CLAIMS

1. A method for issuing preemption requests, comprising:

determining, by an on-vehicle circuit arrangement, a location and a heading of a vehicle;

determining, by the on-vehicle circuit arrangement, boundaries of a geo-window in response to the determined location and heading;

determining, by the on-vehicle circuit arrangement, whether or not any one of a plurality of intersections is located within the boundaries of the geo-window;

in response to determining that one of the plurality of intersections is located within the boundaries of the geo-window, transmitting a preemption request from the vehicle to an intersection controller at the one of the plurality of intersections;

periodically determining a heading of the vehicle by the on-vehicle circuit arrangement; and

periodically adjusting boundaries of the geo-window in response to the determined heading of the vehicle.

2. The method of claim 1, further comprising:

determining whether or not any one of a plurality of locations that are not coincident with any of the plurality of intersections is located within the boundaries of the geo-window, wherein each location of the plurality of locations is associated with one of the plurality of intersections; and

in response to determining that at least one of the plurality of locations is located within the boundaries of the geo-window, transmitting a preemption request from the vehicle to an intersection controller at the intersection associated with the one location.

3. The method of claim 1, further comprising:

in response to activation of a turn signal that indicates a direction, generating a supplemental geo-window that is oriented in the direction of the turn signal;

determining, by the on-vehicle circuit arrangement, whether or not any one of the plurality of intersections is located within the boundaries of the supplemental geo-window;

in response to determining that another one of the plurality of intersections is located within the boundaries of the supplemental geo-window, transmitting a preemption request from the vehicle to an intersection controller at the another one of the plurality of intersections.

4. The method of claim 1, wherein the periodic adjusting of the boundaries of the geo-window includes defining the geo-window with a length extending from the vehicle toward the heading of the vehicle and a width that is less than the length.

5. The method of claim 4, further comprising:

periodically determining a speed of the vehicle by the on-vehicle circuit arrangement; and

wherein the periodic adjusting of the boundaries of the geo-window further includes defining the length of the geo-window to be inversely proportional to the determined speed of the vehicle.

6. The method of claim 4, further comprising:

periodically determining a speed of the vehicle by the on-vehicle circuit arrangement; and

wherein the periodic adjusting of the boundaries of the geo-window further includes defining the length of the geo-window to be proportional to the determined speed of the vehicle.

7. The method of claim 1, wherein preemption request includes data that identify the intersection controller.

8. The method of claim 7, wherein preemption request further includes data that indicate at least one of signal phase, heading, or position.

9. An on-vehicle system for issuing traffic signal preemption requests, comprising:

a receiver configured and arranged to receive a location signal indicating a location of a vehicle;

a storage device configured with data that indicate geographical data that identify locations of a plurality of traffic signals;

a processor coupled to the receiver and to the storage device, wherein the processor is configured and arranged to:

determine a location and a heading of the vehicle in response to the location signal;

generate a representation of a geo-window from the location and heading of the vehicle;

determine from the stored geographical data whether or not any one of the traffic signals is located within boundaries of the geo-window;

in response to determining that one of the traffic signals is located within the boundaries of the geo-window, generate a preemption request;

periodically determine a heading of the vehicle by the on-vehicle circuit arrangement; and

periodically adjust boundaries of the geo-window in response to the determined heading of the vehicle; and

a transmitter coupled to the processor, wherein the transmitter is configured and arranged to transmit the preemption request to an intersection controller of the one of the traffic signals.

10. The system of claim 9, wherein the processor is further configured and arranged to:

determine whether or not any one of a plurality of locations that are not coincident with any of the plurality of intersections is located within the boundaries of

the geo-window, wherein each location of the plurality of locations is associated with one of the plurality of intersections; and

in response to determining that at least one of the plurality of locations is located within the boundaries of the geo-window, transmit a preemption request from the vehicle to an intersection controller at the intersection associated with the one location.

11. The system of claim 9, wherein the processor is further configured and arranged to:

in response to activation of a turn signal that indicates a direction, generate a supplemental geo-window that is oriented in the direction of the turn signal;

determine by the on-vehicle circuit arrangement, whether or not any one of the plurality of intersections is located within the boundaries of the supplemental geo-window;

in response to determining that another one of the plurality of intersections is located within the boundaries of the supplemental geo-window, transmit a preemption request from the vehicle to an intersection controller at the other one of the plurality of intersections.

12. The system of claim 9, wherein the periodic adjustment of the boundaries of the geo-window includes defining the geo-window with a length extending from the vehicle toward the heading of the vehicle and a width that is less than the length.

13. The system of claim 12, wherein the processor is further configured and arranged to:

periodically determine a speed of the vehicle by the on-vehicle circuit arrangement; and

wherein the periodic adjustment of the boundaries of the geo-window further includes defining the length of the geo-window to be inversely proportional to the determined speed of the vehicle.

14. The system of claim 12, wherein the processor is further configured and arranged to:

periodically determine a speed of the vehicle by the on-vehicle circuit arrangement; and

wherein the periodic adjustment of the boundaries of the geo-window further includes defining the length of the geo-window to be proportional to the determined speed of the vehicle.

15. The system of claim 9, wherein preemption request includes data that identify the intersection controller.

16. The system of claim 15, wherein preemption request further includes data that indicate at least one of a signal phase, heading, or position.

CLAIMS

1. A method for issuing preemption requests, comprising:

determining, by an on-vehicle circuit arrangement, a location and a heading of a vehicle;

calculating, by a processor of the on-vehicle circuit arrangement, coordinates that define boundaries of a geo-window in response to the determined location and heading;

determining, by the on-vehicle circuit arrangement, whether or not any one of a plurality of intersections is located within the boundaries of the geo-window;

in response to determining that one of the plurality of intersections is located within the boundaries of the geo-window, transmitting a preemption request from the vehicle to an intersection controller at the one of the plurality of intersections.

2. The method of claim 1, further comprising:

periodically determining a heading of the vehicle by the on-vehicle circuit arrangement; and

periodically adjusting boundaries of the geo-window in response to the determined heading of the vehicle.

3. The method of claim 2, wherein the periodic adjusting of the boundaries of the geo-window includes defining the geo-window with a length extending from the vehicle toward the heading of the vehicle and a width that is less than the length.

4. The method of claim 3, further comprising:

periodically determining a speed of the vehicle by the on-vehicle circuit arrangement; and

wherein the periodic adjusting of the boundaries of the geo-window further includes defining the length of the geo-window to be inversely proportional to the determined speed of the vehicle.

5. The method of claim 3, further comprising:

periodically determining a speed of the vehicle by the on-vehicle circuit arrangement; and

wherein the periodic adjusting of the boundaries of the geo-window further includes defining the length of the geo-window to be proportional to the determined speed of the vehicle.

6. The method of claim 1, further comprising:

determining whether or not any one of a plurality of locations that are not coincident with any of the plurality of intersections is located within the boundaries of the geo-window, wherein each location of the plurality of locations is associated with one of the plurality of intersections; and

in response to determining that at least one of the plurality of locations is located within the boundaries of the geo-window, transmitting a preemption request from the vehicle to an intersection controller at the intersection associated with the one location.

7. The method of claim 1, further comprising:

in response to activation of a turn signal that indicates a direction, generating a supplemental geo-window that is oriented in the direction of the turn signal;

determining, by the on-vehicle circuit arrangement, whether or not any one of the plurality of intersections is located within the boundaries of the supplemental geo-window;

in response to determining that another one of the plurality of intersections is located within the boundaries of the supplemental geo-window, transmitting a preemption request from the vehicle to an intersection controller at the another one of the plurality of intersections.

8. The method of claim 1, wherein the preemption request includes data that identify the intersection controller.

9. The method of claim 8, wherein the preemption request further includes data that indicate at least one of signal phase, heading, or position.

10. An on-vehicle system for issuing traffic signal preemption requests, comprising:

a receiver configured and arranged to receive a location signal indicating a location of a vehicle;

a storage device configured with data that indicate geographical data that identify locations of a plurality of traffic signals;

a processor coupled to the receiver and to the storage device, wherein the processor is configured and arranged to:

determine a location and a heading of the vehicle in response to the location signal;

calculate coordinates that define boundaries of a geo-window from the location and heading of the vehicle;

determine from the stored geographical data whether or not any one of the traffic signals is located within boundaries of the geo-window; and

in response to determining that one of the traffic signals is located within the boundaries of the geo-window, generate a preemption request; and

a transmitter coupled to the processor, wherein the transmitter is configured and arranged to transmit the preemption request to an intersection controller of the one of the traffic signals.

11. The system of claim 10, wherein the processor is further configured and arranged to:

periodically determine a heading of the vehicle by an on-vehicle circuit arrangement; and

periodically adjust boundaries of the geo-window in response to the determined heading of the vehicle.

12. The system of claim 11, wherein the periodic adjustment of the boundaries of the geo-window includes defining the geo-window with a length extending from the vehicle toward the heading of the vehicle and a width that is less than the length.

13. The system of claim 12, wherein the processor is further configured and arranged to:

periodically determine a speed of the vehicle by the on-vehicle circuit arrangement; and

wherein the periodic adjustment of the boundaries of the geo-window further includes defining the length of the geo-window to be inversely proportional to the determined speed of the vehicle.

14. The system of claim 12, wherein the processor is further configured and arranged to:

periodically determine a speed of the vehicle by the on-vehicle circuit arrangement; and

wherein the periodic adjustment of the boundaries of the geo-window further includes defining the length of the geo-window to be proportional to the determined speed of the vehicle.

15. The system of claim 10, wherein the processor is further configured and arranged to:

determine whether or not any one of a plurality of locations that are not coincident with any of a plurality of intersections is located within the boundaries of the geo-window, wherein each location of the plurality of locations is associated with one of the plurality of intersections; and

in response to determining that at least one of the plurality of locations is located within the boundaries of the geo-window, transmit a preemption request from the vehicle to an intersection controller at the intersection associated with the one location.

16. The system of claim 10, wherein the processor is further configured and arranged to:

in response to activation of a turn signal that indicates a direction, generate a supplemental geo-window that is oriented in the direction of the turn signal;

determine by an on-vehicle circuit arrangement, whether or not any one of a plurality of intersections is located within the boundaries of the supplemental geo-window;

in response to determining that another one of the plurality of intersections is located within the boundaries of the supplemental geo-window, transmit a preemption request from the vehicle to an intersection controller at the other one of the plurality of intersections.

17. The system of claim 10, wherein the preemption request includes data that identify the intersection controller.

18. The system of claim 17, wherein the preemption request further includes data that indicate at least one of a signal phase, heading, or position.

19. A method for issuing preemption requests, comprising:

repeatedly calculating by a processor of an on-vehicle circuit arrangement, coordinates that define boundaries of a geo-window based on locations and headings of a vehicle as the vehicle is traveling along a roadway;

determining whether or not any one of a plurality of intersections is located within the boundaries of the geo-window in response to changed boundaries of the geo-window; and

in response to determining that one of the plurality of intersections is located within the boundaries of the geo-window, transmitting a preemption request from the vehicle to an intersection controller at the one of the plurality of intersections.

20. An apparatus for issuing preemption requests, comprising:

means for repeatedly calculating coordinates that define boundaries of a geo-window based on locations and headings of a vehicle as the vehicle is traveling along a roadway;

means for determining whether or not any one of a plurality of intersections is located within the boundaries of the geo-window in response to changed boundaries of the geo-window; and

means, responsive to determining that one of the plurality of intersections is located within the boundaries of the geo-window, for transmitting a preemption request from the vehicle to an intersection controller at the one of the plurality of intersections.