What is claims

1. A system of communication satellites in low earth orbits, the system comprising a plurality of communication satellites in low earth orbits, the plurality including at least a first satellite and a second satellite that orbit the Earth in two distinct orbits, each satellite comprising:

one or more communication antennas that provide communication services to a coverage area of the satellite, said coverage area being a portion of the surface of the Earth wherein Earth terminals can access communication services via the satellite; and

an attitude control module for rotating the satellite about a roll axis thereof, wherein the attitude control module of the first satellite causes same to:

(a) rotate about the roll axis thereof by a first angle when the first satellite passes above a first trigger location on the surface of the Earth, thereby placing the first satellite in a first rotated orientation, and

(b) remain in the first rotated orientation during a coverage time interval, such that the coverage area of the first satellite and the coverage area of the second satellite overlap, at least in part, during the coverage time interval, wherein a designated location on the surface of the Earth remains within the part where the coverage areas overlap during the coverage time interval.

2. The system of communication satellites of claim 1 wherein at least two satellite coverage areas overlap over the designated location every day during a predesignated portion of the day.

3. The system of communication satellites of claim 1 wherein the planes of the two orbits intersect one another along a line that crosses the surface of the Earth in a polar region.

4. The system of communication satellites of claim 1 wherein the designated location comprises a portion of the ground track traced by the second satellite during the coverage time interval.

5. The system of communication satellites of claim 1 wherein the attitude control module of the second satellite causes same to:

(a) rotate about the roll axis thereof by a second angle when the second satellite passes above a second trigger location on the surface of the Earth, thereby placing the second satellite in a second rotated orientation, and

(b) remain in the second rotated orientation during the coverage time interval, such that the size of the part where the coverage areas overlap becomes relatively larger.

6. The system of communication satellites of claim 1 wherein the plurality of communication satellites further comprises a third satellite having an orbit that is distinct from that of the first satellite and the second satellite,
the third satellite comprising:

one or more communication antennas that provide communication services to a coverage area of the third satellite,

an attitude control module for rotating the third satellite about a roll axis thereof and that causes same to:

(a) rotate about the roll axis thereof by a third angle when the third satellite passes above a third trigger location on the surface of the Earth, thereby placing the third satellite in a third rotated orientation, and

(b remain in the third rotated orientation during the coverage time interval, such that an omitted location on the surface of the Earth is within the coverage area of the third satellite during the coverage time interval, wherein the omitted location would have been within the coverage area of the first satellite during the coverage time interval, but for the fact that the first satellite remains in the first rotated orientation during the coverage time interval.

7. A method for enhancing the communication capacity of a system of communication satellites in low earth orbits, the satellites including a first satellite and a second satellite, the method comprising:

operating an attitude control module of the first satellite so as to cause the first satellite to rotate about a roll axis of the first satellite by a first angle when the first satellite passes above a first trigger location on the surface of the Earth, thereby placing the first satellite in a first rotated orientation;

further operating the attitude control module of the first satellite so as to cause the first satellite to remain in the first rotated orientation during a coverage time interval, such that a coverage area of the first satellite and a coverage area of the second satellite overlap, at least in part, during the coverage time interval;

wherein the coverage area of a satellite is a portion of the surface of the Earth wherein Earth terminals can access communication services via the satellite;

wherein the first satellite and the second satellite orbit the Earth in two distinct orbits;

wherein a designated location on the surface of the Earth remains within the part where the coverage areas overlap during the coverage time interval.

8. The method of claim 7 wherein at least two satellite coverage areas overlap over the designated location every day during a predesignated portion of the day.

9. The method of claim 7 wherein the planes of the two orbits intersect one another along a line that crosses the surface of the Earth in a polar region.

10. The method of claim 7 wherein the designated location comprises a portion of the ground track traced by the second satellite during the coverage time interval.

11. The method of claim 7 further comprising:

operating the attitude control module of the second satellite so as to cause the second satellite to rotate about a roll axis of the second satellite by a second angle when the second satellite passes above a second trigger location on the surface of the Earth, thereby placing the second satellite in a second rotated orientation;

further operating the attitude control module of the second satellite so as to cause the second satellite to remain in the second rotated orientation during the coverage time interval, such that the size of the part where the first and second coverage areas overlap becomes larger.

12. The method of claim 7 further comprising:

operating an attitude control module of a third satellite so as to cause the third satellite to rotate about a roll axis of the third satellite by a third angle when the third satellite passes above a third trigger location on the surface of the Earth, thereby placing the third satellite in a third rotated orientation;

further operating the attitude control module of the third satellite so as to cause the third satellite to remain in the third rotated orientation during the coverage time interval, such that an omitted location on the surface of the Earth is within the coverage area of the third satellite during the coverage time interval;

wherein the third satellite orbits the Earth in an orbit that is distinct from the orbit of the first satellite and from the orbit of the second satellite;

wherein the omitted location would have been within the coverage area of the first satellite during the coverage time interval, but for the fact that the first satellite remains in the first rotated orientation during the coverage time interval.

13. The system of communication satellites of claim 2 wherein the planes of the two orbits intersect one another along a line that crosses the surface of the Earth in a polar region.

14. The system of communication satellites of claim 2 wherein the designated location comprises a portion of the ground track traced by the second satellite during the coverage time interval.

15. The system of communication satellites of claim 2 wherein the attitude control module of the second satellite causes same to:

(a) rotate about the roll axis thereof by a second angle when the second satellite passes above a second trigger location on the surface of the Earth, thereby placing the second satellite in a second rotated orientation, and

(b) remain in the second rotated orientation during the coverage time interval, such that the size of the part where the coverage areas overlap becomes relatively larger.

16. The system of communication satellites of claim 2 wherein the plurality of communication satellites further comprises a third satellite having an orbit that is distinct from that of the first satellite and the second satellite, the third satellite comprising:

one or more communication antennas ~~for~~ that provide communication services to a coverage area of the third satellite,

an attitude control module for rotating the third satellite about a roll axis thereof and that causes same to:

(a) rotate about the roll axis thereof by a third angle when the third satellite passes above a third trigger location on the surface of the Earth, thereby placing the third satellite in a third rotated orientation, and

(b) remain in the third rotated orientation during the coverage time interval, such that an omitted location on the surface of the Earth is within the coverage area of the third satellite during the coverage time interval, wherein the omitted location would have been within the coverage area of the first satellite during the coverage time interval, but for the fact that the first satellite remains in the first rotated orientation during the coverage time interval.

17. The method of claim 8 wherein the planes of the two orbits intersect one another along a line that crosses the surface of the Earth in a polar region.

18. The method of claim 8 wherein the designated location comprises a portion of the ground track traced by the second satellite during the coverage time interval.

19. The method of claim 8 further comprising:

operating the attitude control module of the second satellite so as to cause the second satellite to rotate about a roll axis of the second satellite by a second angle when the second satellite passes above a second trigger location on the surface of the Earth, thereby placing the second satellite in a second rotated orientation;

further operating the attitude control module of the second satellite so as to cause the second satellite to remain in the second rotated orientation during the coverage time interval, such that the size of the part where the first and second coverage areas overlap becomes larger.

20. The method of claim 8 further comprising:

operating an attitude control module of a third satellite so as to cause the third satellite to rotate about a roll axis of the third satellite by a third angle when the third satellite passes above a third trigger location on the surface of the Earth, thereby placing the third satellite in a third rotated orientation;

further operating the attitude control module of the third satellite so as to cause the third satellite to remain in the third rotated orientation during the coverage time interval, such that an omitted location on the surface of the Earth is within the coverage area of the third satellite during the coverage time interval;

wherein the third satellite orbits the Earth in an orbit that is distinct from the orbit of the first satellite and from the orbit of the second satellite;

wherein the omitted location would have been within the coverage area of the first satellite during the coverage time interval, but for the fact that the first satellite remains in the first rotated orientation during the coverage time interval.