CLAIMS

1. A computer implemented method of autonomous path planning in an autonomous vehicle for traversing an area in offroad conditions, the method comprising:

obtaining a map representing an area around the vehicle; wherein the map is generated by scanning an area around the vehicle and comprises at least one scanned area and at least one unscanned area;

generating one or more candidate paths leading the vehicle towards a desired destination, wherein the generating comprises:

dividing the map into a plurality of subregions, each subregion being defined by one or more respective ranges from the vehicle, including at least: short-range subregion, medium-range subregion, and long-range subregion; wherein the map is divided into cells, where cells in a scanned area are classified to a class selected from at least two classes, comprising traversable and non-traversable, and wherein cells in an unscanned area are defined as uncharted cells;

applying a selective path planning logic that classifies the traversability of uncharted cells according to the subregion in which they are located, to thereby enable efficient and safe path planning;

excluding from the one or more candidate paths, segments that include cells classified as non-traversable and segments that include uncharted cells located in the short-range subregion;

selecting a preferred path from the one or more candidate paths; and generating steering instructions for steering the vehicle in accordance with the path.

2. The method of claim 1, wherein:

in the short-range subregion, classifying uncharted cells as non-traversable; and in the long-range subregion, classifying uncharted cells as traversable.

3. The method of claim 2, wherein applying the selective path planning logic further comprises:

in the medium-range subregion, applying a penalty to a segment that includes uncharted cells that negatively affects a score of a respective candidate path that includes the segment.

4. The method of any one of claims 1 to 3 , further comprising:

dynamically updating one or more candidate paths as the vehicle is advancing along the preferred path, comprising:

obtaining an updated map generated based on updated scanning output data, wherein the update map comprises one or more of: an unscanned area that was previously in the medium-range subregion of the map and is in the short-range subregion; and an unscanned area that was previously in the long-range subregion and is in the medium-range subregion;

excluding segments, from any one of the one or more candidate paths, that cross uncharted cells in the short-range subregion;

and applying a penalty to segments, in any one of the one or more candidate paths, that cross uncharted cells in the medium-range subregion, where the penalty negatively affects a respective score of a candidate path;

recalculating a respective score for each candidate path; and selecting a preferred path from the one or more candidate paths according to the respective scores; and generating steering instructions for steering the vehicle in accordance with the path.

5. The method of any one of claims 2 to 4, responsive to determining that the preferred path includes segments crossing the short-range subregion that include uncharted cells, updating the preferred path to replace the segments with one or more other segments that circumvent the uncharted cells.

6. The method of any one of the preceding claims further comprising:

responsive to identifying uncharted cells in the medium-range subregion, generating a speed control command for slowing down the vehicle to thereby increase probability of successfully scanning unscanned areas in subsequent scans.

7. The method of any one of the preceding claims, further comprising:

operating a sensors-suite comprising one or more sensors onboard the vehicle for repeatedly scanning the area around the vehicle, to thereby generate respective scanning output data; and

operating a computer for generating and updating the map based on the scanning output data.

8. The method of any one of the preceding claims, further comprising: dynamically adapting the size of one or more of the plurality of subregions according to one or more real-time operational conditions.

9. The method of claim 8, wherein the one or more real-time operational conditions include vehicle speed, the method further comprising one or more of:

a. responsive to increase in vehicle speed, increasing the size of the short-range subregion and decreasing the size of the long-range subregion and/or medium-range subregion; and

b. responsive to decrease in vehicle speed, decreasing the size of the short-range subregion and increasing the size of the long-range subregion and/or medium-range subregion.

10. The method of claim 8, wherein the one or more real-time operational conditions include obstacle density, the method further comprising determining obstacle density and performing one or more of:

a. response to determination that obstacle density is above a certain value, increasing the size of the short-range subregion and decreasing the size of the long range-subregion and/or medium-range subregion;

b. response to determination that obstacle density is below a certain value, decreasing the size of the short-range subregion and increasing the size of the long range-subregion and/or medium-range subregion.

11. The method of any one of the preceding claims further comprising: executing the steering instruction and controlling one or more control devices for leading the vehicle along the preferred path.

12. The method of any one of the preceding claims wherein the vehicle is an Unmanned Ground Vehicle.

13. The method of any one of the preceding claims, wherein the map is generated relative to the vehicle by accumulating scanning output data in an advancement direction of the vehicle as the vehicle advances, and omitting from the map scanning output data representing areas in a direction opposite to the advancement direction.

14. A computer system mountable on an autonomous vehicle for autonomous path planning while traversing an area in offroad conditions, the system comprising at least one processing circuitry configured to execute operations as disclosed in any one of claims 1 to 13.

15. An Unmanned Vehicle comprising a system for autonomous path planning while traversing an area in offroad conditions, the system comprising a scanning device configured to scan an area around the vehicle and at least one processing circuitry configured to execute operations as disclosed in any one of claims 1 to 13.

16. A computer-readable storage medium comprising instructions, which, when executed by a computer, cause the computer to perform a method as disclosed in any one of claims 1 to 13.