CLAIMS:

1. A computerized method of collision risk detection between an interrogating aircraft and at least one interrogated aircraft, the computerized method comprising:

receiving signals from the at least one interrogated aircraft;

processing the signals and determining situation awareness data, the situation awareness data including at least a range between the interrogating aircraft and at least one interrogated aircraft;

performing at least one of operations (a) or (b):

a) determining an interrogating circle around the interrogating aircraft, wherein the at least one interrogated aircraft is located on the interrogating circle;

b) determining an interrogating sphere surrounding the interrogating aircraft, wherein the at least one interrogated aircraft is located on the interrogating sphere;

obtaining situation awareness data with respect to the at least one interrogated aircraft from one or more other interrogating aircraft, the obtained situation awareness data being indicative of one other interrogating sphere, the one other interrogating sphere surrounding a respective aircraft from among the one or more other interrogating aircraft;

determining enriched situation awareness data based on information obtained by the interrogating aircraft and the one or more other interrogating aircraft, wherein determining enriched situation awareness data includes determining an intersection between the interrogating sphere surrounding the interrogating aircraft and a respective interrogating sphere surrounding the one other interrogating aircraft, wherein the intersection is indicative of a circle and the interrogated aircraft is located on the circle; and

generating a collision warning based on the enriched situation awareness data, the collision warning including data indicative of at least an estimated location of the at least one interrogated aircraft.

2. The computerized method according to claim **1**, further comprising:

generating and transmitting interrogating signals;

wherein the interrogating signals are generated at the at least one interrogated aircraft responsive to the interrogating signals.

3. The computerized method according to claim **1** wherein the situation awareness data includes closing velocity of the at least one interrogated aircraft.

4. The computerized method according to claim **1** wherein:

the obtained situation awareness data is indicative of one or more other interrogating circles, each of the one or more other interrogating circles encircling a respective aircraft from among the one or more other interrogating aircraft; and

determining enriched situation awareness data includes determining one or more intersection points between the interrogating circle and the one or more other interrogating circles, wherein the interrogated aircraft is located at one of the intersection points.

5. The computerized method according to claim **4** wherein:

the obtained situation awareness data is indicative of two or more other interrogating circles; and

determining enriched situation awareness data includes determining an intersection point between the interrogating circle around the interrogating aircraft and at least two other interrogating circles, each of the at least two other interrogating circles encircling a respective aircraft from among the two or more other interrogating aircraft.

6. The computerized method according to claim **1** wherein:

obtained situation awareness data is indicative of two or more other interrogating spheres, each of the two or more other interrogating spheres surrounding a respective aircraft from among the one or more other interrogating aircraft; and

determining enriched situation awareness data includes determining an intersection between the interrogating sphere surrounding the interrogating aircraft and at least two other interrogating spheres the intersection being indicative of at least one intersecting point, wherein the interrogated aircraft is located at an intersecting point.

7. The computerized method according to claim **6** wherein the obtained situation awareness data is indicative of three or more other interrogating spheres, and the intersection is indicative of one intersecting point, the interrogated aircraft being located at the one intersecting point.

8. A computerized method of collision risk detection between an interrogating aircraft and at least one interrogated aircraft, the computerized method comprising:

receiving signals from the at least one interrogated aircraft;

processing the signals and determining situation awareness data, the situation awareness data including at least a range between the interrogating aircraft and at least one interrogated aircraft;

performing at least one of operations (a) or (b):

a) determining an interrogating circle around the interrogating aircraft, wherein the at least one interrogated aircraft is located on the interrogating circle;

b) determining an interrogating sphere surrounding the interrogating aircraft, wherein the at least one interrogated aircraft is located on the interrogating sphere;

responsive to obtaining a first situation awareness data, generating a track file for tracking situation awareness data of a first interrogated aircraft;

responsive to obtaining a second situation awareness data, determining whether the first situation awareness data and the second situation awareness data corresponds to the same interrogated aircraft;

if the first situation awareness data and the second situation awareness data corresponds to the same interrogated aircraft, updating the first track file with the second situation awareness data; and

if the first situation awareness data and the second situation awareness data does not correspond to the same interrogated aircraft, generating a second track file for tracking situation awareness data of a second interrogated aircraft; and

generating a collision warning, the collision warning including data indicative of at least an estimated location of the at least one interrogated aircraft.

9. A system for detection of collision risk between an interrogating aircraft and at least one interrogated aircraft, the system comprising:

a receiver configured to receive signals transmitted from the at least one interrogated aircraft;

a collision warning unit;

a processing unit configured to:

process signals and determine situation awareness data, the situation awareness data including at least a range between the interrogating aircraft and at least one other aircraft;

perform at least one of operations (a) or (b):

a) determining an interrogating circle around the interrogating aircraft; wherein the at least one interrogated aircraft is located on the interrogating circle;

b) determining an interrogating sphere surrounding the interrogating aircraft; wherein the at least one interrogated aircraft is located on the interrogating sphere; and

a communication unit configured to communicate with one or more other interrogating aircraft and obtain situation awareness data with respect to the at least one interrogated aircraft from the one or more other interrogating aircraft, the obtained situation awareness data includes information indicative of one other interrogating sphere, the one other interrogating sphere surrounding a respective aircraft from among the one or more other interrogating aircraft;

wherein the processing unit is further configured to:

determine enriched situation awareness data based on situation awareness data obtained by the interrogating aircraft and the one or more other interrogating aircraft, the enriched situation data includes an intersection between the interrogating sphere surrounding the interrogating aircraft and a respective interrogating sphere surrounding the one other interrogating aircraft, wherein the intersection is indicative of a circle and the interrogated aircraft is located on the circle; and

wherein the collision warning unit is configured to generate a collision warning based on the enriched situation awareness data, the collision warning including data indicative of at least one estimated location of the interrogated aircraft.

10. The system according to claim **9**, further comprising a transponder configured to generate and transmit interrogating signals and receive the signals, the signals are generated by an aviation transponder onboard the at least one interrogated aircraft in response to the interrogating signals.

11. The system according to claim **9** wherein the situation awareness data includes closing velocity of the at least one interrogated aircraft.

12. The system according to claim **9** wherein:

the obtained situation awareness data is indicative of one or more other interrogating circles, each of the one or more other interrogating circles encircling a respective aircraft from among the one or more other interrogating aircraft; and

the processing unit is configured to determine one or more intersection points between the interrogating circle and the one or more other interrogating circles, wherein the interrogated aircraft is located at one of the intersection points.

13. The system according to claim **12** wherein:

the obtained situation awareness data is indicative of two or more other interrogating circles; and

the processing unit is configured to determine an intersection point between the interrogating circle around the interrogating aircraft and at least two other interrogating circles, each encircling a respective other interrogating aircraft.

14. The system according to claim **9** wherein:

the obtained situation awareness data is indicative of two or more other interrogating spheres, each one of the two or more other interrogating spheres surrounding a respective aircraft from among the one or more other interrogating aircraft; and

the processing unit is configured to determine an intersection between the interrogating sphere surrounding the interrogating aircraft and at least two other interrogating spheres each surrounding a respective other interrogating aircraft.

15. The system according to claim **14** wherein the obtained situation awareness data is indicative of three or more other interrogating spheres, and the intersection is indicative of one intersecting point, the interrogated aircraft being located at the one intersecting point.

16. A system for detection of collision risk between an interrogating aircraft and at least one interrogated aircraft, the system comprising:

a receiver configured to receive signals transmitted from the at least one interrogated aircraft;

a collision warning unit; and

a processing unit configured to:

process signals and determine situation awareness data, the situation awareness data including at least a range between the interrogating aircraft and at least one other aircraft;

perform at least one of operations (a) or (b):

a) determining an interrogating circle around the interrogating aircraft; wherein the at least one interrogated aircraft is located on the interrogating circle;

b) determining an interrogating sphere surrounding the interrogating aircraft; wherein the at least one interrogated aircraft is located on the interrogating sphere;

generate a track file for tracking situation awareness data of a first interrogated aircraft, responsive to obtaining a first situation awareness data;

responsive to obtaining a second situation awareness data, determining whether the first situation awareness data and the second situation awareness data corresponds to the same interrogated aircraft;

if the first situation awareness data and the second situation awareness data corresponds to the same interrogated aircraft, update the first track file with the second situation awareness data;

if the first situation awareness data and the second situation awareness data does not correspond to the same interrogated aircraft, generate a second track file for tracking situation awareness data of a second interrogated aircraft; and

wherein the collision warning unit is configured to generate a collision warning, the collision warning including data indicative of at least one estimated location of the interrogated aircraft.

17. A non-transitory program storage device readable by machine, tangibly embodying a computer readable code portion executable by the machine to perform a method of collision risk detection between an interrogating aircraft and at least one interrogated aircraft, the method comprising:

receiving signals from the at least one other aircraft;

processing the signals determining situation awareness data; the situation awareness data includes at least a range between the interrogating aircraft and at least one interrogated aircraft;

performing at least one of operations (a) or (b):

a) determining an interrogating circle around the interrogating aircraft; wherein the at least one interrogated aircraft is located on the interrogating circle;

b) determining an interrogating sphere surrounding the interrogating aircraft; wherein the at least one interrogated aircraft is located on the interrogating sphere;

obtaining, via a friendly data link, situation awareness data with respect to the at least one other aircraft from one or more other interrogating aircraft, the obtained situation awareness data being indicative of one other interrogating sphere, the one other interrogating sphere surrounding a respective aircraft from among the one or more other interrogating aircraft;

determining enriched situation awareness data based on information obtained by the interrogating aircraft and the one or more other interrogating aircraft, wherein determining enriched situation awareness data includes determining an intersection between the interrogating sphere surrounding the interrogating aircraft and a respective interrogating sphere surrounding the one other interrogating aircraft, wherein the intersection is indicative of a circle and the interrogated aircraft is located on the circle; and

generating a collision warning based on the enriched situation awareness data, the collision warning including data indicative of at least one estimated location of the interrogated aircraft.

18. A non-transitory program storage device readable by machine, tangibly embodying a computer readable code portion executable by the machine to perform a method of collision risk detection between an interrogating aircraft and at least one interrogated aircraft, the method comprising:

receiving signals from the at least one other aircraft;

processing the signals determining situation awareness data; the situation awareness data includes at least a range between the interrogating aircraft and at least one interrogated aircraft;

performing at least one of operations (a) or (b):

a) determining an interrogating circle around the interrogating aircraft; wherein the at least one interrogated aircraft is located on the interrogating circle;

b) determining an interrogating sphere surrounding the interrogating aircraft; wherein the at least one interrogated aircraft is located on the interrogating sphere;

obtaining, via a friendly data link, situation awareness data with respect to the at least one other aircraft from one or more other interrogating aircraft;

determining enriched situation awareness data based on information obtained by the interrogating aircraft and the one or more other interrogating aircraft;

responsive to obtaining a first situation awareness data, generating a track file for tracking situation awareness data of a first interrogated aircraft;

responsive to obtaining a second situation awareness data, determining whether the first situation awareness data and the second situation awareness data corresponds to the same interrogated aircraft;

if the first situation awareness data and the second situation awareness data corresponds to the same interrogated aircraft, updating the first track file with the second situation awareness data;

if the first situation awareness data and the second situation awareness data does not correspond to the same interrogated aircraft, generating a second track file for tracking situation awareness data of a second interrogated aircraft; and

generating a collision warning, the collision warning including data indicative of at least one estimated location of the at least one interrogated aircraft.

19. The computerized method according to claim **8**, further comprising:

generating and transmitting interrogating signals;

wherein the interrogating signals are generated at the at least one interrogated aircraft responsive to the interrogating signals.

20. The computerized method according to claim **8** wherein the situation awareness data includes closing velocity of the at least one interrogated aircraft.

21. The computerized method according to claim **8** wherein:

the obtained situation awareness data is indicative of one or more other interrogating circles, each of the one or more other interrogating circles encircling a respective aircraft from among the one or more other interrogating aircraft; and

determining enriched situation awareness data includes determining one or more intersection points between the interrogating circle and the one or more other interrogating circles, wherein the interrogated aircraft is located at one of the intersection points.

22. The computerized method according to claim **21** wherein:

the obtained situation awareness data is indicative of two or more other interrogating circles; and

determining enriched situation awareness data includes determining an intersection point between the interrogating circle around the interrogating aircraft and at least two other interrogating circles, each of the at least two other interrogating circles encircling a respective aircraft from among the two or more other interrogating aircraft.

23. The computerized method according to claim **8** wherein:

obtained situation awareness data is indicative of two or more other interrogating spheres, each of the two or more other interrogating spheres surrounding a respective aircraft from among the one or more other interrogating aircraft; and

determining enriched situation awareness data includes determining an intersection between the interrogating sphere surrounding the interrogating aircraft and at least two other interrogating spheres the intersection being indicative of at least one intersecting point, wherein the interrogated aircraft is located at an intersecting point.

24. The computerized method according to claim **23** wherein the obtained situation awareness data is indicative of three or more other interrogating spheres, and the intersection is indicative of one intersecting point, the interrogated aircraft being located at the one intersecting point.

25. The system according to claim **16**, further comprising a transponder configured to generate and transmit interrogating signals and receive the signals, the signals are generated

by an aviation transponder onboard the at least one interrogated aircraft in response to the interrogating signals.

26. The system according to claim **16** wherein the situation awareness data includes closing velocity of the at least one interrogated aircraft.

27. The system according to claim 1**6** wherein:

the obtained situation awareness data is indicative of one or more other interrogating circles, each of the one or more other interrogating circles encircling a respective aircraft from among the one or more other interrogating aircraft; and

the processing unit is configured to determine one or more intersection points between the interrogating circle and the one or more other interrogating circles, wherein the interrogated aircraft is located at one of the intersection points.

28. The system according to claim **27** wherein:

the obtained situation awareness data is indicative of two or more other interrogating circles; and

the processing unit is configured to determine an intersection point between the interrogating circle around the interrogating aircraft and at least two other interrogating circles, each encircling a respective other interrogating aircraft.

29. The system according to claim **16** wherein:

the obtained situation awareness data is indicative of two or more other interrogating spheres, each one of the two or more other interrogating spheres surrounding a respective aircraft from among the one or more other interrogating aircraft; and

the processing unit is configured to determine an intersection between the interrogating sphere surrounding the interrogating aircraft and at least two other interrogating spheres each surrounding a respective other interrogating aircraft.

30. The system according to claim **29** wherein the obtained situation awareness data is indicative of three or more other interrogating spheres, and the intersection is indicative of one intersecting point, the interrogated aircraft being located at the one intersecting point.