SUMMARY OF THE INVENTION

According to an aspect, there is provided a moving core segment being a component of at least one moving relay operable in a cellular system; the moving core segment comprising: at least one add-on Security Module (SM) wherein the at least one moving relay associated with said moving core component being carry-able by a moving platform the cellular system including said at least one moving relay for enabling cellular communication between at least two mobile stations, each having at least one add-on Security Module (SM); the cellular communication being in a geographic area that lacks adequate cellular coverage by at least one stationary base station.

~~In accordance with an aspect of the invention, there is provided~~ Disclosed herein is a cellular system comprising at least one moving non-stationary base station for enabling cellular communication between at least two mobile stations in a geographic area that lacks adequate cellular coverage by at least one stationary base station.

In accordance with certain embodiments, there is further provided at least one stationary base station.

In accordance with certain embodiments of the invention, there is further provided at least one non stationary core segment.

In accordance with certain embodiments of the invention, said non stationary core segment being a simulated stationary network.

In accordance with certain embodiments of the invention, said non stationary base station being a moving relay.

In accordance with certain embodiments of the invention, there is further provided at least one stationary core segment and stationary base station.

In accordance with certain embodiments of the invention there is further provided support of dynamic topology in terms of at least variable number of non stationary base stations and number of mobile stations.

In accordance with certain embodiments of the invention, said dynamic topology includes multi-layer Hierarchical dynamic cellular network.

In accordance with certain embodiments of the invention, the system is operable in an adaptable network coverage mode for adequately supporting a static or dynamic deployment of cellular mobile stations.

In accordance with certain embodiments of the invention, said adaptable network coverage includes change of assignment of cellular mobile stations between non- stationary base stations.

In accordance with certain embodiments of the invention, said adaptable network coverage includes change of location of at least one non- stationary base station.

In accordance with certain embodiments of the invention, said adaptable network coverage includes change of transmission or reception characteristics of said non- stationary bases stations.

In accordance with certain embodiments of the invention, said transmission or reception characteristics are selected from a group includes antenna type, antenna pointing, antenna beam-width and transmission power.

In accordance with certain embodiments of the invention, the system is operable in 3G standard.

In accordance with certain embodiments of the invention, the system is operable in 4G standard.

In accordance with certain embodiments of the invention, the system is operable in WiMax standard.

In accordance with certain embodiments of the invention, the system is operable in areas of disaster where existing stationary cellular infrastructure malfunction.

In accordance with certain embodiments of the invention, said cellular communication is characterized by

i) communication between at least two mobile stations at a variable distance that falls in the range of sub-meter to more than lOKm;

ii) communication of desired application including at least one of audio, video, messaging and data.

In accordance with certain embodiments of the invention, said cellular communication is further characterized by

iii) communication in an environment including at least one of urban, sub-urban, rural, maritime and aerial.

In accordance with certain embodiments of the invention, said non stationary moving base station is carried by moving autonomous platform from a group that includes ground robot, unmanned aerial vehicle (UAV) or unmanned seaborne vessel.

~~In accordance with an aspect of the invention, there is provided~~ Disclosed herein is a mobile station equipped with ICM and carry-able by a platform, in a cellular system comprising at least one moving non- stationary base station for enabling cellular communication between at least two mobile stations in a geographic area that lacks adequate cellular coverage by at least one stationary base station.

In accordance with certain embodiments of the invention, said cellular system further including at least one stationary base station.

~~In accordance with an aspect of the invention, there is provided~~ Disclosed herein is a mobile station equipped with SM and carry-able by a platform, in a cellular system comprising at least one moving non- stationary base station for enabling cellular communication between at least two mobile stations in a geographic area that lacks adequate cellular coverage by at least one stationary base station.

In accordance with certain embodiments of the invention, said cellular system further including at least one stationary base station.

~~In accordance with an aspect of the invention, there is provided~~ Disclosed herein is a non stationary base station equipped with ICM, in a cellular system comprising at least one moving non- stationary base station for enabling cellular communication between at least two mobile stations in a geographic area that lacks adequate cellular coverage by at least one stationary base station.

~~In accordance with an aspect of the invention, there is provided~~ Disclosed herein is a non stationary core segment equipped with SM, in a cellular system comprising at least one moving non- stationary base station for enabling cellular communication between at least two mobile stations in a geographic area that lacks adequate cellular coverage by at least one stationary base station.

~~In accordance with an aspect of the invention, there is provided~~ Disclosed herein is a cellular system comprising at least two moving non-stationary base stations for enabling cellular communication between at least two mobile stations in a geographic area that lacks adequate cellular coverage by at least one stationary base station.

~~A~~ Disclosed herein is a system according to any of the previous embodiments wherein the cellular system enables adaptable network coverage.

Furthermore, the adaptable network coverage can be one or more of the following types: distributed, centralistic, partly distributed and partially centralistic.

Furthermore, adaptation of the network coverage may be made autonomously by the moving non- stationary base station.

Furthermore, the system may be operable in WiFi standard.

CLAIMS:

1. A cellular system comprising

   at least one moving relay having at least one Interference Cancellation Module (ICM) capable of interference cancellation

   for enabling cellular communication between at least two mobile stations in a geographic area that lacks adequate cellular coverage by at least one stationary base station.

2. The system according to Claim 1, wherein said interference cancellation includes intra-network interference.

3. The system according to Claims 1 or 2, wherein said interference cancellation includes out-of-network interference.

4. The system according to any one of the preceding Claims, wherein said lack of adequate coverage by the stationary base station stems from disconnected backhauling radio link between the moving relay and the static base station.

5. The cellular system according to any one of the preceding Claims, wherein said moving relay includes a base station, a relay resource manager and a link to other base station.

6. The cellular system according to Claim 5, wherein said ICM is coupled to said base station.

7. The cellular system according to Claim 5, wherein said link is implemented as in-band backhauling using mobile station functionality and wherein said ICM is coupled to said local station functionality.

8. A cellular system comprising

   at least one moving relay having at least one Security Module (SM) facilitating upgraded security for enabling cellular communication between at least two mobile stations in a geographic area that lacks adequate cellular coverage by at least one stationary base station.

9. The cellular system according to Claim 8, wherein the upgraded security enables higher security application.

10. The system according to Claims 8 or 9, wherein said lack of adequate coverage by the stationary base station stems from disconnected backhauling radio link between the moving relay and the static base station.

11. The cellular system according any one of Claims 8 to 10, wherein said moving relay includes a base station, a relay resource manager and a link to other base station.

12. The cellular- system according to Claim 11, wherein said SM is interfaced to said relay resource manager.

13. The cellular system according to Claim 11, wherein said link is implemented as in-band backhauling using mobile station functionality and wherein said SM is interfaced to said local station functionality.

14. The cellular system according to any one of Claims 8 to 13, comprising at least one stationary base station.

15. The cellular system according to any one of Claims 8 to 14 , wherein said cellular system further comprising at least one non stationary core segment.

16. The cellular system according to Claim 15, wherein said non stationary core segment being a simulated stationary network.

17. The cellular system according to any one of the Claims 8 to 13, wherein said cellular system further comprising at least one stationary core segment and stationary base station.

18. The system according to any one of Claims 8 to 17, supporting dynamic topology in terms of at least variable number of non stationary base stations and number of mobile stations.

19. The system according to Claim 18, wherein said dynamic topology includes multi-layer Hierarchical dynamic cellular network.

20. The system according to any one of Claims 8 to 19, operable in an adaptable network coverage mode for adequately supporting a static or dynamic deployment of cellular mobile stations.

21. The system according to Claim 20, wherein said adaptable network coverage includes change of assignment of cellular mobile stations between moving relays.

22. The system according to Claims 20 or 21, wherein said adaptable network coverage includes change of location of at least, one moving relay.

23. The system according to any one of Claims 20 to 22, wherein said adaptable network coverage includes change of transmission or reception characteristics of said moving relays.

24. The system according to claim 23, wherein said transmission or reception characteristics are selected from a group includes antenna type, antenna pointing, antenna beam-width and transmission power.

25. The system according to any one of Claims 8 to 24, operable in 3G standard.

26. The system according to any one of the Claims 8 to 24, operable in 4G standard.

27. The system according to any one of the Claims 8 to 24, operable in WiMax standard.

28. The system according to any one of the Claims 8 to 27 operable in areas of disaster where existing stationary cellular infrastructure malfunction.

29. The system according to any one of Claims 8 to 28 wherein said cellular communication is characterized by

i) communication between at least two mobile stations at a variable distance that falls in the range of sub-meter to more than 10Km;

ii) communication of desired application including at least one of audio, video, messaging and data.

30. The system according to Claim 29, wherein said cellular communication is further characterized by

i) communication in an environment including at least one of urban, sub-urban, rural, maritime and aerial.

31. The system according to any one of Claims 8 to 30, wherein said non stationary moving base station is carried by moving autonomous platform from a group that includes ground robot, unmanned aerial vehicle (UAV) or unmanned seaborne vessel.

32. A mobile station equipped with ICM and carry-able by a platform, in a cellular system comprising at least one moving relay for enabling cellular communication between at least two mobile stations in a geographic area that lacks adequate cellular coverage by at least one stationary base station.

33. The mobile station of Claim 32, wherein said cellular system further including at least one stationary base station.

34. A mobile station equipped with SM and carry-able by a platform, in a cellular system comprising at least one moving relay for enabling cellular communication between at least two mobile stations in a geographic area that lacks adequate cellular coverage by at least one stationary base station.

35. The mobile station of Claim 34, wherein said cellular system further including at least one stationary base station.

36. A non stationary core segment equipped with SM, in a cellular system comprising at least one moving relay for enabling cellular communication between at least two mobile stations in a geographic area that lacks adequate cellular coverage by at least one stationary base station.

37. The non stationary core segment of Claim 36, wherein said lack of adequate coverage by the stationary base station stems from disconnected backhauling radio link between the moving relay and the static base station.

38. A system according to any one of Claims 8 to 31, wherein said cellular system enables adaptable network coverage.

39. A system according to claim 38, wherein said adaptable network coverage can be one or more of the following types: distributed, centralistic, partly distributed and partially centralistic.

40. A system according to claims 38 or 39, wherein said adaptation of the network coverage is made autonomously by the moving relay.

41. The system according to any one of the Claims 8 to 24, operable in WiFi standard.

42. The cellular system according to any one of Claims 1 to 7, comprising at least one stationary base station.

43. The cellular system according to any one of Claims 1 to 7 and 42, wherein said cellular system further comprising at least one non stationary core segment.

44. The cellular system according to Claim 43, wherein said non stationary core segment being a simulated stationary network.

45. The cellular system according to any one of the Claims 1 to 7, wherein said cellular system further comprising at least one stationary core segment and stationary base station.

46. The system according to any one of Claims 1 to 7 and 42 to 45, supporting dynamic topology in terms of at least variable number of non stationary base stations and number of mobile stations.

47. The system according to Claim 46, wherein said dynamic topology includes multi-layer Hierarchical dynamic cellular network.

48. The system according to any one of Claims 1 to 7 and 43 to 47, operable in an adaptable network coverage mode for adequately supporting a static or dynamic deployment of cellular mobile stations.

49. The system according to Claim 48, wherein said adaptable network coverage includes change of assignment of cellular mobile stations between moving relays.

50. The system according to Claims 48 or 49, wherein said adaptable network coverage includes change of location of at least one moving relay.

51. The system according to any one of Claims 49 to 50, wherein said adaptable network coverage includes change of transmission or reception characteristics of said moving relays.

52. The system according to claim 51, wherein said transmission or reception characteristics are selected from a group which includes antenna type, antenna pointing, antenna beam-width and transmission power.

53. The system according to any one of Claims 1-7 and 42 to 52, operable in 3G standard.

54. The system according to any one of the Claims 1 to 7 and 42 to 52, operable in 4G standard.

55. The system according to any one of the Claims 1 to 7 and 42 to 52, operable in WiMax standard.

56. The system according to any one of the Claims 1 to 7 and 42 to 55, operable in areas of disaster where existing stationary cellular infrastructure malfunction.

57. The system according to any one of Claims 1 to 7 and 42 to 56, wherein said cellular communication is characterized by

    i) communication between at least two mobile stations at a variable distance that falls in the range of sub-meter to more than 10Km;

    ii) communication of desired application including at least one of audio, video, messaging and data.

58. The system according to Claim 57, wherein said cellular communication is further characterized by

    i) communication in an environment including at least one of urban, sub-urban, rural maritime and aerial.

59. The system according to any one of Claims 1 to 7 and 42 to 58, wherein said non stationary moving base station is carried by moving autonomous platform from a group that includes ground robot, unmanned aerial vehicle (UAV) or unmanned seaborne vessel.

60. A system according to any one of Claims 1 to 7 and 42 to 59, wherein said cellular system enables adaptable network coverage.

61. A system according to claim 60, wherein said adaptable network coverage can be one or more of the following types: distributed, centralistic, partly distributed and partially centralistic.

62. A system according to claims 60 or 61, wherein said adaptation of the network coverage is made autonomously by the moving relay.

63. The system according to any one of the Claims 1 to 7 and 42 to 52, operable in WiFi standard.

64. A cellular system comprising at least one moving relay each including base station functionality, a radio manager and mobile station functionality all co-located,

wherein each base station functionality is operative to communicate via antennae with at least one mobile station thereby to define a first radio link there between, and wherein each base station functionality has a physical connection to its co-located radio manager,

wherein each mobile station functionality communicates via antennae with a unit which has base station functionality thereby to define a second radio link,

wherein the radio manager in each individual moving relay comprises:

a radio resource manager; and

functionality for exchanging information with radio managers included in moving relays other than said individual moving relay,

wherein said information is used by said radio resource manager to select, for at least one individual mobile station seeking to be served, one of:

a static base station; and

a base station functionality,

to which to connect said individual mobile station in order to provide cellular communication services thereto,

said moving relay having at least one Interference Cancellation Module (ICM) capable of interference cancellation for enabling cellular communication between at least two mobile stations in a geographic area that lacks adequate cellular coverage by at least one stationary base station.

65. A cellular system comprising

at least one moving relay each including base station functionality, a radio manager and mobile station functionality, all co-located,

wherein each base station functionality is operative to communicate via antennae with at least one mobile station thereby to define a first radio link there between, and wherein each base station functionality has a physical connection to its co-located radio manager,

wherein each mobile station functionality communicates via antennae with a unit which has base station functionality thereby to define a second radio link,

wherein the radio manager in each individual moving relay comprises:

a radio resource manager; and

functionality for exchanging information with radio managers included in moving relays other than said individual moving relay,

wherein said information is used by said radio resource manager to select, for at least one individual mobile station seeking to be served, one of:

a static base station; and

a base station functionality,

to which to connect said individual mobile station in order to provide cellular communication services thereto,

said moving relay having having at least one Security Module (SM) facilitating upgraded security, for enabling cellular communication between at least two mobile stations in a geographic area that lacks adequate cellular coverage by at least one stationary base station.

Claims:

1. A moving core segment being a component of at least one moving relay operable in a cellular system; the moving core segment comprising:

at least one add-on Security Module (SM) wherein the at least one moving relay associated with said moving core component being carry-able by a moving platform the cellular system including said at least one moving relay for enabling cellular communication between at least two mobile stations, each having at least one add-on Security Module (SM); the cellular communication being in a geographic area that lacks adequate cellular coverage by at least one stationary base station.