CLAIMS:

1. A computer implemented tool for reporting to a user non-compliance of a vessel with a plurality of compliance rules, the tool comprising:

a screening function arranged to assess compliance of the vessel with at least some of said compliance rules, and to report resulting compliance issues to the user; and

a voyage monitoring function arranged to monitor, after operation of the screening function, compliance of the vessel and a current track of the vessel with at least some of said compliance rules, and to report resulting compliance issues to the user.

2. The computer implemented tool of claim 1 wherein the screening function assesses compliance of the vessel with the compliance rules without reference to a current track or position of the vessel.

3. The computer implemented tool of claim 1 or 2 wherein at least part of the assessment made by the screening function is an assessment of compliance of the vessel, in combination with a prior track of the vessel, with at least some of said compliance rules.

4. The computer implemented tool of claim 3 wherein the prior track of the vessel is derived from vessel coordinate messages previously transmitted by one or more transceivers located on board the vessel.

5. The computer implemented tool of claim 3 or 4 wherein the compliance rules, with which an assessment is made by the screening function of compliance of the vessel in combination with a prior track of the vessel, identify one or more ports, the use of which by the vessel comprises non-compliance with the compliance rules.

6. The computer implemented tool of any preceding claim wherein at least part of the assessment made by the screening function is an assessment of compliance of the vessel with a sanctions list.

7. The computer implemented tool of any preceding claim wherein the screening function is also arranged to report to the user port checks relating to the vessel.

8. The computer implemented tool of claim 7 wherein the user port checks comprise port state control reports.

9. The computer implemented tool of any preceding claim wherein the voyage monitoring function is also arranged to periodically repeat at least a part of the compliance assessments of the screening function.

10. The computer implemented tool of any preceding claim wherein the voyage monitoring function is arranged to monitor, after operation of the screening function, compliance of the vessel in conjunction with a current track of the vessel, with at least some of said compliance rules which define geographical zones entry, into which by the vessel comprises non-compliance with the compliance rules.

11. The computer implemented tool of any preceding claim wherein the compliance rules used by the screening function comprise a global sanctions list.

12. A computer implemented tool for reporting to a user non-compliance of a vessel with a plurality of compliance rules, the tool comprising a screening function for assessing compliance of a vessel with compliance rules, the function being arranged to assess compliance, with the compliance rules, of the vessel in combination with a prior track of the vessel, and to report resulting compliance issues to the user.

13. A computer implemented tool for reporting to a user non-compliance of a vessel with a plurality of compliance rules, the tool comprising a voyage monitoring function for assessing compliance of a vessel with compliance rules, the function being arranged to monitor compliance of the vessel in conjunction with a current track of the vessel with at least some of said compliance rules, to periodically assess compliance of the vessel with at least some of said compliance rules without reference to a current track of the vessel, and to report resulting compliance issues to the user.

14. A computer implemented tool for reporting to a user non-compliance of a vessel with a plurality of compliance rules, the tool comprising a voyage monitoring function for assessing compliance of a vessel with compliance rules, the function being arranged to monitor compliance, of the vessel in conjunction with a current track of the vessel, with at least some of said compliance rules, and to issue to the user alerts in respect of resulting compliance issues.

15. The computer implemented tool of any preceding claim further comprising a reporting function arranged to generate a compliance report comprising compliance issues reported to the user.

16. The computer implemented tool of claim 15 wherein the tool is further configured to always generate a compliance report after operation of the voyage monitoring function.

17. A computer implemented method of reporting to a user non-compliance of a vessel with a plurality of compliance rules, comprising:

screening a vessel by assessing compliance of the vessel with at least some of said compliance rules without reference to a current track of the vessel, and reporting resulting compliance issues to the user; and

monitoring, after completing the step of screening, compliance of the vessel in conjunction with a current track of the vessel, with at least some of said compliance rules, and reporting resulting compliance issues to the user.

18. The method of claim 17 further comprising generating a compliance report, after completing the step of monitoring, the compliance report comprising the compliance issues reported to the user.

19. A graphical user interface arranged to assist a user in compliance checking of a vessel against a plurality of compliance rules, the graphical user interface being arranged to:

provide a user with access to a screening function for selecting and screening a vessel, the screening function assessing compliance of a selected vessel with at least some of said compliance rules, and to report resulting compliance issues to the user;

permit selection by the user of a screened vessel for voyage monitoring; and

provide a user with access to a monitoring function for monitoring compliance of the vessel in conjunction with a current track of the vessel, with at least some of said compliance rules, and to report resulting compliance issues to the user.

20. A method of tracking a vessel having a plurality of transceivers located on board the vessel, the method comprising:

receiving a stream of coordinate messages, each coordinate message defining a geographical position of the vessel and indicating that the message originates from a particular one of one of the transceivers;

assigning a confidence level to each coordinate message dependent on at least one of: the identity of the indicated transceiver, and the geographical position defined by the message; and

generating a track of the vessel based on the defined geographical positions and the confidence levels assigned to the associated coordinate messages.

21. The method of claim 20 wherein assigning a confidence level to a said coordinate message dependent on at least the geographical position defined by the message comprises assigning a confidence level dependent on a relationship between the geographical position defined by the coordinate message and geographical positions defined by a plurality of previous ones of said coordinate messages.

22. The method of claim 20 wherein assigning a confidence level to a said coordinate message dependent on at least the identity of the indicated transceiver comprises assigning a confidence level dependent on a measure of past performance of the indicated transceiver.

23. The method of claim 22 wherein the measure of past performance of the indicated transceiver is dependent upon confidence levels assigned to previous coordinate messages indicated as received from the same transceiver.

24. The method of claim 22 or 23 wherein assigning a confidence level to a said coordinate message dependent on at least the identity of the indicated transceiver comprises assigning a confidence level dependent on a measure of past performance of the indicated transceiver.

25. The method of claim 24 wherein the measure of past performance of the indicated transceiver is dependent on confidence levels assigned to previously received coordinate messages.

26. The method of any of claims 20 to 25 claim wherein generating a track of the vessel comprises generating the track of the vessel using geographical positions only from coordinate messages selected according to the assigned confidence levels.

27. The method of any of claims 20 to 26 wherein the track of the vessel comprises position of the vessel dependent upon time, and optionally one or

more of velocity of the vessel dependent upon time and acceleration of the vessel dependent upon time.

28. The method of any of claims 20 to 27 further comprising deferring use of a first coordinate message representing an earlier geographical position in generating the track until a second coordinate message representing a later geographical position has been received.

29. The method of claim 28 wherein the first coordinate message indicates an identity of a first type of transceiver, the second coordinate message indicates an identity of a second type of transceiver different to the first type of transceiver.

30. A method of tracking a vessel having a plurality of transceivers located on board the vessel, the method comprising:

receiving a stream of coordinate messages, each coordinate message defining a geographical position of the vessel and indicating that the message originates from a particular one of one of the transceivers;

generating a track of the vessel using at least some of said coordinate messages;

generating at least one measure of performance of at least one of said transceivers dependent upon said received coordinate messages; and

controlling at least one of the transceivers in a manner dependent upon the at least one measure of performance.

31. The method of claim 30 wherein at least one said measure of performance of a particular transceiver is dependent upon a frequency of received coordinate messages which are indicated as originating from that transceiver.

32. The method of claim 30 or 31 wherein at least one said measure of performance of a particular transceiver is dependent geographical positions defined in coordinate messages indicated as received from that transceiver.

33. The method of any of claims 30 to 32 further comprising defining financial costs associated with operating one or more of said transceivers, and the step of controlling comprises controlling at least one of the transceivers in a manner dependent upon said financial costs.

34. The method of any of claims 30 to 33 further comprising defining a risk model wherein a measure of risk to the vessel is dependent at least upon position of the vessel with respect to a plurality of geographical zones, and controlling at least one of said transceivers is also carried out dependent upon risk to the vessel according to the risk model evaluated using the track of the vessel in respect of said position.

35. The method of any of claims 30 to 34 wherein the step of controlling comprises sending an instruction to change the interval between transmissions of coordinate messages of a selected one of said transceivers.

36. The method of any of claims 30 to 35 wherein the step of controlling comprises sending an instruction to stop and/or start transmission of coordinate messages by a selected one of said transceivers.

37. The method of any of claims 30 to 36 wherein the step of controlling comprises sending an instruction to restart a selected one of said transceivers.

38. The method of any of claims 30 to 37 wherein controlling at least one of the transceivers comprises controlling a plurality of said transceivers.

39. A method of tracking a vessel having a plurality of transceivers located on board the vessel, the method comprising:

receiving a stream of coordinate messages, each coordinate message defining a geographical position of the vessel and indicating that the message originates from a particular one of one of the transceivers;

generating a track of the vessel using at least some of said coordinate messages;

defining a risk model wherein risk to the vessel is dependent at least upon position of the vessel with respect to a plurality of geographical zones;

generating alerts dependent on risk to the vessel assessed using the model in conjunction with the generated track of the vessel in respect of said geographical position.

40. The method of claim 39 wherein the track of the vessel comprises position of the vessel, and optionally one or more of velocity of the vessel and acceleration of the vessel, and risk to the vessel is dependent upon one or more of position, velocity and acceleration of the vessel according to the track.

41. The method of claim 39 or 40 wherein the risk model comprises a plurality of said geographical zones defined as core zones, and one or more of said geographical zones defined as buffer zones which are peripheral to ones of said core zones, the risk model defining changes of risk in respect of a vessel transitioning into a said buffer zone and in respect of a vessel transitioning into a said core zone, said changes or risk being associated with a said generation of respective alerts.

42. The method of any of claims 39 to 41 wherein the risk to the vessel according to the risk model is also dependent upon one or more performance measures of the one or more transceivers.

43. The method of any of claims 39 to 42 wherein the risk model is defined such that risk to the vessel is also dependent upon legal status of the vessel including one or more of: the flag / country of registration of the vessel, the owner of the vessel, and prior values of the above.

44. A method of analysing a past voyage of a vessel having a plurality of transceivers located on board the vessel, the method comprising:

storing a plurality of coordinate messages transmitted by said transceivers during the past voyage, each coordinate message defining a geographical position of the vessel during the past voyage and indicating that the message originated from a particular one of one of the transceivers; and

generating a track of the vessel during the past voyage using the defined geographical positions.

45. The method of claim 44 further comprising assigning a confidence level to each stored coordinate message dependent on at least one of: the identity of the indicated transceiver, and the geographical position defined by the message; and

generating the track of the vessel based on the defined geographical positions and the confidence levels assigned to the associated coordinate messages.

46. The method of claim 44 or 45 comprising defining a risk model relevant to the past voyage wherein the modelled risk to the vessel is dependent at least upon position of the vessel with respect to a plurality of geographical zones;

forming alerts which would have been relevant to the vessel during the past voyage according to risk to the vessel assessed using the risk model in conjunction with the generated track of the vessel.

47. The method of any preceding claim wherein at least two of the plurality of transceivers are of different types.

48. Apparatus for tracking a vessel having a plurality of transceivers located on board the vessel, the apparatus being arranged to:

receive a stream of coordinate messages, each coordinate message defining a geographical position of the vessel and indicating that the message originates from a particular one of one of the transceivers;

assign a confidence level to each coordinate message dependent on at least one of: the identity of the indicated transceiver, and the geographical position defined by the message; and

generate a track of the vessel based on the defined geographical positions and the confidence levels assigned to the associated coordinate messages.

49. Apparatus for tracking a vessel having a plurality of transceivers located on board the vessel, the apparatus being arranged to:

receive a stream of coordinate messages, each coordinate message defining a geographical position of the vessel and indicating that the message originates from a particular one of one of the transceivers;

generate a track of the vessel using at least some of said coordinate messages;

generate at least one measure of performance of at least one of said transceivers dependent upon said received coordinate messages; and

control at least one of the transceivers in a manner dependent upon the at least one measure of performance.

50. Apparatus for tracking a vessel having a plurality of transceivers located on board the vessel, the apparatus being arranged to:

receive a stream of coordinate messages, each coordinate message defining a geographical position of the vessel and indicating that the message originates from a particular one of one of the transceivers;

generate a track of the vessel using at least some of said coordinate messages;

define a risk model wherein risk to the vessel is dependent at least upon position of the vessel with respect to a plurality of geographical zones; and

generate alerts dependent on risk to the vessel assessed using the model in conjunction with the generated track of the vessel in respect of said geographical position.

51. A system comprising a vessel having a plurality of transceivers located on board the vessel, and the apparatus of any of claims 48 to 50 arranged to track the vessel.

52. The system of claim 51 wherein at least two of the transceivers are of different type to each other.

53. The system of claim 51 wherein at least one of the transceivers is an AIS type transceiver, and at least one of the transceivers is not an AIS transceiver.

54. Apparatus for analysing a past voyage of a vessel which had a plurality of transceivers located on board the vessel during the past voyage, the apparatus being arranged to:

receive a plurality of coordinate messages transmitted by said transceivers during the past voyage, each coordinate message defining a geographical position of the vessel during the past voyage and indicating that the message originated from a particular one of one of the transceivers; and

generate a track of the vessel during the past voyage using the defined geographical positions.

55. Computer program code arranged to put into effect the steps of any of claims 20 to 47 when executed on suitable computer apparatus.

56. A computer readable medium carrying the computer program code of claim 55.

CLAIMS:

1. A computer-implemented method of reporting to a user non-compliance of a vessel with a plurality of compliance rules, comprising:

screening a vessel by assessing compliance of the vessel with at least some of said compliance rules without reference to a current track of the vessel, and reporting resulting compliance issues to the user;

monitoring, after completing the step of screening, compliance of the vessel in conjunction with a current track of the vessel, with at least some of said compliance rules, and reporting resulting compliance issues to the user;

providing the user with access to a screening function for carrying out the screening step;

permitting selection by the user of a screened vessel for voyage monitoring; and

providing the user with access to a monitoring function for carrying out the monitoring step, and for reporting resulting compliance issues to the user.

2. The method of claim 1 further comprising generating a compliance report, after completing the step of monitoring, the compliance report comprising the compliance issues reported to the user.

3. A method of tracking a vessel having a plurality of transceivers located on board the vessel, the method comprising:

receiving a stream of coordinate messages, each coordinate message defining a geographical position of the vessel and indicating that the message originates from a particular one of one of the transceivers;

assigning a confidence level to each coordinate message dependent on at least one of: the identity of the indicated transceiver, and the geographical position defined by the message; and

generating a track of the vessel based on the defined geographical positions and the confidence levels assigned to the associated coordinate messages.

4. The method of claim 3 wherein assigning a confidence level to a said coordinate message dependent on at least the geographical position defined by the message comprises assigning a confidence level dependent on a relationship between the

geographical position defined by the coordinate message and geographical positions defined by a plurality of previous ones of said coordinate messages.

5. The method of claim 3 wherein assigning a confidence level to a said coordinate message dependent on at least the identity of the indicated transceiver comprises assigning a confidence level dependent on a measure of past performance of the indicated transceiver.

6. The method of claim 5 wherein the measure of past performance of the indicated transceiver is dependent upon confidence levels assigned to previous coordinate messages indicated as received from the same transceiver.

7. The method of claim 3 wherein generating a track of the vessel comprises generating the track of the vessel using geographical positions only from coordinate messages selected according to the assigned confidence levels.

8. The method of claim 3 wherein the track of the vessel comprises position of the vessel dependent upon time, and optionally one or more of velocity of the vessel dependent upon time and acceleration of the vessel dependent upon time.

9. The method of claim 3 further comprising deferring use of a first coordinate message representing an earlier geographical position in generating the track until a second coordinate message representing a later geographical position has been received.

10. The method of claim 9 wherein the first coordinate message indicates an identity of a first type of transceiver, the second coordinate message indicates an identity of a second type of transceiver different to the first type of transceiver.

11. A method of tracking a vessel having a plurality of transceivers located on board the vessel, the method comprising:

receiving a stream of coordinate messages, each coordinate message defining a geographical position of the vessel and indicating that the message originates from a particular one of one of the transceivers;

generating a track of the vessel using at least some of said coordinate messages;

generating at least one measure of performance of at least one of said transceivers dependent upon said received coordinate messages; and

controlling at least one of the transceivers in a manner dependent upon the at least one measure of performance.

12. The method of claim 11 wherein at least one said measure of performance of a particular transceiver is dependent upon a frequency of received coordinate messages which are indicated as originating from that transceiver.

13. The method of claim 11 wherein at least one said measure of performance of a particular transceiver is dependent geographical positions defined in coordinate messages indicated as received from that transceiver.

14. The method of claim 11 further comprising defining financial costs associated with operating one or more of said transceivers, and the step of controlling comprises controlling at least one of the transceivers in a manner dependent upon said financial costs.

15. The method of claim 11 further comprising defining a risk model wherein a measure of risk to the vessel is dependent at least upon position of the vessel with respect to a plurality of geographical zones, and controlling at least one of said transceivers is also carried out dependent upon risk to the vessel according to the risk model evaluated using the track of the vessel in respect of said position.

16. The method of claim 11 wherein the step of controlling comprises sending an instruction to change the interval between transmissions of coordinate messages of a selected one of said transceivers.

17. The method of claim 11 wherein the step of controlling comprises sending an instruction to stop and/or start transmission of coordinate messages by a selected one of said transceivers.

18. The method of claim 11 wherein the step of controlling comprises sending an instruction to restart a selected one of said transceivers.

19. The method of claim 11 wherein controlling at least one of the transceivers comprises controlling a plurality of said transceivers.

20. A method of tracking a vessel having a plurality of transceivers located on board the vessel, the method comprising:

receiving a stream of coordinate messages, each coordinate message defining a geographical position of the vessel and indicating that the message originates from a particular one of one of the transceivers;

generating a track of the vessel using at least some of said coordinate messages;

defining a risk model wherein risk to the vessel is dependent at least upon position of the vessel with respect to a plurality of geographical zones;

generating alerts dependent on risk to the vessel assessed using the model in conjunction with the generated track of the vessel in respect of said geographical position.

21. The method of claim 20 wherein the track of the vessel comprises position of the vessel, and optionally one or more of velocity of the vessel and acceleration of the vessel, and risk to the vessel is dependent upon one or more of position, velocity and acceleration of the vessel according to the track.

22. The method of claim 20 wherein the risk model comprises a plurality of said geographical zones defined as core zones, and one or more of said geographical zones defined as buffer zones which are peripheral to ones of said core zones, the risk model defining changes of risk in respect of a vessel transitioning into a said buffer zone and in respect of a vessel transitioning into a said core zone, said changes or risk being associated with a said generation of respective alerts.

23. The method of claim 20 wherein the risk to the vessel according to the risk model is also dependent upon one or more performance measures of the one or more transceivers.

24. The method of claim 20 wherein the risk model is defined such that risk to the vessel is also dependent upon legal status of the vessel including one or more of: the flag / country of registration of the vessel, the owner of the vessel, and prior values of the above.

25. A method of analyzing a past voyage of a vessel having a plurality of transceivers located on board the vessel, the method comprising:

storing a plurality of coordinate messages transmitted by said transceivers during the past voyage, each coordinate message defining a geographical position of the vessel during the past voyage and indicating that the message originated from a particular one of one of the transceivers; and

generating a track of the vessel during the past voyage using the defined geographical positions.

26. The method of claim 25 further comprising assigning a confidence level to each stored coordinate message dependent on at least one of: the identity of the indicated transceiver, and the geographical position defined by the message; and

generating the track of the vessel based on the defined geographical positions and the confidence levels assigned to the associated coordinate messages.

27. The method of claim 25 comprising defining a risk model relevant to the past voyage wherein the modelled risk to the vessel is dependent at least upon position of the vessel with respect to a plurality of geographical zones;

forming alerts which would have been relevant to the vessel during the past voyage according to risk to the vessel assessed using the risk model in conjunction with the generated track of the vessel.

28. The method of claim 3, wherein at least two of the plurality of transceivers are of different types.

29. Apparatus for tracking a vessel having a plurality of transceivers located on board the vessel, the apparatus comprising elements for:

receiving a stream of coordinate messages, each coordinate message defining a geographical position of the vessel and indicating that the message originates from a particular one of one of the transceivers;

assigning a confidence level to each coordinate message dependent on at least one of: the identity of the indicated transceiver, and the geographical position defined by the message; and

generating a track of the vessel based on the defined geographical positions and the confidence levels assigned to the associated coordinate messages.

30. The apparatus of claim 29 further comprising:

an element for generating at least one measure of performance of at least one of said transceivers dependent upon said received coordinate messages; and

an element for controlling at least one of the transceivers in a manner dependent upon the at least one measure of performance.

31. The apparatus of claim 29 further comprising:

a risk model wherein risk to the vessel is dependent at least upon position of the vessel with respect to a plurality of geographical zones; and

an element for generating alerts dependent on risk to the vessel assessed using the model in conjunction with the generated track of the vessel in respect of said geographical position.

32. The apparatus of claim 29 further comprising a vessel having the plurality of transceivers located on board the vessel.

33. The apparatus of claim 32 wherein at least two of the transceivers are of different type to each other.

34. The apparatus of claim 32 wherein at least one of the transceivers is an AIS type transceiver, and at least one of the transceivers is not an AIS transceiver.

35. The apparatus of claim 29 wherein assigning a confidence level to a said coordinate message dependent on at least the geographical position defined by the message comprises assigning a confidence level dependent on a relationship between

the geographical position defined by the coordinate message and geographical positions defined by a plurality of previous ones of said coordinate messages.

36. The apparatus of claim 29 wherein assigning a confidence level to a said coordinate message dependent on at least the identity of the indicated transceiver comprises assigning a confidence level dependent on a measure of past performance of the indicated transceiver.

37. The apparatus of claim 36 wherein the measure of past performance of the indicated transceiver is dependent upon confidence levels assigned to previous coordinate messages indicated as received from the same transceiver.

38. The apparatus of claim 29 wherein generating a track of the vessel comprises generating the track of the vessel using geographical positions only from coordinate messages selected according to the assigned confidence levels.

39. The apparatus of claim 29 wherein the track of the vessel comprises position of the vessel dependent upon time, and optionally one or more of velocity of the vessel dependent upon time and acceleration of the vessel dependent upon time.

40. The apparatus of claim 29 further comprising deferring use of a first coordinate message representing an earlier geographical position in generating the track until a second coordinate message representing a later geographical position has been received.

41. The apparatus of claim 29 wherein the first coordinate message indicates an identity of a first type of transceiver, the second coordinate message indicates an identity of a second type of transceiver different to the first type of transceiver.

42. The apparatus of claim 30 wherein at least one said measure of performance of a particular transceiver is dependent upon a frequency of received coordinate messages which are indicated as originating from that transceiver.

43. The apparatus if claim 30 wherein at least one said measure of performance of a particular transceiver is dependent geographical positions defined in coordinate messages indicated as received from that transceiver.

44. The apparatus of claim 30 wherein the element for controlling at least one of the transceivers is arranged to control the at least one of the transceivers in a manner dependent upon defined financial costs associated with operating one or more of the transceivers.

45. The apparatus of claim 30 wherein the element for controlling at least one of the transceivers is arranged to send an instruction to change the interval between transmissions of coordinate messages of a said transceiver dependent upon the at least one measure of performance of said transceiver.

46. The apparatus of claim 30 wherein the element for controlling at least one of the transceivers is arranged to send an instruction to stop and/or start transmission of coordinate messages by a selected one of said transceivers.

47. The apparatus of claim 30 wherein the element for controlling at least one of the transceivers is arranged to send an instruction to restart a selected one of said transceivers.

48. The method of claim 28 wherein at least one of the transceivers is an AIS type transceiver, and at least one of the transceivers is not an AIS transceiver.

49. The method of claim 48 wherein one of the transcievers which is not an AIS receiver is a transceiver operating through geostationary satellites

50. The method of claim 11 wherein at least two of the plurality of transceivers are of different types.

51. The method of claim 50 wherein at least one of the transceivers is an AIS type transceiver, and at least one of the transceivers is not an AIS transceiver.

52. The method of claim 3 wherein the vessel is a ship and the method is carried out remotely from the ship.

53. The method of claim 52 wherein the generated track is a blended track of the ship generated by combining at least some of the defined geographical positions from each of the plurality of transceivers.