CLAIMS:

1. A method for order fulfillment, the method comprising:

storing items in bins located along at least a first side of a first aisle;

moving a first guided vehicle horizontally along the first aisle;

conveying horizontally, along a first horizontal tote path that runs parallel to the first side of the first aisle, a first plurality of totes and a second plurality of totes moving to the first guided vehicle, wherein the first plurality of totes includes a first tote and a second tote, and wherein the second plurality of totes includes a third tote that carries restock items;

conveying vertically each tote of the first plurality of totes and the second plurality of totes sequentially from the first horizontal tote path to a different one of a plurality of vertical locations, each of the plurality of vertical locations being in the first aisle and horizontally adjacent to and at different heights relative to the first guided vehicle, wherein the conveying vertically includes moving the second tote from a first vertical location of the plurality of vertical locations to a second vertical location of the plurality of vertical locations while the first tote remains vertically stationary at a third vertical location of the plurality of vertical locations;

from the first guided vehicle, sequentially picking items to be picked from the bins and stowing the picked items in selected totes of the first plurality of totes;

from the first guided vehicle, moving the restock items from the third tote to one of the bins;

conveying horizontally, along the first aisle, the first plurality of totes moving away from the first guided vehicle to an end of the first aisle; and

collecting the picked items from totes of the first plurality of totes into shipping containers for shipment to customers.

2. The method of claim 1, wherein the first guided vehicle carries a human operator picker, and wherein the sequential picking of items from the bins is performed by the human picker, the method further comprising:

moving horizontally the first guided vehicle to a first selected horizontal location along the first aisle and moving vertically a first selected tote of the plurality of totes to a first selected one of a plurality of different tote heights, such that the first selected tote is next to a first selected bin; and

moving vertically the human picker to a first selected one of a plurality of different picker heights such that the human picker is next to the first selected tote and the first selected bin so that the human picker picks a first selected item from the first selected bin and places the first selected item into the first selected tote.

3. The method of claim 1, wherein the first guided vehicle carries a robotic picker, and wherein the sequential picking of items from the bins is performed by the robotic picker, the method further comprising:

moving horizontally the first guided vehicle to a first selected horizontal location along the first aisle and moving vertically a first selected tote of the plurality of totes to a first selected one of a plurality of different tote heights, such that the first selected tote is next to a first selected bin; and

moving vertically the robotic picker to a first selected one of a plurality of different picker heights such that the robotic picker is next to the first selected tote and the first selected bin so that the robotic picker picks a first selected item from the first selected bin and places the first selected item into the first selected tote.

4. The method of claim 1, wherein the conveying horizontally of the first plurality of totes to the first guided vehicle and the conveying horizontally of the first plurality of totes from the first guided vehicle to the end of the first aisle are performed on parallel horizontal tote paths, wherein the totes moving towards the first guided vehicle and the totes moving away from the first guided vehicle are moving in opposite horizontal directions.

5. The method of claim 1, wherein the conveying horizontally of the first plurality of totes to the first guided vehicle and the conveying horizontally of the first plurality of totes from the first guided vehicle to an end of the first aisle at a first end of the first aisle are performed on parallel horizontal tote paths in opposite horizontal directions from and to a first end of the first aisle, the method further comprising:

conveying horizontally a second plurality of totes to the first guided vehicle;

conveying vertically each tote of the second plurality of totes to a plurality of vertical locations, each of the plurality of locations being at different heights next to the first guided vehicle;

sequentially picking items to be picked from the bins and stowing the picked items in the second plurality of totes;

conveying horizontally the second plurality of totes from the first guided vehicle to a second end of the first aisle.

6. The method of claim 1, wherein the conveying horizontally along the first aisle of the first plurality of totes to the first guided vehicle and the conveying horizontally of the first plurality of totes from the first guided vehicle are both performed on a first horizontal tote path moving in a single horizontal direction from a first end of the first aisle to a second end of the first aisle, the method further comprising:

conveying horizontally a second plurality of totes on a second horizontal tote path along the first aisle to the first guided vehicle from the second end of the first aisle;

conveying vertically each tote of the second plurality of totes to a plurality of vertical locations, each of the plurality of locations being at different heights next to the first guided vehicle;

sequentially picking items to be picked from the bins and stowing the picked items in the second plurality of totes; and

conveying horizontally the second plurality of totes on the second horizontal tote path from the first guided vehicle to the first end of the first aisle.

7. The method of claim 1, wherein the conveying horizontally of the first plurality of totes to the first guided vehicle and the conveying horizontally of the first plurality of totes from the first guided vehicle to the end of the aisle are performed on a single horizontal tote path in a single horizontal direction.

8. The method of claim 1, wherein the conveying vertically each tote to each of the plurality of vertical locations is performed along a first upward vertical tote path and a first downward vertical tote path in opposite vertical directions, the method further comprising:

horizontally transferring the first plurality of totes between the first upward vertical tote path and the first downward vertical tote path.

9. The method of claim 1, wherein the conveying horizontally of the first plurality of totes to the first guided vehicle and the conveying horizontally of the first plurality of totes from the first guided vehicle to the end of the first aisle are performed on a single horizontal tote path in a single horizontal direction; and wherein the conveying vertically each tote to each of the

plurality of vertical locations is performed along a first upward vertical tote path and a first downward vertical tote path in opposite vertical directions, the method further comprising:

horizontally transferring the first plurality of totes between the first upward vertical tote path and the first downward vertical tote path.

10. The method of claim 1, wherein the moving of the first guided vehicle along the first aisle includes:

supporting the first guided vehicle from below only on a first vehicle ground path located only on a single side of the first horizontal tote path;

supporting the first guided vehicle from above on at least a first upper track, wherein the first upper track is parallel to the first vehicle ground path; and

moving the first guided vehicle to a plurality of different horizontal locations along the first aisle.

11. The method of claim 1, wherein the conveying horizontally, along the first aisle, the first plurality of totes moving away from the first guided vehicle to an end of the first aisle is done on a second horizontal tote path that runs parallel to and in an opposite direction to the conveying horizontally, along the first horizontal tote path, of the first plurality of totes moving to the first guided vehicle, and wherein the moving of the first guided vehicle along the first aisle includes:

supporting the first guided vehicle from below only on a first vehicle ground path located between the first horizontal tote path and the second horizontal tote path;

supporting the first guided vehicle from above on at least a first upper track, wherein the first upper track is parallel to the first vehicle ground path; and

moving the first guided vehicle to a plurality of different horizontal locations along the first aisle.

12. The method of claim 1, further comprising:

conveying horizontally, along a second horizontal tote path that runs parallel to the horizontal tote path, a second plurality of totes arriving to the first guided vehicle from a direction opposite the direction of the first plurality of totes arriving to the first guided vehicle;

conveying vertically each tote of the second plurality of totes to a plurality of vertical locations, each of the plurality of locations being at different heights next to the first guided vehicle;

sequentially picking items to be picked from the bins and stowing the picked items in the second plurality of totes;

conveying horizontally, along the first aisle, the second plurality of totes moving away from the first guided vehicle to an end of the first aisle.

13. The method of claim 1, further comprising:

storing items in bins located along both sides of a second aisle;

moving the first guided vehicle to a second aisle;

conveying horizontally, along a horizontal tote path that runs parallel to sides of the second aisle, a second plurality of totes moving to the first guided vehicle;

conveying vertically each tote of the second plurality of totes to a plurality of vertical locations, each of the plurality of locations being at different heights next to the first guided vehicle;

sequentially picking items to be picked from the bins and stowing the picked items in the second plurality of totes;

conveying horizontally, along the second aisle, the second plurality of totes moving away from the first guided vehicle to an end of the second aisle; and

collecting the picked items from the second plurality of totes into shipping containers for shipment to customers.

14. An apparatus comprising:

an automatically guided vehicle (AGV) that carries a human picker;

a holder attached to the AGV; and

one or more conveyors that successively convey a plurality of arriving totes to the holder and a plurality of departing totes from the holder,

wherein the holder is configured to hold a first plurality of totes, wherein each of the first plurality of totes is configured to receive picked items,

wherein the holder is further configured to hold a second plurality of totes that contain restock items to be placed into preselected ones of a plurality of inventory stock bins, and

wherein the AGV is configured to move to successive ones of a plurality of inventory stock bins such that the human picker successively retrieves each of a plurality of stock items from the successive ones of the plurality of inventory stock bins and places the respective items in preselected ones of the plurality of totes based on a customer shipment order.

15. An apparatus for order fulfillment, the apparatus comprising:

means for storing items in bins located along at least a first side of a first aisle;

means for moving a first guided vehicle moving along the first aisle;

means for conveying horizontally, along a first horizontal tote path that runs parallel to the first side of the first aisle, a first sequence of totes and a second sequence of totes moving to the first guided vehicle, wherein the first sequence of totes includes a first tote and a second tote, and wherein the second sequence of totes includes a third tote that carries restock items;

means for conveying vertically each tote of the first sequence of totes to a plurality of vertical locations, each of the plurality of locations being at different heights next to the first guided vehicle, wherein the means for conveying vertically is configured to move the second tote from a first vertical location of the plurality of vertical locations to a second vertical location of the plurality of vertical locations while the first tote remains vertically stationary at a third vertical location of the plurality of vertical locations;

means for sequentially picking items to be picked from the bins and stowing the picked items in the first sequence of totes;

means for moving the restock items from the third tote to one of the bins;

means for conveying horizontally, along the first aisle, the first sequence of totes moving away from the first guided vehicle to an end of the first aisle; and

means for collecting the picked items from the first sequence of totes into shipping containers for shipment to customers.

16. The apparatus of claim 15, wherein the first guided vehicle carries a human operator picker, and wherein the sequential picking of items from the bins is performed by the human picker, the apparatus further comprising:

means for moving horizontally the first guided vehicle to a first selected horizontal location along the first aisle and moving vertically a first selected tote of the plurality of totes to a first selected one of a plurality of different tote heights, such that the first selected tote is next to a first selected bin; and

means for moving vertically the human picker to a first selected one of a plurality of different picker heights such that the first selected to the human picker is next to the first selected tote and the first selected bin so that the human picker picks a first selected item from the first selected bin and places the first selected item into the first selected tote.

17. The apparatus of claim 15, wherein the means for conveying vertically each tote to each of the plurality of vertical locations is performed along a first upward vertical tote path and a first downward vertical tote path in opposite vertical directions, the apparatus further comprising:

means for horizontally transferring the sequence of totes between the first upward vertical tote path and the first downward vertical tote path.

18. An apparatus for order fulfillment from stored items in a plurality of bins located along at least a first side of a first aisle, the apparatus comprising:

a first guided vehicle configured to move horizontally along the first aisle;

a first horizontal tote-conveyor system positioned along a first horizontal tote path that runs parallel to the first side of the first aisle, wherein the horizontal tote-conveyor system moves a first sequence of totes and a second sequence of totes to the first guided vehicle, wherein the first sequence of totes includes a first tote and a second tote, wherein the second sequence of totes includes a third tote that carries restock items;

a first vertical tote-conveyor system operatively coupled to the first guided vehicle and configured to convey vertically each tote of the first sequence of totes to a plurality of vertical locations, wherein each of the plurality of vertical locations of the first vertical tote-conveyor system is at a different height relative to the first guided vehicle, wherein the first vertical tote-conveyor system is further configured to move the second tote from a first vertical location of the plurality of vertical locations to a second vertical location of the plurality of vertical locations while the first tote remains vertically stationary at a third vertical location of the plurality of vertical locations; and

a first picker platform operatively coupled to the first guided vehicle and configured to moves to one of a plurality of vertical positions to facilitate the movement of picked items from the plurality of bins to stow in the first sequence of totes and to facilitate movement of the restock items from the third tote to one of the plurality of bins; wherein the first horizontal tote-conveyor system moves the first sequence of totes away from the first guided vehicle to a first end of the first aisle.

19. The apparatus of claim 18, wherein the first guided vehicle is configured to carry a human operator picker, and wherein the human picker sequentially picks items from the plurality of plurality of bins and stows the picked items in the first sequence of totes, the method apparatus comprising:

a horizontal vehicle-motion system operatively coupled to the first guided vehicle and

configured to move the first guided vehicle to a first selected horizontal location along the first aisle, wherein the first vertical tote-conveyor system moves a first selected tote of the plurality of totes vertically to a first selected one of a plurality of different tote heights, such that the first selected tote is next to a first selected bin; and

a vertical picker-motion system operatively coupled to the first guided vehicle and configured to move the human picker vertically to a first selected one of a plurality of different picker heights such that the human picker is next to the first selected tote and the first selected bin to pick a first selected item from the first selected bin and place the first selected item into the first selected tote.

20. The apparatus of claim 18, further comprising:

a robotic picker operatively coupled to the first guided vehicle and configured to sequentially pick items from the plurality of bins;

a horizontal vehicle-motion system operatively coupled to the first guided vehicle and configured to move the first guided vehicle horizontally to a first selected horizontal location along the first aisle, wherein the first vertical conveyor system moves a first selected tote of the plurality of totes vertically to a first selected one of a plurality of different tote heights, such that the first selected tote is next to a first selected bin; and

a vertical picker-motion system operatively coupled to the first guided vehicle and configured to move the robotic picker to a first selected one of a plurality of different picker heights such that the first selected to the robotic picker is next to the first selected tote and the first selected bin so that the robotic picker picks a first selected item from the first selected bin and places the first selected item into the first selected tote.

21. The apparatus of claim 18, wherein the first horizontal tote-conveyor system includes a plurality of parallel horizontal tote paths, wherein the first sequence of totes moves towards the first guided vehicle on a first one of the plurality of parallel horizontal tote paths and the first sequence of totes move away from the first guided vehicle on a second one of the plurality of parallel horizontal tote paths in opposite horizontal directions.

22. The apparatus of claim 18, wherein the first horizontal tote-conveyor system includes a plurality of parallel horizontal tote paths, wherein the first sequence of totes move towards the first guided vehicle on a first one of the plurality of parallel horizontal tote paths and the first sequence of totes move away from the first guided vehicle on a second one of the plurality of

parallel horizontal tote paths in opposite horizontal directions from and to a first end of the first aisle, wherein the first horizontal tote-conveyor system is configured to convey horizontally a second sequence of totes to the first guided vehicle from a second end of the first aisle; and wherein the apparatus further includes:

a second vertical tote-conveyor system operatively coupled to the first guided vehicle and configured to convey vertically each tote of the second sequence of totes to a plurality of vertical locations, wherein each of the plurality of locations on the second vertical tote-conveyor system is at a different height relative to the first guided vehicle, wherein items are sequentially picked from the plurality of bins and stowed in the second sequence of totes, and wherein the first horizontal tote-conveyor system conveys the second sequence of totes horizontally from the first guided vehicle to a second end of the first aisle.

23. The apparatus of claim 18, wherein the first horizontal tote-conveyor system includes a first horizontal tote path,

wherein the first sequence of totes move towards the first guided vehicle on the first horizontal tote path from a first end of the first aisle, and the first sequence of totes move away from the first guided vehicle on the first horizontal tote path towards a second end of the first aisle,

wherein the first horizontal tote-conveyor system is configured to convey horizontally a second sequence of totes to the first guided vehicle on a second horizontal path from the second end of the first aisle, and the second sequence of totes move away from the first guided vehicle on the second horizontal tote path towards the first end of the first aisle; the apparatus further including:

a second vertical tote conveyor system operatively coupled to the first guided vehicle and configured to move each tote of the second sequence of totes vertically to a plurality of vertical locations, each of the plurality of locations being at different heights next to the first guided vehicle such that each respective selected tote of the second sequence of totes is next to a respective selected bin of the plurality of bins at successive time periods to facilitate the pick of a selected item from the respective selected bin and stow of the selected item into the respective selected tote to form a loaded tote, and wherein the first horizontal tote-conveyor system horizontally conveys the second sequence of totes on the second horizontal tote path from the first guided vehicle to the first end of the first aisle.

24. The apparatus of claim 18, wherein the first horizontal tote-conveyor system has a single horizontal tote path on which the first sequence of totes is horizontally conveyed to the first guided vehicle and on which of the first sequence of totes are horizontally conveyed from the first guided vehicle to the end of the aisle in a single horizontal direction.

25. The apparatus of claim 18, wherein the first vertical tote-conveyor system includes a mechanism that moves totes along a first upward vertical tote path and a mechanism that moves totes along a first downward vertical tote path in opposite vertical directions, the apparatus further including:

a horizontal tote-transfer mechanism operatively coupled to the first guided vehicle and configured to move the first sequence of totes between the first upward vertical tote path and the first downward vertical tote path.

26. The apparatus of claim 18, wherein the first horizontal tote-conveyor system has a single horizontal tote path on which the first sequence of totes is horizontally conveyed to the first guided vehicle and on which of the first sequence of totes are horizontally conveyed from the first guided vehicle to the end of the aisle in a single horizontal direction; and wherein the first vertical tote-conveyor system vertically conveys each tote to each of the plurality of vertical locations is along a first upward vertical tote path and along a first downward vertical tote path, the apparatus further including:

a horizontal tote-transfer mechanism operatively coupled to the first guided vehicle and configured to move the first sequence of totes between the first upward vertical tote path and the first downward vertical tote path.

27. The apparatus of claim 18, further comprising:

a lower support operatively coupled to the first guided vehicle to support the first guided vehicle from below only on a first vehicle ground path located only on a single side of the first horizontal tote path;

an upper support operatively coupled to the first guided vehicle to support the first guided vehicle from above on at least a first upper track, wherein the first upper track is parallel to the first vehicle ground path; and

a motion device operatively coupled to the first guided vehicle to move the first guided vehicle successively to a plurality of different horizontal locations along the first aisle.

28. The apparatus of claim 18, wherein the first horizontal tote-conveyor system includes a first horizontal tote conveyor that moves the first sequence of totes along the first aisle away from the first guided vehicle along the first horizontal tote path and a second horizontal tote conveyor that is parallel to and moves totes in an opposite direction to the first horizontal tote conveyor that moves a second sequence of totes away from the first guided vehicle to a second end of the first aisle on a second horizontal tote path that, and wherein the apparatus further includes:

a lower support operatively coupled to the first guided vehicle to support the first guided vehicle from below only between the first horizontal tote conveyor and the second horizontal tote conveyor along a first vehicle ground path;

an upper support operatively coupled to the first guided vehicle to support the first guided vehicle from above on at least a first upper track, wherein the first upper track is parallel to the first vehicle ground path; and

a motion device operatively coupled to the first guided vehicle to move the first guided vehicle successively to a plurality of different horizontal locations along the first vehicle ground path.

29. The apparatus of claim 18, wherein the first horizontal tote-conveyor system includes a first horizontal tote conveyor that moves the first sequence of totes along the first aisle away from the first guided vehicle along the first horizontal tote path and a second horizontal tote conveyor that is parallel to and moves totes in an opposite direction to the first horizontal tote conveyor that moves a second sequence of totes away from the first guided vehicle to a second end of the first aisle on a second horizontal tote path that is parallel to first horizontal tote path, and wherein the apparatus further includes:

a second vertical tote-conveyor system operatively coupled to the first guided vehicle and configured to convey vertically each tote of the second sequence of totes to a plurality of vertical locations, wherein each of the plurality of locations of the second vertical tote-conveyor system is at a different height relative to the first guided vehicle so that a picker sequentially picks items to be picked from the plurality of bins and stows the picked items in the second sequence of totes, wherein the first horizontal tote-conveyor system moves the second sequence of totes away from the first guided vehicle to a second end of the first aisle.

30. The apparatus of claim 18, wherein a plurality of bins is located along at least a first side of a second aisle, wherein the first guided vehicle is configured to move to the second aisle, and wherein the apparatus further includes:

a second horizontal tote-conveyor system positioned along a second horizontal tote path that runs parallel to the first side of the second aisle, wherein the horizontal tote-conveyor system moves a third sequence of totes to the first guided vehicle in the second aisle, wherein the first vertical tote-conveyor system is configured to convey vertically each tote of the third sequence of totes to a plurality of vertical locations, wherein each of the plurality of locations of the first vertical tote-conveyor system is at a different height relative to the first guided vehicle such that items selected from the plurality of bins on the second aisle are placed in the third sequence of totes.

31. The apparatus of claim 18, further comprising:

a collection-and-shipping system configured to collect the first sequence of totes and take the picked items from the first sequence of totes and place the picked items into shipping containers for shipment to customers.