CLAIMS

What is claimed is:

1. An order fulfillment system, said order fulfillment system comprising:

an automated storage and retrieval system (ASRS) structure, said ASRS structure comprising a three-dimensional array of storage locations distributed throughout a two-dimensional footprint of the ASRS structure at a plurality of storage levels within the ASRS structure;

a fleet of robotic storage/retrieval vehicles navigable within the ASRS structure ~~at least~~ by travel in two dimensions over the two-dimensional footprint of the ASRS structure at ~~one or more~~ service levels of the ASRS structure, wherein the ~~one or more~~ service levels are positioned above and~~/or~~ below the storage levels;

a supply of storage bins of compatible size and shape for storage in the storage locations of the ASRS structure, wherein the storage bins are configured to be carried by the robotic storage/retrieval vehicles within the ASRS structure during transfer of the storage bins to and from the storage locations; ~~and~~

a plurality of different service areas positioned adjacent to an outer perimeter of the two-dimensional footprint of the ASRS structure at the ~~one or more~~ service levels of the ASRS structure, wherein each of the different service areas comprises ~~one or more~~ workstations ~~of a type~~ configured for ~~a task or a combination of~~ a plurality of tasks ~~different from the one or more workstations at another of the different service areas~~, and wherein ~~the~~ each of the different service areas is configured to receive a drop-off of the storage bins ~~at~~ and~~/or~~ to facilitate a travel of the robotic storage/retrieval vehicles carrying the storage bins therethrough ~~through the each of the different service areas by the robotic storage/retrieval vehicles~~;

wherein the different service areas are configured in a continuous arrangement around the ASRS structure and the system is configured for the storage bins to be transferred to and from the storage locations of the ASRS structure and between the different service areas, free of identification or scanning of the storage bins, due to the continuous arrangement of the different service areas

around the ASRS structure; and

wherein different perimeter sides of the ASRS structure are each occupied by a different combination of the workstations such that each perimeter side of the ASRS structure is dedicated to a particular task or a combination of the tasks that differs from the task or the combination of the tasks performed at other perimeter sides of the ASRS structure.

2. The order fulfillment system of claim 1, wherein the storage bins are transportable between the different service areas in any order.

3. The order fulfillment system of claim 1, wherein ~~the~~ each of the different service areas is configured to receive the storage bins a plurality of times for performance of ~~one or more of~~ the plurality of tasks.

4. The order fulfillment system of claim 1, wherein the storage bins are received at a first one of the different service areas for performance of one ~~or more~~ of the plurality of tasks and subsequently stored in the storage locations of the ASRS structure and retrieved from the storage locations of the ASRS structure for the transfer of the storage bins to a second one of the different service areas.

~~5. The order fulfillment system of claim 1, wherein the different service areas are configured in a continuous arrangement around the ASRS structure, and wherein the storage bins are configured to be transferred to and from the storage locations of the ASRS structure and between the different service areas, free of identification of the storage bins, due to the continuous arrangement of the different service areas.~~

~~6~~ 5. The order fulfillment system of claim 1, wherein the different service areas comprise a decanting area at which inbound items are placed in an originally received unprocessed condition in unprocessed storage bins selected from the supply of storage bins, and from which the unprocessed storage bins are inducted into the ASRS structure.

~~7~~ 6. The order fulfillment system of claim ~~6~~ 5, wherein the decanting area is a combined decanting and induction area at which the unprocessed storage bins are inducted directly into the ASRS structure by the robotic storage/retrieval vehicles without transfer to, past, ~~or~~ and through any other of the different service areas.

~~8~~ 7. The order fulfillment system of claim ~~7~~ 6, wherein the different service areas further comprise a processing area to which the unprocessed storage bins inducted into the ASRS structure are served by the robotic storage/retrieval vehicles for processing the inbound items contained in the unprocessed storage bins, and from which the processed items are returned into the ASRS structure for storage therein as saleable inventory ready for order fulfillment.

~~9~~ 8. The order fulfillment system of claim ~~8~~ 7, wherein, at the processing area, the processed items are transferred from the unprocessed storage bins to inventory storage bins selected from the supply of storage bins, and returned to the ASRS structure in the inventory storage bins.

~~10~~ 9. The order fulfillment system of claim 1, wherein the different service areas comprise a picking area to which inventory items in the ASRS structure are served by the robotic storage/retrieval vehicles for order picking.

~~11~~ 10. The order fulfillment system of claim ~~10~~ 9, wherein the different service areas further comprise a packing area to which ~~at least~~ partially fulfilled orders, previously picked at the picking area, are served by the robotic storage/retrieval vehicles for packing. ~~the at least partially fulfilled orders at the packing area.~~

~~12~~ 11. The order fulfillment system of claim ~~11~~ 10, wherein the different service areas further comprise an oversized item storage area for storing large-scale items ~~that are~~ substantially large for storage in the ASRS structure, and wherein the different service areas further comprise a consolidation area to which ordered large-scale items are transferred for consolidation with inventory items picked at the picking area.

~~13~~ 12. The order fulfillment system of claim ~~12~~ 11, wherein the consolidation area is positioned to ~~one of~~ neighbor the packing area ~~and~~ or overlap the packing area.

~~14~~ 13. The order fulfillment system of claim ~~13~~ 12, wherein the consolidation area that overlaps the packing area comprises at least one consolidated-packing workstation ~~from among the one or more workstations~~, wherein the ~~at least one~~ consolidated-packing workstation is configured to share a common order bin conveyor with ~~another of the one or more~~ other workstations of the packing area.

~~15~~ 14.The order fulfillment system of claim 1, further comprising at least one robotic

package-handling vehicle navigable within the ASRS structure and operable to receive packaged orders containing ordered items fulfilled from the ASRS structure, wherein the different service areas comprise a last mile sort area at which shipment-consolidation containers of a greater capacity than the storage bins are stored at positions accessible from the ASRS structure, and wherein the ~~at least one~~ robotic package-handling vehicle is operable to compile the packaged orders into the shipment-consolidation containers at the last mile sort area.

~~16~~ 15. The order fulfillment system of claim ~~15~~ 14, wherein the last mile sort area comprises storage racking delimiting storage spaces of a greater size than the storage locations of the ASRS structure, and wherein the last mile sort area comprises at least one row of the storage racking running along the outer perimeter thereof.

~~17~~ 16. The order fulfillment system of claim ~~15~~ 14, wherein the at least one robotic package-handling vehicle is a conveyor-equipped robotic vehicle comprising a wheeled chassis and a conveyor unit mounted atop the wheeled chassis, wherein the wheeled chassis is operable to perform locomotion of the ~~at least one~~ robotic package-handling vehicle through the ASRS structure, and wherein the conveyor unit is operable to receive the packaged orders and offload the packaged orders to the shipment-consolidation containers.

~~18~~ 17. The order fulfillment system of claim ~~17~~ 16, wherein the conveyor unit is rotatably mounted atop the wheeled chassis for movement relative to the wheeled chassis about an upright axis to re-orient the conveyor unit into a plurality of different working positions operable to offload the packaged orders in different directions from the at least one robotic package-handling vehicle to the shipment-consolidation containers.

~~19~~ 18. The order fulfillment system of claim ~~18~~ 17, wherein the conveyor unit comprises a belt conveyor operable to receive the packaged orders and offload the packaged orders to the shipment-consolidation containers.

~~20~~ 19. The order fulfillment system of claim ~~18~~ 17, wherein the conveyor unit is rotatable between at least two working positions of ninety-degree increment to one another about the upright axis.

~~21~~ 20. The order fulfillment system of claim 1, wherein ~~at least one of the one or more~~

the workstations ~~comprises~~ include:

at least one travel path on which internally subdivided storage bins selected from the supply of storage bins are movable through the ~~at least one of the one or more~~ workstations;

an access spot at which each of the internally subdivided storage bins is presentable to one of a human worker and a robotic worker available at the ~~at least one of the one or more~~ workstations; and

a set of illuminable indicators disposed around the access spot, wherein at least one of the illuminable indicators is positioned in neighboring adjacency to each compartment of each of the internally subdivided storage bins.

~~22~~ 21. The order fulfillment system of claim ~~21~~ 20, wherein the illuminable indicators are configured to border an access port that overlies the at least one travel path at the access spot thereof.

~~23~~ 22. The order fulfillment system of claim ~~21~~ 20, wherein each of the illuminable indicators is accompanied by a respective item quantity display configured to guide ~~one of~~ placement and picking of items in predetermined quantities to ~~or~~ and from ~~one or more~~ compartments of the internally subdivided storage bins.

~~24~~ 23. The order fulfillment system of claim 1, wherein at least one of the ~~one or more~~ workstations comprises at least one drive-through travel path on which the robotic storage/retrieval vehicles are traversable through ~~the~~ at least one of the ~~one or more~~ workstations to carry the storage bins therethrough.

~~25~~ 24. The order fulfillment system of claim 1, wherein at least one of the ~~one or more~~ workstations is arranged to receive two different storage bins between which items received at the at least one of the ~~one or more~~ workstations are transferred, and wherein ~~the~~ at least one of the ~~one or more~~ workstations receives a first of the two different storage bins via one of:

a drive-through travel path on which the robotic storage/retrieval vehicles are traversable through ~~the~~ at least one of the ~~one or more~~ workstations to carry the first of the two different storage bins therethrough; and

a ~~separate~~ conveyor-based travel path on which previously inducted storage bins traverse through ~~the~~ at least one of the ~~one or more~~ workstations

independent of the robotic storage/retrieval vehicles.

~~26~~ 25. The order fulfillment system of claim ~~25~~ 24, wherein the two different storage bins comprise internal compartments of quantities different from one another.

~~27~~ 26. The order fulfillment system of claim 1, wherein at least one of the different service areas ~~comprises~~ include at least one series of workstations arranged in a row extending outward from the ASRS structure and served by a bin conveyor, wherein the bin conveyor comprises an outbound section extending outward from the ASRS structure and passing by the series of workstations, and wherein the bin conveyor further comprises a series of offshoots, each branching off the outbound section of the bin conveyor to a respective one of the workstations to deliver ~~a~~ received ~~one of the~~ storage bins thereto.

~~28~~ 27. The order fulfillment system of claim ~~27~~ 26, wherein the at least one series of workstations is served by a package conveyor operable to convey packaged orders from the workstations back towards the ASRS structure.

~~29~~ 28. The order fulfillment system of claim 1, wherein the storage locations in the ASRS structure are arranged in storage columns, wherein each of the storage columns is neighbored by an upright shaft from which the storage locations in ~~the~~ each of the storage columns are accessible, and wherein the fleet of robotic storage/retrieval vehicles is navigable within the three-dimensional array of storage locations by both the travel in the two dimensions over the two-dimensional footprint of the ASRS structure, and a travel in an ascending direction and a descending direction in a third dimension through the upright shaft neighboring ~~the~~ each of the storage columns, whereby the transfer of the storage bins between the storage locations and ~~any of~~ the different service areas is performed entirely by the robotic storage/retrieval vehicles.

~~30~~ 29. The order fulfillment system of claim 1, wherein the ~~one or more~~ service levels of the ASRS structure comprise a lower level positioned below the storage levels.

~~31~~ 30. The order fulfillment system of claim ~~30~~ 29, wherein the different service areas are positioned adjacent to the ASRS structure at the lower level thereof for service of the different service areas by the robotic storage/retrieval vehicles from the lower level.

~~32~~ 31. The order fulfillment system of claim 1, wherein the ASRS structure ~~is the only~~

serves as an autonomously operable bin-transfer link for the storage bins between the different service areas.

~~33. The order fulfillment system of claim 1 free of any inter-area conveyors running between any of the different service areas.~~

~~34~~ 32. The order fulfillment system of claim 1, wherein at least one of the ~~one or more~~ workstations comprises:

a picking port overlying a supply bin pathway on which a supply storage bin selected from the supply of storage bins and containing ~~one or more~~ items to be picked is movable through ~~the~~ at least one of the ~~one or more~~ workstations to allow picking of the ~~one or more~~ items from the supply storage bin when parked on the supply bin pathway at a picking spot beneath the picking port; and

a placement port overlying a recipient bin pathway on which a recipient storage bin selected from the supply of storage bins and for which the ~~one or more~~ items are destined is movable through ~~the~~ at least one of the ~~one or more~~ workstations to allow placement of the ~~one or more~~ items to the recipient storage bin when parked on the recipient bin pathway at a placement spot beneath the placement port;

wherein a first one of the supply bin pathway and the recipient bin pathway is an extension track connected to a track of the ASRS structure on which the fleet of robotic storage/retrieval vehicles navigate the ASRS structure, whereby a first one of the picking port and the placement port is served by ~~one of~~ the robotic storage/retrieval vehicles navigating the extension track to carry a corresponding one of the supply storage bin and the recipient storage bin to the first one of the picking port and the placement port.

~~35~~ 33. The order fulfillment system of claim ~~34~~ 32, wherein a second one of the supply bin pathway and the recipient bin pathway comprises a conveyor-based path running off the track of the ASRS structure to receive the corresponding one of the supply storage bin and the recipient storage bin from ~~one of~~ the robotic storage/retrieval vehicles navigating the track.

~~36~~ 34. The order fulfillment system of claim ~~34~~ 32, wherein at least one of the supply bin pathway and the recipient bin pathway is arranged to ~~both~~ receive and return

the corresponding one of the supply storage bin and the recipient storage bin from and to the track of the ASRS structure.

~~37~~ 35. The order fulfillment system of claim ~~34~~ 32, wherein ~~both of~~ the supply bin pathway and the recipient bin pathway are arranged to receive and return the corresponding one of the supply storage bin and the recipient storage bin from and to the track of the ASRS structure.

~~38~~ 36. The order fulfillment system of claim ~~34~~ 32, wherein at least one of the picking port and the placement port is bordered by a set of illuminable indicators occupying a layout that places at least one of the illuminable indicators in neighboring adjacency to each compartment of a respective one of the supply storage bin and the recipient storage bin.

~~39~~ 37. The order fulfillment system of claim 1, further comprising a computerized control system in operable communication with the fleet of robotic storage/retrieval vehicles and the workstations of each of the different service areas, wherein the computerized control system comprises a network interface coupled to a communication network, at least one processor coupled to the network interface, ~~and a non-transitory, computer-readable storage medium communicatively coupled to the at least one processor, wherein the non-transitory, computer-readable storage medium is configured to store computer program instructions, which when executed by the at least one processor, cause the at least one~~ said processor configured to activate ~~one or more of~~ the robotic storage/retrieval vehicles to ~~one or more of~~:

(a) navigate within the ASRS structure and~~/or~~ through ~~the~~ each of the different service areas;

(b) retrieve the storage bins from the storage locations of the ASRS structure;

(c) drop off the storage bins at the different service areas;

(d) pick up the storage bins from the different service areas; and

(e) return and store the storage bins to the storage locations of the ASRS structure.

~~40~~ 38. The order fulfillment system of claim ~~39~~ 37, wherein the computerized control system is in operable communication with the ~~one or more~~ workstations of ~~the~~

each of the different service areas, wherein the computerized control system is configured to transmit service instructions to one of a human worker and a robotic worker for performance of ~~one or more~~ service actions on the items contained in the storage bins.

~~41~~ 39. An order fulfillment system, said order fulfillment system comprising:

a three-dimensional array of storage locations defined within a three-dimensional gridded storage structure, said three-dimensional array of storage locations and said three-dimensional storage structure in combination forming an automated storage retrieval system (ASRS) structure, said three-dimensional array of storage locations comprising:

storage columns, each of the storage columns ~~being~~ neighbored by an upright shaft from which the storage locations in ~~the~~ each of the storage columns are accessible; and

at least one two-dimensional gridded track layout from which the upright shaft neighboring ~~the~~ each of the storage columns is accessible;

a fleet of robotic vehicles navigable within the three-dimensional array of storage locations by travel in two dimensions on the at least one two-dimensional gridded track layout to access the upright shaft neighboring ~~any of~~ the storage columns, and by travel in an ascending direction and a descending direction in a third dimension through the upright shaft neighboring the ~~any of the~~ storage columns;

a supply of storage bins of compatible size and shape for storage in the storage locations of the three-dimensional gridded storage structure, wherein the storage bins are configured to be carried through the three-dimensional gridded storage structure by ~~one or more of~~ the robotic vehicles;

a plurality of different service areas positioned adjacent to an outer perimeter of the two-dimensional footprint of the ASRS structure, each of the different service areas comprising workstations configured for a plurality of tasks;

at least one packing workstation incorporated within at least one of the service areas, to which ordered items contained in ~~one or more of~~ the storage bins are served by the robotic vehicles for removal and packing of the ordered items into packaged orders at the at least one packing workstation;

storage racking delimiting storage spaces of a greater size than the storage locations of the three-dimensional gridded storage structure; and

a supply of shipment-consolidation containers of a greater capacity than the storage bins, wherein the shipment-consolidation containers are compatible in size and shape with the storage spaces of the storage racking;

wherein the service areas are configured in a continuous arrangement around the ASRS structure and the storage bins are transferred to and from the storage locations of the ASRS structure and between the service areas, free of identification or scanning of the storage bins, due to the continuous arrangement of the different service areas around the ASRS structure;

wherein the storage spaces of the storage racking are defined at positions accessible from the three-dimensional gridded storage structure, and ~~at least one of~~ the robotic vehicles ~~is~~ are operable to receive the packaged orders from the ~~at least one~~ packing workstation and compile the packaged orders into the shipment-consolidation containers; and

wherein different perimeter sides of the ASRS structure are each occupied by a different combination of the workstations such that each perimeter side of the ASRS structure is dedicated to a particular task or a combination of the tasks that differs from the task or the combination of the tasks performed at other perimeter sides of the ASRS structure.

~~42~~ 40. The order fulfillment system of claim ~~41~~ 39, wherein ~~the at least one of~~ the robotic vehicles ~~is~~ are ~~a~~ conveyor-equipped robotic vehicles ~~comprising~~ incorporating a wheeled chassis and a conveyor unit mounted atop the wheeled chassis, wherein the wheeled chassis is operable to perform locomotion of the ~~at least one of the~~ robotic vehicles through the three-dimensional gridded storage structure, and wherein the conveyor unit is operable to receive the packaged orders from the packing workstation and offload the packaged orders to the shipment-consolidation containers.

~~43~~ 41. The order fulfillment system of claim ~~42~~ 40, wherein the conveyor unit is rotatably mounted atop the wheeled chassis for movement relative to the wheeled chassis about an upright axis to re-orient the conveyor unit into a plurality of different working positions operable to offload the packaged orders in different

directions from the ~~at least one of the~~ robotic vehicles to the shipment-consolidation containers.

~~44~~ 42. The order fulfillment system of claim ~~43~~ 41, wherein the conveyor unit is rotatable between at least two working positions of ninety-degree increment to one another about the upright axis.

~~45~~ 43. The order fulfillment system of claim ~~43~~ 41, wherein the conveyor unit comprises a belt conveyor operable to receive the packaged orders and offload the packaged orders to the shipment-consolidation containers.

~~46~~ 44. An order fulfillment system, said order fulfillment system comprising:

a three-dimensional array of storage locations defined within a three-dimensional gridded storage structure, said three-dimensional array of storage locations and said three-dimensional storage structure in combination forming an automated storage retrieval system (ASRS) structure, said three-dimensional array of storage locations comprising:

storage columns, each of the storage columns ~~being~~ neighbored by an upright shaft from which the storage locations in ~~the~~ each of the storage columns are accessible; and

at least one two-dimensional gridded track layout from which the upright shaft neighboring ~~the~~ each of the storage columns is accessible;

a fleet of robotic vehicles navigable within the three-dimensional array of storage locations by travel in two dimensions on the at least one two-dimensional gridded track layout to access the upright shaft neighboring ~~any of~~ the storage columns, and by travel in an ascending direction and a descending direction in a third dimension through the upright shaft neighboring the ~~any of the~~ storage columns;

a supply of storage bins of compatible size and shape for storage in the storage locations of the three-dimensional gridded storage structure, wherein the storage bins are configured to be carried through the three-dimensional gridded storage structure by ~~one or more of~~ the robotic vehicles;

a plurality of different service areas positioned adjacent to an outer perimeter of the two-dimensional footprint of the ASRS structure, each of the different service areas comprising workstations configured for a plurality of tasks;

at least one packing workstation incorporated within at least one of the service areas to which ordered items contained in ~~one or more of~~ the storage bins are served by the robotic ~~storage/retrieval~~ vehicles for removal and packing of the ordered items into packaged orders at the at least one packing workstation;

storage racking delimiting storage spaces of a greater size than the storage locations of the three-dimensional gridded storage structure; and

a supply of shipment-consolidation containers of a greater capacity than the storage bins, wherein the shipment-consolidation containers are compatible in size and shape with the storage spaces of the storage racking;

wherein the service areas are configured in a continuous arrangement around the ASRS structure and the storage bins are transferred to and from the storage locations of the ASRS structure and between the service areas, free of identification or scanning of the storage bins, due to the continuous arrangement of the different service areas around the ASRS structure;

wherein different perimeter sides of the ASRS structure are each occupied by a different combination of the workstations such that each perimeter side of the ASRS structure is dedicated to a particular task or a combination of the tasks that differs from the task or the combination of the tasks performed at other perimeter sides of the ASRS structure; and

wherein the storage racking is served by a combination of:

(a) a navigation structure of assembled track rails and upright frame members of a same type and relative spacing used in the three-dimensional gridded storage structure to form the at least one two-dimensional gridded track layout, the storage columns, and the upright shaft neighboring ~~the~~ each of the storage columns; and

(b) at least one package-handling robotic vehicle navigable within the navigation structure by travel in two dimensions on the assembled track rails and by travel in an ascending direction and a descending direction in a third dimension on the upright frame members, wherein the ~~at least one~~ package-handling robotic vehicle is operable to receive the packaged orders from the ~~at least one~~ packing workstation, carry the packaged orders through the navigation structure to the storage spaces, and compile the packaged orders

into the shipment-consolidation containers located in the storage spaces.

~~47~~ 45. The order fulfillment system of claim ~~46~~ 44, wherein the ~~at least one~~ package-handling robotic vehicle is a conveyor-equipped robotic vehicle comprising a wheeled chassis and a conveyor unit mounted atop the wheeled chassis, wherein the wheeled chassis is operable to perform locomotion of the ~~at least one~~ package-handling robotic vehicle through the navigation structure, and wherein the conveyor unit is operable to receive the packaged orders from the packing workstation and offload the packaged orders to the shipment-consolidation containers.

~~48~~ 46. The order fulfillment system of claim ~~47~~ 45, wherein the conveyor unit is rotatably mounted atop the wheeled chassis for movement relative to the wheeled chassis about an upright axis to re-orient the conveyor unit into a plurality of different working positions operable to offload the packaged orders in different directions from the ~~at least one~~ package-handling robotic vehicle.

~~49~~ 47. The order fulfillment system of claim ~~48~~ 46, wherein the conveyor unit is rotatable between at least two working positions of ninety-degree increment to one another about the upright axis.

~~50~~ 48. The order fulfillment system of claim ~~48~~ 46, wherein the conveyor unit comprises a belt conveyor operable to receive the packaged orders and offload the packaged orders to the shipment-consolidation containers.

~~51~~ 49. A method for fulfilling orders, the method comprising:

receiving inbound items at a facility, the facility comprising:

an automated storage and retrieval system (ASRS) structure comprising a three-dimensional array of storage locations distributed throughout a two-dimensional footprint of the ASRS structure at a plurality of storage levels within the ASRS structure; and

a fleet of robotic storage/retrieval vehicles navigable within the ASRS structure at least by travel in two-dimensions over the two-dimensional footprint of the ASRS structure at ~~one or more~~ the service levels of the ASRS structure, wherein the ~~one or more~~ service levels are positioned above and~~/or~~ below the storage levels; and

a plurality of different service areas positioned adjacent to an outer perimeter of the two-dimensional footprint of the ASRS structure at the service levels of the ASRS structure, wherein each of the different service areas include at least one of a decanting workstation, a processing workstation, a picking workstation, a packing workstation, a value-added services workstation, a returns-handling workstation, and a consolidated-packing workstation;

at ~~one or more~~ the decanting workstation~~s~~, placing ~~the~~ inbound items into unprocessed storage bins in an originally received condition and inducting the unprocessed storage bins into the ASRS structure on the robotic storage/retrieval vehicles;

carrying ~~one or more of~~ the unprocessed storage bins to ~~one or more~~ processing workstations using the robotic storage/retrieval vehicles, wherein processing steps are performed at the ~~one or more~~ processing workstations to transform the inbound items into saleable inventory items ready for order fulfillment;

from the ~~one or more~~ processing workstations, inducting the saleable inventory items into the ASRS structure in inventory storage bins carried on the robotic storage/retrieval vehicles;

carrying ~~at least one of~~ the inventory storage bins to a picking workstation using the robotic storage/retrieval vehicles, wherein, at the picking workstation, ~~one or more of~~ the saleable inventory items are picked from the inventory storage bins and transferred to an order bin to form ~~an~~ at least a partially fulfilled order; ~~and~~

from the picking workstation, inducting the ~~at least~~ partially fulfilled order into the ASRS structure on ~~one of~~ the robotic storage/retrieval vehicles;

configuring the different service areas in a continuous arrangement around the ASRS structure and transferring the storage bins to and from the storage locations of the ASRS structure and between the different service areas, free of identification or scanning of the storage bins, due to the continuous arrangement of the different service areas around the ASRS structure; and

configuring different perimeter sides of the ASRS structure to be respectively

occupied by a different combination of workstations such that each perimeter side of the ASRS structure is dedicated to a particular task or a combination of tasks that differs from the task or the combination of tasks performed at other perimeter sides of the ASRS structure.

~~52~~ 50. The method of claim ~~51~~ 49, further comprising using ~~one of:~~ the ~~one of the~~ robotic storage/retrieval vehicles ~~and a different one of the robotic storage/retrieval vehicles,~~ for carrying the order bin to a packing workstation, where a complete order with the ~~at least~~ partially fulfilled order is packaged for shipping.

~~53~~ 51. The method of claim ~~52~~ 50, further comprising:

transferring the ~~at least~~ partially fulfilled order from the packing workstation to a last mile sort area;

at the last mile sort area, using a robotic package-handling vehicle of a locomotive design matching that of the robotic storage/retrieval vehicles to carry the ~~at least partially~~ fulfilled order through the last mile sort area on a navigation structure of componentry matching ~~that of~~ the ASRS structure; and

through navigation of the robotic package-handling vehicle on the navigation structure, carrying the ~~at least~~ partially fulfilled order to a shipment-consolidation container and depositing the ~~at least~~ partially fulfilled order into the shipment-consolidation container for consolidation with other orders awaiting shipment.

~~54~~ 52. The method of claim ~~53~~ 51, wherein the navigation structure of the last mile sort area is operably coupled to the ASRS structure in which the robotic storage/retrieval vehicles are navigable, whereby the robotic package-handling vehicle is navigable within the ASRS structure.

~~55~~ 53. The method of claim ~~51~~ 49, wherein ~~the facility further comprises a plurality of different service areas positioned adjacent to an outer perimeter of the two-dimensional footprint of the ASRS structure at the one or more service levels of the ASRS structure, wherein each of the different service areas comprises one or more workstations of a type configured for a task or a combination of tasks different from the one or more workstations at another of the different service areas, and wherein the~~ each of the different service areas positioned adjacent to the outer perimeter of the two-dimensional footprint of the ASRS structure is

configured to receive a drop-off of storage bins at and~~/or~~ a travel of the storage bins through ~~the~~ each of the different service areas by the robotic storage/retrieval vehicles.

~~56~~ 54. The method of claim ~~55~~ 53, wherein the plurality of different service areas include ~~comprises a decanting/induction area, a processing area, a picking area, a packing area, and a last mile sort area configured in a continuous arrangement around the ASRS structure, and wherein the plurality of different service areas further comprises~~ a consolidation area and an oversized item storage area positioned proximal to the ASRS structure.

~~57~~ 55. A robotic vehicle for use in an order fulfillment system for relocating an article between a plurality of storage locations incorporated within an automated storage and retrieval system (ASRS) structure, the robotic vehicle comprising:

a wheeled chassis operable to perform locomotion of the robotic vehicle between the plurality of storage locations in the ~~order fulfillment system~~ ASRS structure; and

a conveyor unit mounted atop the wheeled chassis, wherein the conveyor unit is operable to receive an article on the robotic vehicle at a pickup ~~one of the locations~~ location and offload the article ~~on the robotic vehicle~~ at a drop-off ~~one of the locations~~ location, and wherein the conveyor unit is rotatably mounted atop the wheeled chassis for movement relative to the wheeled chassis about an upright axis to re-orient the conveyor unit into a plurality of different working positions operable to offload the article in different directions from the robotic vehicle; and

wherein said robotic vehicle transports storage bins to and from and between workstations of different service areas incorporated within the ASRS structure, thereby omitting a need for long-range conveyors running between the different service areas of the ASRS structure; and

wherein said robotic vehicle transfers the storage bins to and from storage locations of the ASRS structure and between the different service areas, free of identification or scanning of the storage bins, due to a continuous arrangement of the different service areas around the ASRS structure;

and wherein different perimeter sides of the ASRS structure are each occupied by

a different combination of workstations such that each perimeter side of the ASRS structure is dedicated to a particular task or a combination of tasks that differs from the task or the combination of tasks performed at other perimeter sides of the ASRS structure.

~~58~~ 56. The robotic vehicle of claim ~~57~~ 55, wherein the conveyor unit ~~comprises~~ includes a belt conveyor operable to receive the article from the pickup location ~~one of the locations~~ and offload the article to the drop-off ~~one of the locations~~ location.

~~59~~ 57. The robotic vehicle of claim ~~57~~ 55, wherein the conveyor unit is rotatable between at least two working positions of ninety-degree increment to one another about the upright axis.

58. A method for fulfilling orders in an order fulfillment center, said method comprising the following steps:

receiving inbound items at a receiving area of the order fulfillment center, said order fulfilment center comprising an automated storage and retrieval system (ASRS) structure, said ASRS structure further comprising a three-dimensional array of storage locations distributed throughout a two-dimensional footprint of the ASRS structure at a plurality of storage levels within the ASRS structure;

triggering a fleet of robotic storage/retrieval vehicles to navigate the ASRS structure by travelling in two dimensions over the two-dimensional footprint of the ASRS structure at service levels of the ASRS structure, wherein the service levels are positioned above and below the storage levels;

configuring storage bins to be carried by the robotic storage/retrieval vehicles within the ASRS structure during transfer of the storage bins to and from the storage locations;

positioning a plurality of different service areas positioned adjacent to an outer perimeter of the two-dimensional footprint of the ASRS structure at the service levels of the ASRS structure, wherein each of the different service areas comprises workstations configured for a plurality of tasks;

configuring each of the different service areas to receive a drop-off of the

storage bins and to facilitate a travel of the robotic storage/retrieval vehicles carrying the storage bins therethrough;

configuring the different service areas in a continuous arrangement around the ASRS structure and transferring the storage bins are transferred to and from the storage locations of the ASRS structure and between the different service areas, free of identification or scanning of the storage bins, due to the continuous arrangement of the different service areas around the ASRS structure; and

causing each different perimeter side of the ASRS structure to be occupied by a different combination of the workstations such that each perimeter side of the ASRS structure is dedicated to a particular task or a combination of the tasks that differs from the task or the combination of the tasks performed at other perimeter sides of the ASRS structure.

59. The method as claimed in claim 58, wherein the method further includes the following steps:

transporting the storage bins between the different service areas in any order;

configuring each of the different service areas to receive the storage bins a plurality of times for performance of the plurality of tasks; and

receiving the storage bins at a first one of the different service areas for performance of one of the plurality of tasks;

subsequently storing the storage bins in the storage locations of the ASRS structure; and

retrieving the storage bins from the storage locations of the ASRS structure and transferring retrieved storage bins to a second one of the different service areas.