to another fixed location in the system. The fixed location within the system is often a designated station whereby the passengers embark and disembark from. Such systems disadvantageously require passengers to follow a schedule for the arrival of for example the trains. At the same time, the route of mass transit systems are fixed and passengers will have to go through all the designated stations if their intended destination is the furthest one.

[0003] As a result of such disadvantages of mass transit systems, smaller versions presently referred to as the Personal Rapid Transit (PRT) has since been developed. Some examples of well known PRT systems are "Taxi 2000" and "Urban Light Transport (Ultra)" system. Such on-demand PRT systems utilize small, personal vehicles that travel on guideways for transporting small number of passengers from one station directly to another destination station. These PRT systems are envisioned to have extensive interconnected guideway systems allowing the vehicles to travel along the shortest or fastest path to a destination station. It is further envisioned that several vehicles will be travelling on the guideways at any one time and stations on the guideways would allow for the passengers to embark and disembark from the vehicles.

[0004] In US Patent No. 5,797,330, Li discloses a passenger station adjacent to a main guideway, where the passenger station is accessible via a branched guideway joined at two locations from the main guideway. A vehicle stopping at the passenger station would then travel along the same direction on the branch guideway to join the main guideway. While this prevents congestion on the main guideway, it does not however prevent the branch guideway from getting congested.

[0005] In US Patent No. 6,318,274, Park discloses a PRT system having several branch guideways branching off from main guideways and having terminals at the end of the branch guideways. The terminals each having several platforms for embarking and disembarking several passengers at any one time. While this prevents congestion on the branch guideways, it disadvantageously takes up more space as the branch guideway branches off from the main guideway in a long curve. The vehicles would also need to travel a substantial distance from the main guideway to the branch guideway to reach the terminal.

[0006] Therefore, a need clearly exists for an improved guideway transport system that overcomes the problems or at least alleviate the limitations of existing systems.

Summary of the Invention

[0007] The present invention seeks to provide a guideway based transport system having angular berthing stations and sharp turning capabilities.

[0008] Accordingly, in one aspect, the present invention provides a guideway transportation system for delivering goods or passengers from one point to another, the guideway transportation system comprising:

a vehicle having an in-vehicle steering system and a propulsion means;

a guideway system comprising a plurality of guideways forming a network of interconnected guideways for allowing the vehicle to travel on; and

a plurality of stations sited at predetermined intervals along the guideway systems for disembarking of goods or passengers;

each of the plurality of stations are immediately adjacent the guideways, and each of the plurality of stations further comprising a plurality of berths;

each of the plurality of berths for berthing the vehicle;

wherein the guideway transportation system is adapted for guiding the vehicle through a substantially right angle turn; and

wherein the substantially right angle turn has turn radius of less than one length of the vehicle.

[0009] In another aspect, the present invention provides, an in-vehicle steering system for a vehicle adapted for travelling on a guideway having a platform for supporting the plurality of vehicles, and a pair of steering channel guides disposed above the platform for providing guidance to the vehicle, the in-vehicle steering system comprises:

two pairs of wheel assemblies free-pivotally attached to an undercarriage of the vehicle;

each of the wheel assemblies having a supporting wheel for supporting the weight of each of the vehicle,

a guide wheel for contacting the steering channel guides and for limiting free-pivotal movement of the wheel assembly, and

a steering wheel for engaging the steering channel guides for guiding the of vehicle at the branch off point.

a control shaft having a drive motor and a worm disposed on each of the opposing ends of the control shaft;

a worm gear engaged to each of the worm, the worm gear having a fork coupled to each of the opposing ends of the worm gear;

a wheel assembly shaft having a tongue on one end adapted to engage the fork and a pinion coupled to an opposing end of the wheel assembly shaft via another worm on the opposing end of the wheel assembly shaft, the pinion further having a coaxial worm gear for engaging the another worm; and

a rack coupled to the steering wheel, adapted for engaging the pinion,

wherein activation of the drive motor rotates the control shaft and the worm disposed on each of the opposing ends of the control shaft, in rotating the worm gear engaged to the worm and the fork, rotating the tongue on the wheel assembly shaft, rotating the another worm and the coaxial worm gear, rotating the pinion engaged to the rack, and causing the rack to raise or lower the steering wheel.

[0010] In yet another aspect, the present invention provides, a pop-up router for engaging and guiding at least one supporting wheel of a vehicle having an in-vehicle steering system on a surface through a predetermined path, the pop-up router comprising:

a first set of rollers and a second set of rollers;

the first set of rollers mounted on a frame substantially parallel to a second set of rollers mounted on the frame,

wherein the first and second sets of rollers defining a space therebetween sufficient for guiding the supporting wheel of the vehicle and wherein the first and second set of rollers serve to guide the supporting wheel smoothly through the space in the predetermined path.

Brief Description of the Drawings

[0011] Embodiments of the present invention will now be more fully described, by way of example, with reference to the drawings of which:

[0012] FIG.1 illustrates a guideway transport system according to the present invention;

[0013] FIG.2A illustrates a cross section view of a guideway of FIG.1;

[0014] FIG.2B illustrates a cross section view of a branch-off point of FIG.1;

[0015] FIG.3 illustrates an undercarriage of a vehicle of FIG.1;

[0016] FIG.4 illustrates a front/back view of an in-vehicle steering system of FIG.3;

[0017] FIG.5 illustrates a skeleton view of the in-vehicle steering system of FIG.3 and FIG.4;

[0018] FIG.6 illustrates a pop-up router of FIG.1; and

[0019] FIG.7 illustrates a detailed view of the pop-up router of FIG.6.

Detailed Description

[0020] In the following description, details are provided to describe the embodiments of the invention. It shall be apparent to one skilled in the art, however, that the embodiments may be practiced without such details. Some of these details may not be described at length so as not to obscure the preferred embodiments.

[0021] The present invention is a guideway transportation system capable of delivering goods or passengers from one point on a guideway system to another. A vehicle is adapted for the guideway system and is capable of performing sharp turns on guideways of the guideway system. The guideway system comprises a complex interconnected arrangement of guideways connecting to and branching from each other. The guideways are further adapted to allow the vehicles to turn off the guideways to stations sited immediately adjacent to the guideways.

[0022] These stations are adapted to allow the vehicles to perform substantially right angle turns off the guideways into the station. The substantially right angle turns has turn radius of less than one length of the vehicles. In the station, passengers or goods may be embarked or disembarked. Following which, the

vehicles can perform another substantially right angle turn out of the station onto the guideway. The substantially right angle turn has turn radius of less than one length of the vehicles.

[0023] Furthermore, the guideway system is further adapted to guide vehicles perform substantially right angle turns on the guideway. The substantially right angle turns have turn radius of less than one length of the vehicle. The substantially right angle turns may be on the guideway when the guideway is adapted for guiding the vehicle through a U-turn. It may further be for the vehicle turning from one guideway to another interconnected guideway.

[0024] This advantageously allows for smaller stations along the guideways than previously envisioned with existing PRT systems. Furthermore, each station may comprise several berths allowing several vehicles to turn off the guideway into the station at any one time. The berths are sited closely adjacent to one another, further reducing the space required for the station. Another advantage is that the guideway does not get congested when vehicles stop to embark or disembark.

[0025] The vehicle of the present guideway transportation system is adapted to travel on the guideway to an intended destination. The guideways are interconnected to each other at branch-off points. Each branch off point comprises at least two paths to follow, each path formed by a guideway. The vehicles of the present guideway transportation system are further adapted with an in-vehicle steering system permitting the vehicles to travel from one guideway to another connected guideway at a branch-off point.

[0026] Furthermore, with the in-vehicle steering system, the vehicles are further adapted to perform substantially right angle turns on the guideway. The substantially right angle turns have turn radius of less than one length of the vehicle. The substantially right angle turns may be on the guideway when the guideway is adapted for guiding the vehicle through a U-turn. It may further be for the vehicle turning from one guideway to another interconnected guideway.

[0027] Referring to FIG.1, the guideway transport system 10 of the present invention comprises a guideway system made up of a system and network of interconnected guideways 20 and vehicles 30 adapted for the guideway 20.

[0028] Furthermore, the guideway system is further adapted to guide vehicles 30 perform substantially right angle turns on the guideway 20. The substantially right angle turns have turn radius of less than one length of the vehicle. The substantially right angle turns may be on the guideway 20 when the guideway is adapted for guiding the vehicle through a U-turn. It may further be for the vehicle 30 turning from one guideway 20 to another interconnected guideway 20.

[0029] The guideway transport system 10 further comprises a plurality of stations 32 adjacent immediately of the guideways 20. Each station 32 of the guideway transport system is adapted to allow the vehicles 30 to perform substantially right angle turns from the guideway 20 immediately into the station 32.

[0030] The station 32 further comprises a plurality of berths 34 for the parking of the vehicles 30. The berths 34 are also adapted to allow the embarking and disembarking of passengers and goods. The berths 34 may further be provided with weighing scales for weighing the vehicles 30.

[0031] The vehicles 30 can after disembarking and embarking of passengers and goods, perform another substantially right angle turn from the berth 34 of the station 32 out onto the guideway 20 and continue travelling. The substantially right angle turn has turn radius of less than one length of the vehicle 30.

[0032] Branch-off points 21 on the guideways 20 comprise two paths heading in a different direction, each path following one guideway 20. The vehicles of the present guideway transportation system are adapted to permit the vehicles 30 to travel from one guideway 20 to another connected guideway 20 at the branch-off points 22.

[0033] Referring to FIG.1 and FIG.2A, the guideway 20 comprises a platform 24 and a pair of steering channel guides 26. The platform 24 provides a substantially flat area for supporting the vehicles 30 and for the vehicles 30 to travel on. The steering channel guides 26 appear in cross section to resemble c-channels and are adapted for mating to the in-vehicle steering system of the vehicles 30.

[0034] Referring to FIG.1 and FIG.2B, the guideway 20 at the branch off point 22 is essentially the beginning of two guideways 20 heading in different directions. Assuming a first guideway 21a and a second guideway 21b at the branch off point 22. At section B-B which is the branch off point 22, there is only one outside steering channel guide 26a for the first guideway 21a and one outside guideway 21b for the second guideway 26b respectively instead of the usual pair of steering channel guides 26. The outside steering channel guides 26a, 26b are only found on the opposing far sides of the first and second guideways 21a, 21b respectively.

[0035] In operation, when the vehicle 30 approaches the branch off point 22 and intends to continue along the path according to the first guideway 21a, the vehicle 30 will activate the in-vehicle steering system to only engage the vehicle 30 to the outside steering channel 26a of the first guideway 21a, while disengaging from the other steering channel 26. If instead the second guideway 21b is intended as the path to follow, then the vehicle 30 will only be engaged to the outside steering channel 26b of the second guideway 21b, while disengaging from the other steering channel 26.

[0036] Referring to FIG.3. the in-vehicle steering system 40 is located at the undercarriage of the vehicles 30. The in-vehicle steering system 40 comprises in the present examples two pairs of wheel assemblies 44. One pair of wheel assemblies 44 are situated at the front and the other pair at the rear end of the vehicle undercarriage respectively.

[0037] At least one electric motor 46 for providing propulsion to the vehicle 30 is coupled to at least one of the wheel assemblies 44. The wheel assemblies 44 may further be individually provided and coupled with other forms of propulsion means. The wheel assemblies 44 are free-pivotaly attached to the vehicle undercarriage. Each wheel assembly 44 may thus rotate freely independent of the other wheel assemblies 44. This allows the wheel assemblies 44 to independently follow the steering channels 26 of the guideways 30 even during very sharp turns.

[0038] Referring to FIG.3 and FIG.4, each wheel assembly 44 further comprises a supporting wheel 47, a guide wheel 48 and a steering wheel 49. The supporting wheel 47 serves as a drive wheel when coupled to a propulsion means such as the electric motor 46 and also serves to support the weight of the vehicle 30.

[0039] The guide wheel 48 is adapted to contact and engage an outer side of the steering channel 26 and act as a guide to limit the free movement of the wheel assembly 44 as well as the vehicle 30. The steering wheel 49 is adapted for mating and engaging to the steering channel guides 26. During normal operations on a guideway 30, the wheel assemblies 44 work in pairs, and at any one time, only one steering wheel 49 of the pair of wheel assemblies 44 engages the steering channel guide 26. The other steering wheel 49 of the pair of wheel assemblies 44 will be disengaged. The wheel assembly 44 having the steering wheel 49 engaged will thus be limited to movement following the guideway 30. The other wheel assembly having the disengaged steering wheel 49 may be free pivoting.

[0040] When turning at a branch off point 22 as earlier described, the vehicle 30 will activate the in-vehicle steering system 40 to only engage the outside steering channel 26a to follow the first guideway 21a, while disengaging from the other steering channel 26. This is performed by engaging the steering wheels 49 of the wheel assemblies 44 to the outside steering channel 26a, while the steering wheel 49 of the wheel assemblies corresponding to the other steering channels 26 are disengaged. This thus causes the vehicle 30 to only follow the outside steering channel 26a of the first guideway 21a. When the vehicle 30 has passed the branch-

off point 22, the steering wheels 49 of the wheel assemblies that have not been engaged are then activated to engage the steering channels 26.

[0041] An alternative description to the operation when the vehicle 30 is at the branch off point 22, is that the in-vehicle steering system 40 engages the steering channels 26 on the side which the vehicle 30 intends to turn to. When turning into the first guideway 21a, the vehicle 30 would be turning right at the branch-off point 22. The steering wheels 49 on the right side of the vehicle 30 would continue to be engaged to the steering channels 26, while the steering wheels 49 on the left side of the vehicle would be disengaged from the steering channels 26.

[0042] The engaged wheel assemblies 44 are then limited in movement according to the steering channels 26. The disengaged wheel 44 assemblies are then free pivoting.

[0043] Referring to FIG.3 and FIG.4, the steering wheel 49 of the wheel assemblies are engaged and disengaged from the steering channel guides 26 by raising and lowering the steering wheels 49. The steering wheels 49 are adapted to fit into the c-channel of the steering channel guides 26. When the steering wheels 49 are engaged to the steering channel guide 26, the wheel assembly 44 is limited to moving along the steering channel guide 26, thus also limiting the vehicle 30 to that steering channel guide 26.

[0044] The steering wheels 49 may be raised and lowered by any mechanical or electrical or electromechanical means of the in-vehicle steering system 40. In the present example, at any one time, only one of the steering wheels 49 of the pairs of wheel assemblies is raised, while the other steering wheel 49 of the pair of wheel assemblies 44 will be lowered.

[0045] Referring to FIG.3, FIG.4 and FIG.5, the in-vehicle steering system 40 located at the undercarriage of the vehicle 30 further comprises the two pairs of steering wheels 49 of the wheel assemblies 44 coupled to a control shaft 52.

[0046] The control shaft 52 defines a control axis along its length and through the center of the control shaft 54. At least one drive motor 54 is coupled to the control shaft for rotating the control shaft 52 about the control axis.

[0047] Each wheel assembly 44 further comprises a wheel assembly shaft 55 having one end coupled to a tongue 56 which is adapted to be engaged by a fork 57. The other end of the wheel assembly shaft 55 ends in a pinion 49a which is adapted to engage a rack 49b of the steering wheel 49.

[0048] The forks 57 of each of the wheel assembly shafts 55 of the pair of wheel assemblies 44 are further coupled to opposing ends of a worm gear 58b.

[0049] In operation, when the control shaft 52 rotates, a worm 58a on the control shaft 52 engages and rotates the worm gear 58b. This in turn rotates the forks 57 coupled to the opposing ends of the worm gear 58b. The forks 57 then engages the tongues 56 and results in the rotation of the wheel assembly shaft 55. The pinion 49a of the wheel assembly shaft 55 rotates and engages the rack 49b of the steering wheel 49. This results in the rack 49a raising or lowering depending on the direction of rotation and thus results in the raising and lowering of the steering wheel 49.

[0050] The other end of the wheel assembly shaft 55 which ends in a pinion 49a further comprises of another worm on the wheel assembly shaft 55. This another worm is adapted to engage another worm gear coaxial to the pinion 49a. This arrangement thus advantageously allows the steering wheel 49 to remain in its raised or lowered position when the tongue 56 is disengaged from the fork 57.

[0051] As the forks 57 of opposing wheel assemblies 44 of each pair of wheel assemblies 44 are coupled to the same worm gear 58b. Rotation in one direction raises one steering wheel 49, and lowers the other, while rotation in the opposite directions achieves the opposite.

[0052] In the present example, there are two pairs of wheel assemblies 44 in the in-vehicle steering system 40. The wheel assemblies 44 are configured such that the steering wheels 49 on each side of the vehicle 30 are lowered or raised together. This allows for all the steering wheels 49 on one side of the vehicle 30 to be engaged to the same steering channel guide 26 of the guideway 20 at any one time.

[0053] The control shaft 52 of the in-vehicle steering system 40 is further adapted to allow for recovery by another vehicle 30 when the propulsion means or drive motor 54 is down. The opposing ends of the control shaft 52 are provided with coupling adapters 59. When a vehicle 30 is down, another vehicle 30 acting as a recovery vehicle can approach the vehicle 30 that is down and engage the coupling adapter 59 of the vehicle 30 that is down (recovered vehicle 30) to the coupling adapter 59 of the recovery vehicle 30. The recovery vehicle 30 can then act as a drive train to propel the recovered vehicle 30. The recovery vehicle's 30 in-vehicle steering system 40 can also take over the in-vehicle steering system 40 of the recovered vehicle 30 by way of the coupling adapters 59 of the control shafts 52.

[0054] Torque limiting couplers are further used together with the worm gear 58b of the control shaft 52. The torque limiting couplers allow the control shaft 52 to continue rotation even after any of the steering wheels 49 have been fully raised or fully lowered. This prevents the stalling of the control shaft 52 should any of the steering wheels 49 not be properly timed with the other steering wheels 49. This also allows for recovery operations when the control shaft 52 and steering wheels 49 of a recovered vehicle are not timed to that of the recovery vehicle 30. The control shaft 52 of the recovery vehicle 30 continue to rotate even after its own steering wheels 49 are fully raised or lowered to ensure that the steering wheels 49 of the recovered vehicle 30 are also fully raised or lowered.

[0055] Referring to FIG.3 and FIG.5, the in-vehicle steering system 40 is shown when the wheel assemblies 44 are in an orientation when the vehicle 30 is going in a straight direction. In this orientation, the tongues 56 of the wheel assembly shafts

55 are engaged to the forks 57 allowing power transmission from the drive motor 54 of the control shaft 52 to the rack 49b and pinion 49a of the steering wheel 49.

[0056] The wheel assemblies 44 are however free-pivoting which allows for the sharp angular turns the vehicle is adapted to perform. The fork 57 and tongue 56 allows the wheel assemblies 44 to freely pivot during turns yet when approaching a branch-off point 22 allow the in-vehicle steering system 40 to operate and engage the relevant steering wheels 49 of the wheel assemblies.

[0057] When performing turns at branch off points 22 or when turning into stations 32, the wheel assemblies 44 would pivot to accommodate the turns provided for by the guideways 20. The steering wheels 49 would have been engaged earlier and would be in place for the turn. During the turn, the tongues 56 of the wheel assembly shafts 55 would disengage from the forks 57 thus allowing the wheel assembly 44 the free-pivoting movement allowing the vehicle to execute the turn. Upon completion of the turn, and when the vehicle 30 begins to travel on a straight portion of the guideway 20, the wheel assemblies 44 also straighten out and the tongues 56 again are engaged back to the forks 57. This allows the in-vehicle steering system 40 to operate and engage the relevant steering wheels 49 of the wheel assemblies via power transmission from the drive motor 54 of the control shaft 52 to the rack 49b and pinion 49a of the steering wheels 49.

[0058] Furthermore, with the present in-vehicle steering system 40, the vehicles 30 are further adapted to perform substantially right angle turns on the guideway 20. The substantially right angle turns have turn radius of less than one length of the vehicle. The substantially right angle turns may be on the guideway 20 when the guideway 20 is adapted for guiding the vehicle 30 through a U-turn. It may further be for the vehicle 30 turning from one guideway 20 to another interconnected guideway 20. The fork 57 and tongue 56 arrangement of the in-vehicle steering system 40 allows the free-pivoting movement of the wheel assemblies 44 which allows for the sharp angular turns or the substantially right angle turns of turn radius less than one length of the vehicle 30.

[0059] Referring to FIG.1 and FIG.6, when the vehicle 30 approaches a station 32 and prepares to turn into the station 32, the in-vehicle steering system 40 is engaged and the steering wheels 49 on the side the vehicle 30 is turning into are engaged to the steering channel guides 26. This also causes the steering wheels 49 on the opposing side of the vehicle 30 to be disengaged.

[0060] The steering channel guides 26 immediately adjacent to the station 32 terminates and do not guide the vehicle 30 into the station. The termination of the steering channel guides 26 amounts to a termination of the guideway 20 into the station 32. The vehicles 30 are therefore not guided into the berths 34 of the stations 32 by the guideways 20.

[0061] Instead, pop-up routers 23 appear from the surface of the platform 24 of the guideway 20 to engage the supporting wheels 47 of the vehicle 30 and guide the vehicle 30 through a substantially right angle turn directly into the berth 34 of the station 32. When not in use, the pop-up routers 23 are kept in a recess flush to the platform 24 of the guideways 20 and the stations 32.

[0062] The pop-up routers 23 may be in a variety of configurations. They may be curved defining shallow angle turns or substantially right angle turns. The pop-up routers 23 may further be straight defining a straight path for guiding the vehicles 30 when guideways 20 have terminated.

[0063] The berths 34 in the stations 32 are situated relatively close to each other. This allows for smaller stations 32 than in current systems. The pop-up routers 23 play an important role here in guiding the vehicles 30 from the guideway 20 into the berths 34 of the stations 32.

[0064] Depending on the number of berths 34 in the station 32, there are at least a corresponding number of pop-up routers 23 defining a substantially right angle turn from the guideway 20 into the individual berths 34 in the station 32. There are also

pop-up routers 23 defining straight paths for at least a distance from where the guideway 20 terminates to the other berths 34 in the station 32. This allows for several vehicles 30 being berthed at any one time. The pop-up routers 23 defining straight paths would guide the vehicles 30 to a position whereby the pop-up routers 23 defining a substantially right angle turn would then guide the vehicle 30 into an empty berth 34.

[0065] As such, a combination of straight and curved pop-up routers 23 is thus installed at the stations 32 to guide the vehicles 30 into the berths 34. They also serve to guide the vehicles 30 out of the berths 34, performing similar substantially right angle turns out of the berth 34 and back onto the guideway 20.

[0066] Referring to FIG.7, the pop-up routers 23 are made up of two sets of rollers 62 mounted on a frame 64. One set of rollers 62 are mounted parallel to the other and between the two sets of rollers is a defined space sufficient for guiding the supporting wheels 47 of the wheel assemblies 44. The rollers 62 serve to guide the supporting wheels 47 smoothly through the defined space in the direction of the pop-up routers 23.

[0067] The frame 64 of the pop-up router 23 is coupled to a raising means which may be mechanical, electrical or electromechanical. In the present example, a pneumatic extender 66 is used to raise and lower the pop-up routers 23. A hydraulic means could also be utilized.

[0068] In addition to guiding the vehicles 30 into their berths 34, the pop-up routers 23 may further be used to guide the vehicles 30 in areas where the steering channel guides 26 are not installed.

[0069] Examples of such applications are when the guideway 20 crosses or terminates at a road. The road is essentially used by conventional automobiles and guideways on the roads would end up obstructing traffic. Pop-up routers 23 may then be installed into the roads for guiding the vehicles 30 across the road onto

another connecting guideway 20 or on the road to areas where another guideway 20 is encountered.

[0070] The pop-up routers 23 would in operation, not be above ground all the time. The pop-up routers 23 would be modular and comprise of several sections. The sections would cascade according to the vehicle's 30 movement and only certain sections would pop-up to guide the vehicle. As the vehicle 30 passes by, the sections of pop-up routers 30 not guiding the vehicle would then be lowered back to be flush with the road.

[0071] It will be appreciated that although one preferred embodiment has been described in detail, various modifications and improvements can be made by a person skilled in the art without departing from the scope of the present invention.

CLAIMS

1. A guideway transportation system for delivering goods or passengers from one point to another, the guideway transportation system comprising:

a guideway system that comprises a plurality of guideways forming a network of interconnected guideways;

a vehicle having a propulsion means and an in-vehicle steering system and that is adapted to travel on the network of guideways; and

a plurality of stations sited at predetermined intervals along guideways of the guideway system for disembarking of goods or passengers from the vehicle;

wherein the guideway system is adapted to guide the vehicle through a substantially right angle turn with a turn radius of less than one length of the vehicle,

and wherein a said station is immediately adjacent to and connecting with a guideway and comprises a plurality of berths, the berths being adapted for berthing the vehicle.
2. The system according to claim 1 wherein the guideway system is adapted to guide the vehicle through a substantially right angled turn from a guideway of the guideway system into one of the plurality of berths of a station on that guideway.
3. The system according to claim 1 wherein the guideway system is adapted to guide the vehicle through a substantially right angle turn from one of the plurality of guideways to another of the plurality of guideways.
4. The system according to claim 1 wherein the vehicle is adapted to perform a substantially right angle turn having a radius less than one length of the vehicle.
5. The system according to claim 1 wherein the vehicle is adapted to perform a substantially right angle turn from one of the plurality of guideways into one of the plurality of berths of a station on that guideway, the turn having a radius of less than one length of the vehicle.
6. The system according to claim 1 wherein the vehicle is adapted to perform a substantially right angle turn from one of the plurality of guideways to another one of the plurality of guideways.

7. The system according to claim 1 wherein a guideway comprises firstly a platform on which steerable supporting wheels of the vehicle roll and secondly a pair of steering guides disposed above the platform and engageable by the in-vehicle steering system to provide guidance to the vehicle.
8. The system according to claim 7 wherein at least one of said steering guides terminates at a location on said guideway and the vehicle after passing that location is steerable by a pop-up router adapted to be raised from a storage position to an operative position in which said pop-up router engages at least supporting wheels of the vehicle whereby to steer the vehicle.
9. The system according to claim 8 wherein one of the steering guides terminates at a location on said guideway and the other steering guide continues past the location so that the vehicle can be steered after passing the location either by virtue of the in-vehicle steering system engaging the said other steering guide or by engagement of at least supporting wheels in the pop-up router so that said supporting wheels are steered by the pop-up router.
10. The system according to claim 8 wherein the pop-up router is provided to guide the vehicle from the guideway into a berth of a station.
11. The system according to claim 8 wherein the pop-up router is adapted to define a predetermined path for guiding the vehicle to move through the predetermined path.
12. The system according to claim 11 wherein the pop-up router is adapted to define a substantially right angle turn for guiding the vehicle to perform a substantially right angle turn.
13. The system according to claim 12 wherein the substantially right angle turn executed by the vehicle under guidance from the pop-up router has a radius of less than the length of the vehicle.
14. The system according to claim 8 wherein the pop-up router is positioned in a recess in the platform when not in use and is raised when required for guiding the vehicle.
15. The system according to claim 14 wherein the pop-up router is raised from below the platform by one of pneumatic hydraulic or electromechanical raising means.

16. The system according to claim 8 wherein the pop-up router comprises first and second sets of rollers mounted to a frame and wherein the first and second sets of rollers define a space therebetween sufficient for receiving and guiding a supporting wheel of the vehicle.
17. The system according to claim 7 wherein the steering guides comprise C-section channels between flanges of which channels steering wheels of the in-vehicle steering system are receivable.
18. The system according to claim 8 having a branch-off point at which the vehicle can make a turn from a first guideway onto a second guideway.
19. The system according to claim 18 wherein when the vehicle is turning into the second guideway the in-vehicle steering system is in engagement with a said steering guide that is on the inner side of the turn.
20. The system according to claim 1 wherein the in-vehicle steering system comprises left and right pairs of wheel assemblies each wheel assembly being free-pivotaly mounted to an undercarriage of the vehicle, and wherein each wheel assembly comprises:
 - a supporting wheel for supporting weight of the vehicle and which is steerable by pivoting of the wheel assembly; and
 - a steering wheel selectively engageable with or disengageable from a guide extending along a guideway of the guideway system and arranged when engaged with the guide to orient the wheel assembly for steering of the vehicle.
21. The system according to claim 20 wherein the propulsion means is coupled to the supporting wheel of at least one of the wheel assemblies.
22. The system according to claim 20 wherein steering wheels of the left pair of wheel assemblies are engageable with a said guide positioned to the left of the vehicle and steering wheels of the right pair of wheel assemblies are engageable with a said guide positioned to the right of the vehicle.
23. The system according to claim 20 wherein each wheel assembly of the left pair of wheel assemblies further comprises a guide wheel positioned to contact a left one of said guides so as to limit free-pivotal movement of the wheel assembly, and wherein each wheel assembly of the right pair of wheel assemblies further comprises a guide wheel positioned to contact a right one of said guides so as to limit free-pivotal movement of the wheel assembly.

24. The system according to claim 20 wherein the in-vehicle steering system is adapted to move the steering wheels of a first one of said pairs of wheel assemblies into engagement with one of said guides and to move the steering wheels of the other one of said pairs of wheel assemblies out of engagement with the other one of said guides.
25. The system according to claim 24 wherein at a branch-off point of the guideway system the guide engaged by the steering wheels of the said first one of the said pairs of wheel assemblies is on the inside of a turn to be executed by the vehicle at the branch-off point.
26. The system according to claim 20 wherein said in-vehicle steering system further comprises:

in each wheel assembly a mechanism for moving the steering wheel of that wheel assembly into and out of engagement with a said guide, responsively to rotation of an input shaft comprised in the mechanism;

mounted to the undercarriage of the vehicle a further mechanism driven by a steering system drive motor, and adapted to rotate the input shaft comprised in each of the said mechanisms of the wheel assemblies so as to operate the said mechanisms.
27. The system according to claim 26 wherein the input shaft of each said wheel assembly mechanism engages with and is rotatable by the said further mechanism when the wheel assembly is pivoted to a position for straight-ahead travel on the guideway and able to disengage from the further mechanism when the wheel assembly pivots away from that position.
28. The system according to claim 27 wherein engagement of the wheel assembly mechanism input shaft and the further mechanism is by means of a tongue on the input shaft engaging with a fork comprised in the further mechanism and rotatable by the further mechanism.
29. The system according to claim 26 wherein each said wheel assembly mechanism is adapted to raise and lower the steering wheel of that wheel assembly respectively into and out of engagement with a channel-section guide.
30. The system according to claim 29 wherein the input shaft is coupled by a gear train to a pinion that engages a rack so that said rack moves linearly in response to input shaft rotation whereby to raise and lower the steering wheel.

31. The system according to claim 26 wherein said further mechanism and said wheel assembly mechanisms are adapted to move steering wheels of one of said pairs of steering wheels into engagement with one guide while moving steering wheels of the other one of said pairs of steering wheels out of engagement with another guide.
32. The system according to claim 26 wherein the further mechanism of the vehicle is adapted to be operatively coupled to the further mechanism of a second vehicle on the guideway having an identical in-vehicle steering system so that the vehicle can actuate engagement and disengagement of the steering wheels of the second vehicle with the guides of the guideway.
33. The system according to claim 32 wherein said further mechanism comprises a coupling adaptor rotatable by the further mechanism and adapted to engage a coupling adaptor of the second vehicle so as to drive the further mechanism of the second vehicle as an alternative to the steering system drive motor of the second vehicle.
34. The system according to claim 28 wherein said further mechanism comprises:

a control shaft extending longitudinally in the vehicle undercarriage and rotatable by the said drive motor; and

transverse shafts coupled by gears to the control shaft so as to be rotatable responsively to rotation of the control shaft,

wherein each end of each transverse shaft has mounted thereon a said fork.
35. The system according to claim 34 wherein said further mechanism comprises coupling adaptors secured to ends of the control shaft each being engageable with a cooperating coupling adaptor of another vehicle having a control shaft the same as that of the vehicle, whereby the in-vehicle steering system of the vehicle is operable by rotation of the control shaft of the other vehicle.
36. An in-vehicle steering system for a vehicle adapted for use on a guideway having a platform on which can roll supporting wheels of the vehicle, wherein the in-vehicle steering system comprises left and right pairs of wheel assemblies each wheel assembly being free-pivotally mounted to an undercarriage of the vehicle; and wherein each wheel assembly comprises:

a supporting wheel for supporting weight of the vehicle and which is steerable by pivoting of the wheel assembly; and

a steering wheel selectively engageable with or disengageable from a guide extending along a guideway of the guideway system and arranged when engaged with the guide to orient the wheel assembly for steering of the vehicle.

37. The in-vehicle steering system according to claim 36 further comprising:

in each wheel assembly a mechanism for moving the steering wheel of that wheel assembly into and out of engagement with a said guide, responsively to rotation of an input shaft comprised in the mechanism;

mounted to the undercarriage of the vehicle a further mechanism driven by a steering system drive motor and adapted to rotate the input shaft comprised in each of the said mechanisms of the wheel assemblies so as to operate the said mechanisms.

38. The in-vehicle steering system according to claim 37 wherein engagement of the wheel assembly mechanism input shaft and the further mechanism is by means of a tongue on the input shaft engaging with a fork comprised in the further mechanism and rotatable by the further mechanism.

39. The in-vehicle system according to claim 38 wherein the further mechanism comprises:

a control shaft extending longitudinally in the vehicle undercarriage and rotatable by the said drive motor; and

transverse shafts coupled by gears to the control shaft so as to be rotatable responsively to rotation of the control shaft,

wherein each end of each transverse shaft has mounted thereon a said fork.

40. The in-vehicle steering system according to claim 39 wherein said further mechanism comprises coupling adaptors secured to ends of the control shaft each being engageable with a cooperating coupling adaptor of another vehicle having a control shaft the same as that of the vehicle, whereby the in-vehicle steering system of the vehicle is operable by rotation of the control shaft of the other vehicle.

41. A pop-up router for engaging and guiding at least a supporting wheel of a vehicle that rolls on a surface of a guideway of a guideway transportation system, the pop-up router comprising first and second sets of rollers mounted to a frame and wherein the first and second sets of rollers define

a space therebetween sufficient for receiving and guiding a supporting wheel of the vehicle along a predetermined path.

42. A pop-up router according to claim 41 wherein the predetermined path is such that the vehicle executes a substantially right angle turn.
43. A pop-up router according to claim 42 wherein the radius of the right angle turn of the vehicle is less than the length of the vehicle.
44. A pop-up router according to claim 41 that is positioned in a recess below the said surface when not in use and is raised when required for guiding the vehicle.