CLAIMS

1. A method of navigating a vehicle (100), the vehicle comprising a scanning device (104) and a self-contained navigation system, SCNS (108) being operatively connected to a computer (124), the SCNS providing data indicative of a current position of the vehicle relative to a previous position, the method comprising: operating the scanning device (104) for repeatedly executing a scanning operation, where each scanning operation includes scanning an area surrounding the vehicle, to thereby generate respective scanning output data; operating the computer for generating, based on the scanning output data from multiple scanning operations, a relative map representing at least a part of the area, the relative map having known dimensions and being relative to a position of the vehicle, wherein the relative map comprises cells, each cell being classified to a class selected from at least two classes, comprising traversable and non-traversable; the method is characterized by: each cell is characterized by dimensions equal or larger than an accumulated drift value of the SCNS (108) over a predefined distance, wherein the predefined distance is derived from one or more of the known dimensions of the relative map; wherein non-traversable cells correspond to obstacles identified in the scanning output data; receiving SCNS data and updating a position of the vehicle relative to the cells based on the SCNS data, enabling to generate instructions for controlling the vehicle movement within the area based on the relative map, while avoiding non-traversable cells.

2. The method of claim 1, wherein updating a position of the vehicle relative to the cells based on the SCNS data includes updating the position of the vehicle relative to obstacles detected in scanning output data of a previous scanning operation from the multiple scanning operations and not detected in scanning output data of a current scanning operation from the multiple scanning operations, while the obstacle is still located within the scanned area.

3. The method of any one of the preceding claims further comprising: applying the instructions for controlling the vehicle within the area based on the relative map, to thereby avoid non-traversable cells.

4. The method of any one of the preceding claims, wherein generating of the relative map comprises: continuously accumulating scanning output data from a plurality of consecutive scanning operations and combining the scanning output data

obtained in the consecutive scanning operations into the relative map using SCNS data and not GPS.

5. The method of any one of the preceding claims further comprising: navigating the vehicle within an area represented by the relative map while avoiding non-traversable cells based on the relative map and the SCNS and not GPS, while navigating the vehicle towards a target destination along a global path, using at least one navigation means other than the SCNS.

6. The method of claim 5, further comprising:

aligning between a global map comprising the global path leading to the target destination and the relative map, thereby providing a combined map leading to the destination, wherein the aligning comprises:

using time tags for temporally aligning between an update of the global map and an updated of the relative map;

spatially aligning between the global map and the relative map by matching between the position of the vehicle in the global map and the position of the vehicle in the relative map.

7. The method of any one of claims 1 to 6, wherein the predefined distance is equal to any one of: a dimension of an area represented by the relative map; a half of a dimension of the area represented by the relative map; and a diagonal connecting opposite vertexes of the relative map.

8. The method of any one of the preceding claims, wherein the SCNS (108) is an inertial navigation system.

9. A system (102) mountable on vehicle (100), the system comprising:

a scanning device (104) for scanning an area surrounding the vehicle, to thereby provide scanning output data providing information about distances between objects in the area and the vehicle in a multiplicity of directions;

a self-contained navigation system, SCNS (108) for providing data indicative of a current position of the vehicle relative to a previous position; and at least one processor (124);

the scanning device (104) is operable to repeatedly execute a scanning operation, where each scanning operation includes scanning an area surrounding the

vehicle, to thereby generate respective scanning output data;

the at least one processor (124) is configured to:

generate, based on the scanning output data from multiple scanning operations, a relative map representing at least a part of the area, the relative map having known dimensions and being relative to a position of the vehicle, wherein the relative map comprises cells, each cell is classified to a class selected from a group consisting of traversable and non-traversable; the system is characterized by:

each cell is characterized by dimensions equal or larger than an accumulated drift value of the SCNS over a predefined distance, which is derived from one or more of the known dimensions of the relative map; wherein non-traversable cells correspond to obstacles identified in the scanning output data;

receive SCNS data and update a position of the vehicle relative to the cells based on the SCNS (108) data, thereby enabling to generate instructions for controlling the vehicle movement within the area based on the relative map, while avoiding non-traversable cells.

10. The system of claim 9, wherein the generating of the relative map comprises: continuously accumulating scanning output data from a plurality of consecutive scanning operations and combining the scanning output data obtained in the consecutive scanning operations into the relative map, using SCNS data and not GPS.

11. The system of any one of claims 9 or 10, wherein the at least one processer (124) is further configured to: navigate the vehicle within an area represented by the relative map while avoiding non-traversable cells, based on the relative map and the SCNS, without using GPS, while navigating the vehicle towards a target destination, using at least one navigation means other than SCNS.

12. The system (102) of claim 11, wherein the at least one processor (124) is further configured to: align between a global map comprising a global path leading to the target destination and the relative map thereby providing a combined map leading to the target destination that comprises a global path which has been updated based on the relative map.

13. The system of any one of claim 9 to 12 wherein the predefined distance is equal to any one of:

a dimension of an area represented by the relative map;

a half of a dimension of the area represented by the relative map; and

a diagonal connecting opposite vertexes of the relative map.

14. The system of any one of claims 9 to 13, wherein the SCNS is an inertial navigation system.

15. A vehicle (100), comprising a system (102) according to any one of claims 9 to 14.

16. The vehicle (100) of claim 15 wherein the vehicle is any one of: unmanned ground vehicle; manned ground vehicle; unmanned aerial vehicle; manned aerial vehicle; unmanned marine vehicle; manned marine vehicle.

17. A computer program product comprising a computer readable storage medium retaining program instructions, which program instructions when executed by a processor, cause the processor to perform the method according to any one of claim 1 to 8.