

Nicolás Vargas

#### Search history

Search PN=(WO2017124004) (Results 1)

1:

2: [SP]: 1. a method of communication at an access node of a communication system comprising a plurality of access nodes at geographically distributed locations providing a communication service to user terminals distributed over multiple forward user beam coverage areas via an end-to-end relay comprising multiple forward receive/transmit signal paths, the method comprising: obtaining an access node-specific forward signal for transmission via the end-to-end relay to a plurality of the user terminals grouped by the multiple forward user beam coverage areas, the access node-specific forward signal comprising a composite of forward beam signals corresponding to a plurality of the multiple forward user beam coverage areas, the forward beam signals weighted by respective beam weights of a beam weight vector associated with the access node identifying forward signal transmit timing information indicating transmission timing for the access node-specific forward signal transmitting a forward uplink signal comprising the access node-specific forward signal and an access node beacon signal to the end-to-end relay, the access node-specific forward signal having the forward signal transmit timing information synchronized to corresponding transmit timing information in the access node beacon signal receiving signaling from the end-to-end relay comprising a relay beacon signal and the access node beacon signal relayed from the end-to-end relay and adjusting the forward uplink signal to time and phase align the relayed access node beacon signal with the received relay beacon signal. 2. the method of claim 1, further comprising: demodulating the relay beacon signal to obtain receive timing information and receive phase information. 3. the method of claim 2, further comprising: demodulating the relayed access node beacon signal to obtain relayed transmit timing information and relayed transmit phase information. 4. the method of claim 3, wherein the adjusting comprises: adjusting timing of the forward uplink signal based on comparing the receive timing information to the relayed transmit timing information. 5. the method of claim 3, wherein the adjusting comprises: adjusting a phase of the forward uplink signal based on comparing the receive phase information to the relayed transmit phase information. 6. the method of claim 1, wherein the identifying comprises: demultiplexing the forward signal transmit timing information from a multiplexed access node-specific forward signal received at the access node. 7. the method of claim 1, wherein the access node-specific forward signal comprises a plurality of time-domain subsets of samples. 8. the method of claim 1, wherein: the access node-specific forward signal comprises a plurality of sub-signals associated with different subsets of the multiple forward user beam coverage areas and the transmitting the forward uplink signal comprises upconverting the plurality of sub-signals to different carrier frequencies. 9. the method of claim 1, wherein: the forward uplink signal comprises a plurality of signals transmitted over different frequency sub-bands and the multiple forward user beam coverage areas comprise a plurality of subsets of forward user beam coverage areas associated with the different frequency sub-bands. 10. an access node for communication in a communication system comprising a plurality of access nodes at geographically distributed locations providing a communication service to user terminals distributed over multiple forward user beam coverage areas via an end-to-end relay comprising multiple forward receive/transmit signal paths, comprising: a network interface that obtains an access node-specific forward signal for transmission to a plurality of the user terminals grouped by the multiple forward user beam coverage areas via the end-to-end relay, the access node-specific forward signal comprising a composite of forward beam signals corresponding to a plurality of the multiple forward user beam coverage areas, the forward beam signals weighted by respective beam weights of a beam weight vector associated with the access node a de-multiplexer that obtains forward signal transmit timing and phase information for the access node-specific forward signal a transmitter that transmits a forward uplink signal comprising an access node beacon signal and the access node-specific forward signal to the end-to-end relay a receiver that receives a downlink signal from the end-to-end relay, the downlink signal comprising a relay beacon signal and the relayed access node beacon signal relayed from the end-to-end relay a controller that determines a timing and phase adjustment to align relayed transmit timing and phase information in the relayed access node beacon signal with received relay timing and phase information in the received relay beacon signal and a transmit timing and phase compensator that outputs the forward uplink signal to the transmitter based on the timing and phase adjustment, the transmit timing and phase compensator multiplexing the access node-specific forward signal with the access node beacon signal such that the forward signal transmit timing and phase information is synchronized to corresponding transmit timing and phase information in the access node beacon signal. 11. the access node of claim 10, further comprising: a relay beacon signal demodulator that demodulates the relay beacon signal to obtain receive timing and phase information. 12. the access node of claim 11, further comprising: an access beacon signal demodulator that demodulates the relayed access node beacon signal to obtain relayed transmit timing and phase information. 13. the access node of claim 12, wherein the controller determines the timing and phase adjustment based on a comparison of the receive timing and phase information with the relayed transmit timing and phase information. 14. the access node of claim 10, wherein the access node-specific forward signal comprises a plurality of time-domain subsets of samples. 15. the access node of claim 10, wherein: the access node-specific forward signal comprises a plurality of sub-signals associated with different subsets of the multiple forward user beam coverage areas and the transmitting the forward uplink signal comprises upconverting the plurality of sub-signals to different carrier frequencies. 16. the access node of claim 10, wherein the plurality of access nodes has a first number of the access nodes and the end-to-end relay has a second number of the forward receive/transmit signal paths, wherein the first number is greater than the second number. 17. the access node of claim 10, wherein: the forward uplink signal comprises a plurality of signals transmitted over different frequency sub-bands and the multiple forward user beam coverage areas comprise a plurality of subsets of forward user beam coverage areas associated with the different frequency sub-bands. 18. the method of claim 7, wherein each of the plurality of time-domain subsets of samples comprises a plurality of interleaved samples for the access node-specific forward signal, the method further comprising: de-interleaving the interleaved samples of the access node-specific forward signal. 19. the method of claim 1, wherein the relay beacon signal comprises a pseudo-noise (pn) code. 20. the method of claim 1, wherein the relay beacon signal comprises relay frame timing information. 21. the method of claim 1, wherein the access node beacon signal comprises a pseudo-noise (pn) code associated with the access node. 22. the method of claim 21, wherein the access node beacon signal comprises transmit frame timing information. 23. the method of claim 21, wherein the adjusting the forward uplink signal comprises: adjusting a chip timing of the pn code. 24. the method of claim 9, wherein each of the plurality of subsets of forward user beam coverage areas comprises a plurality of non-overlapping forward user beam coverage areas. 25. the method of claim 9, wherein a bandwidth for each of the different frequency sub-bands is greater than or equal to 500 megahertz. 26. the access node of claim 10, wherein the relay beacon signal comprises a pseudo-noise (pn) code. 27. the access node of claim 10, wherein the relay beacon signal comprises relay frame timing information. 28. the access node of claim 10, wherein the access node beacon signal comprises a pseudo-noise (pn) code associated with the access node. 29. the access node of claim 28, wherein the access node beacon signal comprises transmit frame timing information. 30. the access node of claim 17, wherein each of the plurality of subsets of forward user beam coverage areas comprises a plurality of non-overlapping forward user beam coverage areas. (Results 0)

Search 3: [SP]: access node for end-to-end beamforming communications systems methods and systems are described for providing end-to-end beamforming. for example, end-to-end beamforming systems include end-to-end relays and ground networks to provide communications to user terminals located in user beam coverage areas. the ground segment can include geographically distributed access nodes and a central processing system. return uplink signals, transmitted from the user terminals, have multipath induced by a plurality of receive/transmit signal paths in the end to end relay and are relayed to the ground network. the ground network, using beamformers, recovers user data streams transmitted by the user terminals from return downlink signals. the ground network, using beamformers generates forward uplink signals from appropriately weighted combinations of user data streams that, after relay by the end-end-end relay, produce forward downlink signals that combine to form user beams. (Results 77)

Search 3 and cluster\* (Results 18)

4:

Search 4 and node\* (Results 7)

5:

Search 5 and PD<20160113 (Results 6)

6:

Search 6 and relay (Results 4)

7:

Search 7 and matrix (Results 2)

8:

**Title:** METHOD AND ARRANGEMENT FOR COOPERATIVE **RELAYING**

**Abstract:** In a method for **relaying** deployment in a wireless communication system comprising a transmitting **node** with multiple antennas for communicating with at least one receiving **node** via at least two **relay nodes**, a data stream at the transmitting **node** is partitioned into at least two data substreams, each of which is beamformed and transmitted over a first link to a respective of the **relay nodes**; subsequently at least one restorable representation of each received substream is forwarded over a second link to the receiving **node** from the two **relay nodes**; and finally the received and decoded representations are multiplexed to form an output signal at the receiving **node** corresponding to the original data stream.

**Classifications:**

**International (IPC 8-9):** H04L12/56 H04B7/02 H04B7/10 H04B7/14 H04B7/15 H04B7/24 H04B7/26 H04J99/00

H04L1/06 (Advanced/Invention);

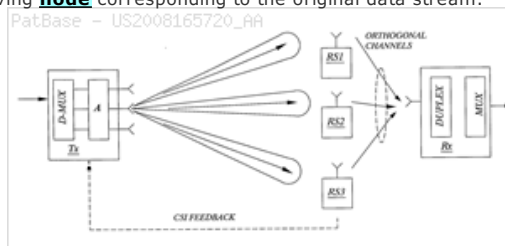
H04B7/02 H04B7/14 H04B7/15 H04B7/24 H04B7/26 H04J99/00

H04L1/02 (Core/Invention)

**CPC:** H04B7/0632 H04B7/15592 H04L1/0625

**European:** H04B7/06C1F1Q H04B7/155M H04L1/06T3

**US:** 370/315 370/315P

**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| CN101167294 A      | 20080423         | CN200580049481     | 20050217         |
| CN101167294 B      | 20130717         | CN200580049481     | 20050217         |
| DE602005043220 D1  | 20140522         | DE200560043220T    | 20050217         |
| EP1854235 A1       | 20071114         | EP20050711087      | 20050217         |
| EP1854235 B1       | 20140409         | EP20050711087      | 20050217         |
| JP2008530946 T2    | 20080807         | JP20070556105T     | 20050217         |
| RU2007134427 A     | 20090327         | RU20070134427      | 20050217         |
| RU2374765 C2       | 20091127         | RU20070134427      | 20050217         |
| TW200644477 A      | 20061216         | TW20060103855      | 20060206         |
| US2008165720 AA    | 20080710         | US20050884454      | 20050217         |
| WO06088400 A1      | 20060824         | WO2005SE00227      | 20050217         |

**Priority:**

EP20050711087 20050217 RU20070134427 20050217 WO2005SE00227 20050217

**Probable Assignee:** TELEFONAKTIEBOLAGET LM ERICSSON PUBL

**Assignee(s):** (std): ERICSSON TELEFON AB L M ; ERICSSON TELEFON AB LM ; ERICSSON TELEFON L M AB ; HU RONG ; LARSSON PETER ; ZHANG ZHANG ; TELEFONAKTIEBOLAGET LM ERICSSON PUBL

**Assignee(s):** TELEFONAKTIEBOLAGET LM ERICSSON (PUBL) ; TELEFONAKTIEBOLAGET LM ERICSSON ; TELEFONAKTIEBOLAGET L M ERICSSON PUBL ; TELEFONAKTIEBOLAGET LM EHRIKSSON PABL

**Inventor(s):** (std): CHZHAN CHZHAN ; HU RONG ; KHU ZHUN ; LARSSON PETER ; P LASSEN ; R HU ; Z ZHANG ; ZHANG ZHANG

**Agent(s):** MARKS AND CLERK LUXEMBOURG LLP; STENBORG ANDERS VILHELM; NIXON AND VANDERHYE PC

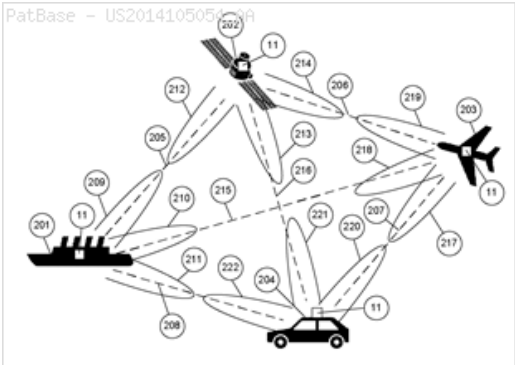
**Designated states:** AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GW HR HU ID IE IL IN IS IT JP KE KG KP KR KZ LC LI LK LR LS LT LU LV MA MC MD MG MK ML MN MR MW MX MZ NA NE NI NL NO NZ OM PG PH PL PT RO RU SC SD SE SG SI SK SL SM SN SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW

**Title:** METHOD AND SYSTEM FOR LONG-RANGE ADAPTIVE MOBILE BEAM-FORMING AD-HOC COMMUNICATION SYSTEM WITH INTEGRATED POSITIONING

**Abstract:** Method and system for provided a long range, high capacity ad-hoc mobile communication network where a narrow antenna beam formed by a plurality of antenna elements, radio transceivers and digital spatial signal processing is used to provide a high accuracy positioning system integrated into the communication system. The relative positions and directive orientation of all the units in the network is done by mutual exchange of positioning data as an element in the communication protocol in the network.

**Classifications:**

**International (IPC 8-9):** G01R31/08 G01S19/06 G01S5/00 G01S5/02 G01S5/12 G06F11/00 H01Q3/26 H04B10/30 H04B7/02 H04W16/28 H04W24/08 H04W40/12 H04W40/20 H04W52/18 H04W64/00 H04W84/18 (Advanced/Invention); G01S7/00 G01S7/28 H04B7/06 (Advanced/Non-invention)  
**CPC:** H04W16/28 H04W64/00 H04W84/18 H04W24/08 G01S5/0072 G01S5/12 G01S7/006 G01S7/2813 H01Q3/2605 H01Q3/267 H04B7/0617  
**US:** 370/252



**Family:**

| Publication number | Publication date | Application number | Application date |
|--------------------|------------------|--------------------|------------------|
| AR086420 AA        | 20131211         | AR2012P101732      | 20120516         |
| EP2710400 A2       | 20140326         | EP20120786172      | 20120516         |
| EP2710400 A4       | 20150617         | EP20120786172      | 20120516         |
| NO20110728 A       | 20121119         | NO20110000728      | 20110516         |
| NO334170 B1        | 20131230         | NO20110000728      | 20110516         |
| US2014105054 AA    | 20140417         | US20120116827      | 20120516         |
| US9516513 BB       | 20161206         | US20120116827      | 20120516         |
| WO12158045 A2      | 20121122         | WO2012NO50090      | 20120516         |
| WO12158045 A3      | 20130131         | WO2012NO50090      | 20120516         |

**Priority:**

NO20110000728 20110516      WO2012NO50090 20120516

**Probable Assignee:** RADIONOR COMMUNICATIONS AS

**Assignee(s):** (std): KAMBEN ROGER ; RADIONOR COMM AS ; RADIONOR COMMUNICATIONS AS ; SAEGROV ATLE

**Assignee(s):** RADIONOR COMMUNICATION AS

**Inventor(s):** (std): KAMBEN ROGER ; SAEGROV ATLE

**Agent(s):** CURO AS; ALIX YALE AND RISTAS LLP

**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW