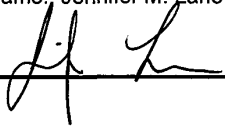


UTILITY PATENT APPLICATION TRANSMITTAL (Only for new nonprovisional applications under 37 CFR 1.53(b))		Date: March 18, 2010	
		Attorney Docket No.: P215467.US.01	
		First Inventor: Gustavo de Veciana	
		Title:	METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION
APPLICATION ELEMENTS See MPEP chapter 600 concerning utility patent application contents.		ADDRESS TO: Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450	
		ACCOMPANYING APPLICATION PARTS	
1. ☐ Application Fee Transmittal Form (Submit an original and a duplicate for fee processing)	2. ☐ Applicant claims small entity status See 37 CFR 1.27.	3. ☒ Specification [Total Pages: 30] Both the claims and abstract must start on a new page	4. ☒ Drawings (35 U.S.C. 113) [Total Sheets: 4]
5. ☐ Oath or Declaration [Total Pages:] a. ☐ Newly Executed (original or copy) b. ☐ A copy from a prior application (37 CFR 1.63(d)) (for continuation/divisional with Box 18 completed) The entire disclosure of the prior application from which a copy of the oath or declaration is supplied is considered to be part of the disclosure of the accompanying application and is hereby incorporated by reference therein. i. ☐ DELETION OF INVENTORS Signed statement attached deleting inventor(s) named in the prior application (37 C.F.R. 1.63(d)(2) and 1.33(b))	6. ☒ Application Data Sheet (37 C.F.R. 1.76)	7. ☐ CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix)	8. ☐ Nucleotide and/or Amino Acid Sequence Submission (If applicable, all necessary) a. ☐ Computer Readable Form (CRF) b. ☐ Specification Sequence Listing on: i. ☐ CD-ROM or CD-R (2 copies); or c. ☐ Statement verifying identity of above copies
9. ☐ Assignment Papers (cover sheet & document(s)) Name of Assignee:		10. ☐ 37 C.F.R. 3.73(b) Submission ☐ Power of Attorney (when there is an assignment)	
11. ☐ English Translation Document (if applicable)		12. ☐ Information Disclosure Statement (IDS) (PTO/SB/08 or PTO-1449) ☐ Copies of citations attached	
13. ☐ Preliminary Amendment		14. ☐ Return Receipt Postcard (MPEP 503) (Should be specifically itemized)	
15. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)		16. ☐ Nonpublication Request under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent	
17. ☐ Other: _____ _____ _____ _____		17. ☐ Other: _____ _____ _____ _____	
CONTINUING APPLICATIONS			
18. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76: ☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: Prior application information: Examiner Art Unit:			
19. CORRESPONDENCE ADDRESS			
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APPLICATION DATA SHEET

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Application Information

Title : METHODS AND COMMUNICATION SYSTEMS HAVING
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Total Drawing Sheets : 4
Formal Drawings : YES
Application Type : Utility
Attorney Docket Number : P215467.US.01

Representative Information

Representative Customer No. : 27,076

Priority Information

This application claims priority to

Provisional Application No. : 61/161,166
Filing Date : March 18, 2009

METHODS AND COMMUNICATION SYSTEMS
HAVING ADAPTIVE MODE SELECTION

CROSS-REFERENCE TO RELATED APPLICATION

- [001] This application claims the benefit of the filing date of U.S. Provisional Application Serial Number 61/161,166, filed March 18, 2009, which application is hereby incorporated by reference in its entirety for any purpose.

BACKGROUND

- [002] Unless otherwise indicated herein, the materials described in this section are not prior art to the claims in this application, and are not admitted to be prior art by inclusion in this section.
- [003] Multiple-input multiple-output (MIMO) communication systems employ multiple transmit antennas and multiple receive antennas to communicate data symbols over a communications channel. MIMO communication systems may allow a plurality of receivers to be serviced utilizing a same frequency band. In this manner, MIMO communication systems may advantageously increase an amount of data the communication systems are able to send to users.
- [004] Single-input multiple-output (SIMO) communication systems may employ a single transmit antenna and multiple receive antennas to communicate data symbols over a communications channel.
- [005] MIMO and SIMO systems may find use in a variety of applications including, but not limited to, wireless networks, cellular systems including 3G and 4G systems, such as 3GPP LTE-Advanced, local and wide area networks, and wireless broadband systems (such as WiMAX or WiMAX2).

BRIEF DESCRIPTION OF THE DRAWINGS

- [006] The foregoing and other features of the present disclosure will become more fully apparent from the following description and appended claims, taken in conjunction with the accompanying drawings. Understanding that these drawings depict only several

examples in accordance with the disclosure and are, therefore, not to be considered limiting of its scope, the disclosure will be described with additional specificity and detail through use of the accompanying drawings, in which:

[007] In the drawings:

Figure 1 is a flow diagram illustrating a method for selecting a transmit mode in a communications system;

Figure 2 is a flow diagram illustrating a method for calculating the first transmission rate for a MIMO mode of a communications;

Figure 3 is a flow diagram illustrating a method for calculating the second transmission rate for a SIMO mode of a communications;

Figure 4 is a schematic illustration of a communications system, all arranged in accordance with at least some examples of the present disclosure; and

Figure 5 is a block diagram illustrating an example computer program product 500 that is arranged to store instructions for selecting a transmission rate and selecting a transmission mode in accordance with at least some examples of the present disclosure.

DETAILED DESCRIPTION

[008] In the following detailed description, reference is made to the accompanying drawings, which form a part hereof. In the drawings, similar symbols typically identify similar components, unless context dictates otherwise. The illustrative examples described in the detailed description, drawings, and claims are not meant to be limiting. Other examples may be utilized, and other changes may be made, without departing from the spirit or scope of the subject matter presented herein. It will be readily understood that the aspects of the present disclosure, as generally described herein, and illustrated in the Figures, can be arranged, substituted, combined, separated, and designed in a wide variety of different configurations, all of which are implicitly contemplated herein.

[009] This disclosure is drawn, inter alia, to methods, systems, devices, and/or apparatus generally related to selecting a transmit mode in a communications system. An example method may include calculating a first transmission rate for data in a multiple-input

multiple-output mode of the communications system and calculating a second transmission rate for the data in a single-input multiple-output mode of the communications system. A mode may be selected from the group consisting of the multiple-input multiple-output mode and the single-input multiple-output mode based, at least in part, on an energy consumption of the first and second transmission rates. Data may be transmitted from a transceiver in the communications system using the selected mode.

[010] Figure 1 is a flow diagram illustrating some example methods for selecting a transmit mode in a communications system arranged in accordance with at least some examples of the present disclosure. Example methods illustrated by Figure 1 may include one or more functions, operations or actions as are illustrated by block 105, 110, 115 and/or 120. Processing may begin at block 105 and/or block 110.

[011] In block 105, a first transmission rate for a multiple-input multiple-output (MIMO) mode of a communications system may be calculated. In block 110, a second transmission rate for a single-input multiple-output (SIMO) mode of a communications system may be calculated. Block 115 may follow the conclusion of the calculations of blocks 105 and/or 110. In block 115, a selected mode may be selected from the group consisting of the MIMO and SIMO modes. The selection may be based, at least in part, on an energy consumption of the first and second transmission rates. Block 115 may be followed by block 120. In block 120, data may be transmitted from a transceiver in the communications system using the selected MIMO or SIMO mode. In this manner, as will be described further below, MIMO or SIMO mode operation may be adaptively selected during operation of the communications system.

[012] In block 105, a first transmission rate for a MIMO mode of the communications system may be calculated. The first transmission rate may be calculated based, at least in part, on an energy-optimized rate for data in the MIMO mode. The energy-optimized rate may be based, at least in part, on power consumption of circuitry coupled to a plurality of antennas at the transceiver which are configured to transmit in the MIMO mode. That is, the power consumed by the circuitry used to process signals for antennas used to transmit in the MIMO mode may be included in the calculation of the energy-optimized rate. The

energy-optimized rate may also or instead be based, at least in part, on a power consumption of the transceiver during an idle time. The idle time is a time during which the transceiver may be waiting to send data over the communications channel. The transceiver may, for example, be waiting for a scheduled start time for the transceiver to use the communications channel. Generally, greater power is needed to transmit at higher rates in the communications system. Accordingly, power may be saved by reducing the transmission rate in the MIMO mode when a lower transmission rate is acceptable for a particular application, to achieve a particular average throughput in some examples. However, if the transmission rate is too slow, a greater number of transceivers may become idle, waiting to send transmissions over the communications channel. Even if the idling transceivers turn off their transmission chains, some idle power may be consumed due to leakage current or other effects. The idle power spent at a lower transmission rate may accordingly make the lower transmission rate less desirable in some examples.

[013] The energy-optimized rate may be expressed mathematically in the following equation:

$$e_{i,z}(t) = \arg \min_r (\nu_i(t) f_{i,z}(r/\nu_i(t)) + (1 - \nu_i(t)) p_{idle}) \frac{1}{r};$$
 where $e_{i,z}(t)$ is the energy-optimized rate for a user i , the index z designates the MIMO mode, and r designates rate. $\nu_i(t)$ is a fraction of time the user i is transmitting, and $1 - \nu_i(t)$ is a fraction of time the user i is idle. In some examples, where temporally fair scheduling may be used, $\nu_i(t)$ may be equal to $1/n(t)$ where $n(t)$ is a number of users of the communications system. $f_{i,z}(r/\nu_i(t))$ is a function for an amount of power consumed by user i during transmission.

[014] Any of a variety of power models may be used to calculate the amount of power consumed by user i during transmission in the MIMO mode. The power consumption expression may vary with the type of receiver used, such as a zero forcing receiver, maximum-likelihood receiver, or MMSE receiver in some examples. In one example, the transmission power equation $f(r)$ may be expressed mathematically as:

[015]
$$f(r) = \frac{2N_0}{\eta\phi_1\phi_2} \left(\sqrt{\left(\frac{\phi_1 + \phi_2}{2}\right)^2 + \phi_1\phi_2(2^{r/w} - 1)} - \frac{\phi_1 + \phi_2}{2} \right) + p_{dc,m};$$
 where N_0 is the

noise power, η is an efficiency of a power amplifier used to power one or more transmit antennas; ϕ_1 and ϕ_2 are eigenvalues of $\mathbf{H}^*\mathbf{H}$, where $\mathbf{H}$ is a channel matrix representing an operation of a channel on a transmitted data symbol, and $\mathbf{H}^*$ is the complex conjugate of $\mathbf{H}$; r is the transmission rate, w is the spectral bandwidth, and $p_{dc,m}$ is a power consumption of circuitry coupled to the multiple antennas configured to transmit in the MIMO mode. The power consumption of the circuitry may include any of a variety of circuit components, including power consumption of one or more digital-to-analog converters, mixers, filters, and frequency synthesizers.

[016] The first transmission rate may be equal to the energy-optimized rate, or may be based on the energy-optimized rate. The calculation of the first transmission rate may also take into account a target rate and a capacity rate in some examples, which will be described further below.

[017] Referring again to Figure 1, in block 110 a second transmission rate for a SIMO mode of the communications system may be calculated. The order of execution of the blocks 105 and 110 may vary in examples of the invention. All or a portion of the calculations in blocks 105 and 110 may occur in parallel in some examples. In other examples, the calculation of the first transmission rate may occur before the calculation of the second transmission rate, and in other examples, the calculation of the second transmission rate may occur before the calculation of the first transmission rate.

[018] Recall the energy-optimized rate may be mathematically expressed as written above:

[019]
$$e_{i,z}(t) = \arg \min_r \left(\nu_i(t) f_{i,z}(r / \nu_i(t)) + (1 - \nu_i(t)) p_{idle} \right) \frac{1}{r};$$
 in block 110, the z index

refers to the SIMO mode. Any of a variety of power models may be used to calculate the amount of power consumed by user i during transmission in the SIMO mode. The power consumption expression may vary with the type of receiver used, such as a zero forcing

receiver, maximum-likelihood receiver, or MMSE receiver in some examples. In one example, the transmission power equation $f(r)$ may be expressed mathematically as:

$$[020] \quad f(r) = \frac{1}{\eta} \frac{2^{r/w} - 1}{\sum_{\ell=1}^{N_r} |h_{\ell,k}|^2} N_0 + p_{dc,s}; \text{ where } N_0 \text{ is the noise power, } \eta \text{ is an efficiency of a}$$

power amplifier used to power one or more transmit antennas; ℓ is an index of a number of antennas, N_r is a number of receive antennas, and $\mathbf{h}_k$ is the k th column vector of the channel matrix $\mathbf{H}$; r is the transmission rate, w is the spectral bandwidth, and $p_{dc,s}$ is a power consumption of circuitry coupled to the multiple antennas configured to transmit in the SIMO mode. The power consumption of the circuitry may include any of a variety of circuit components, including power consumption of one or more digital-to-analog converters, mixers, filters, and frequency synthesizers. Note that in SIMO mode, only one set of circuitry coupled to the single transmit antenna may contribute substantially to the $p_{dc,s}$ term. Accordingly, SIMO mode may consume less power in circuitry for the transmit antennas than MIMO mode at some rates.

[021] While examples of the calculation of first and second transmission rates involving an energy-optimized rate have been described above, in some examples the first and second transmission rates may be specified by the communications system, and may be equal to one another.

[022] Referring again to Figure 1, in block 115 a selected mode may be selected from the group consisting of the MIMO mode and the SIMO mode based, at least in part, on an energy consumption of the first and second transmission rates. That is, either the MIMO mode or the SIMO mode may be selected based, at least in part, on which mode provides a lower energy per bit for transmission in the communications system. Mathematically, the selection may be described as evaluation of the function for each user i where the selected mode z is given as:

$$[023] \quad \hat{z} = \arg \min_{z \in \{m,s\}} \frac{f_{i,z}(n(t)r_{i,z}(t))}{r_{i,z}(t)}, \text{ where } f_{i,z} \text{ is a transmit power function, examples of}$$

which were described above, and $r_{i,z}$ represents the first and second transmission rates for the respective modes z .

- [024] A crossover point for when SIMO consumes less power than MIMO, or vice versa, may be considered a function of any of a variety of variables including, but not limited to, the power consumed by circuitry processing signals for the receive antennas, a number of receive antennas, and channel correlations. The power consumed by circuitry and number of receive antennas effect the power consumed during transmission, as described above, and accordingly may affect the crossover point. Correlations in the communications channel of the communications system may further effect the crossover point by reducing an available capacity of the MIMO mode, making a SIMO mode more energy efficient in some examples.
- [025] The transmission mode may be selected periodically in block 115 in some examples. In some examples, the transmission mode may be selected once for each data frame. In this manner, the transmission mode may be adaptively changed during operation of a communications system.
- [026] In block 120, data may be transmitted from a transceiver in the communications system using the selected MIMO or SIMO mode. In some examples, the selection of the MIMO or SIMO mode may be made in a base station of the communications system. The transmission mode may then be communicated to a mobile station, which may then encode data for transmission in accordance with the indicated MIMO or SIMO mode. If SIMO mode is selected, a particular antenna may also be specified for use in transmission. In one example, the antenna selected is one in which the product $\mathbf{h}_k^* \mathbf{h}_k$ is largest, where $\mathbf{h}_k$ is the k-th column vector of the channel matrix $\mathbf{H}$.
- [027] Figure 2 is a flow diagram illustrating some example methods for calculating the first transmission rate for a MIMO mode of a communications system arranged in accordance with at least some examples of the present disclosure. Example methods illustrated by Figure 2 may include one or more functions, operations or actions as are illustrated by blocks 205, 210, and/or 215. Processing for the illustrated methods may begin at block 205.
- [028] In block 205, an energy-optimized rate for data transmission in the MIMO mode may be calculated, for example, by a base station in a communications system. Block 205

may be followed by block 210. In block 210, a maximum rate may be selected, for example, by a base station in a communications system, from the energy-optimized rate and a target rate based, at least in part, on an average throughput. Block 210 may be followed by block 215. In block 215, a minimum rate may be selected, for example, by a base station in a communications system, from the maximum rate and a capacity rate of the communications system. The minimum rate selected in the block 215 may then be utilized as the first transmission rate described with reference to Figure 1.

[029] In block 205, an energy-optimized rate for data transmission in the MIMO mode may be calculated, by a device such as a base station in a communications system. Examples of the calculation of the energy-optimized rate have been described above. In some examples, the energy-optimized rate may be used as the first transmission rate used to select the mode. However, in other examples, a different rate may be used, as described further now with reference to Figure 2.

[030] In block 210, a maximum rate may be selected, by a device such as a base station in a communications system, from the energy-optimized rate and a target rate based, at least in part, on an average throughput. One or more receivers or transmitters in the communications system may specify an average throughput for data. In some examples, the average throughput itself may be equivalent to the target rate. In other examples, the target rate may be reduced relative to the average throughput if the data to be transmitted is fault tolerant, such as in examples where data files are transmitted in the communications system. Accordingly, the target rate represents a rate required by a user, transmitter, or receiver, of the communications system. If the energy-optimized rate is less than the target rate, the target rate may instead be used as the first transmission rate in Figure 1. If the energy-optimized rate is greater than the target rate, the energy-optimized rate may be used as the first transmission rate in Figure 1.

[031] Referring again to Figure 2, in block 215, a minimum rate may be selected, by a device such as a base station in a communications system, from the maximum rate selected in block 210 and a capacity rate of the communications system. The capacity rate may represent a maximum feasible transmission rate of the communications system.

Accordingly, if the rate selected in the block 210 is greater than the capacity rate, the capacity rate may be used as the first transmission rate in Figure 1. If the rate selected in the block 210 is less than the capacity rate, the rate selected in the block 210 may be used as the first transmission rate in Figure 1. The capacity rate may be calculated based on parameters of the communications system, including an available power supply, for example.

[032] Figure 3 is a flow diagram illustrating some methods for calculating the second transmission rate for a SIMO mode of a communications system arranged in accordance with at least some examples of the present disclosure. Example methods illustrated by Figure 3 may include one or more functions, operations or actions as are illustrated by blocks 305, 310, and/or 315. Processing for the illustrated methods may begin at block 305.

[033] In block 305, an energy-optimized rate for data transmission in the SIMO mode may be calculated, for example, by a base station in a communications system. Block 305 may be followed by block 310. In block 310, a maximum rate may be selected, for example, by a base station in a communications system, from the energy-optimized rate and a target rate based, at least in part, on an average throughput. Block 310 may be followed by block 315. In block 315, a minimum rate may be selected, for example, by a base station in a communications system, from the maximum rate and a capacity rate of the communications system. The minimum rate selected in the block 315 may then be utilized as the second transmission rate described with reference to Figure 1.

[034] In block 305, an energy-optimized rate for data transmission in the SIMO mode may be calculated, for example, by a base station in a communications system. Examples of the calculation of the energy-optimized rate have been described above. In some examples, the energy-optimized rate may be used as the first transmission rate used to select the mode. However, in other examples, a different rate may be used, as described further now with reference to Figure 3.

[035] In block 310, a maximum rate may be selected, for example, by a base station in a communications system, from the energy-optimized rate and a target rate based, at least in

part, on an average throughput. The target rate has been described above. If the energy-optimized rate for the SIMO mode calculated in the block 305 is less than the target rate, the target rate may instead be used as the first transmission rate in Figure 1. If the energy-optimized rate is greater than the target rate, the energy-optimized rate may be used as the second transmission rate in Figure 1.

[036] Referring again to Figure 3, in block 315, a minimum rate may be selected, for example, by a base station in a communications system, from the maximum rate selected in block 310 and a capacity rate of the communications system. The capacity rate has been described above with reference to Figure 2. If the rate selected in the block 310 is greater than the capacity rate, the capacity rate may be used as the second transmission rate in Figure 1. If the rate selected in the block 310 is less than the capacity rate, the rate selected in the block 310 may be used as the second transmission rate in Figure 1.

[037] Figure 4 is a schematic illustration of some example communications systems arranged in accordance with at least some examples of the present disclosure. The example communications system 400 includes a base station 405 and three mobile stations 410, 415, and 420. The base station 405 is configured to communicate with the mobile stations 410, 415, and 420 over a communications channel 422 represented by a channel matrix $\mathbf{H}$. The base station 405 includes a rate selector 430, which may include a MIMO rate selector 432 and SIMO rate selector 434. Parameter storage 435 may be coupled to the rate selector 430. A mode selector 440 may be coupled to the rate selector 435 and a transmitter 442. The base station 405 may include two antennas 444 and 446 configured to transmit and/or receive over the communications channel 422. A decoder 447 may be coupled to the antennas 444 and 446 and the transmitter 442, and may be further coupled to the parameter storage 435. The mobile station 410 may include two antennas 450 and 452. First circuitry 454 is coupled to the antenna 450 and configured to process signals for transmission by the antenna 450. The first circuitry may include a digital-to-analog converter 455, a filter 456, a mixer 457, a filter 458, and a power amplifier 459. Second circuitry 460 may be coupled to the antenna 452 and configured to process signals for transmission by the antenna 452. The second circuitry 460 may also include a digital-to-

analog converter 461, a filter 462, a mixer 463, a filter 464, and a power amplifier 465. A local oscillator 452 may be coupled to the first circuitry 454 and the second circuitry 460 at the respective mixers 457 and 463. An encoder 470 may be coupled to the first and second circuitry. A controller 475 may be coupled to the encoder 470 and configured to provide a signal to the encoder 470 to operate in a MIMO mode or a SIMO mode. A feedback decoder 477 may be coupled to the controller 475 and one or more of the antennas 450 and 452 and configured to decode received data and provide a signal to the controller 475 corresponding to a selected mode. The mobile stations 415 and 420 may have analogous components to the mobile station 410, which are not shown in Figure 4. Further, blocks used to encode and modulate data for transmission over the communications channel 422 and decode and demodulate data received over the communications channel 422 have not necessarily been shown in Figure 4 to avoid obscuring the components shown and described below.

[038] The base station 405 may be configured to communicate with any number of mobile stations, including the mobile stations 410, 415, and 420 shown in Figure 4. The base station 405 may be configured to transmit data symbols over the communications channel 422 to the base stations 410, 415, and 420. Examples of components of the base station 405 are described further below, however, not all components of the base station 405 may be described. In particular, the base station 405 may include any of a variety of components useful for encoding, decoding, transmitting, and/or receiving over the communications channel including for example encoders, decoders, modulators, demodulators, analog-to-digital converters, digital-to-analog converters, etc.

[039] Any number of antennas may be included at the base station 405, including the antennas 444 and 446. The antennas may be configured to transmit data symbols over the communications channel 422, and receive data symbols over the communications channel. Multiple antennas may be configured to allow for spatial multiplexing, as is generally described above.

[040] The rate selector 430 may be configured to generate a first signal corresponding to a first transmission rate for data in a multiple-input multiple-output mode of the

communications system 400 and a second signal corresponding to a second transmission rate for data in a single-input multiple-output mode of the communications system 400. Accordingly, the rate selector 430 may implement examples of the methods for calculating the first and second transmission rates as described above. The rate selector 430 may be implemented in hardware, software, or combinations thereof, and one or more processing units used to implement the rate selector 430 may, in some examples, be shared with other components of the base station 405 described herein. Although shown in the base station 405, the rate selector 430 may in some embodiments be provided at one or more of the mobile stations 410, 415, and 420. That is, in some examples, when the mobile station may be configured to calculate one or more transmission rates as described above. Generally, when the mobile station is configured to calculate the transmission rates, the mobile station may be provided with information suitable for making the calculation, including, for example, information about the channel 422.

[041] The rate selector 430 may include a MIMO rate selector 432 and a SIMO rate selector 434. Although illustrated separately in Figure 4, the MIMO and SIMO rate selectors may be implemented in some examples using all or portions of the same hardware, software, or combinations thereof. The MIMO rate selector 432 may be configured to calculate the first transmission rate based, at least in part, on an energy-optimized rate for data in the multiple-input-multiple-output mode. The MIMO rate selector 432 may be further configured to calculate the energy-optimized rate.

[042] The SIMO rate selector 434 may be configured to calculate the second transmission rate based, at least in part, on an energy-optimized rate for data in the single-input-multiple-output mode. The SIMO rate selector 434 may be further configured to calculate the energy-optimized rate.

[043] The MIMO and SIMO rate selectors 432 and 434 may accordingly make use of one or multiple parameters of the communications system 400 in calculating the first and second transmission rates, as generally described above, including, but not limited to, idle power consumption of one or more mobile stations, transmission circuitry power consumption of one or more mobile stations, number of users of the communications

system, number of receive antennas at the base station or one or more mobile stations, and variations in the communications channel 422. These parameters may be provided to the rate selector 430, including the MIMO and SIMO rate selectors 432 and 434, in any of a variety of ways, examples of which are described further below.

[044] One or more of the parameters used by the rate selector 430 may be stored in the parameters storage 435. Any type of storage device may be used to implement the parameter storage 435, including any type of electronic memory, which may be integral to or in communication with the base station 405.

[045] Various data or other information associated with a power consumption of the mobile station 410 during an idle time, or other mobile stations in the communications system 400 may be stored in the parameter storage 435. Recall the idle time may include times during which the mobile station 410 is waiting to send data over the communications channel, such as waiting for a scheduled time to begin transmission. Alternatively or in addition to storing information related to the power consumption of the mobile station 410 during an idle time, a signal indicative of the power consumption during an idle time may be provided to the rate selector 430, without necessarily storing the parameter. In some examples, a default value may be stored and may be updated by a communication from the mobile station 410, or other mobile stations, over the communications channel 422. A feedback control channel may be used to carry the updated power consumption information, and it may be received and decoded by the receiver 447, and stored in the parameter storage 435.

[046] Various information associated with power consumption of the circuitry 454 and 460 may be stored in the parameter storage 435. The information may include a rate of power consumption of the circuitry 454 or 460 during the transmission of data over the communications channel. Alternatively or in addition to storing information related to the power consumption of the circuitry 454 or 460, a signal indicative of the power consumption of the circuitry 454 or 460 may be provided to the rate selector 430, without necessarily storing the information. In some examples, a default value may be stored and may be updated by a communication from the mobile station 410, or other mobile stations,

over the communications channel 422. A feedback control channel may be used to carry the updated circuitry power consumption information, and it may be received and decoded by the receiver 447, and stored in the parameter storage 435.

[047] Various data or other information indicating a number of users of the communications system 400 may be stored in the parameter storage 435, and a signal indicative of the number of users may be provided to the rate selector 430. In some examples, the signal may not be provided by the parameter storage 435, and may be provided by another component of the base station 405 (not necessarily shown in Figure 4) that has access to the number of users, such as a component of the base station 405 involved in scheduling user transmission.

[048] A number of receive antennas at the base station is known to the base station, and a signal indicative of the number of antennas may be used by the rate selector 430 in calculating the first and second transmission rates for MIMO and SIMO modes, respectively. A number of antennas at one or more of the mobile stations 410, 415, 420, may communicated to the base station 405 and provided to the rate selector 430. Alternatively or in addition, the number of antennas may be stored in the parameter storage 435.

[049] Channel variations or other channel information used by the rate selector 430 may be stored in the parameter storage 435 in some examples, and may be provided to the rate selector 430 by other components of the base station 405 (not necessarily shown in Figure 4), such as components involved in the generation or analysis of channel state information.

[050] The mode selector 440 may be coupled to the rate selector. The mode selector 440 may be configured to receive the first and second signals indicative of the first and second transmission rates. The mode selector 440 may be configured to select a selected mode from the group consisting of the multiple-input multiple-output mode and the single-input multiple-output mode based, at least in part, on an energy consumption of the first and second transmission rates. The mode selector 440 may be implemented in hardware, software, or combinations thereof, and one or more processing units used to implement the mode selector 440 in some examples may be shared with other components of the base

station 440 described herein. Although the mode selector 440 is shown in Figure 4 in the base station 405, in other examples the mode selector 440 may be implemented in one or more mobile stations, such as the mobile station 410, 415, or 420. The mode selector 440 may be configured to implement examples of methods described above for selecting between the MIMO and SIMO mode. In making the selection, the mode selector 440 may also be provided with one or more signals indicative of parameters of the communications system 400, as generally described above with reference to the rate selector 430. The mode selector 440 may also be configured to identify one of a plurality of transmit antennas at a mobile station to use when SIMO mode is selected. The mode selector 440 may also provide a signal corresponding to the selected mode to the receiver 447.

[051] The transmitter 442 may be coupled to the mode selector 440 and configured to transmit a signal corresponding to the selected mode to one or more of the mobile stations, such as the mobile station 410. In some examples, the transmitter 442 may also be configured to encode data to be transmitted over the communications channel. In some examples, the signal corresponding to the selected mode may be implemented as a bit that may be included in one or more data frames. As mentioned above, the transmission mode may be changed periodically. In some examples, the transmission mode may be selected once for each data frame. In this manner, the transmission mode may be adaptively changed during operation of a communications system.

[052] The transmitter 442 may also be configured to transmit a signal indicative of which of a plurality of transmit antennas at the mobile station to use when the mode is SIMO. For example, the transmitter 442 may be configured to transmit an indication that the antenna 450 at the mobile station 410 should be used to transmit when SIMO mode is selected.

[053] The receiver 447 may be configured to receive and decode data from the communications channel 422. The receiver 447 may be provided with a signal indicative of the selected mode from the mode selector 440. Responsive to the signal, the receiver 447 may change the manner in which received data is decoded. The receiver 447 may thus be dynamically configured to decode received data in a different manner based on whether

the SIMO mode is selected or the MIMO mode is selected. Any suitable strategy for SIMO or MIMO decoding may be implemented by the receiver 447. In some examples, multiple decoders may be included in the base station 405, including one for SIMO decoding and one for MIMO decoding. While in some examples the receiver 447 may implement a decoding method based on a selected mode provided by the mode selector 440, in other examples the receiver 447 may implement a decoding method based on mode information received from one or more mobile stations, such as the mobile station 410. In some examples as will be discussed further below, the mobile station 410 may be configured to override a mode selection received from the mode selector 440, and a different mode may be used to transmit. The receiver 447 may accordingly be dynamically configured to decode data in accordance with a mode indicator received from one or more mobile stations. The receiver 447 may also decode feedback information received from one or more mobile stations, and provide signals to one or more of the parameter storage 435 and/or the rate selector 430.

[054] Any number of mobile stations may generally be configured for communication with the base station 405. Three mobile stations 410, 415, and 420 are shown in Figure 4. Any of a variety of devices may be used as a mobile station, including but not limited to, cellular telephones, laptop computers, desktop computers, and personal digital assistants or other similar computing devices that are configured for MIMO/SIMO communications. A device need not be mobile to be used as a mobile station. Components of all mobile stations are not shown in Figure 4. The mobile station 410 will be described as an example, and the mobile stations 415 and 420 may also include components analogous to those described with reference to the mobile station 410.

[055] The mobile station 410 may be configured to communicate data symbols over the communications channel 422 and receive data symbols over the communications channel 422. While a single communications channel 422 is shown in Figure 4, multiple communications channels may be utilized by the communications system 400. Not all components of the mobile station 410 are shown in Figure 4, and any of a variety of components useful for the sending and receiving of data symbols may be included in the

mobile station 410 including, but not limited to, encoders, decoders, modulators, demodulators, analog-to-digital converters, and digital-to-analog converters.

[056] Circuitry 454 and 460 may be coupled to the antennas 450 and 452, respectively. The circuitry 454 and 460 may be configured to process signals for transmission by the antennas 450 and 452. The circuitry 454 may include a digital-to-analog converter 455, filter 456, mixer 457, filter 458, and power amplifier 459. The circuitry 460 may include a digital-to-analog converter 461, filter 462, mixer 463, filter 464, and power amplifier 465. A local oscillator 466 may be coupled to both the circuitry 454 and 460 at the respective mixers 457 and 463. The power consumption of the circuitry 454 and 460 may be used to calculate the MIMO and SIMO transmission rates, as generally described above. Accordingly, a signal indicative of the power consumption of the circuitry 454 and 460 may in some examples be communicated to the base station 405. In other examples, the base station 405 may determine an approximation of the power consumption of the circuitry 454 and 460.

[057] A feedback decoder 477 may be coupled to the antennas 450 and 452 and configured to decode feedback signals received from the base station 405. The feedback signals may include control signals corresponding to a selected mode, selected rate, selected antenna for use in SIMO mode, or combinations of those, as generally described above. A feedback control channel may be used to communicate the feedback information, and generally any type of feedback control channel may be used, including for example a dedicated or an optional feedback control channel.

[058] A controller 475 may be coupled to the feedback decoder 477 and an encoder 470. The controller 475 may be provided with a signal indicative of the selected mode, selected rate, selected antenna, or combinations thereof. Based on the received signals, the controller may configure the encoder 470 to encode data using the selected mode, selected rate, selected antenna, or combinations thereof. That is, as described above, the base station 405 may be configured to communicate a selected mode of MIMO or SIMO mode to the mobile station 410. If the selected mode is a MIMO mode, the controller 475 may provide a control signal to the encoder 470 to configure the encoder 470 for MIMO

operation using both the antennas 450 and 452. If the selected mode is SIMO mode, the controller 475 may provide a control signal to the encoder 470 to configure the encoder 470 for SIMO operation using either the antenna 450 or 452. In some examples, the controller 475 may not configure the encoder 470 in accordance with the mode selected by the base station 405, but may override that selection based on some other criteria. For example, if a battery power at the mobile station 410 is too low to implement a mode selection made by the base station 405, the controller 475 may implement a different mode. The controller may be implemented in hardware, software, or combinations thereof, and one or more processing units used to implement the controller 475 in some examples may be shared with other components of the mobile station 410.

[059] The encoder 470 may be coupled to the circuitry 454 and 460 and configured to encode data for transmission over the communications channel 422 in accordance with a control signal provided by the controller 475. In particular, the encoder may be dynamically configured to encode data in either a MIMO mode or a SIMO mode. While one encoder is shown in Figure 4, any number may be used, including one for MIMO mode and one for SIMO mode. The encoder 470 may be implemented in hardware, software, or combinations thereof, and one or more processing units used to implement the encoder 470 may be shared with other components of the mobile station 410. Figure 5 is a block diagram illustrating an example computer program product 500 that is arranged to store instructions for selecting a transmission rate and selecting a transmission mode in accordance with at least some examples of the present disclosure. The signal bearing medium 502 which may be implemented as or include a computer-readable medium 506, a recordable medium 508, a communications medium 510, or combinations thereof, stores instructions 504 that may configure one or more processing units to perform all or some of the processes previously described. These instructions may include, for example, one or more executable instructions 511 causing one or more processing units to calculate 511 a first transmission rate for a MIMO mode of a communications system, calculate 515 a second transmission rate for a MIMO mode of a communications system, and select 520 a selected transmission mode from the group consisting of the MIMO and SIMO modes

based, at least in part, on an energy consumption of the first and second transmission rates. The computer program product 500 may be stored at least partially in a base station of the communications system in some examples, and the base station may also execute the programming instructions shown in Figure 5 in some examples.

[060] The present disclosure is not to be limited in terms of the particular examples described in this application, which are intended as illustrations of various aspects. Many modifications and examples can may be made without departing from its spirit and scope, as will be apparent to those skilled in the art. Functionally equivalent methods and apparatuses within the scope of the disclosure, in addition to those enumerated herein, will be apparent to those skilled in the art from the foregoing descriptions. Such modifications and examples are intended to fall within the scope of the appended claims. The present disclosure is to be limited only by the terms of the appended claims, along with the full scope of equivalents to which such claims are entitled. It is to be understood that this disclosure is not limited to particular methods, reagents, compounds compositions or biological systems, which can, of course, vary. It is also to be understood that the terminology used herein is for the purpose of describing particular examples only, and is not intended to be limiting.

[061] With respect to the use of substantially any plural and/or singular terms herein, those having skill in the art can translate from the plural to the singular and/or from the singular to the plural as is appropriate to the context and/or application. The various singular/plural permutations may be expressly set forth herein for sake of clarity.

[062] It will be understood by those within the art that, in general, terms used herein, and especially in the appended claims (e.g., bodies of the appended claims) are generally intended as “open” terms (e.g., the term “including” should be interpreted as “including but not limited to,” the term “having” should be interpreted as “having at least,” the term “includes” should be interpreted as “includes but is not limited to,” etc.).

[063] It will be further understood by those within the art that if a specific number of an introduced claim recitation is intended, such an intent will be explicitly recited in the claim, and in the absence of such recitation no such intent is present. For example, as an

aid to understanding, the following appended claims may contain usage of the introductory phrases “at least one” and “one or more” to introduce claim recitations. However, the use of such phrases should not be construed to imply that the introduction of a claim recitation by the indefinite articles “a” or “an” limits any particular claim containing such introduced claim recitation to examples containing only one such recitation, even when the same claim includes the introductory phrases “one or more” or “at least one” and indefinite articles such as “a” or “an” (e.g., “a” and/or “an” should be interpreted to mean “at least one” or “one or more”); the same holds true for the use of definite articles used to introduce claim recitations. In addition, even if a specific number of an introduced claim recitation is explicitly recited, those skilled in the art will recognize that such recitation should be interpreted to mean at least the recited number (e.g., the bare recitation of “two recitations,” without other modifiers, means at least two recitations, or two or more recitations).

[064] Furthermore, in those instances where a convention analogous to “at least one of A, B, and C, etc.” is used, in general such a construction is intended in the sense one having skill in the art would understand the convention (e.g., “a system having at least one of A, B, and C” would include but not be limited to systems that have A alone, B alone, C alone, A and B together, A and C together, B and C together, and/or A, B, and C together, etc.). In those instances where a convention analogous to “at least one of A, B, or C, etc.” is used, in general such a construction is intended in the sense one having skill in the art would understand the convention (e.g., “a system having at least one of A, B, or C” would include but not be limited to systems that have A alone, B alone, C alone, A and B together, A and C together, B and C together, and/or A, B, and C together, etc.). It will be further understood by those within the art that virtually any disjunctive word and/or phrase presenting two or more alternative terms, whether in the description, claims, or drawings, should be understood to contemplate the possibilities of including one of the terms, either of the terms, or both terms. For example, the phrase “A or B” will be understood to include the possibilities of “A” or “B” or “A and B.”

[065] In addition, where features or aspects of the disclosure are described in terms of Markush groups, those skilled in the art will recognize that the disclosure is also thereby described in terms of any individual member or subgroup of members of the Markush group.

[066] As will be understood by one skilled in the art, for any and all purposes, such as in terms of providing a written description, all ranges disclosed herein also encompass any and all possible subranges and combinations of subranges thereof. Any listed range can be easily recognized as sufficiently describing and enabling the same range being broken down into at least equal halves, thirds, quarters, fifths, tenths, etc. As a non-limiting example, each range discussed herein can be readily broken down into a lower third, middle third and upper third, etc. As will also be understood by one skilled in the art all language such as “up to,” “at least,” “greater than,” “less than,” and the like include the number recited and refer to ranges which can be subsequently broken down into subranges as discussed above. Finally, as will be understood by one skilled in the art, a range includes each individual member. Thus, for example, a group having 1-3 items refers to groups having 1, 2, or 3 items. Similarly, a group having 1-5 items refers to groups having 1, 2, 3, 4, or 5 items, and so forth.

[067] While the foregoing detailed description has set forth various examples of the devices and/or processes via the use of block diagrams, flowcharts, and/or examples, such block diagrams, flowcharts, and/or examples contain one or more functions and/or operations, it will be understood by those within the art that each function and/or operation within such block diagrams, flowcharts, or examples can be implemented, individually and/or collectively, by a wide range of hardware, software, firmware, or virtually any combination thereof. In one example, several portions of the subject matter described herein may be implemented via Application Specific Integrated Circuits (ASICs), Field Programmable Gate Arrays (FPGAs), digital signal processors (DSPs), or other integrated formats. However, those skilled in the art will recognize that some aspects of the examples disclosed herein, in whole or in part, can be equivalently implemented in integrated circuits, as one or more computer programs running on one or more computers (e.g., as one

or more programs running on one or more computer systems), as one or more programs running on one or more processors (e.g., as one or more programs running on one or more microprocessors), as firmware, or as virtually any combination thereof, and that designing the circuitry and/or writing the code for the software and or firmware would be well within the skill of one of skill in the art in light of this disclosure. For example, if a user determines that speed and accuracy are paramount, the user may opt for a mainly hardware and/or firmware vehicle; if flexibility is paramount, the user may opt for a mainly software implementation; or, yet again alternatively, the user may opt for some combination of hardware, software, and/or firmware.

[068] In addition, those skilled in the art will appreciate that the mechanisms of the subject matter described herein are capable of being distributed as a program product in a variety of forms, and that an illustrative example of the subject matter described herein applies regardless of the particular type of signal bearing medium used to actually carry out the distribution. Examples of a signal bearing medium include, but are not limited to, the following: a recordable type medium such as a floppy disk, a hard disk drive, a Compact Disc (CD), a Digital Video Disk (DVD), a digital tape, a computer memory, etc.; and a transmission type medium such as a digital and/or an analog communication medium (e.g., a fiber optic cable, a waveguide, a wired communications link, a wireless communication link, etc.).

[069] Those skilled in the art will recognize that it is common within the art to describe devices and/or processes in the fashion set forth herein, and thereafter use engineering practices to integrate such described devices and/or processes into data processing systems. That is, at least a portion of the devices and/or processes described herein can be integrated into a data processing system via a reasonable amount of experimentation. Those having skill in the art will recognize that a typical data processing system generally includes one or more of a system unit housing, a video display device, a memory such as volatile and non-volatile memory, processors such as microprocessors and digital signal processors, computational entities such as operating systems, drivers, graphical user interfaces, and applications programs, one or more interaction devices, such as a touch pad or screen,

and/or control systems including feedback loops and control motors (e.g., feedback for sensing position and/or velocity; control motors for moving and/or adjusting components and/or quantities). A typical data processing system may be implemented utilizing any suitable commercially available components, such as those typically found in data computing/communication and/or network computing/communication systems.

[070] The herein described subject matter sometimes illustrates different components contained within, or connected with, different other components. It is to be understood that such depicted architectures are merely examples, and that in fact many other architectures can be implemented which achieve the same functionality. In a conceptual sense, any arrangement of components to achieve the same functionality is effectively "associated" such that the desired functionality is achieved. Hence, any two components herein combined to achieve a particular functionality can be seen as "associated with" each other such that the desired functionality is achieved, irrespective of architectures or intermedial components. Likewise, any two components so associated can also be viewed as being "operably connected", or "operably coupled", to each other to achieve the desired functionality, and any two components capable of being so associated can also be viewed as being "operably couplable", to each other to achieve the desired functionality. Specific examples of operably couplable include but are not limited to physically mateable and/or physically interacting components and/or wirelessly interactable and/or wirelessly interacting components and/or logically interacting and/or logically interactable components.

[071] While various aspects and examples have been disclosed herein, other aspects and examples will be apparent to those skilled in the art. The various aspects and examples disclosed herein are for purposes of illustration and are not intended to be limiting, with the true scope and spirit being indicated by the following claims.

CLAIMS

What is claimed is:

1. A method for selecting a transmission mode for a transceiver in a communications system, the method comprising:

calculating a first transmission rate for data in a multiple-input multiple-output (MIMO) mode of the communications system;

calculating a second transmission rate for the data in a single-input multiple-output (SIMO) mode of the communications system; and

selecting the transmission mode based, at least in part, on an energy consumption associated with the first and second transmission rates, wherein the transmission mode corresponds to either the MIMO mode or the SIMO mode.

2. The method of claim 1, further comprising:

transmitting data from the transceiver in the communications system using the selected transmission mode.

3. The method of claim 1, wherein calculating the first transmission rate comprises calculating the first transmission rate based, at least in part, on an energy-optimized rate for data in the MIMO mode.

4. The method of claim 3, wherein the energy-optimized rate is based, at least in part, on a power consumption of circuitry coupled to a plurality of antennas at the transceiver when the communications system is configured to transmit in the MIMO mode.

5. The method of claim 4, wherein the energy-optimized rate is further based, at least in part, on a power consumption of the transceiver during an idle time.

6. The method of claim 3, wherein calculating the first transmission rate comprises selecting a maximum rate from the energy-optimized rate and a target rate,

wherein the target rate is based, at least in part, on an average throughput for the communications system.

7. The method of claim 6, wherein calculating the first transmission rate comprises selecting a minimum rate from the selected rate and a capacity rate for the communications system, wherein the capacity rate is based, at least in part, on a configuration of the communications system.

8. The method of claim 1, wherein calculating the second transmission rate comprises calculating the second transmission rate based, at least in part, on an energy-optimized rate for data in the SIMO mode.

9. The method of claim 8, wherein the energy-optimized rate is based, at least in part, on a power consumption associated with circuitry coupled to a single antenna configured to transmit in the SIMO mode.

10. The method of claim 8, wherein calculating the second transmission rate comprises selecting a maximum rate from the energy-optimized rate and a target rate, wherein the target rate is based, at least in part, on an average throughput for the communications system.

11. The method of claim 10, wherein calculating the second transmission rate comprises selecting a minimum rate from the selected rate and a capacity rate for the communications system, wherein the capacity rate is based, at least in part, on a configuration of the communications system.

12. The method of claim 1, wherein the selected transmission mode is further based, at least in part, on a number of users of the communications system.

13. The method of claim 1, wherein the communications system is configured for communication over a communications channel, and wherein selecting the transmission mode is further based, at least in part, on a correlation in the communications channel.

14. The method of claim 1, wherein selecting the transmission mode is further based, at least in part, on a number of receive antennas in the communications system.

15. The method of claim 1, wherein calculating the first and second transmission rates are performed by a base station.

16. The method of claim 1, further comprising selecting an identity of a single antenna at the transceiver for use in the SIMO mode when the selected transmission mode corresponds to the SIMO mode.

17. A base station for use in communicating over a communications channel, the base station comprising:

a rate selector configured to generate a first signal corresponding to a first transmission rate for data in a multiple-input multiple-output (MIMO) mode of the communications system, wherein the rate selector is further configured to generate a second signal corresponding to a second transmission rate for data in a single-input multiple-output (SIMO) mode of the communications system;

a mode selector coupled to the rate selector, wherein the mode selector is configured to receive the first and second signals, and select a transmission mode based, at least in part, on an energy consumption associated with the first and second transmission rates, wherein the transmission mode corresponds to either the MIMO mode or the SIMO mode; and

a transmitter coupled to the mode selector, wherein the transmitter is configured to transmit a third signal to a transceiver in the communications system, wherein the third signal identifies the selected transmission mode for the transceiver.

18. The base station of claim 17, wherein the rate selector comprises a MIMO rate selector configured to calculate the first transmission rate based, at least in part, on an energy-optimized rate for data in the MIMO mode.

19. The base station of claim 18, wherein the MIMO rate selector is configured to receive a signal indicative of a power consumption of circuitry coupled to a plurality of antennas at the transceiver, and wherein the energy-optimized rate is based, at least in part, on the power consumption of circuitry coupled to the plurality of antennas at the transceiver configured to transmit in the MIMO mode.

20. The base station of claim 19, wherein the MIMO rate selector is further configured to receive a signal indicative a power consumption of the transceiver during an idle time, and wherein the energy-optimized rate is further based, at least in part, on the power consumption of the transceiver during the idle time.

21. The base station of claim 17, wherein the rate selector comprises a SIMO rate selector configured to calculate the second transmission rate based, at least in part, on an energy-optimized rate for data in the SIMO mode.

22. The base station of claim 21, wherein the SIMO rate selector is further configured to receive a signal indicative of a power consumption of circuitry coupled to a single antenna at the transceiver, and wherein the energy-optimized rate is based, at least in part, on the power consumption of the circuitry coupled to the single antenna at the transceiver configured to transmit in the SIMO mode.

23. The base station of claim 17, wherein the mode selector is further configured to receive a signal indicative of a number of users of the communications

system, and wherein the selected mode is further based, at least in part, on the number of users.

24. The base station of claim 17, wherein the communications system is configured for communication over a communications channel, and wherein the mode selector is further configured to select the mode is based, at least in part, on a correlation in the communications channel.

25. The base station of claim 17, wherein the mode selector is further configured to select the selected transmission mode based, at least in part, on a number of receive antennas at the transceiver.

26. The base station of claim 17, wherein, when the selected mode is the SIMO mode, the transmitter is further configured to transmit a fifth signal corresponding to an identity of a single antenna for use in the single-input multiple-output mode.

27. A mobile station for use in a communications system comprising:
a first antenna and a second antenna;
first circuitry coupled to the first antenna and configured to process signals for transmission by the first antenna;
second circuitry coupled to the second antenna and configured to process signals for transmission by the second antenna; and
a controller coupled to the first and second circuitry, wherein the controller is configured to receive a control signal and, in accordance with the control signal, to select between a multiple-input multiple-output (MIMO) mode wherein both the first and second antennas transmit data over a communications channel and a single-input multiple-output (SIMO) mode wherein only one of the first and second antennas transmit data over a communications channel.

28. The mobile station of claim 27, wherein the control signal is based, at least in part, on a power consumption of the first and second circuitry.

29. The mobile station of claim 27, wherein the control signal is based, at least in part, on a number of users of the communications system.

30. The mobile station of claim 27, wherein the control signal is based, at least in part, on a correlation in the communications channel.

31. The mobile station of claim 27, wherein the control signal is based, at least in part, on energy optimized rates for the MIMO mode and the SIMO mode.

32. The mobile station of claim 27, wherein the control signal is based, at least in part, on an idle power consumption of the mobile station.

33. The mobile station of claim 27, wherein the control signal is transmitted to the mobile station by a base station.

ABSTRACT OF THE DISCLOSURE

Examples are generally described that include methods for selecting a transmit mode in a communications system. An example method may include calculating a first transmission rate for data in a multiple-input multiple-output mode of the communications system and calculating a second transmission rate for the data in a single-input multiple-output mode of the communications system. A mode may be selected from the group consisting of the multiple-input multiple-output mode and the single-input multiple-output mode based, at least in part, on an energy consumption of the first and second transmission rates. Data may be transmitted from a transceiver in the communications system using the selected mode.

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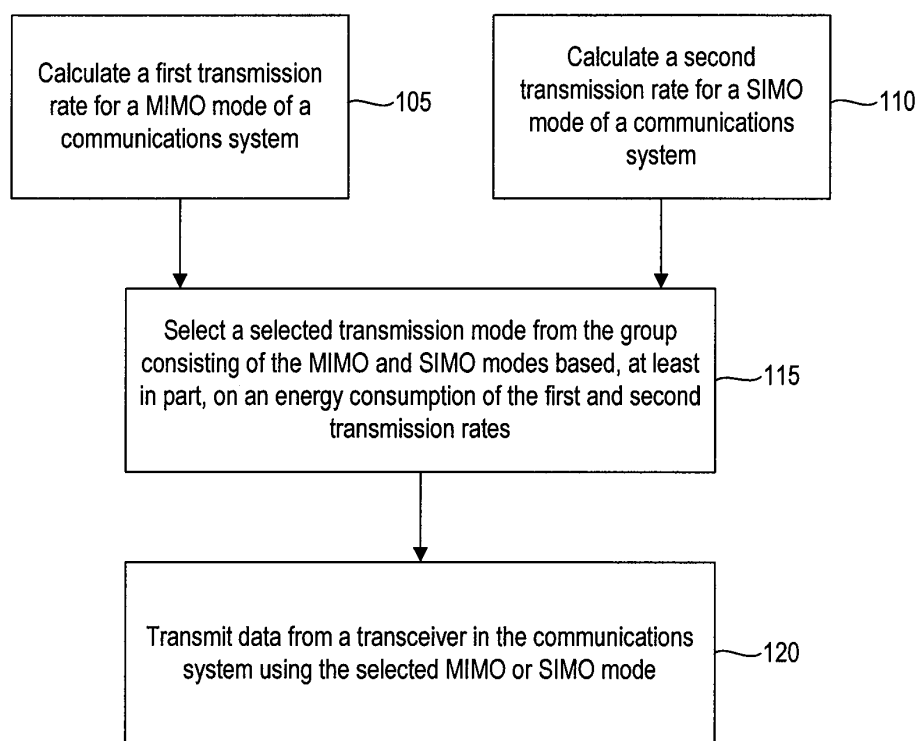


Figure 1

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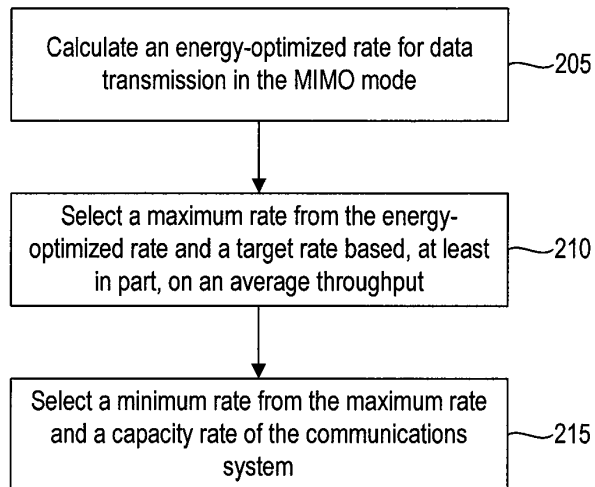


Figure 2

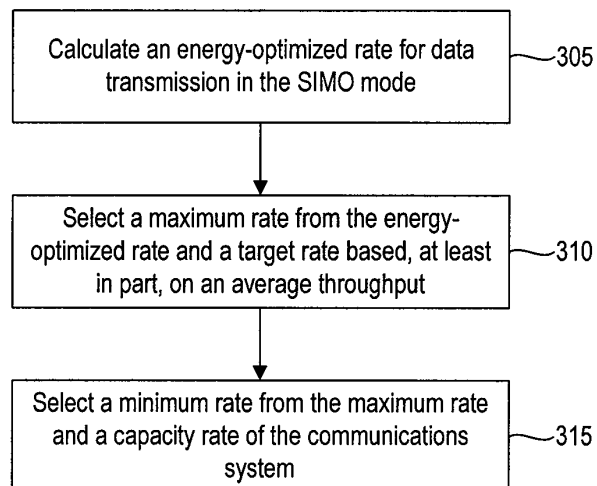


Figure 3

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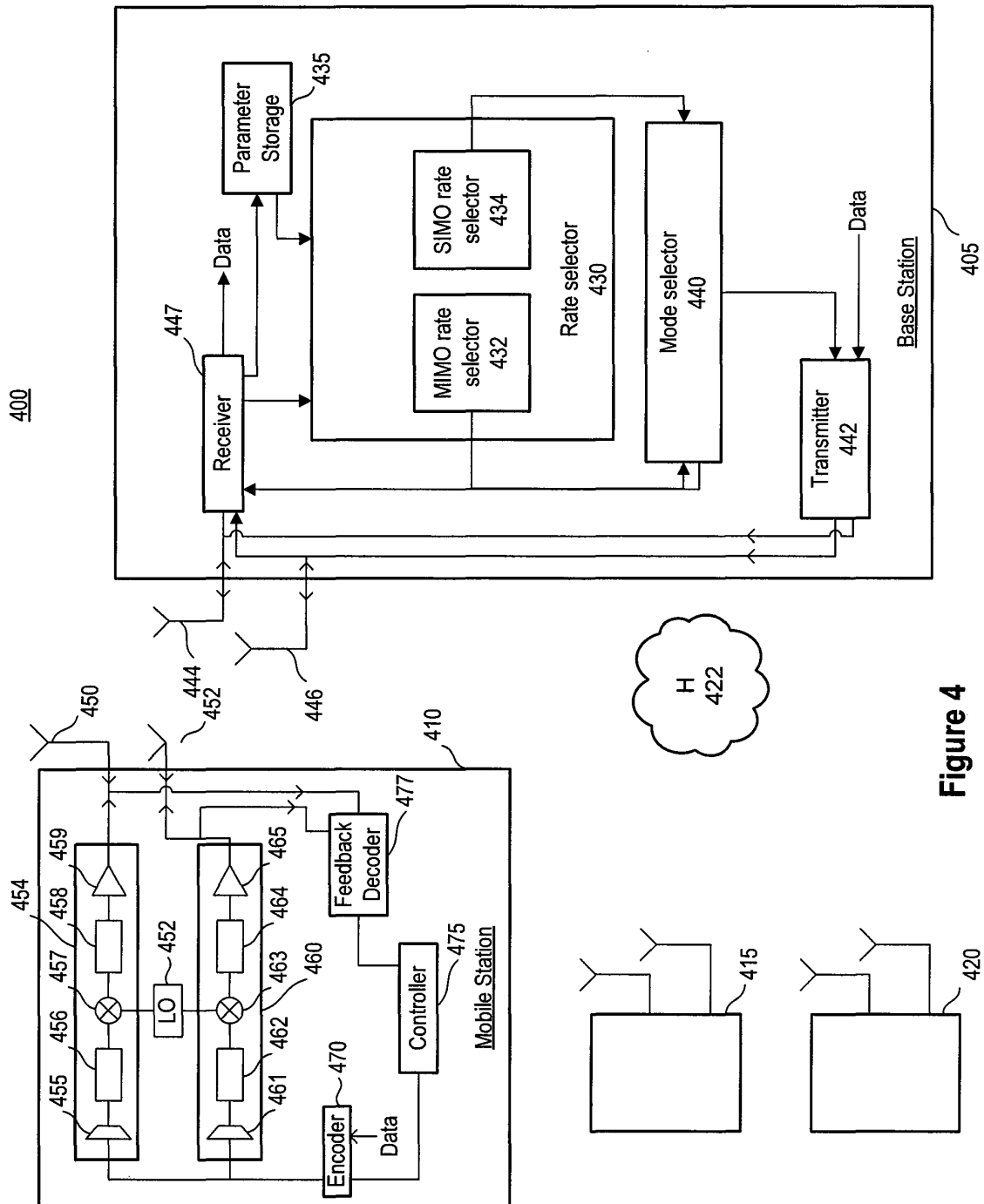


Figure 4

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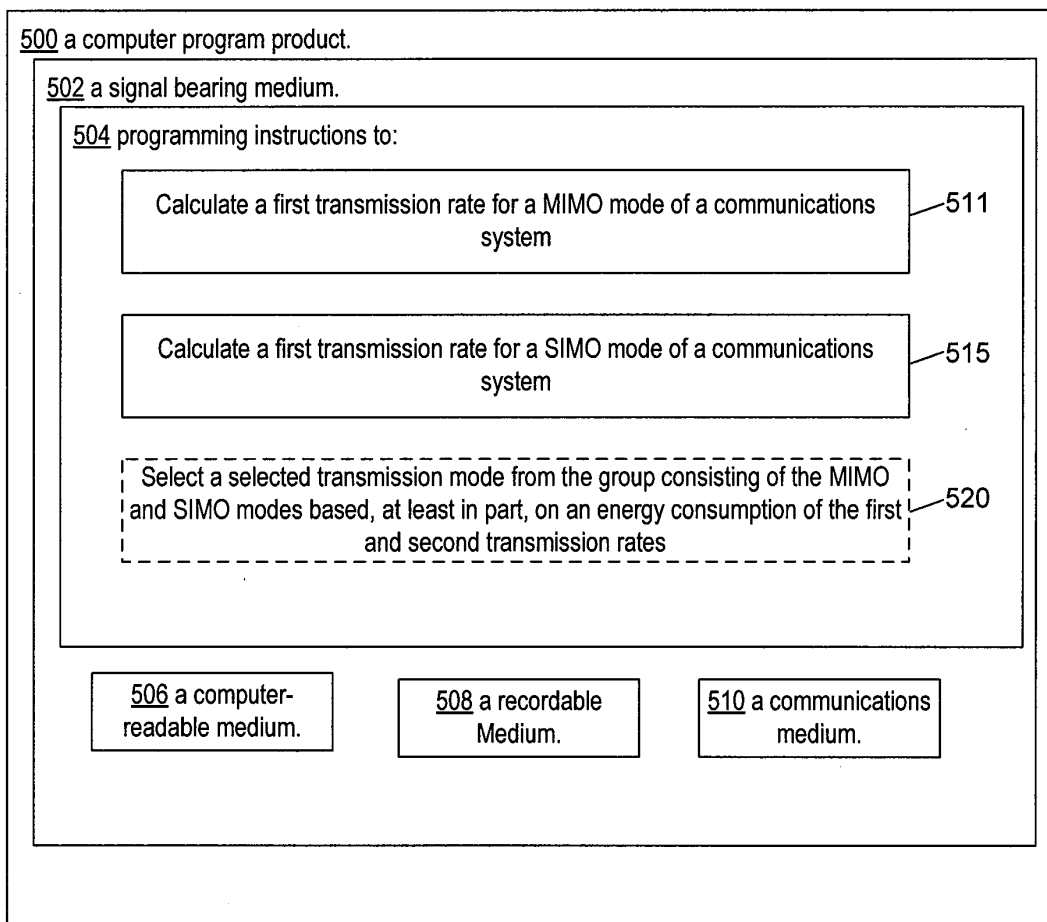


Figure 5

Electronic Acknowledgement Receipt	
EFS ID:	7240672
Application Number:	12727049
International Application Number:	
Confirmation Number:	2452
Title of Invention:	METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION
First Named Inventor/Applicant Name:	Gustavo de Veciana
Customer Number:	27076
Filer:	Jennifer Marie Lane/Alexandra Beggs
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Application Type:	Utility under 35 USC 111(a)

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		215467US01_AppAsFiled_0318 2010.PDF	1701969 5ac1c311ccd0a255c9a5c230c9be4c6227b 2efdd	yes	37

Multipart Description/PDF files in .zip description			
Document Description	Start	End	
Transmittal of New Application	1	1	
Application Data Sheet	2	3	
Specification	4	26	
Claims	27	32	
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Date: 03/18/10

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APPLICATION AS FILED – PART I						
(Column 1)		(Column 2)		SMALL ENTITY		OR
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A		N/A	330
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A		N/A	540
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A		N/A	220
TOTAL CLAIMS (37 CFR 1.16(j))	33	minus 20 = 13	x\$26		x\$52	676
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 = *	x\$110		x\$220	
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$260 (\$130 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR					
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))			195		390	
			TOTAL		TOTAL	1766
* If the difference in column 1 is less than zero, enter "0" in column 2.						
APPLICATION AS AMENDED – PART II						
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR
	Total (37 CFR 1.16(i))	Minus **	=	X =		OR
	Independent (37 CFR 1.16(h))	Minus ***	=	X =		OR
	Application Size Fee (37 CFR 1.16(s))			N/A		OR
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))			TOTAL ADD'T FEE		OR
(Column 1)		(Column 2)		(Column 3)		OR
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR
	Total (37 CFR 1.16(i))	Minus **	=	X =		OR
	Independent (37 CFR 1.16(h))	Minus ***	=	X =		OR
	Application Size Fee (37 CFR 1.16(s))			N/A		OR
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))			TOTAL ADD'T FEE		OR
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". If the "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.						

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO					
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)				<i>Complete if Known</i>	
				Application Number	12/727,049
				Filing Date	Mar 18, 2010
				First Named Inventor	Gustavo de Veciana
				Art Unit	Not Yet Allocated
				Examiner Name	Not Yet Allocated
Sheet	1	of	2	Attorney Docket No: P215467.US.01	

US PATENT DOCUMENTS					
Examiner Initial *	Cite No	Document Number	Publication Date	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No	Foreign Patent Document	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T ²

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
		BORST, S. , "USER-LEVEL PERFORMANCE OF CHANNEL-AWARE SCHEDULING ALGORITHMS IN WIRELESS DATA NETWORKS", <u>Proc. IEEE INFOCOM; Volume 1</u> 04/2003 , 321-331	
		BOUGARD, B. et al., "SMARTMIMO: AN ENERGY-AWARE ADAPTIVE MIMO-OFDM RADIO LINK CONTROL FOR NEXT-GENERATION WIRELESS LOCAL AREA NETWORKS", <u>EURASIP Journal on Wireless Communications and Networking; Volume 2007</u> 2007 , 1-15	
		CATREUX, S. et al., "ADAPTIVE MODULATIONS AND MIMO CODING FOR BROADBAND WIRELESS DATA NETWORKS", <u>IEEE Comm. Mag.; Volume 2</u> 06/2002 , 108-115	
		CHAE, C.-B. et al., "ADAPTIVE SPATIAL MODULATION FOR MIMO-OFDM", <u>Proc. IEEE WCNC</u> 03/2004 , 87-92	
		CUI, S. et al., "CROSS-LAYER ENERGY AND DELAY OPTIMIZATION IN SMALL-SCALE SENSOR NETWORKS", <u>IEEE Trans. Wirelss Comm.; Volume 6</u> 10/2007 , 3688-3699	
		CUI, S. et al., "ENERGY-CONSTRAINED MODULATION OPTIMIZATION", <u>IEEE Trans. Wireless Comm.; Volume 4</u> 09/2005 , 1-11	
		CUI, S. et al., "ENERGY-EFFICIENCY OF MIMO AND COOPERATIVE MIMO TECHNIQUES IN SENSOR NETWORKS", <u>IEEE Jour. Select. Areas in Comm.; Volume 22</u> 08/2004 , 1089-1098	
		FORENZA, A. et al., "ADAPTIVE MIMO TRANSMISSION FOR EXPLOITING THE CAPACITY OF SPATIALLY CORRELATED CHANNELS", <u>IEEE Trans. on Veh. Technol.; Volume 56</u> 03/2007 , 619-630	

EXAMINER

DATE CONSIDERED

Substitute Disclosure Statement Form (PTO-1449)

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.¹ Applicant's unique citation designation number (optional) ² Applicant is to place a check mark here if English language Translation is attached

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Substitute for form 1449A/PTO					
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)				<i>Complete if Known</i>	
				Application Number	12/727,049
				Filing Date	Mar 18, 2010
				First Named Inventor	Gustavo de Veciana
				Art Unit	Not Yet Allocated
				Examiner Name	Not Yet Allocated
Sheet	2	of	2	Attorney Docket No: P215467.US.01	

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS				
Examiner Initials*	Cite No ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²	
		GESBERT, D. et al., "FROM THEORY TO PRACTICE: AN OVERVIEW OF MIMO SPACE-TIME CODED WIRELESS SYSTEMS", <u>IEEE Jour. Select. Areas in Comm.</u> ; Volume 21 04/2003, 281-302		
		HEATH, R. W. et al., "SWITCHING BETWEEN SPATIAL MULTIPLEXING AND TRANSMIT DIVERSITY BASED ON CONSTELLATION DISTANCE", <u>IEEE Trans. Communications</u> ; Volume 53 06/2005, 962-968		
		KIM, H. et al., "ENERGY-EFFICIENT ADAPTIVE MIMO SYSTEMS LEVERAGING DYNAMIC SPARE CAPACITY", <u>Proc. Conference on Information Sciences and Systems (CISS)</u> 03/2008		
		KNOPP, R. et al., "INFORMATION CAPACITY AND POWER CONTROL IN SINGLE-CELL MULTIUSER COMMUNICATIONS", <u>Proc. IEEE Int. Conf. on Comm. (ICC)</u> 1995, 331-335		
		MIAO, G. et al., "ENERGY EFFICIENT DESIGN IN WIRELESS OFDMA", <u>Proc. IEEE Int. Conf. on Comm. (ICC)</u> 05/2008		
		POLLIN, S. et al., "MEERA: CROSS-LAYER METHODOLOGY FOR ENERGY EFFICIENT RESOURCE ALLOCATION IN WIRELESS NETWORKS", <u>IEEE Trans. Wireless Comm</u> ; Volume 6 02/2007, 617-628		
		PRABHAKAR, B. et al., "ENERGY-EFFICIENT TRANSMISSION OVER A WIRELESS LINK VIA LAZY PACKET SCHEDULING", <u>Proc. IEEE INFOCOM</u> ; Volume 1 2001, 386-393		
		RAJAN, D. et al., "DELAY-BOUNDED PACKED SCHEDULING OF BURSTY TRAFFIC OVER WIRELESS CHANNELS", <u>IEEE Trans. Information Theory</u> , Volume 50 2004, 125-144		

EXAMINER

DATE CONSIDERED

Substitute Disclosure Statement Form (PTO-1449)

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional) 2 Applicant is to place a check mark here if English language Translation is attached

Electronic Acknowledgement Receipt	
EFS ID:	7316089
Application Number:	12727049
International Application Number:	
Confirmation Number:	2452
Title of Invention:	METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION
First Named Inventor/Applicant Name:	Gustavo de Veciana
Customer Number:	27076
Filer:	Jennifer Marie Lane/Alexandra Beggs
Filer Authorized By:	Jennifer Marie Lane
Attorney Docket Number:	P215467.US.01
Receipt Date:	30-MAR-2010
Filing Date:	
Time Stamp:	14:53:05
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		215467US01_IDS_03302010. PDF	177627 71fa522173164cee971c962dcc3df8e7bf1fc164	yes	4

	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Transmittal Letter		1	2	
	Information Disclosure Statement (IDS) Filed (SB/08)		3	4	
Warnings:					
Information:					
2	NPL Documents	215467US01_UserLevelPerformance.pdf	274506	no	11
			ddbc263ce185bb857a14a3805e3a9ade267a245		
Warnings:					
Information:					
3	NPL Documents	215467US01_SmartMIMOAnEnergyAware.pdf	1172700	no	15
			7ec179e894f53f5ba63f90bc2900ccd5f984f45		
Warnings:					
Information:					
4	NPL Documents	215467US01_AdaptiveModulationAndMIMO.pdf	122893	no	8
			6470e5cf7a43057eb34b515d54dd096ede4901c9		
Warnings:					
Information:					
5	NPL Documents	215467US01_AdaptiveSpatialModulation.pdf	420401	no	6
			b32a25eebc2bd3d655e3f34e59a5a38e93a0c363		
Warnings:					
Information:					
6	NPL Documents	215467US01_CrossLayerEnergyAndDelay.pdf	306305	no	12
			68b13cba585770c1bf3efecae7e39f21e0b2a94b		
Warnings:					
Information:					
7	NPL Documents	215467US01_EngeryConstrainedMod.pdf	247834	no	11
			dece80fd9cd1264794765cad6b2c5844e456fb		
Warnings:					
Information:					
8	NPL Documents	215467US01_EnergyEfficiencyOfMIMO.pdf	329234	no	10
			e4106972e33a47e94363e6fef9ee0eca2fe9a6c		
Warnings:					
Information:					

9	NPL Documents	215467US01_AdaptiveMIMOTransmission.pdf	1046561 4c6d638456b5f3341f700d61ae3a66e70ba5747e	no	12
Warnings:					
Information:					
10	NPL Documents	215467US01_FromPracticeToTheory.pdf	679082 79157a1369276a6447b3458448f048d47c2f1fd1	no	52
Warnings:					
Information:					
11	NPL Documents	215467US01_SwitchingBetweenDiversity.pdf	267475 77be6046b157be29e63ad40cd65e533e907ccd5	no	7
Warnings:					
Information:					
12	NPL Documents	215467US01_EnergyEfficientAdaptiveMIMOSystems.pdf	251352 898096d07238101cab568915dc44d9a8cc6353b5	no	6
Warnings:					
Information:					
13	NPL Documents	215467US01_EnergyEfficientDesign.pdf	357109 b7dd37e416fb4f3baa8d41d03fd449e897428c6	no	6
Warnings:					
Information:					
14	NPL Documents	215467US01_MEERACrossLayerMethodology.pdf	215157 548142f2c1b7e81ccf6d077751ee645a9610cdee	no	11
Warnings:					
Information:					
15	NPL Documents	215467US01_EnergyEfficientPacket.pdf	246784 ccd3764ce163e46e11cdf1aa637acaf72956e8ea	no	9
Warnings:					
Information:					
16	NPL Documents	215467US01_DelayBoundedPacket.pdf	409271 e61826f93d7d020109420509c74d5f9ab712e1f4	no	21
Warnings:					
Information:					
17	NPL Documents	215467US01_InformationCapacityAndPowerControl.PDF	386814 a4b9f9e27d02aef38eed6010654b1dc7e90c397	no	5
Warnings:					
Information:					

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PATENT

I hereby certify that on the date specified below, this correspondence is being submitted electronically via the USPTO electronic filing system.

March 30, 2010
Date

A. Beggs
Alexandra L. Beggs

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. :	12/727,049	Confirmation No. :	2452
Applicants :	Gustavo de Veciana et al.		
Filed :	March 28, 2010	Attorney Docket No.:	P215467.US.01
Art Unit :	Not Yet Allocated	Customer No. :	27,076
Examiner :	Not Yet Allocated		
Title :	METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION		

INFORMATION DISCLOSURE STATEMENT

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

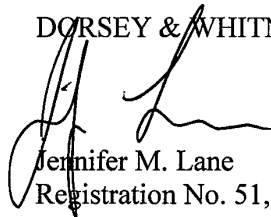
In accordance with 37 C.F.R. §§ 1.56 and 1.97 through 1.98, applicant wishes to make known to the Patent and Trademark Office the references set forth on the attached form PTO-1449. Copies of the cited non-patent literature references, as required under 37 C.F.R. § 1.98(a)(2), are enclosed. Although the aforesaid references are made known to the Patent and Trademark Office in compliance with applicant's duty to disclose all information he is aware of which is believed relevant to the examination of the above-identified application, applicant believes that his invention is patentable.

App. No. 12/727,049

Please acknowledge receipt of this Information Disclosure Statement and kindly make the cited references of record in the above-identified application.

Respectfully submitted,

DORSEY & WHITNEY LLP

A handwritten signature in dark ink, appearing to be 'J. Lane', written over the printed name and registration number.

Jennifer M. Lane
Registration No. 51,916

JML:alb

Enclosures:

Form PTO-1449
Cited References (16)

701 Fifth Avenue, Suite 6100
Seattle, WA 98101-7043
Telephone: (206) 903-8800
Facsimile: (206) 299-9288



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/727,049	03/18/2010	Gustavo de Veciana	P215467.US.01

CONFIRMATION NO. 2452

FORMALITIES LETTER



27076
DORSEY & WHITNEY LLP
INTELLECTUAL PROPERTY DEPARTMENT
Columbia Center
701 Fifth Avenue, Suite 6100
SEATTLE, WA 98104-7043

Date Mailed: 04/08/2010

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
Applicant must submit \$330 to complete the basic filing fee for a non-small entity. If appropriate, applicant may make a written assertion of entitlement to small entity status and pay the small entity filing fee (37 CFR 1.27).
- The oath or declaration is missing.
A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
Note: If a petition under 37 CFR 1.47 is being filed, an oath or declaration in compliance with 37 CFR 1.63 signed by all available joint inventors, or if no inventor is available by a party with sufficient proprietary interest, is required.

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- Additional claim fees of **\$676** as a non-small entity, including any required multiple dependent claim fee, are required. Applicant must submit the additional claim fees or cancel the additional claims for which fees are due.
- To avoid abandonment, a surcharge (for late submission of filing fee, search fee, examination fee or oath or declaration) as set forth in 37 CFR 1.16(f) of **\$130** for a non-small entity, must be submitted with the missing items identified in this notice.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is **\$1896** for a non-small entity

- **\$330** Statutory basic filing fee.
- **\$130** Surcharge.
- The application search fee has not been paid. Applicant must submit **\$540** to complete the search fee.

- The application examination fee has not been paid. Applicant must submit **\$220** to complete the examination fee for a non-small entity.
- Total additional claim fee(s) for this application is **\$676**
 - **\$676** for **13** total claims over 20.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

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For more information about EFS-Web please call the USPTO Electronic Business Center at **1-866-217-9197** or visit our website at <http://www.uspto.gov/ebc>.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

/ebanaybanay/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
12/727,049	03/18/2010		0.00	P215467.US.01	33	3

CONFIRMATION NO. 2452

27076
DORSEY & WHITNEY LLP
INTELLECTUAL PROPERTY DEPARTMENT
Columbia Center
701 Fifth Avenue, Suite 6100
SEATTLE, WA 98104-7043

FILING RECEIPT



OC000000041008285

Date Mailed: 04/08/2010

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Gustavo de Veciana, Austin, TX;
Hongsoek Kim, Hillsboro, OR;
Chan-Byoung Chae, Austin, TX;
Robert W. Heath JR., Austin, TX;

Power of Attorney: None

Domestic Priority data as claimed by applicant

This appln claims benefit of 61/161,166 03/18/2009

Foreign Applications

If Required, Foreign Filing License Granted: 04/07/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/727,049**

Projected Publication Date: To Be Determined - pending completion of Missing Parts

Non-Publication Request: No

Early Publication Request: No

Title

METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION

Preliminary Class**PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER**Title 35, United States Code, Section 184****Title 37, Code of Federal Regulations, 5.11 & 5.15****GRANTED**

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier

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This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

PATENT

I hereby certify that on the date specified below, this correspondence is being submitted electronically via the USPTO electronic filing system.

July 27, 2010
Date

ABeggs
Alexandra L. Beggs

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 12/727,049

Confirmation No. : 2452

Applicants : Gustavo de Veciana et al.

Filed : March 18, 2010

Attorney Docket No.: P215467.US.01

Art Unit : Not yet allocated

Customer No. : 27,076

Examiner : Not yet assigned

Title : METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE
SELECTION

RESPONSE TO NOTICE TO FILE MISSING PARTS OF APPLICATION

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Notice to File Missing Parts dated April 8, 2010, applicants herewith petition the Commissioner for Patents under 37 C.F.R. § 1.136(a)(3) for a 2-month extension of time for filing this response from June 8, 2010, to August 8, 2010. The Commissioner is authorized to charge Deposit Account No. 50-1266 the sum of \$2,386, which includes \$490 to cover the cost of the extension. Any deficiency or overpayment should be charged or credited to Deposit Account No. 50-1266.

Attached is a declaration executed by each inventor, in compliance with 37 C.F.R. 1.63.

Also attached is a General Authorization Under 37 C.F.R. § 1.136(a)(3) and a Supplemental Application Data Sheet.

The fees have been calculated as follows:

Basic Fee	\$ 330
Search Fees	\$ 540
Examination Fees	\$ 220
Total Claims (33, 13 extra)	\$ 676
Independent Claims (3, 0 extra)	\$ 0
Missing Parts Surcharge	\$ 130
Total	\$ 1,896

Respectfully submitted,

DORSEY & WHITNEY LLP



Jennifer M. Lane
Registration No. 51,916

JML:alb

Enclosures:

Declaration
General Authorization
Supplemental Application Data Sheet

701 Fifth Avenue, Suite 6100
Seattle, WA 98104-7043
Tel: (206) 903-8800
Fax: (206) 903-8820

United States Patent Application
DECLARATION UNDER 37 C.F.R. § 1.63

As a below named inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

METHODS AND COMMUNICATION SYSTEMS
HAVING ADAPTIVE MODE SELECTION

The specification of which:

☐ is attached hereto
☒ was filed on March 18, 2010 as United States Patent Application Serial No. 12/727,049

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claim(s), as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose all information which is material to patentability as defined in 37 C.F.R. § 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

PRIORITY CLAIMS

I hereby claim foreign priority benefits under Title 35 U.S.C. § 119(a)-(d) or (f) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT international application(s) which designated at least one country other than the United States of America listed below and have also identified, by checking the box, any foreign application(s) for patent or inventor's certificate or any PCT international application(s) having a filing date before that of the application(s) on which priority is claimed.

☐ no such applications have been filed.
☒ such applications have been filed as follows:

COUNTRY	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER § 119 or § 365
			☐ YES ☐ NO
			☐ YES ☐ NO
			☐ YES ☐ NO
			☐ YES ☐ NO

I hereby claim the benefit under Title 35, United States Code, § 120/365 of any United States and PCT international application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

- ☒ no such applications have been filed.
☐ such applications have been filed as follows:

U.S. APPLICATION NUMBER	DATE OF FILING (day, month, year)	STATUS (patented, pending, abandoned)

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below:

- ☐ no such applications have been filed.
☒ such applications have been filed as follows:

U.S. PROVISIONAL APPLICATION NUMBER	DATE OF FILING (day, month, year)
61/161,166	March 18, 2009

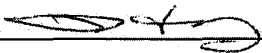
DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Given Name:	<u>Gustavo de Veciana</u>		
Inventor's Signature:	<u><i>Gustavo de Veciana</i></u>	Date	<u>July 7, 2010</u>
Residence:	<u>Austin, TX USA</u>	Citizenship:	<u>US</u>
Mailing Address:	<u>1115 W. 7th St. Apt. 104</u> <u>Austin, TX 78703</u>		
Given Name:	<u>Hongseok Kim</u>		
Inventor's Signature:	_____	Date	_____
Residence:	<u>Chatham, NJ USA</u>	Citizenship:	<u>US</u>
Mailing Address:	<u>25 Hickory Place, F28</u> <u>Chatham, NJ 07928</u>		
Given Name:	<u>Chan-Byoung Chae</u>		
Inventor's Signature:	_____	Date	_____
Residence:	<u>Austin, TX USA</u>	Citizenship:	<u>US</u>
Mailing Address:	<u>11500 Jollyville Rd. #821</u> <u>Austin, TX 78703</u>		

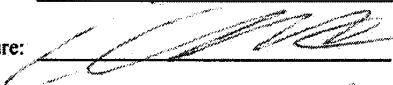
DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Given Name:	<u>Gustavo de Veciana</u>		
Inventor's Signature:	_____	Date	_____
Residence:	<u>Austin, TX USA</u>	Citizenship:	<u>US</u>
Mailing Address:	<u>1115 W. 7th St. Apt. 104</u> <u>Austin, TX 78703</u>		
Given Name:	<u>Hongseok Kim</u>		
Inventor's Signature:		Date	<u>7.20.2010</u>
Residence:	<u>Chatham, NJ USA</u>	Citizenship:	<u>~~US~~ ^{HK} Korea</u>
Mailing Address:	<u>25 Hickory Place, F28</u> <u>Chatham, NJ 07928</u>		
Given Name:	<u>Chan-Byoung Chae</u>		
Inventor's Signature:	_____	Date	_____
Residence:	<u>Austin, TX USA</u>	Citizenship:	<u>US</u>
Mailing Address:	<u>11500 Jollyville Rd. #821</u> <u>Austin, TX 78703</u>		

DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Given Name:	<u>Gustavo de Veciana</u>		
Inventor's Signature:	_____	Date	_____
Residence:	<u>Austin, TX USA</u>	Citizenship:	<u>US</u>
Mailing Address:	<u>1115 W. 7th St. Apt. 104</u> <u>Austin, TX 78703</u>		
Given Name:	<u>Hongseok Kim</u>		
Inventor's Signature:	_____	Date	_____
Residence:	<u>Chatham, NJ USA</u>	Citizenship:	<u>US</u>
Mailing Address:	<u>25 Hickory Place, F28</u> <u>Chatham, NJ 07928</u>		
Given Name:	<u>Chan-Byoung Chae</u>		
Inventor's Signature:		Date	<u>July 12th / 2010</u>
Residence:	<u>Austin, TX USA</u> <u>Jersey City, NJ</u>	Citizenship:	<u>US Korea</u>
Mailing Address:	<u>11500 Jollyville Rd. #821</u> <u>50 Christopher Columbus Dr.</u> #1806 <u>Austin, TX 78703</u> <u>Jersey City, NJ 07302</u>		

Given Name:	<u>Robert W. Heath, Jr.</u>		
Inventor's Signature:		Date	<u>7/7/2010</u>
Residence:	<u>Austin, TX USA</u>	Citizenship:	<u>US</u>
Mailing Address:	<u>2143 Barton Hills Drive</u>		
	<u>Austin, TX 78704-4659</u>		

PATENT

I hereby certify that on the date specified below, this correspondence is being submitted electronically via the USPTO electronic filing system.

Date July 27, 2010 Abeggs
Alexandra L. Beggs

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 12/727,049	Confirmation No. : 2452
Applicants : Gustavo de Veciana et al.	
Filed : March 18, 2010	Attorney Docket No.: P215467.US.01
Art Unit : Not yet allocated	Customer No. : 27,076
Examiner : Not yet assigned	
Title : METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION	

GENERAL AUTHORIZATION UNDER 37 C.F.R. § 1.136(a)(3)

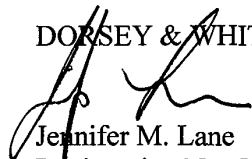
Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

With respect to the above-identified application, the Commissioner is authorized to treat any concurrent or future reply requiring a petition for an extension of time under 37 C.F.R. § 1.136(a)(3) for its timely submission as incorporating a petition therefor for the appropriate length of time. The Commissioner is also authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account No. 50-1266.

Respectfully submitted,

DORSEY & WHITNEY LLP



Jennifer M. Lane
Registration No. 51,916

JML:alb

DORSEY & WHITNEY LLP
701 Fifth Avenue, Suite 6100
Seattle, Washington 98104-7043
(206) 903-8800 (telephone)
(206) 299-9288 (fax)

SUPPLEMENTAL APPLICATION DATA SHEET

Inventor Information

Inventor One Given Name : Gustavo
Family Name : de Veciana
Postal Address Line One : 1115 W. 7th St. Apt. 104
City : Austin
State or Province : Texas
County : Travis
Postal or Zip Code : 78703
City of Residence : Austin
State or Prov. Of Residence : Texas
Country of Residence : United States of America
Citizenship Country : United States of America

Inventor Two Given Name : ~~Hongseek~~ Hongseek
Family Name : Kim
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City : ~~Hillsboro~~ Chatham
State or Province : ~~Oregon~~ New Jersey
County : ~~Washington~~ Morris
Postal or Zip Code : ~~97124~~ 07928
City of Residence : ~~Hillsboro~~ Chatham
State or Prov. Of Residence : ~~Oregon~~ New Jersey
Country of Residence : United States of America
Citizenship Country : ~~United States of America~~ Korea

Inventor Three Given Name : Chan-Byoung
Family Name : Chae
Postal Address Line One : ~~11500 Jollyville Road, #824~~ 50 Christopher Columbus Drive, #1806
City : ~~Austin~~ Jersey City
State or Province : ~~Texas~~ New Jersey
County : ~~Travis~~ Hudson
Postal or Zip Code : ~~78703~~ 07302
City of Residence : ~~Austin~~ Jersey City
State or Prov. Of Residence : ~~Texas~~ New Jersey
Country of Residence : United States of America
Citizenship Country : ~~United States of America~~ Korea

Inventor Four Given Name : Robert W.
Family Name : Heath, Jr.
Postal Address Line One : 2143 Barton Hills Drive
City : Austin
State or Province : Texas
County : Travis
Postal or Zip Code : 78704
City of Residence : Austin
State or Prov. Of Residence : Texas
Country of Residence : United States of America
Citizenship Country : United States of America

Correspondence Information

Customer No. : Address associated with Customer No. 27,076

Application Information

Title : METHODS AND COMMUNICATION SYSTEMS HAVING
ADAPTIVE MODE SELECTION
Total Drawing Sheets : 4
Formal Drawings : YES
Application Type : Utility
Attorney Docket Number : P215467.US.01

Representative Information

Representative Customer No. : 27,076

Priority Information

This application claims priority to

Provisional Application No. : 61/161,166
Filing Date : March 18, 2009

Electronic Patent Application Fee Transmittal				
Application Number:	12727049			
Filing Date:	18-Mar-2010			
Title of Invention:	METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION			
First Named Inventor/Applicant Name:	Gustavo de Veciana			
Filer:	Jennifer Marie Lane/Alexandra Beggs			
Attorney Docket Number:	P215467.US.01			
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Utility application filing	1011	1	330	330
Utility Search Fee	1111	1	540	540
Utility Examination Fee	1311	1	220	220
Pages:				
Claims:				
Claims in excess of 20	1202	13	52	676
Miscellaneous-Filing:				
Late filing fee for oath or declaration	1051	1	130	130

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1896

Electronic Acknowledgement Receipt	
EFS ID:	8097334
Application Number:	12727049
International Application Number:	
Confirmation Number:	2452
Title of Invention:	METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION
First Named Inventor/Applicant Name:	Gustavo de Veciana
Customer Number:	27076
Filer:	Jennifer Marie Lane/Alexandra Beggs
Filer Authorized By:	Jennifer Marie Lane
Attorney Docket Number:	P215467.US.01
Receipt Date:	27-JUL-2010
Filing Date:	18-MAR-2010
Time Stamp:	14:13:43
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$1896
RAM confirmation Number	464
Deposit Account	501266
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		215467US01_MissingPartsResponse_07272010.PDF	390834 eaaadc5f28c1949f5d00ad9227ea65ae20872a736	yes	11

Multipart Description/PDF files in .zip description

Document Description	Start	End
Applicant Response to Pre-Exam Formalities Notice	1	2
Oath or Declaration filed	3	8
Authorization for Extension of Time all replies	9	9
Application Data Sheet	10	11

Warnings:

Information:

2	Fee Worksheet (PTO-875)	fee-info.pdf	38613 c32262eaf85965b0b87b33d4e24b16d8ed59fb82	no	2
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Warnings:

Information:

Total Files Size (in bytes): 429447

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Electronic Acknowledgement Receipt

EFS ID:	8097334
Application Number:	12727049
International Application Number:	
Confirmation Number:	2452
Title of Invention:	METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION
First Named Inventor/Applicant Name:	Gustavo de Veciana
Customer Number:	27076
Filer:	Jennifer Marie Lane/Alexandra Beggs
Filer Authorized By:	Jennifer Marie Lane
Attorney Docket Number:	P215467.US.01
Receipt Date:	27-JUL-2010
Filing Date:	18-MAR-2010
Time Stamp:	14:13:43
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 1896
RAM confirmation Number	464
Deposit Account	501266
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
12/727,049	03/18/2010		1896	P215467.US.01	33	3

CONFIRMATION NO. 2452

UPDATED FILING RECEIPT



OC000000042888422

27076
DORSEY & WHITNEY LLP
INTELLECTUAL PROPERTY DEPARTMENT
Columbia Center
701 Fifth Avenue, Suite 6100
SEATTLE, WA 98104-7043

Date Mailed: 08/05/2010

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Gustavo de Veciana, Austin, TX;
Hongseok Kim, Chatham, NJ;
Chan-Byoung Chae, Jersey City, NJ;
Robert W. Heath JR., Austin, TX;

Power of Attorney: None

Domestic Priority data as claimed by applicant

This appln claims benefit of 61/161,166 03/18/2009

Foreign Applications

If Required, Foreign Filing License Granted: 04/07/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/727,049**

Projected Publication Date: 11/11/2010

Non-Publication Request: No

Early Publication Request: No

Title

METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION

Preliminary Class**PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier

license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/727,049	03/18/2010	Gustavo de Veciana	P215467.US.01

CONFIRMATION NO. 2452

27076
DORSEY & WHITNEY LLP
INTELLECTUAL PROPERTY DEPARTMENT
Columbia Center
701 Fifth Avenue, Suite 6100
SEATTLE, WA 98104-7043

PUBLICATION NOTICE



Title:METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION

Publication No.US-2010-0284449-A1

Publication Date:11/11/2010

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

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The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently <http://pair.uspto.gov/>. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS	Application Number	12/727,049
	Filing Date	March 18, 2010
	First Named Inventor	Gustavo de Veciana
	Title	Methods and Communication Systems Having Adaptive Mode Selection
	Art Unit	Not known
	Examiner Name	Not known
	Attorney Docket Number	P215467.US.01

I hereby revoke all previous powers of attorney given in the above-identified application.

☐ A Power of Attorney is submitted herewith.
OR
☒ I hereby appoint Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith: 27,076

OR
☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified application to:

☒ The address associated with the above-mentioned Customer Number.
OR
☐ The address associated with Customer Number:

OR
☐ Firm or Individual Name

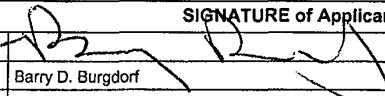
Address

City	State	Zip
Country		
Telephone	Email	

I am the:

☐ Applicant/Inventor.
OR
☒ Assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) (Form PTO/SB/96) submitted herewith or filed on _____

SIGNATURE of Applicant or Assignee of Record

Signature		Date	February 21, 2011
Name	Barry D. Burgdorf	Telephone	(512) 499-4462
Title and Company	Vice Chancellor & General Counsel Board of Regents, The University of Texas System		

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☐ *Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Acknowledgement Receipt	
EFS ID:	9522758
Application Number:	12727049
International Application Number:	
Confirmation Number:	2452
Title of Invention:	METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION
First Named Inventor/Applicant Name:	Gustavo de Veciana
Customer Number:	27076
Filer:	Jennifer Marie Lane/Eric Eaton
Filer Authorized By:	Jennifer Marie Lane
Attorney Docket Number:	P215467.US.01
Receipt Date:	24-FEB-2011
Filing Date:	18-MAR-2010
Time Stamp:	13:00:10
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		P215467US01_POA.pdf	125138	yes	2
			05c6c6fd6a6edcd798d0b0c3c803b6a74ec7f802		

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Assignee showing of ownership per 37 CFR 3.73(b).	1	1
	Power of Attorney	2	2
Warnings:			
Information:			
Total Files Size (in bytes):		125138	
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.			

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Gustavo de Veciana, Hongseok Kim, Chan-Byoung Chae, Robert W. Heath, Jr.

Application No.: 12/727,049 Filed Date: March 18, 2010

Entitled: METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION

The Board of Regents of the University of Texas System, a University
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest; or
2. ☐ an assignee of less than the entire right, title and interest.
(The extent (by percentage) of its ownership interest is _____ %)

in the patent application/patent identified above by virtue of either:

- A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 025021 Frame 0634, or a true copy of the assignment is attached.
- OR
- B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

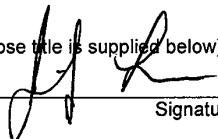
1. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.
2. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.
3. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet.

As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, if the assignment is to be recorded in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.



Signature

Jennifer M. Lane
Printed or Typed Name

Attorney of Record
Title

February 23, 2011

Date

206-903-8800
Telephone Number

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/727,049	03/18/2010	Gustavo de Veciana	P215467.US.01

CONFIRMATION NO. 2452

POA ACCEPTANCE LETTER

27076
DORSEY & WHITNEY LLP
INTELLECTUAL PROPERTY DEPARTMENT
Columbia Center
701 Fifth Avenue, Suite 6100
SEATTLE, WA 98104-7043



Date Mailed: 03/04/2011

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 02/24/2011.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/sleutchit/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Field

PTO/SB/08a (01-10)

Approved for use through 07/31/2012. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12/727,049
	Filing Date		Mar 18, 2010
	First Named Inventor	Gustavo de Veciana	
	Art Unit	2611	
	Examiner Name	Michael R. Neff	
	Attorney Docket Number	P215467.US.01	

U.S.PATENTS								
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear		
U.S.PATENT APPLICATION PUBLICATIONS								
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear		
FOREIGN PATENT DOCUMENTS								
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
NON-PATENT LITERATURE DOCUMENTS								
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.						T ⁵
		CHAE, et al., "Adaptive MIMO Transmission Techniques for Broadband Wireless Communication Systems", IEEE Communication magazine, Volume 48, issue 5, May 2010, Pages 2-9						
		KIM, et al., "A Cross-Layer Approach to Energy Efficiency for Adaptive MIMO Systems Exploiting Spare Capacity", IEEE Transaction on Wireless Communication, Volume 8, No. 8, Aug 2009, Pages 1-29						
		KIM, HONGSEOK et al., "Leveraging Dynamic Spare Capacity in Wireless Systems to Conserve Mobile Terminals' Energy", IEEE/ACM Transaction on Networking, Vol 18, Issue 3, June 2010, 1-14						

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Field

PTO/SB/08a (01-10)

Approved for use through 07/31/2012. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	12/727,049
	Filing Date	Mar 18, 2010
	First Named Inventor	Gustavo de Veciana
	Art Unit	2611
	Examiner Name	Michael R. Neff
	Attorney Docket Number	P215467.US.01

EXAMINER SIGNATURE			
Examiner Signature		Date Considered	
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			
¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.			

Electronic Acknowledgement Receipt	
EFS ID:	12217297
Application Number:	12727049
International Application Number:	
Confirmation Number:	2452
Title of Invention:	METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION
First Named Inventor/Applicant Name:	Gustavo de Veciana
Customer Number:	27076
Filer:	Jennifer Lane Spaith/randi rowe
Filer Authorized By:	Jennifer Lane Spaith
Attorney Docket Number:	P215467.US.01
Receipt Date:	02-MAR-2012
Filing Date:	18-MAR-2010
Time Stamp:	18:53:16
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		P215467US01_IDS_030212.pdf	146046 3e42a25243cc21086b10f19a8db409bb6536cb34	yes	4

Multipart Description/PDF files in .zip description					
Document Description			Start	End	
Transmittal Letter			1	2	
Information Disclosure Statement (IDS) Form (SB08)			3	4	
Warnings:					
Information:					
2	Non Patent Literature	Clair_Ref2_AdaptiveMimoTransmissionTechniques.pdf	510383	no	8
			55e34eec01ffecb2a2d7eccfa1050b892182de		
Warnings:					
Information:					
3	Non Patent Literature	Clair_Ref4_ACrossLayerApproachtoEnergy.pdf	421021	no	29
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Warnings:					
Information:					
4	Non Patent Literature	Clair_Ref3_LeveragingDynamicSpareCapacity_June2010.pdf	1442487	no	14
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Warnings:					
Information:					
Total Files Size (in bytes):			2519937		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	: 12/727,049	Confirmation No.	: 2452
Applicants	: Gustavo de Veciana et al.		
Filed	: March 18, 2010	Attorney Docket No.:	P215467.US.01
Art Unit	: 2611	Customer No.	: 27,076
Examiner	: Michael R. Neff		
Title	: METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION		

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

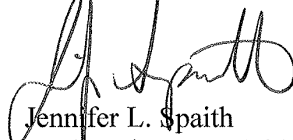
Sir:

In accordance with 37 C.F.R. §§ 1.56 and 1.97 through 1.98, applicants wish to make known to the Patent and Trademark Office the references set forth on the attached form PTO/SB/08. Copies of the cited foreign patent references, as required under 37 C.F.R. § 1.98(a)(2), are attached.

Please acknowledge receipt of this Information Disclosure Statement and kindly make the cited references of record in the above-identified application.

Respectfully submitted,

DORSEY & WHITNEY LLP


Jennifer L. Spaith
Registration No. 51,916

March 2, 2012
Date

JLS:rar

Enclosures:
Form PTO-SB/08

701 Fifth Avenue, Suite 6100
Seattle, WA 98104-7043
Telephone: (206) 903-8800
Facsimile: (206) 299-9288



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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P.O. Box 1450
Alexandria, Virginia 22313-1450
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/727,049	03/18/2010	Gustavo de Veciana	P215467.US.01	2452

27076	7590	10/15/2012
DORSEY & WHITNEY LLP INTELLECTUAL PROPERTY DEPARTMENT Columbia Center 701 Fifth Avenue, Suite 6100 SEATTLE, WA 98104-7043		

EXAMINER	
NEFF, MICHAEL R	

ART UNIT	PAPER NUMBER
2631	

NOTIFICATION DATE	DELIVERY MODE
10/15/2012	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ipdocket-se@dorsey.com
IPDocket_SE@dorsey.foundationip.com
pogson.phoebe@dorsey.com

Office Action Summary	Application No.	Applicant(s)	
	12/727,049	DE VECIANA ET AL.	
	Examiner	Art Unit	
	MICHAEL NEFF	2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on 18 March 2010.

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.

4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5) ☒ Claim(s) 1-33 is/are pending in the application.

5a) Of the above claim(s) ____ is/are withdrawn from consideration.

6) ☐ Claim(s) ____ is/are allowed.

7) ☒ Claim(s) 1-4, 8, 9, 13-15, 17-19, 21, 22, 24, 25, 27, 28, 30, 31 and 33 is/are rejected.

8) ☒ Claim(s) 5-7, 10-12, 16, 20, 23, 26, 29 and 32 is/are objected to.

9) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

10) ☐ The specification is objected to by the Examiner.

11) ☒ The drawing(s) filed on 18 March 2012 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)	4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. ____.
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)	5) ☐ Notice of Informal Patent Application
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>3/30/2010, 3/2/2012</u> .	6) ☐ Other: ____.

DETAILED ACTION

Claim Objections

1. Claims 7 and 11 are objected to because of the following informalities:
 - 1) In claim 7, line 2; the claims states 'selecting a minimum from the selected rate'; however the 'selected rate' would be the maximum rate from claim 6; 'the selected rate' in claim 7 should be amended to read 'the energy-optimized rate'.
 - 2) In claim 11, line 2; the claims states 'selecting a minimum from the selected rate'; however the 'selected rate' would be the maximum rate from claim 10; 'the selected rate' in claim 11 should be amended to read 'the energy-optimized rate'.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1-4, 8, 9, 15, 17-19, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu (US Patent 8,081,698).

Re claim 1, Xu discloses a method for selecting a transmission mode for a transceiver in a communications system, the method comprising:

selecting the transmission mode (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47 'mode selection/switching') based, at least in part, on an energy consumption associated with the first and second transmission rates (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47 'transmission data rate is limited by the power amplifier headroom'), wherein the transmission mode corresponds to either the MIMO mode or the SIMO mode (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47 'SIMO/MIMO switching techniques'); however, Xu does not explicitly state in the disclosure the steps of calculating a first transmission rate for data in a multiple-input multiple-output (MIMO) mode of the communications system; and calculating a second transmission rate for the data in a single-input multiple-output (SIMO) mode of the communications system.

However, while Xu does not state the steps of calculating the transmission rates for the SIMO/MIMO modes, the disclosure of Xu is interpreted to disclose a functional equivalent to this process. In Xu, specifically at (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47), the design for adaptively adjusting a transmitting mode between SIMO and MIMO to achieve the most efficient use of channel resources is discussed. In this discussion, within the above cited portion, Xu discloses the capability to request a threshold data rate, and then by comparing the SIMO/MIMO

capabilities to the requested data rate, chose which mode to proceed with. While Xu discusses many factors being considered, the cited portion states 'The SIMO threshold data rate mat be predetermined and may be changed...the SIMO threshold is determined after running simulation to derive the optimum data rate value to switch from LFDM-SIMO (typo in disclosure but the LFDM relates to SIMO) to OFDM-MIMO'. From this the disclosure is showing the capability to consider the data rate capabilities of the SIMO and MIMO modes, and determine a threshold from which it can be determined which mode keeps the system processing in the most efficient manner.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made that the design as shown by Xu not only disclosed the functional mode switching design between SIMO and MIMO transmissions but that the system also discloses the capability of determining and considered the data rates for the two transmission modes in order to achieve the desired result of performing signal transmission in the most efficient method possible based on the system and the channel environment.

Re claim 2, Xu discloses the method of claim 1, further comprising: transmitting data from the transceiver in the communications system using the selected transmission mode (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47; Figure 12).

Re claim 3, Xu discloses the method of claim 1, wherein calculating the first transmission rate comprises calculating the first transmission rate based, at least in part, on an energy- optimized rate for data in the MIMO mode (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47).

Re claim 4, Xu discloses the method of claim 3, wherein the energy-optimized rate (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47) is based, at least in part, on a power consumption of circuitry (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47) coupled to a plurality of antennas (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47, MIMO) at the transceiver when the communications system is configured to transmit in the MIMO mode (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47).

Re claim 8, Xu discloses the method of claim 1, wherein calculating the second transmission rate comprises calculating the second transmission rate based, at least in part, on an energy- optimized rate for data in the SIMO mode (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47).

Re claim 9, Xu discloses the method of claim 8, wherein the energy-optimized rate is based, at least in part, on a power consumption associated with circuitry coupled to a single antenna configured to transmit in the SIMO mode (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47; Figure 10).

Re claim 15, Xu discloses the method of claim 1, wherein calculating the first and second transmission rates are performed by a base station (Col. 8 lines 16-47; Figure 12).

Re claim 17, Xu discloses a base station (Figure 12) for use in communicating over a communications channel, the base station comprising:

a mode selector (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47) coupled to the rate selector (figure 3 with Col. 8 lines 25-47 'requested data rate'), wherein the mode selector (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47 'mode selection/switching') is configured to receive the first and second signals (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47 'rate request'), and select a transmission mode (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47 'mode selection/switching') based, at least in part, on an energy consumption associated with the first and second transmission rates (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47 'transmission data rate is limited by the power amplifier headroom'), wherein the transmission mode corresponds to either the MIMO mode or the SIMO mode (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47 'SIMO/MIMO switching techniques')

a transmitter (Figure 12 element 1224) coupled to the mode selector (Col. 8 lines 16-47), wherein the transmitter is configured to transmit a third signal (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47; Figure 12) to a transceiver in the communications system Figure 1/12/13), wherein the third signal (col. 2 lines 11-32;

Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47; Figure 12) identifies the selected transmission mode (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47; Figure 12) for the transceiver (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47; Figure 12); however Xu fails to explicitly disclose a rate selector configured to generate a first signal corresponding to a first transmission rate for data in a multiple-input multiple-output (MIMO) mode of the communications system, wherein the rate selector is further configured to generate a second signal corresponding to a second transmission rate for data in a single-input multiple-output (SIMO) mode of the communications system.

However, while Xu does not state the design of a rate selector configured to generate first and second signals corresponding to the calculating of the transmission rates for the SIMO/MIMO modes, the disclosure of Xu is interpreted to disclose a functional equivalent to this process. In Xu, specifically at (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47), the design for adaptively adjusting a transmitting mode between SIMO and MIMO to achieve the most efficient use of channel resources is discussed. In this discussion, within the above cited portion, Xu discloses the capability to request a threshold data rate, and then by comparing the SIMO/MIMO capabilities to the requested data rate, chose which mode to proceed with. While Xu discusses many factors being considered, the cited portion states 'The SIMO threshold data rate mat be predetermined and may be changed...the SIMO threshold is determined after running simulation to derive the optimum data rate value to switch from LFDM-SIMO (typo in disclosure but the LFDM relates to SIMO) to OFDM-MIMO'. From

this the disclosure is showing the capability to consider the data rate capabilities of the SIMO and MIMO modes, and determine a threshold from which it can be determined which mode keeps the system processing in the most efficient manner.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made that the design as shown by Xu not only disclosed the functional mode switching design between SIMO and MIMO transmissions but that the system also discloses the capability of determining and considered the data rates for the two transmission modes in order to achieve the desired result of performing signal transmission in the most efficient method possible based on the system and the channel environment.

Re claim 18, Xu discloses the base station of claim 17, wherein the rate selector comprises a MIMO rate selector configured to calculate the first transmission rate based, at least in part, on an energy-optimized rate for data in the MIMO mode (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47).

Re claim 19, Xu discloses the base station of claim 18, wherein the MIMO rate selector is configured to receive a signal indicative of a power consumption (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47) of circuitry coupled to a plurality of antennas (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47, MIMO) at the transceiver (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47), and wherein the energy-optimized rate (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47) is based, at least in part, on the power

consumption of circuitry coupled to the plurality of antennas (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47) at the transceiver configured to transmit in the MIMO mode (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47).

Re claim 21, Xu discloses the base station of claim 17, wherein the rate selector comprises a SIMO rate selector configured to calculate the second transmission rate based, at least in part, on an energy-optimized rate for data in the SIMO mode (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47).

Re claim 22, Xu discloses the base station of claim 21, wherein the SIMO rate selector is further configured to receive a signal indicative of a power consumption of circuitry (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47) coupled to a single antenna ((col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47; SIMO) at the transceiver (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47), and wherein the energy-optimized rate (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47) is based, at least in part, on the power consumption of the circuitry coupled to the single antenna (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47, SIMO) at the transceiver configured to transmit in the SIMO mode (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47).

5. Claims 27, 28, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu in view of Cui (US Pub “Energy-efficiency of MIMO and cooperative MIMO Techniques in Sensor Networks, see IDS).

Re claim 27, Xu discloses a mobile station (Figure 12 element 1204) for use in a communications system comprising:

a controller coupled to circuitry (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47; Figure 11/12), wherein the controller is configured to receive a control signal (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47) and, in accordance with the control signal (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47), to select between a multiple-input multiple-output (MIMO) mode (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47) wherein both the plurality of antennas transmit data over a communications channel (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47) and a single-input multiple-output (SIMO) mode (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47) wherein only one of the plurality of antennas transmit data over a communications channel (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47); however Xu fails to explicitly disclose wherein the plurality of antenna comprises a first antenna and a second antenna; and wherein the circuitry comprises first circuitry coupled to the first antenna and configured to process signals for transmission by the first antenna; second circuitry coupled to the second antenna and configured to process signals for transmission by the second antenna.

This design is however disclosed by Cui. Cui discloses the design wherein the plurality of antenna comprises a first antenna and a second antenna (Page 3 'Alamouti 2x2' paragraph; Page 8 sections B and C); and wherein the circuitry comprises first circuitry coupled to the first antenna and configured to process signals for transmission

by the first antenna (Page 3 'Alamouti 2x2' paragraph; Page 8 sections B and C; figures 1 and 2 adjusted for the chosen number of transmit antennas); second circuitry coupled to the second antenna and configured to process signals for transmission by the second antenna (Page 3 'Alamouti 2x2' paragraph; Page 8 sections B and C; figures 1 and 2 adjusted for the chosen number of transmit antennas).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the disclosure of Xu in order to incorporate the disclosure of Cui. Cui discloses processing techniques and results in the consideration between SIMO and MIMO system designs, allowing for the determination of the most efficient conditions to use each design mode. As such incorporating these results into the disclosure of Xu would only help achieve a greater level of efficiency when determining when to use the different modes.

Re claim 28, the combined disclosure of Xu and Cui as a whole discloses the mobile station of claim 27, Xu further discloses wherein the control signal is based, at least in part, on a power consumption of the first and second circuitry (col. 2 lines 11-32 and figure 3 with Col. 8 lines 25-47).

Re claim 31, the combined disclosure of Xu and Cui as a whole discloses the mobile station of claim 27, Xu further discloses wherein the control signal is based, at least in part, on energy optimized rates for the MIMO mode and the SIMO mode (col. 2 lines 11-32 and figure 3 with Col. 8 lines 25-47).

Re claim 32, the combined disclosure of Xu and Cui as a whole discloses the mobile station of claim 27, Xu further discloses wherein the control signal is transmitted to the mobile station by a base station (Col. 8 lines 16-47).

6. Claims 13, 14, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu as applied to claims 1 and 17 above and further in view of Gesbert (US Pub 20020056066).

Re claims 13 and 14, Xu discloses the method of claim 1, but fails to explicitly disclose wherein the communications system is configured for communication over a communications channel, and wherein selecting the transmission mode is further based, at least in part, on a correlation in the communications channel as recited in claim 13 and further the method of claim 1, wherein selecting the transmission mode is further based, at least in part, on a number of receive antennas in the communications system as recited in claim 14.

These design elements are however disclosed by Gesbert. Gesbert discloses the design wherein the communications system (Figures 4 and 6) is configured for communication over a communications channel (Figures 4 and 6), and wherein selecting the transmission mode (Paragraphs 63-64) is further based, at least in part, on a correlation in the communications channel (Paragraph 64) and further wherein selecting the transmission mode (Paragraphs 63-64) is further based, at least in part, on a number of receive antennas in the communications system (Paragraph 63).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the disclosure of Xu to incorporate the mode selection techniques as shown in Gesbert, as Gesbert discloses an even more extensive consideration of the system design and channel environments, allowing for more factors effecting the signal processing to be considered and result in an even more efficient mode determination capability.

Re claims 24 and 25, Xu discloses the base station of claim 17, but fails to explicitly disclose wherein the communications system is configured for communication over a communications channel, and wherein the mode selector is further configured to select the mode is based, at least in part, on a correlation in the communications channel as recited in claim 24 and further wherein the mode selector is further configured to select the selected transmission mode based, at least in part, on a number of receive antennas at the transceiver as recited in claim 25.

This design is however disclosed by Gesbert. Gesbert discloses wherein the communications system (Figures 4 and 6) is configured for communication (Figures 4 and 6) over a communications channel (Figures 4 and 6), and wherein the mode selector (Paragraphs 63-64; Fig 6) is further configured to select the mode is based, at least in part, on a correlation in the communications channel (Paragraph 64); and further wherein the mode selector (Paragraphs 63-64; Fig 6) is further configured to select the selected transmission mode (Paragraphs 63-64; Fig 6) based, at least in part, on a number of receive antennas at the transceiver (Paragraph 63).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the disclosure of Xu to incorporate the mode selection techniques as shown in Gesbert, as Gesbert discloses an even more extensive consideration of the system design and channel environments, allowing for more factors effecting the signal processing to be considered and result in an even more efficient mode determination capability.

7. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Xu and Cui as applied to claim 27 above and further in view of Gesbert (US Pub 20020056066).

Re claim 30, the combined disclosure of Xu and Cui as a whole discloses the mobile station of claim 27, but fails to explicitly disclose wherein the control signal is based, at least in part, on a correlation in the communications channel.

This design is however disclosed by Gesbert. Gesbert discloses wherein the control signal is based, at least in part, on a correlation in the communications channel (Figures 4 and 6, Paragraph 64).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the disclosure of Xu to incorporate the mode selection techniques as shown in Gesbert, as Gesbert discloses an even more extensive consideration of the system design and channel environments, allowing for more factors effecting the signal processing to be considered and result in an even more efficient mode determination capability.

Allowable Subject Matter

8. Claims 5-7, 10-12, 16, 20, 26, 29 and 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter: Re claims 5, 20 and 32; the prior art of record fails to anticipate or render obvious the limitations regarding the consideration of power during idle periods in the mode selection processing. Re claims 6 and 10, the prior art of record fails to anticipate or render obvious the limitations regarding the determination and application of each of a maximum and target rate for the MIMO and SIMO modes. Re claims 12, 23 and 29; the prior art of record fails to anticipate or render obvious the limitations regarding the indication of the number of users in the channel environment factoring into the mode selection determination. Re claims 16 and 26, the prior art of record fails to anticipate or render obvious the limitations regarding the specific designation of a specific antenna to function and the SIMO transmitting antenna from the antenna array.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL NEFF whose telephone number is (571)270-1848. The examiner can normally be reached on Monday - Friday 8:00am - 4:30pm EST ALT Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571)272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/MICHAEL R. NEFF/
Examiner, Art Unit 2631

Notice of References Cited	Application/Control No. 12/727,049	Applicant(s)/Patent Under Reexamination DE VECIANA ET AL.	
	Examiner MICHAEL NEFF	Art Unit 2631	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2002/0056066	05-2002	Gesbert et al.	714/759
*	B	US-8,081,698	12-2011	Xu et al.	375/267
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

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<i>Index of Claims</i> 	Application/Control No. 12727049	Applicant(s)/Patent Under Reexamination DE VECIANA ET AL.
	Examiner MICHAEL NEFF	Art Unit 2631

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant			☐ CPA			☐ T.D.			☐ R.1.47		
CLAIM		DATE									
Final	Original	10/05/2012									
	1	✓									
	2	✓									
	3	✓									
	4	✓									
	5	○									
	6	○									
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<i>Search Notes</i> 	Application/Control No. 12727049	Applicant(s)/Patent Under Reexamination DE VECIANA ET AL.
	Examiner MICHAEL NEFF	Art Unit 2631

SEARCHED			
Class	Subclass	Date	Examiner
375	219, 295, 260	10/5/2012	MRN

SEARCH NOTES		
Search Notes	Date	Examiner
Class/subclass search performed with keyword limitations	10/5/2012	MRN
Inventor/double patenting search performed in east database	10/5/2012	MRN
Claims reviewed for 112 and 101 issues	10/5/2012	MRN
Claim language reviewed for minor issues	10/5/2012	MRN

INTERFERENCE SEARCH			
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				Application Number	12/727,049
				Filing Date	Mar 18, 2010
				First Named Inventor	Gustavo de Veciana
				Art Unit	Not Yet Allocated
				Examiner Name	~~Not Yet Allocated~~ Neff
Sheet	1	of	2	Attorney Docket No: P215467.US.01	

US PATENT DOCUMENTS					
Examiner Initial *	Cite No	Document Number	Publication Date	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
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OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS					
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/M.N./		BORST, S. , "USER-LEVEL PERFORMANCE OF CHANNEL-AWARE SCHEDULING ALGORITHMS IN WIRELESS DATA NETWORKS", <u>Proc. IEEE INFOCOM; Volume 1</u> 04/2003 , 321-331			
/M.N./		BOUGARD, B. et al., "SMARTMIMO: AN ENERGY-AWARE ADAPTIVE MIMO-OFDM RADIO LINK CONTROL FOR NEXT-GENERATION WIRELESS LOCAL AREA NETWORKS", <u>EURASIP Journal on Wireless Communications and Networking; Volume 2007</u> 2007 , 1-15			
/M.N./		CATREUX, S. et al., "ADAPTIVE MODULATIONS AND MIMO CODING FOR BROADBAND WIRELESS DATA NETWORKS", <u>IEEE Comm. Mag.; Volume 2</u> 06/2002 , 108-115			
/M.N./		CHAE, C.-B. et al., "ADAPTIVE SPATIAL MODULATION FOR MIMO-OFDM", <u>Proc. IEEE WCNC</u> 03/2004 , 87-92			
/M.N./		CUI, S. et al., "CROSS-LAYER ENERGY AND DELAY OPTIMIZATION IN SMALL-SCALE SENSOR NETWORKS", <u>IEEE Trans. Wirelss Comm.; Volume 6</u> 10/2007 , 3688-3699			
/M.N./		CUI, S. et al., "ENERGY-CONSTRAINED MODULATION OPTIMIZATION", <u>IEEE Trans. Wireless Comm.; Volume 4</u> 09/2005 , 1-11			
/M.N./		CUI, S. et al., "ENERGY-EFFICIENCY OF MIMO AND COOPERATIVE MIMO TECHNIQUES IN SENSOR NETWORKS", <u>IEEE Jour. Select. Areas in Comm.; Volume 22</u> 08/2004 , 1089-1098			
/M.N./		FORENZA, A. et al., "ADAPTIVE MIMO TRANSMISSION FOR EXPLOITING THE CAPACITY OF SPATIALLY CORRELATED CHANNELS", <u>IEEE Trans. on Veh. Technol.; Volume 56</u> 03/2007 , 619-630			

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				Filing Date	Mar 18, 2010
				First Named Inventor	Gustavo de Veciana
				Art Unit	Not Yet Allocated
				Examiner Name	Not Yet Allocated
Sheet	2	of	2	Attorney Docket No: P215467.US.01	

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS				
Examiner Initials*	Cite No ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²	
/M.N./		GESBERT, D. et al., "FROM THEORY TO PRACTICE: AN OVERVIEW OF MIMO SPACE-TIME CODED WIRELESS SYSTEMS", <u>IEEE Jour. Select. Areas in Comm.</u> ; Volume 21 04/2003, 281-302		
/M.N./		HEATH, R. W. et al., "SWITCHING BETWEEN SPATIAL MULTIPLEXING AND TRANSMIT DIVERSITY BASED ON CONSTELLATION DISTANCE", <u>IEEE Trans. Communications</u> ; Volume 53 06/2005, 962-968		
/M.N./		KIM, H. et al., "ENERGY-EFFICIENT ADAPTIVE MIMO SYSTEMS LEVERAGING DYNAMIC SPARE CAPACITY", <u>Proc. Conference on Information Sciences and Systems (CISS)</u> 03/2008		
/M.N./		KNOPP, R. et al., "INFORMATION CAPACITY AND POWER CONTROL IN SINGLE-CELL MULTIUSER COMMUNICATIONS", <u>Proc. IEEE Int. Conf. on Comm. (ICC)</u> 1995, 331-335		
/M.N./		MIAO, G. et al., "ENERGY EFFICIENT DESIGN IN WIRELESS OFDMA", <u>Proc. IEEE Int. Conf. on Comm. (ICC)</u> 05/2008		
/M.N./		POLLIN, S. et al., "MEERA: CROSS-LAYER METHODOLOGY FOR ENERGY EFFICIENT RESOURCE ALLOCATION IN WIRELESS NETWORKS", <u>IEEE Trans. Wireless Comm</u> ; Volume 6 02/2007, 617-628		
/M.N./		PRABHAKAR, B. et al., "ENERGY-EFFICIENT TRANSMISSION OVER A WIRELESS LINK VIA LAZY PACKET SCHEDULING", <u>Proc. IEEE INFOCOM</u> ; Volume 1 2001, 386-393		
/M.N./		RAJAN, D. et al., "DELAY-BOUNDED PACKED SCHEDULING OF BURSTY TRAFFIC OVER WIRELESS CHANNELS", <u>IEEE Trans. Information Theory</u> , Volume 50 2004, 125-144		

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BIB DATA SHEET

CONFIRMATION NO. 2452

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
12/727,049	03/18/2010	375	2631	P215467.US.01		
APPLICANTS Gustavo de Veciana, Austin, TX; Hongseok Kim, Chatham, NJ; Chan-Byoung Chae, Jersey City, NJ; Robert W. Heath JR., Austin, TX; ** CONTINUING DATA ***** This appln claims benefit of 61/161,166 03/18/2009 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 04/07/2010						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and Acknowledged <u>/MICHAEL R NEFF/</u> Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY TX	SHEETS DRAWINGS 4	TOTAL CLAIMS 33	INDEPENDENT CLAIMS 3
ADDRESS DORSEY & WHITNEY LLP INTELLECTUAL PROPERTY DEPARTMENT Columbia Center 701 Fifth Avenue, Suite 6100 SEATTLE, WA 98104-7043 UNITED STATES						
TITLE METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION						
FILING FEE RECEIVED 1896	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit		

Doc code: IDS

PTO/SB/08a (01-10)

Doc description: Information Disclosure Statement (IDS) Field

Approved for use through 07/31/2012. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12/727,049
	Filing Date		Mar 18, 2010
	First Named Inventor	Gustavo de Veciana	
	Art Unit	2611	
	Examiner Name	Michael R. Neff	
Attorney Docket Number		P215467.US.01	

U.S.PATENTS							
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	
U.S.PATENT APPLICATION PUBLICATIONS							
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	
FOREIGN PATENT DOCUMENTS							
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
							T ⁵
NON-PATENT LITERATURE DOCUMENTS							
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.					T ⁵
/M.N./		CHAE, et al., "Adaptive MIMO Transmission Techniques for Broadband Wireless Communication Systems", IEEE Communication magazine, Volume 48, issue 5, May 2010, Pages 2-9					
/M.N./		KIM, et al., "A Cross-Layer Approach to Energy Efficiency for Adaptive MIMO Systems Exploiting Spare Capacity", IEEE Transaction on Wireless Communication, Volume 8, No. 8, Aug 2009, Pages 1-29					
/M.N./		KIM, HONGSEOK et al., "Leveraging Dynamic Spare Capacity in Wireless Systems to Conserve Mobile Terminals' Energy", IEEE/ACM Transaction on Networking, Vol 18, Issue 3, June 2010, 1-14					

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.N./

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Field

PTO/SB/08a (01-10)

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	First Named Inventor	Gustavo de Veciana
	Art Unit	2611
	Examiner Name	Michael R. Neff
	Attorney Docket Number	P215467.US.01

EXAMINER SIGNATURE			
Examiner Signature	/Michael Neff/	Date Considered	10/05/2012
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			
¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.			

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.N./

EAST Search History**EAST Search History (Prior Art)**

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L7	422626	(transmission or data or transmit\$5) near2 rate	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 08:40
L8	3457	L7 with MIMO	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 08:40
L9	400	L7 with (SIMO or (single near2 input))	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 08:40
L10	121	L8 and L9	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 08:40
L11	121	L10	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 08:40
L12	121	L11 and rate	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 08:40
L13	74	12 and (rate with (energy or power or resource))	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 08:40
L15	16	(US-20020056066-\$ or US-20050031044-\$ or US-20090033524-\$ or US-20060274852-\$ or US-20020177447-\$ or US-20030128658-\$ or US-20060039312-\$ or US-20060105761-\$ or US-20070242766-\$ or US-20080095263-\$ or US-20100029320-\$ or US-20100215108-	US- PGPUB; USPAT; EPO	OR	ON	2012/10/05 13:18

		\$.did. or (US-6760882-\$ or US-8081698-\$).did. or (WO-2008055179-\$ or WO-2008058143-\$).did.				
L16	0	15 and idle	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:18
L17	0	15 and idl\$3	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:25
L18	4	15 and ((max or maxim\$5) with rate) and (target with rate)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:26
L19	4	18 and MIMO and SIMO	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:28
L20	11	15 and (number with (user or UE or mobile or MS))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:32
L21	6	15 and (number with (RX or receiv\$4) with antenna)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:39
L22	8	15 and correlat\$5	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:47
L23	0	15 and (mode with correlat\$5)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:47
L24	0	15 and (SIMO with select\$4 with antenna)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:48
L25	3	15 and (SIMO with select\$4 with antenna)	US-PGPUB; USPAT;	OR	ON	2012/10/05 13:48

			FPRS; EPO; JPO; DERWENT			
S1	2	US-20100284449-\$.did.	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:24
S2	2	((DE near2 VECIANA) near2 GUSTAVO).inv.	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:31
S3	12	((KIM) near2 HONGSEOK).inv.	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:32
S4	151	((chae) near2 (chan-byoung)).inv.	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:32
S5	269	((heath) near2 (robert)).inv.	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:32
S6	418	S2 or S3 or S4 or S5	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:33
S7	1	S6 and SIMO.clm.	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:33
S8	18	S6 and SIMO	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:33
S9	18	S8 and MIMO	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:33
S10	18	S9 and rate	US- PGPUB; USPAT;	OR	ON	2012/10/02 09:33

			FPRS; EPO; JPO; DERWENT			
S11	20	S6 and single.clm.	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:41
S12	11	S11 and input.clm.	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:41
S13	11	S12 and multiple.clm.	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:42
S14	89875	((single near2 input) or SI MO)	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 11:06
S15	18691	S14 and ((multiple near2 input) or MIMO)	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 11:06
S16	1685	S15 and (select\$4 same (transmission or transmit\$5) same mode)	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 11:07
S17	1475	S16 and rate	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 11:08
S18	167	S17 and (rate same energy)	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 11:08
S19	15	S18 and (select\$5 same MIMO same SI MO)	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 11:09
S20	3067	375/219.ccls.	US- PGPUB; USPAT;	OR	ON	2012/10/02 12:53

			FPRS; EPO; JPO; DERWENT			
S21	4470	375/295.ccls.	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 12:54
S22	7371	375/260.ccls.	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 12:54
S23	13949	S20 or S21 or S22	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 12:54
S24	283	S23 and SIMO and MIMO	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 12:55
S25	206	S24 and mode	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 12:55
S26	192	S25 and select\$4	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 12:55
S27	97	S25 and (select\$4 with mode)	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 12:56
S28	13	S25 and ((select\$4 with mode) same MIMO same SIMO)	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 12:56
S29	422626	(transmission or data or transmit\$5) near2 rate	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 09:43
S30	3457	S29 with MIMO	US- PGPUB; USPAT;	OR	ON	2012/10/04 09:43

			FPRS; EPO; JPO; DERWENT			
S31	51	S29 with SIMO	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 09:43
S32	400	S29 with (SIMO or (single near2 input))	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 09:44
S33	121	S30 and S32	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 09:44
S34	74	S33 and (rate with (energy or power or resource))	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 09:45
S35	422626	(transmission or data or transmit\$5) near2 rate	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 14:32
S36	3457	S35 with MIMO	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 14:32
S37	400	S35 with (SIMO or (single near2 input))	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 14:32
S38	121	S36 and S37	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 14:32
S39	121	S38	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 14:32
S40	74	S39 and (rate with (energy or power or resource))	US- PGPUB; USPAT;	OR	ON	2012/10/04 14:32

			FPRS; EPO; JPO; DERWENT		
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EAST Search History (Interference)

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/727,049	03/18/2010	Gustavo de Veciana	P215467.US.01	2452
27076 7590 12/19/2012 DORSEY & WHITNEY LLP INTELLECTUAL PROPERTY DEPARTMENT Columbia Center 701 Fifth Avenue, Suite 6100 SEATTLE, WA 98104-7043			EXAMINER NEFF, MICHAEL R	
			ART UNIT 2631	PAPER NUMBER
			NOTIFICATION DATE 12/19/2012	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ipdocket-se@dorsey.com
IPDocket_SE@dorsey.foundationip.com
pogson.phoebe@dorsey.com

<i>Applicant-Initiated Interview Summary</i>	Application No.	Applicant(s)	
	12/727,049	DE VECIANA ET AL.	
	Examiner	Art Unit	
	MICHAEL NEFF	2631	

All participants (applicant, applicant's representative, PTO personnel):

(1) MICHAEL NEFF. (3) ____.

(2) Brandon Hegstrom. (4) ____.

Date of Interview: 10 December 2012.

Type: ☒ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☒ No.
If Yes, brief description: ____.

Issues Discussed ☐101 ☐112 ☐102 ☒103 ☒Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: 1.

Identification of prior art discussed: Xu.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Discussed the application of the Xu reference to the entered claims, and the Examiner's reasoning for the application of the Xu reference with regards to the changing of modes based on energy consumption. A grounds for amendment was discussed, and agreed on, to amend the claims to explicitly state that the power consumption is with regards to the physical transceiver circuitry, not the signal energy. Both sides also agreed that Xu would not be applicable to such an amendment.

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/MICHAEL R. NEFF/ Examiner, Art Unit 2631	
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Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	: 12/727,049	Confirmation No.	: 2452
First Named Inventor	: Gustavo de Veciana		
Filed	: March 18, 2010	Attorney Docket No.:	P215467.US.01
Art Unit	: 2631	Customer No.	: 27,076
Examiner	: Michael R. Neff		
Title	: METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION		

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE UNDER 37 C.F.R. § 1.111

Sir:

Applicant acknowledges receipt of the Office Action dated October 15, 2012.
Please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims which begins on
page 2 of this paper.

Remarks begin on page 8 of this paper.

CLAIM AMENDMENTS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently amended) A method for selecting a transmission mode for a transceiver in a communications system, the method comprising:
calculating a first transmission rate for data in a multiple-input multiple-output (MIMO) mode of the communications system;
calculating a second transmission rate for the data in a single-input multiple-output (SIMO) mode of the communications system; and
selecting the transmission mode based, at least in part, on an energy consumption of the transceiver associated with the first and second transmission rates, wherein the transmission mode corresponds to either the MIMO mode or the SIMO mode.
2. (Original) The method of claim 1, further comprising: transmitting data from the transceiver in the communications system using the selected transmission mode.
3. (Original) The method of claim 1, wherein calculating the first transmission rate comprises calculating the first transmission rate based, at least in part, on an energy-optimized rate for data in the MIMO mode.
4. (Original) The method of claim 3, wherein the energy-optimized rate is based, at least in part, on a power consumption of circuitry coupled to a plurality of antennas at the transceiver when the communications system is configured to transmit in the MIMO mode.
5. (Original) The method of claim 4, wherein the energy-optimized rate is further based, at least in part, on a power consumption of the transceiver during an idle time.
6. (Original) The method of claim 3, wherein calculating the first transmission rate comprises selecting a maximum rate from the energy-optimized rate and a target rate, wherein

the target rate is based, at least in part, on an average throughput for the communications system.

7. (Currently amended) The method of claim 6, wherein calculating the first transmission rate comprises selecting a minimum rate from the selected maximum rate and a capacity rate for the communications system, wherein the capacity rate is based, at least in part, on a configuration of the communications system.

8. (Original) The method of claim 1, wherein calculating the second transmission rate comprises calculating the second transmission rate based, at least in part, on an energy-optimized rate for data in the SIMO mode.

9. (Original) The method of claim 8, wherein the energy-optimized rate is based, at least in part, on a power consumption associated with circuitry coupled to a single antenna configured to transmit in the SIMO mode.

10. (Original) The method of claim 8, wherein calculating the second transmission rate comprises selecting a maximum rate from the energy-optimized rate and a target rate, wherein the target rate is based, at least in part, on an average throughput for the communications system.

11. (Currently amended) The method of claim 10, wherein calculating the second transmission rate comprises selecting a minimum rate from the selected maximum rate and a capacity rate for the communications system, wherein the capacity rate is based, at least in part, on a configuration of the communications system.

12. (Original) The method of claim 1, wherein the selected transmission mode is further based, at least in part, on a number of users of the communications system.

13. (Original) The method of claim 1, wherein the communications system is configured for communication over a communications channel, and wherein selecting the transmission mode is further based, at least in part, on a correlation in the communications channel.

14. (Original) The method of claim 1, wherein selecting the transmission mode is further based, at least in part, on a number of receive antennas in the communications system.

15. (Original) The method of claim 1, wherein calculating the first and second transmission rates are performed by a base station.

16. (Original) The method of claim 1, further comprising selecting an identity of a single antenna at the transceiver for use in the SIMO mode when the selected transmission mode corresponds to the SIMO mode.

17. (Currently amended) A base station for use in communicating over a communications channel, the base station comprising:

a rate selector configured to generate a first signal corresponding to a first transmission rate for data in a multiple-input multiple-output (MIMO) mode of the communications system, wherein the rate selector is further configured to generate a second signal corresponding to a second transmission rate for data in a single-input multiple-output (SIMO) mode of the communications system;

a mode selector coupled to the rate selector, wherein the mode selector is configured to receive the first and second signals, and select a transmission mode based, at least in part, on an energy consumption of a transmitter associated with the first and second transmission rates, wherein the transmission mode corresponds to either the MIMO mode or the SIMO mode; and

the transmitter coupled to the mode selector, wherein the transmitter is configured to transmit a third signal to a transceiver in the communications system, wherein the third signal identifies the selected transmission mode for the transceiver.

18. (Original) The base station of claim 17, wherein the rate selector comprises a MIMO rate selector configured to calculate the first transmission rate based, at least in part, on an energy-optimized rate for data in the MIMO mode.

19. (Original) The base station of claim 18, wherein the MIMO rate selector is configured

to receive a signal indicative of a power consumption of circuitry coupled to a plurality of antennas at the transceiver, and wherein the energy-optimized rate is based, at least in part, on the power consumption of circuitry coupled to the plurality of antennas at the transceiver configured to transmit in the MIMO mode.

20. (Original) The base station of claim 19, wherein the MIMO rate selector is further configured to receive a signal indicative a power consumption of the transceiver during an idle time, and wherein the energy-optimized rate is further based, at least in part, on the power consumption of the transceiver during the idle time.

21. (Original) The base station of claim 17, wherein the rate selector comprises a SIMO rate selector configured to calculate the second transmission rate based, at least in part, on an energy-optimized rate for data in the SIMO mode.

22. (Original) The base station of claim 21, wherein the SIMO rate selector is further configured to receive a signal indicative of a power consumption of circuitry coupled to a single antenna at the transceiver, and wherein the energy-optimized rate is based, at least in part, on the power consumption of the circuitry coupled to the single antenna at the transceiver configured to transmit in the SIMO mode.

23. (Original) The base station of claim 17, wherein the mode selector is further configured to receive a signal indicative of a number of users of the communications system, and wherein the selected mode is further based, at least in part, on the number of users.

24. (Original) The base station of claim 17, wherein the communications system is configured for communication over a communications channel, and wherein the mode selector is further configured to select the mode is based, at least in part, on a correlation in the communications channel.

25. (Original) The base station of claim 17, wherein the mode selector is further configured to select the selected transmission mode based, at least in part, on a number of receive

antennas at the transceiver.

26. (Original) The base station of claim 17, wherein, when the selected mode is the SIMO mode, the transmitter is further configured to transmit a fifth signal corresponding to an identity of a single antenna for use in the single-input multiple-output mode.

27. (Currently amended) A mobile station for use in a communications system comprising:

a first antenna and a second antenna;
first circuitry coupled to the first antenna and configured to process signals for transmission by the first antenna;
second circuitry coupled to the second antenna and configured to process signals for transmission by the second antenna; and
a controller coupled to the first and second circuitry, wherein the controller is configured to receive a control signal and, in accordance with the control signal, to select between a multiple-input multiple-output (MIMO) mode wherein both the first and second antennas transmit data over a communications channel and a single-input multiple-output (SIMO) mode wherein only one of the first and second antennas transmit data over a communications channel, wherein the control signal is based, at least in part, on a power consumption of the first and second circuitry.

28. (Canceled).

29. (Original) The mobile station of claim 27, wherein the control signal is based, at least in part, on a number of users of the communications system.

30. (Original) The mobile station of claim 27, wherein the control signal is based, at least in part, on a correlation in the communications channel.

31. (Original) The mobile station of claim 27, wherein the control signal is based, at least in part, on energy optimized rates for the MIMO mode and the SIMO mode.

32. (Original) The mobile station of claim 27, wherein the control signal is based, at least in part, on an idle power consumption of the mobile station.

33. (Original) The mobile station of claim 27, wherein the control signal is transmitted to the mobile station by a base station.

REMARKS

Status of the Claims

Claim 28 has been canceled without prejudice or disclaimer. Claims 1, 7, 11, 17, and 27 have been amended. No new matter has been added. Claims 1-27 and 29-33 are currently pending.

Office Action

In the Office Action dated October 15, 2012 ("Office Action"), the Examiner objected claims 7 and 11 because of informalities. Claims 1-4, 8, 9, 15, 17-19, 21, and 22 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 8,081,698 to Xu et al. ("Xu"). Claims 27, 28, 31, and 32 were rejected under 35 U.S.C. 103(a) as being unpatentable over Xu in view of non-patent literature reference, "Energy-efficiency of MIMO and cooperative MIMO Techniques in Sensor Networks," to Cui et al. ("Cui"). Claims 13, 14, 24, and 25 were rejected under 35 U.S.C. 103(a) as being unpatentable over Xu as applied to claims 1 and 7 and further in view of U.S. Publication No. 2002/0056066 to Gesbert et al. ("Gesbert"). Claim 30 was rejected under 35 U.S.C. 103(a) as being unpatentable over Xu and Cui as applied to claim 27 and further in view of Gesbert.

Examiner Interview

Applicant thanks Examiner Neff for the Examiner Interview via telephone conference on December 10, 2012. Participants included Examiner Neff and Applicant's representative Brandon Hegstrom. Allowability of amended claim 1 over the Xu reference was discussed. Applicant thanks the Examiner for agreeing that Xu does not disclose "selecting the transmission mode based, at least in part, on an energy consumption of the transceiver associated with the first and second transmission rates, wherein the transmission mode corresponds to either the MIMO mode or the SIMO mode," as in the combination of claim 1.

Claim Objections

The Office has objected to claims 7 and 11, at page 2 of the Office Action due to informalities. Claim 7 has been amended to recite "selecting a minimum rate from the selected maximum rate and a capacity rate for the communications system." Claim 11 has been amended

to recite “selecting a minimum rate from the selected maximum rate and a capacity rate for the communications system.” Applicant respectfully submits that claims 7 and 11, as amended, overcome the objections. Consequently, Applicant respectfully requests withdrawal of the objections.

Claims 1 and 17 are allowable

In the Office Action, the Office has rejected claims 1 and 17 under 35 U.S.C. 103(a) as being unpatentable over Xu. Applicant respectfully traverses the rejections.

Claim 1

Xu does not disclose or suggest the combination of elements of claim 1. For example, Xu does not disclose or suggest “selecting the transmission mode based, at least in part, on an energy consumption of the transceiver associated with the first and second transmission rates, wherein the transmission mode corresponds to either the MIMO mode or the SIMO mode,” as in the combination of claim 1.

Xu describes a method for selecting between an ODFM-MIMO mode (MIMO) and an LFDM-SIMO mode (SIMO). *See* Xu, Abstract. Xu describes. The method in Xu advocates selecting between the MIMO mode and the SIMO mode based on a corresponding link efficiency. *See* Xu, column 2, lines 11-32. Xu also describes switching between the MIMO mode and the SIMO mode based on power spectrum density, SNR, PAR difference between the MIMO mode and the SIMO mode. *See* Xu, column 7, lines 48-56. Xu further describes switching between the MIMO mode and the SIMO mode based on whether a requested data rate exceeds a SIMO threshold data rate. *See* Xu, column 8, lines 25-47. Thus, Xu describes selecting between the MIMO mode and the SIMO mode based on signal quality characteristics. Applicant thanks the examiner for agreeing during the telephone interview that Xu does not disclose or suggest “selecting the transmission mode based, at least in part, on an energy consumption of the transceiver associated with the first and second transmission rates, wherein the transmission mode corresponds to either the MIMO mode or the SIMO mode,” as in the combination of claim 1.

Therefore, Xu does not disclose or suggest the combination of elements of claim 1. Hence, Applicant respectfully requests withdrawal of the 35 U.S.C. § 103(a) rejection.

Claim 17

Xu does not disclose or suggest the combination of elements of claim 17. For example, Xu does not disclose or suggest “a mode selector coupled to the rate selector, wherein the mode selector is configured to receive the first and second signals, and select a transmission mode based, at least in part, on an energy consumption of a transmitter associated with the first and second transmission rates, wherein the transmission mode corresponds to either the MIMO mode or the SIMO mode,” as in the combination of claim 17.

As explained above, Xu describes a method for selecting between an ODFM-MIMO mode (MIMO) and an LFDM-SIMO mode (SIMO) based on signal quality measurements, such as power spectrum density, SNR, PAR difference between the MIMO mode and the SIMO mode, corresponding link efficiency, or whether a requested data rate exceeds a SIMO threshold data rate. *See* Xu, column 2, lines 11-32, column 7, lines 48-56, and column 8, lines 25-47. Applicant thanks the examiner for agreeing that Xu does not disclose or suggest “a mode selector coupled to the rate selector, wherein the mode selector is configured to receive the first and second signals, and select a transmission mode based, at least in part, on an energy consumption of a transmitter associated with the first and second transmission rates, wherein the transmission mode corresponds to either the MIMO mode or the SIMO mode,” as in the combination of claim 17.

Therefore, Xu does not disclose or suggest the combination of elements of claim 17. Hence, Applicant respectfully requests withdrawal of the 35 U.S.C. § 103(a) rejection.

Claim 27 is allowable

In the Office Action, the Office has rejected claim 27 under 35. U.S.C. 103(a) as being unpatentable over Xu in view of Cui. Applicant respectfully traverses the rejections.

Xu and Cui, individually or in combination, do not disclose or suggest the combination of elements of claim 27. For example, Xu and Cui, individually or in combination, do not disclose

or suggest at least “a controller coupled to the first and second circuitry, wherein the controller is configured to receive a control signal and, in accordance with the control signal, to select between a multiple-input multiple-output (MIMO) mode wherein both the first and second antennas transmit data over a communications channel and a single-input multiple-output (SIMO) mode wherein only one of the first and second antennas transmit data over a communications channel, wherein the control signal is based, at least in part, on a power consumption of the first and second circuitry,” as in the combination of claim 27.

As explained above, Xu describes a method for selecting between an ODFM-MIMO mode (MIMO) and an LFDm-SIMO mode (SIMO) based on signal quality measurements, such as power spectrum density, SNR, PAR difference between the MIMO mode and the SIMO mode, corresponding link efficiency, or whether a requested data rate exceeds a SIMO threshold data rate. *See* Xu, column 2, lines 11-32, column 7, lines 48-56, and column 8, lines 25-47. Applicant thanks the examiner for agreeing that Xu does not disclose or suggest “a controller coupled to the first and second circuitry, wherein the controller is configured to receive a control signal and, in accordance with the control signal, to select between a multiple-input multiple-output (MIMO) mode wherein both the first and second antennas transmit data over a communications channel and a single-input multiple-output (SIMO) mode wherein only one of the first and second antennas transmit data over a communications channel, wherein the control signal is based, at least in part, on a power consumption of the first and second circuitry,” as in the combination of claim 27.

Cui does not make up for the deficiency of Xu, nor does the Office rely on Cui in this capacity. Therefore, Xu and Cui, individually or in combination, do not disclose or suggest the combination of elements of claim 27. Hence, Applicant respectfully requests withdrawal of the 35 U.S.C. § 103(a) rejection.

Claims 2-16, 18-26, and 29-33 are Allowable

Claims 2-16, 18-26, and 29-33 depend from and include all recitations of at least one of Applicant’s respective independent claims discussed above. These claims are patentably distinguished over the applied references because of their dependency on patentable independent claims and also because of the additional recitations added by those claims. Applicant has, for

brevity, chosen not to individually discuss additional distinguishing characteristics of the dependent claims. Applicant's silence should not be interpreted as belief that the dependent claims are patentable only by virtue of their dependence on a patentable independent claim. Applicant's silence should not be interpreted as agreement with the Examiner's characterization of the reference.

Moreover, Applicant has chosen not to individually address all references applied by the Examiner to the dependent claims. Applicant's silence should not be interpreted as agreement with the Examiner's characterization of the references or the relevance of the references.

The Examiner is invited to contact the undersigned attorney at the telephone number listed below if such a call would in any way facilitate efficient prosecution of this application.

Respectfully submitted,

DORSEY & WHITNEY LLP



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JANUARY 14, 2012
Date

BPH:ct

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Electronic Acknowledgement Receipt	
EFS ID:	14694795
Application Number:	12727049
International Application Number:	
Confirmation Number:	2452
Title of Invention:	METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION
First Named Inventor/Applicant Name:	Gustavo de Veciana
Customer Number:	27076
Filer:	Brandon Paul. Hegstrom/Cecilia Tri
Filer Authorized By:	Brandon Paul. Hegstrom
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Receipt Date:	14-JAN-2013
Filing Date:	18-MAR-2010
Time Stamp:	17:06:02
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		US-800802-01-US-REG_20120114_Response.pdf	582761 1448b771147e19d44ec1ff632b526b3d4f504c0a	yes	12

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	7
	Applicant Arguments/Remarks Made in an Amendment	8	12
Warnings:			
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<u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.			

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 12/727,049		Filing Date 03/18/2010		☐ To be Mailed	
APPLICATION AS FILED – PART I										
(Column 1)			(Column 2)			SMALL ENTITY ☐ OR		OTHER THAN SMALL ENTITY		
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)			
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A				
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A				
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A				
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =		OR	X \$ =				
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =			X \$ =				
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).									
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
* If the difference in column 1 is less than zero, enter "0" in column 2.										
APPLICATION AS AMENDED – PART II										
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT	01/14/2013	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 32	Minus	** 33	=	X \$ =		OR	X \$62=	
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	=	X \$ =		OR	X \$250=	
☐ Application Size Fee (37 CFR 1.16(s))										
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0	
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =		OR	X \$ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =		OR	X \$ =	
☐ Application Size Fee (37 CFR 1.16(s))										
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE		
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.										
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".										
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 12/727,049		Filing Date 03/18/2010		☐ To be Mailed		
APPLICATION AS FILED – PART I											
(Column 1)			(Column 2)			SMALL ENTITY ☐ OR		OTHER THAN SMALL ENTITY			
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)				
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A					
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A					
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A					
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =			X \$ =					
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =			X \$ =					
☐ APPLICATION SIZE FEE (37 CFR 1.16(s)) If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).					OR						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					OR						
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL					
APPLICATION AS AMENDED – PART II											
(Column 1)			(Column 2)			(Column 3)		SMALL ENTITY OR		OTHER THAN SMALL ENTITY	
AMENDMENT	01/14/2013	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	* 32	Minus	** 33	= 0	X \$ =		OR	X \$62=	0	
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X \$ =		OR	X \$250=	0	
	☐ Application Size Fee (37 CFR 1.16(s))							OR			
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR			
						TOTAL ADD'L FEE			TOTAL ADD'L FEE		0
AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)			
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =		OR	X \$ =		
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =		OR	X \$ =		
	☐ Application Size Fee (37 CFR 1.16(s))							OR			
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR			
						TOTAL ADD'L FEE			TOTAL ADD'L FEE		
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.											

 Legal Instrument Examiner:
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/727,049	03/18/2010	Gustavo de Veciana	P215467.US.01	2452
27076 7590 04/10/2013 DORSEY & WHITNEY LLP INTELLECTUAL PROPERTY DEPARTMENT Columbia Center 701 Fifth Avenue, Suite 6100 SEATTLE, WA 98104-7043			EXAMINER NEFF, MICHAEL R	
			ART UNIT 2631	PAPER NUMBER
			NOTIFICATION DATE 04/10/2013	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ipdocket-se@dorsey.com
IPDocket_SE@dorsey.foundationip.com
warren.heather@dorsey.com

Office Action Summary	Application No.		Applicant(s)	
	12/727,049		DE VECIANA ET AL.	
	Examiner		Art Unit	
	MICHAEL NEFF		2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on 14 January 2013.

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.

4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5) ☒ Claim(s) 1-27 and 29-33 is/are pending in the application.

5a) Of the above claim(s) ____ is/are withdrawn from consideration.

6) ☐ Claim(s) ____ is/are allowed.

7) ☒ Claim(s) 1-4, 8, 9, 13-15, 17-19, 21, 22, 24, 25, 27, 30, 31 and 33 is/are rejected.

8) ☒ Claim(s) 5-7, 10-12, 16, 20, 23, 26, 29, 32 is/are objected to.

9) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10) ☐ The specification is objected to by the Examiner.

11) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some * c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. ____.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date ____.

3) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.

4) ☐ Other: ____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see remarks, filed 1/14/2013, with respect to the rejection of claim limitations found in cancelled (and amended into the independent claims) claim 28 under Xu have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Bougard.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-4, 8, 9, 15, 17-19, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu (US Patent 8,081,698) in view of Bougard (US Patent 8140023).

Re claim 1, Xu discloses a method for selecting a transmission mode for a transceiver in a communications system, the method comprising:

selecting the transmission mode (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47 'mode selection/switching') based, at least in part, on an energy consumption associated with the first and second transmission rates (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47 'transmission data rate is limited by the power amplifier headroom'), wherein the transmission mode corresponds to either the MIMO mode or the SIMO mode (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47 'SIMO/MIMO switching techniques'); however, Xu does not explicitly state

in the disclosure (1) the steps of calculating a first transmission rate for data in a multiple-input multiple-output (MIMO) mode of the communications system; and calculating a second transmission rate for the data in a single-input multiple-output (SIMO) mode of the communications system; and (2) wherein selecting the transmission mode based, at least in part, on an energy consumption of the transceiver associated with the first and second transmission rates.

Regarding item (1) above, however, while Xu does not state the steps of calculating the transmission rates for the SIMO/MIMO modes, the disclosure of Xu is interpreted to disclose a functional equivalent to this process. In Xu, specifically at (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47), the design for adaptively adjusting a transmitting mode between SIMO and MIMO to achieve the most efficient use of channel resources is discussed. In this discussion, within the above cited portion, Xu discloses the capability to request a threshold data rate, and then by comparing the SIMO/MIMO capabilities to the requested data rate, chose which mode to proceed with. While Xu discusses many factors being considered, the cited portion states 'The SIMO threshold data rate mat be predetermined and may be changed...the SIMO threshold is determined after running simulation to derive the optimum data rate value to switch from LFDM-SIMO (typo in disclosure but the LFDM relates to SIMO) to OFDM-MIMO'. From this the disclosure is showing the capability to consider the data rate capabilities of the SIMO and MIMO modes, and determine a threshold from which it can be determined which mode keeps the system processing in the most efficient manner.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made that the design as shown by Xu not only disclosed the functional mode switching design between SIMO and MIMO transmissions but that the system also discloses the capability of determining and considered the data rates for the two transmission modes in order to achieve the desired result of performing signal transmission in the most efficient method possible based on the system and the channel environment.

Regarding item (2) above, this design is however disclosed by Bougard. Bougard discloses wherein selecting the transmission mode (Col. 3 lines 22-26, 32-53; Col. 9 line 52-Col. 10 line 11) based, at least in part, on an energy consumption of the transceiver (Col. 3 lines 22-26, 32-53; Col. 9 line 52-Col. 10 line 11) associated with the first and second transmission rates (Col. 3 lines 22-26, 32-53; Col. 9 line 52-Col. 10 line 11).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the disclosure of Xu in order to incorporate the energy consumption consideration techniques as shown in Bougard in order to allow for the consideration of energy efficiency of the hardware in the selection processing designs.

Re claim 2, the combined disclosure of Xu and Bougard as a whole discloses the method of claim 1, Xu further discloses further comprising: transmitting data from the transceiver in the communications system using the

selected transmission mode (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47; Figure 12).

Re claim 3, the combined disclosure of Xu and Bougard as a whole discloses the method of claim 1, Xu further discloses wherein calculating the first transmission rate comprises calculating the first transmission rate based, at least in part, on an energy- optimized rate for data in the MIMO mode (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47).

Re claim 4, the combined disclosure of Xu and Bougard as a whole discloses the method of claim 1, Xu further discloses wherein the energy- optimized rate (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47) is based, at least in part, on a power consumption (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47) coupled to a plurality of antennas (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47, MIMO) at the transceiver when the communications system is configured to transmit in the MIMO mode (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47); while Bougard shows that the consumption consideration is based on the circuitry consumption (Col. 3 lines 22-26, 32-53; Col. 9 line 52-Col. 10 line 11).

Re claim 8, the combined disclosure of Xu and Bougard as a whole discloses the method of claim 1, Xu further discloses wherein calculating the second transmission rate comprises calculating the second transmission rate

based, at least in part, on an energy- optimized rate for data in the SIMO mode (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47).

Re claim 9, the combined disclosure of Xu discloses the method of claim 8, wherein the energy-optimized rate is based, at least in part, on a power consumption coupled to a single antenna configured to transmit in the SIMO mode (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47; Figure 10), while Bougard shows that the consumption consideration is based on the circuitry consumption (Col. 3 lines 22-26, 32-53; Col. 9 line 52-Col. 10 line 11).

Re claim 15, the combined disclosure of Xu and Bougard as a whole discloses the method of claim 1, Xu further discloses wherein calculating the first and second transmission rates are performed by a base station (Col. 8 lines 16-47; Figure 12).

Re claim 17, Xu discloses a base station (Figure 12) for use in communicating over a communications channel, the base station comprising:

a mode selector (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47) coupled to the rate selector (figure 3 with Col. 8 lines 25-47 'requested data rate'), wherein the mode selector (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47 'mode selection/switching') is configured to receive the first and second signals (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47 'rate request'), and select a

transmission mode (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47 'mode selection/switching') based, at least in part, on an energy consumption associated with the first and second transmission rates (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47 'transmission data rate is limited by the power amplifier headroom'), wherein the transmission mode corresponds to either the MIMO mode or the SIMO mode (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47 'SIMO/MIMO switching techniques')

a transmitter (Figure 12 element 1224) coupled to the mode selector (Col. 8 lines 16-47), wherein the transmitter is configured to transmit a third signal (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47; Figure 12) to a transceiver in the communications system Figure 1/12/13), wherein the third signal (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47; Figure 12) identifies the selected transmission mode (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47; Figure 12) for the transceiver (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47; Figure 12); however Xu fails to explicitly disclose (1) a rate selector configured to generate a first signal corresponding to a first transmission rate for data in a multiple-input multiple-output (MIMO) mode of the communications system, wherein the rate selector is further configured to generate a second signal corresponding to a second transmission rate for data in a single-input multiple-output (SIMO) mode of the communications system; and (2) wherein selecting

the transmission mode based, at least in part, on an energy consumption of the transmitter associated with the first and second transmission rates.

Regarding item (1) above, however, while Xu does not state the design of a rate selector configured to generate first and second signals corresponding to the calculating of the transmission rates for the SIMO/MIMO modes, the disclosure of Xu is interpreted to disclose a functional equivalent to this process. In Xu, specifically at (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47), the design for adaptively adjusting a transmitting mode between SIMO and MIMO to achieve the most efficient use of channel resources is discussed. In this discussion, within the above cited portion, Xu discloses the capability to request a threshold data rate, and then by comparing the SIMO/MIMO capabilities to the requested data rate, chose which mode to proceed with. While Xu discusses many factors being considered, the cited portion states 'The SIMO threshold data rate mat be predetermined and may be changed...the SIMO threshold is determined after running simulation to derive the optimum data rate value to switch from LFDM-SIMO (typo in disclosure but the LFDM relates to SIMO) to OFDM-MIMO'. From this the disclosure is showing the capability to consider the data rate capabilities of the SIMO and MIMO modes, and determine a threshold from which it can be determined which mode keeps the system processing in the most efficient manner.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made that the design as shown by Xu not only disclosed the functional mode switching design between SIMO and MIMO

transmissions but that the system also discloses the capability of determining and considered the data rates for the two transmission modes in order to achieve the desired result of performing signal transmission in the most efficient method possible based on the system and the channel environment.

Regarding item (2) above, this design is however disclosed by Bougard. Bougard discloses wherein selecting the transmission mode (Col. 3 lines 22-26, 32-53; Col. 9 line 52-Col. 10 line 11) based, at least in part, on an energy consumption of the transceiver (Col. 3 lines 22-26, 32-53; Col. 9 line 52-Col. 10 line 11) associated with the first and second transmission rates (Col. 3 lines 22-26, 32-53; Col. 9 line 52-Col. 10 line 11).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the disclosure of Xu in order to incorporate the energy consumption consideration techniques as shown in Bougard in order to allow for the consideration of energy efficiency of the hardware in the selection processing designs.

Re claim 18, the combined disclosure of Xu and Bougard as a whole discloses the base station of claim 17, Xu further discloses wherein the rate selector comprises a MIMO rate selector configured to calculate the first transmission rate based, at least in part, on an energy-optimized rate for data in the MIMO mode (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47).

Re claim 19, the combined disclosure of Xu and Bougard as a whole discloses the base station of claim 17, Xu further discloses wherein the MIMO rate selector is configured to receive a signal indicative of a power consumption (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47) coupled to a plurality of antennas (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47, MIMO) at the transceiver (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47), and wherein the energy-optimized rate (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47) is based, at least in part, on the power consumption coupled to the plurality of antennas (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47) at the transceiver configured to transmit in the MIMO mode (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47); while Bougard shows that the consumption consideration is based on the circuitry consumption (Col. 3 lines 22-26, 32-53; Col. 9 line 52-Col. 10 line 11).

Re claim 21, the combined disclosure of Xu and Bougard as a whole discloses the base station of claim 17, Xu further discloses wherein the rate selector comprises a SIMO rate selector configured to calculate the second transmission rate based, at least in part, on an energy-optimized rate for data in the SIMO mode (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47).

Re claim 22, the combined disclosure of Xu and Bougard as a whole discloses the base station of claim 21, Xu further discloses wherein the SIMO rate selector is further configured to receive a signal indicative of a power

consumption (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47) coupled to a single antenna ((col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47; SIMO) at the transceiver (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47), and wherein the energy-optimized rate (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47) is based, at least in part, on the power consumption coupled to the single antenna (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47, SIMO) at the transceiver configured to transmit in the SIMO mode (col. 2 lines 11-32; figure 3 with Col. 8 lines 25-47); while Bougard shows that the consumption consideration is based on the circuitry consumption (Col. 3 lines 22-26, 32-53; Col. 9 line 52-Col. 10 line 11).

4. Claims 27, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu in view of Cui (US Pub “Energy-efficiency of MIMO and cooperative MIMO Techniques in Sensor Networks, see IDS) and Bougard (US Patent 8140023).

Re claim 27, Xu discloses a mobile station (Figure 12 element 1204) for use in a communications system comprising:

a controller coupled to circuitry (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47; Figure 11/12), wherein the controller is configured to receive a control signal (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47) and, in accordance with the control signal (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47), to select between a multiple-input multiple-output (MIMO) mode (col. 2 lines 11-32; Col. 7

lines 48-56; and figure 3 with Col. 8 lines 25-47) wherein both the plurality of antennas transmit data over a communications channel (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47) and a single-input multiple-output (SIMO) mode (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47) wherein only one of the plurality of antennas transmit data over a communications channel (col. 2 lines 11-32; Col. 7 lines 48-56; and figure 3 with Col. 8 lines 25-47); however Xu fails to explicitly disclose (1) wherein the plurality of antenna comprises a first antenna and a second antenna; and wherein the circuitry comprises first circuitry coupled to the first antenna and configured to process signals for transmission by the first antenna; second circuitry coupled to the second antenna and configured to process signals for transmission by the second antenna; and (2) wherein the control signal is based, at least in part, on a power consumption of the first and second circuitry.

Regarding item (1) above; this design is however disclosed by Cui. Cui discloses the design wherein the plurality of antenna comprises a first antenna and a second antenna (Page 3 'Alamouti 2x2' paragraph; Page 8 sections B and C); and wherein the circuitry comprises first circuitry coupled to the first antenna and configured to process signals for transmission by the first antenna (Page 3 'Alamouti 2x2' paragraph; Page 8 sections B and C; figures 1 and 2 adjusted for the chosen number of transmit antennas); second circuitry coupled to the second antenna and configured to process signals for transmission by the second antenna (Page 3 'Alamouti 2x2' paragraph; Page 8 sections B and C; figures 1 and 2 adjusted for the chosen number of transmit antennas).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the disclosure of Xu in order to incorporate the disclosure of Cui. Cui discloses processing techniques and results in the consideration between SIMO and MIMO system designs, allowing for the determination of the most efficient conditions to use each design mode. As such incorporating these results into the disclosure of Xu would only help achieve a greater level of efficiency when determining when to use the different modes.

Regarding item (2) above, this design is however disclosed by Bougard. Bougard discloses wherein the control signal is based (Col. 3 lines 22-26, 32-53; Col. 9 line 52-Col. 10 line 11), at least in part, on a power consumption of the first and second circuitry (Col. 3 lines 22-26, 32-53; Col. 9 line 52-Col. 10 line 11).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the disclosure of Xu in order to incorporate the energy consumption consideration techniques as shown in Bougard in order to allow for the consideration of energy efficiency of the hardware in the selection processing designs.

Re claim 31, the combined disclosure of Xu, Bougard and Cui as a whole discloses the mobile station of claim 27, Xu further discloses wherein the control signal is based, at least in part, on energy optimized rates for the MIMO mode and the SIMO mode (col. 2 lines 11-32 and figure 3 with Col. 8 lines 25-47).

Re claim 32, the combined disclosure of Xu, Bougard and Cui as a whole discloses the mobile station of claim 27, Xu further discloses wherein the control signal is transmitted to the mobile station by a base station (Col. 8 lines 16-47).

5. Claims 13, 14, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu and Bougard as applied to claims 1 and 17 above and further in view of Gesbert (US Pub 20020056066).

Re claims 13 and 14, the combination of Xu and Bougard discloses the method of claim 1, but fails to explicitly disclose wherein the communications system is configured for communication over a communications channel, and wherein selecting the transmission mode is further based, at least in part, on a correlation in the communications channel as recited in claim 13 and further the method of claim 1, wherein selecting the transmission mode is further based, at least in part, on a number of receive antennas in the communications system as recited in claim 14.

These design elements are however disclosed by Gesbert. Gesbert discloses the design wherein the communications system (Figures 4 and 6) is configured for communication over a communications channel (Figures 4 and 6), and wherein selecting the transmission mode (Paragraphs 63-64) is further based, at least in part, on a correlation in the communications channel (Paragraph 64) and further wherein selecting the transmission mode (Paragraphs 63-64) is further based, at least in part, on a number of receive antennas in the communications system (Paragraph 63).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the disclosure of Xu to incorporate the mode selection techniques as shown in Gesbert, as Gesbert discloses an even more extensive consideration of the system design and channel environments, allowing for more factors effecting the signal processing to be considered and result in an even more efficient mode determination capability.

Re claims 24 and 25, the combination of Xu and Bougard discloses the base station of claim 17, but fails to explicitly disclose wherein the communications system is configured for communication over a communications channel, and wherein the mode selector is further configured to select the mode is based, at least in part, on a correlation in the communications channel as recited in claim 24 and further wherein the mode selector is further configured to select the selected transmission mode based, at least in part, on a number of receive antennas at the transceiver as recited in claim 25.

This design is however disclosed by Gesbert. Gesbert discloses wherein the communications system (Figures 4 and 6) is configured for communication (Figures 4 and 6) over a communications channel (Figures 4 and 6), and wherein the mode selector (Paragraphs 63-64; Fig 6) is further configured to select the mode is based, at least in part, on a correlation in the communications channel (Paragraph 64); and further wherein the mode selector (Paragraphs 63-64; Fig 6) is further configured to select the selected transmission mode (Paragraphs 63-

64; Fig 6) based, at least in part, on a number of receive antennas at the transceiver (Paragraph 63).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the disclosure of Xu to incorporate the mode selection techniques as shown in Gesbert, as Gesbert discloses an even more extensive consideration of the system design and channel environments, allowing for more factors effecting the signal processing to be considered and result in an even more efficient mode determination capability.

6. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Xu, Bougard and Cui as applied to claim 27 above and further in view of Gesbert (US Pub 20020056066).

Re claim 30, the combined disclosure of Xu, Bougard and Cui as a whole discloses the mobile station of claim 27, but fails to explicitly disclose wherein the control signal is based, at least in part, on a correlation in the communications channel.

This design is however disclosed by Gesbert. Gesbert discloses wherein the control signal is based, at least in part, on a correlation in the communications channel (Figures 4 and 6, Paragraph 64).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the disclosure of Xu to incorporate the mode selection techniques as shown in Gesbert, as Gesbert discloses an even more extensive consideration of the system design and channel environments,

allowing for more factors effecting the signal processing to be considered and result in an even more efficient mode determination capability.

Allowable Subject Matter

7. Claims 5-7, 10-12, 16, 20, 26, 29 and 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter: Re claims 5, 20 and 32; the prior art of record fails to anticipate or render obvious the limitations regarding the consideration of power during idle periods in the mode selection processing. Re claims 6 and 10, the prior art of record fails to anticipate or render obvious the limitations regarding the determination and application of each of a maximum and target rate for the MIMO and SIMO modes. Re claims 12, 23 and 29; the prior art of record fails to anticipate or render obvious the limitations regarding the indication of the number of users in the channel environment factoring into the mode selection determination. Re claims 16 and 26, the prior art of record fails to anticipate or render obvious the limitations regarding the specific designation of a specific antenna to function and the SIMO transmitting antenna from the antenna array.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL NEFF whose telephone number is (571)270-1848. The examiner can normally be reached on Monday - Friday 8:00am - 4:30pm EST ALT Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571)272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MICHAEL R. NEFF/
Examiner, Art Unit 2631

Notice of References Cited	Application/Control No. 12/727,049	Applicant(s)/Patent Under Reexamination DE VECIANA ET AL.	
	Examiner MICHAEL NEFF	Art Unit 2631	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-8,140,023	03-2012	Bougard, Bruno	455/68
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

<i>Index of Claims</i> 	Application/Control No. 12727049	Applicant(s)/Patent Under Reexamination DE VECIANA ET AL.
	Examiner MICHAEL NEFF	Art Unit 2631

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant				☐ CPA				☐ T.D.				☐ R.1.47			
CLAIM		DATE													
Final	Original	10/05/2012	04/03/2013												
	1	✓	✓												
	2	✓	✓												
	3	✓	✓												
	4	✓	✓												
	5	O	O												
	6	O	O												
	7	O	O												
	8	✓	✓												
	9	✓	✓												
	10	O	O												
	11	O	O												
	12	O	O												
	13	✓	✓												
	14	✓	✓												
	15	✓	✓												
	16	O	O												
	17	✓	✓												
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	23	O	O												
	24	✓	✓												
	25	✓	✓												
	26	O	O												
	27	✓	✓												
	28	✓	-												
	29	O	O												
	30	✓	✓												
	31	✓	✓												
	32	O	O												
	33	✓	✓												

EAST Search History**EAST Search History (Prior Art)**

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	2	US-20100284449-\$.did.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:24
S2	2	((DE near2 VECIANA) near2 GUSTAVO).inv.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:31
S3	12	((KIM) near2 HONGSEOK).inv.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:32
S4	151	((chae) near2 (chan-byoung)).inv.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:32
S5	269	((heath) near2 (robert)).inv.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:32
S6	418	S2 or S3 or S4 or S5	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:33
S7	1	S6 and SIMO.dlm.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:33
S8	18	S6 and SIMO	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:33
S9	18	S8 and MIMO	US-PGPUB;	OR	ON	2012/10/02 09:33

			USPAT; FPRS; EPO; JPO; DERWENT			
S10	18	S9 and rate	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:33
S11	20	S6 and single.clm.	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:41
S12	11	S11 and input.clm.	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:41
S13	11	S12 and multiple.clm.	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:42
S14	89875	((single near2 input) or SIMO)	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 11:06
S15	18691	S14 and ((multiple near2 input) or MIMO)	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 11:06
S16	1685	S15 and (select\$4 same (transmission or transmit\$5) same mode)	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 11:07
S17	1475	S16 and rate	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 11:08
S18	167	S17 and (rate same energy)	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 11:08
S19	15	S18 and (select\$5 same MIMO same SIMO)	US- PGPUB;	OR	ON	2012/10/02 11:09

			USPAT; FPRS; EPO; JPO; DERWENT			
S20	3067	375/219.ccls.	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 12:53
S21	4470	375/295.ccls.	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 12:54
S22	7371	375/260.ccls.	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 12:54
S23	13949	S20 or S21 or S22	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 12:54
S24	283	S23 and SIMO and MIMO	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 12:55
S25	206	S24 and mode	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 12:55
S26	192	S25 and select\$4	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 12:55
S27	97	S25 and (select\$4 with mode)	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 12:56
S28	13	S25 and ((select\$4 with mode) same MIMO same SIMO)	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 12:56
S29	422626	(transmission or data or transmit\$5) near2 rate	US- PGPUB;	OR	ON	2012/10/04 09:43

			USPAT; FPRS; EPO; JPO; DERWENT			
S30	3457	S29 with MIMO	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 09:43
S31	51	S29 with SIMO	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 09:43
S32	400	S29 with (SIMO or (single near2 input))	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 09:44
S33	121	S30 and S32	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 09:44
S34	74	S33 and (rate with (energy or power or resource))	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 09:45
S35	422626	(transmission or data or transmit\$5) near2 rate	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 14:32
S36	3457	S35 with MIMO	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 14:32
S37	400	S35 with (SIMO or (single near2 input))	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 14:32
S38	121	S36 and S37	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 14:32
S39	121	S38	US- PGPUB;	OR	ON	2012/10/04 14:32

			USPAT; FPRS; EPO; JPO; DERWENT			
S40	74	S39 and (rate with (energy or power or resource))	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 14:32
S41	422626	(transmission or data or transmit\$5) near2 rate	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 08:40
S42	3457	S41 with MIMO	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 08:40
S43	400	S41 with (SIMO or (single near2 input))	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 08:40
S44	121	S42 and S43	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 08:40
S45	121	S44	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 08:40
S46	121	S45 and rate	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 08:40
S47	74	S46 and (rate with (energy or power or resource))	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 08:40
S48	16	(US-20020056066-\$ or US- 20050031044-\$ or US-20090033524-\$ or US-20060274852-\$ or US- 20020177447-\$ or US-20030128658-\$ or US-20060039312-\$ or US- 20060105761-\$ or US-20070242766-\$ or US-20080095263-\$ or US- 20100029320-\$ or US-20100215108-\$).did. or (US-6760882-\$ or US-	US- PGPUB; USPAT; EPO	OR	ON	2012/10/05 13:18

		8081698-\$).did. or (WO-2008055179-\$ or WO-2008058143-\$).did.				
S49	0	S48 and idle	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:18
S50	0	S48 and idl\$3	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:25
S51	4	S48 and ((max or maxim\$5) with rate) and (target with rate)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:26
S52	4	S51 and MIMO and SIMO	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:28
S53	11	S48 and (number with (user or UE or mobile or MS))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:32
S54	6	S48 and (number with (RX or receiv\$4) with antenna)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:39
S55	8	S48 and correlat\$5	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:47
S56	0	S48 and (mode with correlat\$5)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:47
S57	0	S48 and (SIMO with select\$4 with antenna)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:48
S58	3	S48 and (SIMO with select\$4 with antenna)	US-PGPUB; USPAT; FPRS;	OR	ON	2012/10/05 13:48

EAST Search History

			EPO; JPO; DERWENT			
S59	12955	(select\$4 or chang\$4) same (mode) same ((energy or consumption or consum\$4) with (device or transmitter or transceiver or station))	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2013/04/01 14:45
S60	4640	(select\$4 or chang\$4) with (mode) with ((energy or consumption or consum\$4) with (device or transmitter or transceiver or station))	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2013/04/01 14:46
S61	255	(select\$4 or chang\$4) with (mode) with ((energy with (consumption or consum\$4)) with (device or transmitter or transceiver or station))	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2013/04/01 14:47
S62	7	S61 and MIMO	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2013/04/01 14:47

EAST Search History (Interference)

< This search history is empty >

4/ 3/ 2013 10:56:18 AM**C:\ Users\ mneff\ Documents\ EAST\ Workspaces\ 12727049.wsp**

Search Notes 	Application/Control No. 12727049	Applicant(s)/Patent Under Reexamination DE VECIANA ET AL.
	Examiner MICHAEL NEFF	Art Unit 2631

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
375	219, 295, 260	10/5/2012	MRN

SEARCH NOTES		
Search Notes	Date	Examiner
Class/subclass search performed with keyword limitations	10/5/2012	MRN
Inventor/double patenting search performed in east database	10/5/2012	MRN
Claims reviewed for 112 and 101 issues	10/5/2012	MRN
Claim language reviewed for minor issues	10/5/2012	MRN
Claims reviewed as amended	4/3/2013	MRN
Further search and consideration in light of amendments and interview discussion	4/3/2013	MRN

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

/MICHAEL NEFF/ Examiner.Art Unit 2631	
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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	: 12/727,049	Confirmation No.	: 2452
First Named Inventor	: Gustavo de Veciana		
Filed	: March 18, 2010	Attorney Docket No.:	P215467.US.01
Art Unit	: 2631	Customer No.	: 27,076
Examiner	: Michael R. Neff		
Title	: METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION		

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE UNDER 37 C.F.R. § 1.111

Sir:

Receipt of the Office Action dated April 10, 2013 is acknowledged. Please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks begin on page 11 of this paper.

Claim Amendments:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently amended) A method for selecting a transmission mode for a transceiver in a communications system, the method comprising:

calculating a first transmission rate for data in a multiple-input multiple-output (MIMO) mode of the communications system;

calculating a second transmission rate for the data in a single-input multiple-output (SIMO) mode of the communications system; and

selecting the transmission mode based, at least in part, on an energy consumption of the transceiver associated with the first and second transmission rates, wherein selecting the transmission mode is further based, at least in part, on a number of users of the communications system, and wherein the selected transmission mode corresponds to either the MIMO mode or the SIMO mode.

2. (Original) The method of claim 1, further comprising: transmitting data from the transceiver in the communications system using the selected transmission mode.

3. (Original) The method of claim 1, wherein calculating the first transmission rate comprises calculating the first transmission rate based, at least in part, on an energy-optimized rate for data in the MIMO mode.

4. (Original) The method of claim 3, wherein the energy-optimized rate is based, at least in part, on a power consumption of circuitry coupled to a plurality of antennas at the transceiver when the communications system is configured to transmit in the MIMO mode.

5. (Currently amended) ~~The method of claim 4,~~ A method for selecting a transmission mode for a transceiver in a communications system, the method comprising:

calculating a first transmission rate for data in a multiple-input multiple-output (MIMO) mode of the communications system based, at least in part, on an energy-optimized rate for data in the MIMO mode, wherein the energy-optimized rate is based, at least in part, on a power consumption of circuitry coupled to a plurality of antennas at the transceiver when the communications system is configured to transmit in the MIMO mode, wherein the energy-optimized rate is further based, at least in part, on a power consumption of the transceiver during an idle time;

calculating a second transmission rate for the data in a single-input multiple-output (SIMO) mode of the communications system; and

selecting the transmission mode based, at least in part, on an energy consumption of the transceiver associated with the first and second transmission rates, wherein the selected transmission mode corresponds to either the MIMO mode or the SIMO mode.

6. (Currently amended) ~~The method of claim 3,~~ A method for selecting a transmission mode for a transceiver in a communications system, the method comprising:

calculating a first transmission rate for data in a multiple-input multiple-output (MIMO) mode of the communications system based, at least in part, on an energy-optimized rate for data in the MIMO mode, wherein the energy-optimized rate is based, at least in part, on a power consumption of circuitry coupled to a plurality of antennas at the transceiver when the communications system is configured to transmit in the MIMO mode, wherein calculating the first transmission rate comprises selecting a maximum rate from the energy-optimized rate and a target rate, wherein the target rate is based, at least in part, on an average throughput for the communications system;

calculating a second transmission rate for the data in a single-input multiple-output (SIMO) mode of the communications system; and

selecting the transmission mode based, at least in part, on an energy consumption of the transceiver associated with the first and second transmission rates, wherein the selected transmission mode corresponds to either the MIMO mode or the SIMO mode.

7. (Previously presented) The method of claim 6, wherein calculating the first transmission rate comprises selecting a minimum rate from the selected maximum rate and a capacity rate for the communications system, wherein the capacity rate is based, at least in part, on a configuration of the communications system.

8. (Original) The method of claim 1, wherein calculating the second transmission rate comprises calculating the second transmission rate based, at least in part, on an energy-optimized rate for data in the SIMO mode.

9. (Original) The method of claim 8, wherein the energy-optimized rate is based, at least in part, on a power consumption associated with circuitry coupled to a single antenna configured to transmit in the SIMO mode.

10. (Currently amended) ~~The method of claim 8,~~ A method for selecting a transmission mode for a transceiver in a communications system, the method comprising:
calculating a first transmission rate for data in a multiple-input multiple-output (MIMO) mode of the communications system;
calculating a second transmission rate for the data in a single-input multiple-output (SIMO) mode of the communications system, wherein calculating the second transmission rate comprises calculating the second transmission rate based, at least in part, on an energy-optimized rate for data in the SIMO mode, wherein calculating the second transmission rate comprises selecting a maximum rate from the energy-optimized rate and a target rate, wherein the target rate is based, at least in part, on an average throughput for the communications system; and
selecting the transmission mode based, at least in part, on an energy consumption of the transceiver associated with the first and second transmission rates, wherein the selected transmission mode corresponds to either the MIMO mode or the SIMO mode.

11. (Previously presented) The method of claim 10, wherein calculating the second transmission rate comprises selecting a minimum rate from the selected maximum rate

and a capacity rate for the communications system, wherein the capacity rate is based, at least in part, on a configuration of the communications system.

12. (Canceled).

13. (Original) The method of claim 1, wherein the communications system is configured for communication over a communications channel, and wherein selecting the transmission mode is further based, at least in part, on a correlation in the communications channel.

14. (Original) The method of claim 1, wherein selecting the transmission mode is further based, at least in part, on a number of receive antennas in the communications system.

15. (Original) The method of claim 1, wherein calculating the first and second transmission rates are performed by a base station.

16. (Currently amended) ~~The method of claim 1, further comprising~~ A method for selecting a transmission mode for a transceiver in a communications system, the method comprising:

calculating a first transmission rate for data in a multiple-input multiple-output (MIMO) mode of the communications system;

calculating a second transmission rate for the data in a single-input multiple-output (SIMO) mode of the communications system;

selecting the transmission mode based, at least in part, on an energy consumption of the transceiver associated with the first and second transmission rates, wherein the transmission mode corresponds to either the MIMO mode or the SIMO mode; and

selecting an identity of a single antenna at the transceiver for use in the SIMO mode when the selected transmission mode corresponds to the SIMO mode.

17. (Currently amended) A base station for use in communicating over a communications channel, the base station comprising:

a rate selector configured to generate a first signal corresponding to a first transmission rate for data in a multiple-input multiple-output (MIMO) mode of the communications system, wherein the rate selector is further configured to generate a second signal corresponding to a second transmission rate for data in a single-input multiple-output (SIMO) mode of the communications system;

a mode selector coupled to the rate selector, wherein the mode selector is configured to receive the first and second signals, and select a transmission mode based, at least in part, on an energy consumption of a transmitter associated with the first and second transmission rates, wherein the transmission mode corresponds to either the MIMO mode or the SIMO mode; and

the transmitter coupled to the mode selector, wherein the transmitter is configured to transmit a third signal to a transceiver in the communications system, wherein the third signal identifies the selected transmission mode for the transceiver, wherein, when the selected mode is the SIMO mode, the transmitter is further configured to transmit a fourth signal corresponding to an identity of a single antenna for use in the SIMO mode.

18. (Original) The base station of claim 17, wherein the rate selector comprises a MIMO rate selector configured to calculate the first transmission rate based, at least in part, on an energy-optimized rate for data in the MIMO mode.

19. (Original) The base station of claim 18, wherein the MIMO rate selector is configured to receive a signal indicative of a power consumption of circuitry coupled to a plurality of antennas at the transceiver, and wherein the energy-optimized rate is based, at least in part, on the power consumption of circuitry coupled to the plurality of antennas at the transceiver configured to transmit in the MIMO mode.

20. (Currently amended) ~~The base station of claim 19,~~ A base station for use in communicating over a communications channel, the base station comprising:

a rate selector configured to generate a first signal corresponding to a first transmission rate for data in a multiple-input multiple-output (MIMO) mode of the communications system, wherein the rate selector is further configured to generate a second signal corresponding to a second transmission rate for data in a single-input multiple-output (SIMO) mode of the communications system, wherein the rate selector comprises a MIMO rate selector configured to calculate the first transmission rate based, at least in part, on an energy-optimized rate for data in the MIMO mode wherein the MIMO rate selector is configured to receive a signal indicative of a power consumption of circuitry coupled to a plurality of antennas at the transceiver, and wherein the MIMO rate selector is further configured to receive a signal indicative of a power consumption of the transceiver during an idle time; and;

a mode selector coupled to the rate selector, wherein the mode selector is configured to receive the first and second signals, and select a transmission mode based, at least in part, on an energy consumption of a transmitter associated with the first and second transmission rates, wherein the transmission mode corresponds to either the MIMO mode or the SIMO mode, wherein the energy-optimized rate is based, at least in part, on the power consumption of circuitry coupled to the plurality of antennas at the transceiver configured to transmit in the MIMO mode, and wherein the energy-optimized rate is further based, at least in part, on the power consumption of the transceiver during the idle time; and

the transmitter coupled to the mode selector, wherein the transmitter is configured to transmit a third signal to a transceiver in the communications system, wherein the third signal identifies the selected transmission mode for the transceiver.

21. (Original) The base station of claim 17, wherein the rate selector comprises a SIMO rate selector configured to calculate the second transmission rate based, at least in part, on an energy-optimized rate for data in the SIMO mode.

22. (Original) The base station of claim 21, wherein the SIMO rate selector is further configured to receive a signal indicative of a power consumption of circuitry coupled to a single antenna at the transceiver, and wherein the energy-optimized rate is based, at least in part,

on the power consumption of the circuitry coupled to the single antenna at the transceiver configured to transmit in the SIMO mode.

23. (Original) The base station of claim 17, wherein the mode selector is further configured to receive a signal indicative of a number of users of the communications system, and wherein the selected mode is further based, at least in part, on the number of users.

24. (Original) The base station of claim 17, wherein the communications system is configured for communication over a communications channel, and wherein the mode selector is further configured to select the mode is based, at least in part, on a correlation in the communications channel.

25. (Original) The base station of claim 17, wherein the mode selector is further configured to select the selected transmission mode based, at least in part, on a number of receive antennas at the transceiver.

26. (Canceled).

27. (Currently amended) A mobile station for use in a communications system comprising:

a first antenna and a second antenna;

first circuitry coupled to the first antenna and configured to process signals for transmission by the first antenna;

second circuitry coupled to the second antenna and configured to process signals for transmission by the second antenna; and

a controller coupled to the first and second circuitry, wherein the controller is configured to receive a control signal and, in accordance with the control signal, to select between a multiple-input multiple-output (MIMO) mode wherein both the first and second antennas transmit data over a communications channel and a single-input multiple-output (SIMO) mode wherein only one of the first and second antennas transmit data over a

communications channel, wherein the control signal is based, at least in part, on a power consumption of the first and second circuitry, wherein the control signal is based, at least in part, on an idle power consumption of the mobile station.

28. (Canceled).

29. (Currently amended) ~~The mobile station of claim 27~~ A mobile station for use in a communications system comprising:

a first antenna and a second antenna;

first circuitry coupled to the first antenna and configured to process signals for transmission by the first antenna;

second circuitry coupled to the second antenna and configured to process signals for transmission by the second antenna; and

a controller coupled to the first and second circuitry, wherein the controller is configured to receive a control signal and, in accordance with the control signal, to select between a multiple-input multiple-output (MIMO) mode wherein both the first and second antennas transmit data over a communications channel and a single-input multiple-output (SIMO) mode wherein only one of the first and second antennas transmit data over a communications channel, wherein the control signal is based, at least in part, on a power consumption of the first and second circuitry, wherein the control signal is based, at ~~last~~ least in part, on a number of users of the communications system.

30. (Original) The mobile station of claim 27, wherein the control signal is based, at least in part, on a correlation in the communications channel.

31. (Original) The mobile station of claim 27, wherein the control signal is based, at least in part, on energy optimized rates for the MIMO mode and the SIMO mode.

32. (Canceled).

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33. (Original) The mobile station of claim 27, wherein the control signal is transmitted to the mobile station by a base station.

REMARKS

Claims 1-11, 13-25, 27, 29-31, and 33 are currently pending. Claims 12, 26, 28, 32 have been canceled without prejudice or disclaimer. Claims 1, 5, 6, 10, 16, 17, 20, 27, and 29 have been amended. No new matter has been added.

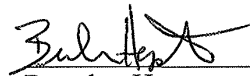
The indication of allowable subject matter in claims 5-7, 10-12, 16, 20, 26, 29, and 32 is noted with appreciation. Independent claim 1 has been amended to include the allowable subject matter of previously presented claim 12. Independent claim 17 has been amended to include the allowable subject matter of previously presented claim 26. Independent claim 27 has been amended to include the allowable subject matter of previously presented claim 32. Withdrawal of the rejections of claims 1, 17, and 27 under 35 U.S.C. § 103(a) is respectfully requested.

Claims 5, 6, 10, 16, 20, and 29 have been rewritten in independent form to include recitations of respective base and intervening claims. Claim 7 depends from claim 6 and claim 11 depends from claim 10. Withdrawal of the objections to claims 5-7, 10, 11, 16, 20, and 29 as dependent on a rejected independent claim is respectfully requested.

Favorable consideration and a timely Notice of Allowance are earnestly solicited. The Examiner is invited to contact the undersigned should a telephone conversation be useful in the efficient prosecution of this matter.

Respectfully submitted,
DORSEY & WHITNEY LLP

June 28, 2013
Date


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Electronic Acknowledgement Receipt	
EFS ID:	16194594
Application Number:	12727049
International Application Number:	
Confirmation Number:	2452
Title of Invention:	METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION
First Named Inventor/Applicant Name:	Gustavo de Veciana
Customer Number:	27076
Filer:	Brandon Paul. Hegstrom/Cecilia Tri
Filer Authorized By:	Brandon Paul. Hegstrom
Attorney Docket Number:	P215467.US.01
Receipt Date:	28-JUN-2013
Filing Date:	18-MAR-2010
Time Stamp:	18:20:32
Application Type:	Utility under 35 USC 111(a)

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Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		US-800802-01-US-REG_20130628_SecondOAResponse.pdf	688809 2debfe19f0592781f0c1897e336b8c358e164e69	yes	11

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	10
	Applicant Arguments/Remarks Made in an Amendment	11	11
Warnings:			
Information:			
Total Files Size (in bytes):		688809	
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.			

Document code: WFEE

United States Patent and Trademark Office
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BTURNER	SALE	#00000001	Mailroom Dt: 06/28/2013	501266	12727049
		01 FC : 1201		2,520.00 DA	

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 12/727,049		Filing Date 03/18/2010		☒ To be Mailed						
ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO														
APPLICATION AS FILED – PART I														
(Column 1)		(Column 2)												
FOR		NUMBER FILED		NUMBER EXTRA		RATE (\$)		FEE (\$)						
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))		N/A		N/A		N/A								
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))		N/A		N/A		N/A								
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))		N/A		N/A		N/A								
TOTAL CLAIMS (37 CFR 1.16(i))		minus 20 =		*		X \$ =								
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 =		*		X \$ =								
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).												
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))														
* If the difference in column 1 is less than zero, enter "0" in column 2.						TOTAL								
APPLICATION AS AMENDED – PART II														
(Column 1)		(Column 2)		(Column 3)										
AMENDMENT	06/28/2013		CLAIMS REMAINING AFTER AMENDMENT				HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))		* 29		Minus		** 33		= 0		X \$80 =		0	
	Independent (37 CFR 1.16(h))		* 9		Minus		***3		= 6		X \$420 =		2520	
	☐ Application Size Fee (37 CFR 1.16(s))													
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))													
						TOTAL ADD'L FEE		2520						
(Column 1)		(Column 2)		(Column 3)										
AMENDMENT			CLAIMS REMAINING AFTER AMENDMENT				HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))		*		Minus		**		=		X \$ =			
	Independent (37 CFR 1.16(h))		*		Minus		***		=		X \$ =			
	☐ Application Size Fee (37 CFR 1.16(s))													
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))													
						TOTAL ADD'L FEE								
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.										LIE /BRENDA TURNER/				

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



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27076 e 2013-07-09

DORSEY & WHITNEY LLP
INTELLECTUAL PROPERTY DEPARTMENT
Columbia Center
701 Fifth Avenue, Suite 6100
SEATTLE, WA 98104-7043

Paper No.

Application No.:	12/727,049	Date Mailed:	2013-07-09
			
First Named Inventor:	de Veciana, Gustavo,	Examiner:	NEFF, MICHAEL R
Attorney Docket No.:	P215467.US.01	Art Unit:	2631
Confirmation No.:	2452	Filing Date:	2010-03-18

Please find attached an Office communication concerning this application or proceeding.

Commissioner for Patents

NOTICE REQUIRING EXCESS CLAIMS FEES	Application No.	Applicant(s)
	12/727,049	DE VECIANA ET AL.
		Art Unit 3998

The excess claim(s) filed on 28 June, 2013 is not accompanied by the appropriate payment of excess claims fees set forth in 37 CFR 1.16(h)-(j) or 1.492(d)-(f). Excess claims fees are required for each claim in independent form in excess of three (§ 1.16(h)), each claim (whether dependent or independent) in excess of twenty (note that § 1.75(c) indicates how multiple dependent claims are considered for fee calculation purposes) (§ 1.16(i)), and each application that contains a multiple dependent claim (§ 1.16(j)).

Since the application is not under a final rejection, applicant is given a time period of **ONE (1) MONTH or THIRTY (30) DAYS** from the mailing date of this notice, whichever is longer, to submit either: (1) the fee payment of \$, or (2) an amendment in compliance with 37 CFR 1.121 that cancels the excess claim(s), in order to avoid ABANDONMENT. Extensions of this time period may be granted under 37 CFR 1.136, unless the excess claim(s) was presented in a preliminary amendment.

☐ 1. The funds in Deposit Account No. are insufficient to cover the entire fee due. The balance is due within the time period set forth in this notice. See note below regarding the appropriate service charge.

☐ 2. The Credit Card payment to cover the entire fee due to Account (Card type + last 4 digits ONLY) was refused. The balance is due within the time period set forth in this notice. See note below regarding the appropriate service charge.

☒ 3. The amendment that includes the excess claim(s) has not been entered, since applicant has failed to remit (or authorize charge to a Deposit Account or Credit Card) the fee as indicated on the attached Patent Application Fee Determination Record (PTO/SB/06). Remittance or authorization is due within the time period set forth in this notice.

☐ 4. The fee submitted in this application is insufficient. A balance of \$ is due for presentation of excess claims (37 CFR 1.16(h)-(j) or 1.492(d)-(f)).

☒ 5. Other.

Explanation (*Provide specific details of the required correction in order to assist the applicant. Indicate whether a service charge has been added to the fee due*): Please note the attach Patent Application Fee Determination Record sheet for additional fee due in the amount \$2,520 due for (6) independent.

THE AMOUNT OF THE FEE(S) DUE IS SUBJECT TO CHANGE, GENERALLY ON OCTOBER 1 OF EACH YEAR (37 CFR 1.16, 1.21 & 1.492). THE AMOUNT OF THE FEE(S) DUE IS DETERMINED AS OF THE DATE A COMPLETE REPLY WITH THE APPROPRIATE FEE(S) IS RECEIVED BY THE OFFICE (37 CFR 1.8 & 1.10). BECAUSE THE AMOUNT DUE IS SUBJECT TO CHANGE, IT IS RECOMMENDED THAT APPLICANT CHECK THE CURRENT FEE SCHEDULE WHICH IS AVAILABLE ON THE USPTO'S WEBSITE AT: <http://www.uspto.gov/web/offices/ac/qs/ope/fees.htm>

Service Charges: There is a \$50 service charge for processing each payment refused (including a check returned "unpaid") or charged back by a financial institution (37 CFR 1.21(m)). There is a \$25.00 service charge for each month when the balance of a deposit account is below \$1000 at the end of the month (37 CFR 1.21(b)(2)).

Technical Support Staff (TSS): /BRENDA TURNER/ Phone Number: (571)272-3614

Note to TSS: Please do NOT use this notice if the application is under a final rejection.



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27076 e 2013-07-30

DORSEY & WHITNEY LLP
INTELLECTUAL PROPERTY DEPARTMENT
Columbia Center
701 Fifth Avenue, Suite 6100
SEATTLE, WA 98104-7043

Paper No.

Application No.:	12/727,049	Date Mailed:	2013-07-30
			
First Named Inventor:	de Veciana, Gustavo,	Examiner:	NEFF, MICHAEL R
Attorney Docket No.:	P215467.US.01	Art Unit:	2631
Confirmation No.:	2452	Filing Date:	2010-03-18

Please find attached an Office communication concerning this application or proceeding.

Commissioner for Patents



UNITED STATES DEPARTMENT OF COMMERCE
U.S. Patent and Trademark Office
Address : COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450

APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
12727049	18 March, 2010	DE VECIANA ET AL.	P215467.US.01

DORSEY & WHITNEY LLP INTELLECTUAL PROPERTY DEPARTMENT Columbia Center 701 Fifth Avenue, Suite 6100 SEATTLE, WA 98104-7043		EXAMINER	
		ART UNIT	PAPER
			20130726-1

DATE MAILED:

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner for Patents

The Notice requiring excess claims fees mailed on July 09/2013 was sent in error, and is hereby withdrawn. The application is being forward to examiner for appropriate action.

Legal Instruments Examiner

/Brenda Turner/

Telephone Number

571-272-3614

PTO-90C (Rev.04-03)

Petitioner Samsung Ex-1004, 0183



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NOTICE OF ALLOWANCE AND FEE(S) DUE

27076 7590 03/20/2014
DORSEY & WHITNEY LLP
INTELLECTUAL PROPERTY DEPARTMENT
Columbia Center
701 Fifth Avenue, Suite 6100
SEATTLE, WA 98104-7043

EXAMINER

NEFF, MICHAEL R

ART UNIT

PAPER NUMBER

2631

DATE MAILED: 03/20/2014

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/727,049	03/18/2010	Gustavo de Veciana	P215467.US.01	2452

TITLE OF INVENTION: METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	06/20/2014

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

27076 7590 03/20/2014
DORSEY & WHITNEY LLP
INTELLECTUAL PROPERTY DEPARTMENT
Columbia Center
701 Fifth Avenue, Suite 6100
SEATTLE, WA 98104-7043

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/727,049	03/18/2010	Gustavo de Veciana	P215467.US.01	2452

TITLE OF INVENTION: METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	06/20/2014

EXAMINER	ART UNIT	CLASS-SUBCLASS
NEFF, MICHAEL R	2631	375-267000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) The names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
- (2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
- 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (**Please first reapply any previously paid issue fee shown above**)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

- ☐ Applicant certifying micro entity status. See 37 CFR 1.29
- ☐ Applicant asserting small entity status. See 37 CFR 1.27
- ☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/727,049	03/18/2010	Gustavo de Veciana	P215467.US.01	2452

27076	7590	03/20/2014
DORSEY & WHITNEY LLP		
INTELLECTUAL PROPERTY DEPARTMENT		
Columbia Center		
701 Fifth Avenue, Suite 6100		
SEATTLE, WA 98104-7043		

EXAMINER	
NEFF, MICHAEL R	

ART UNIT	PAPER NUMBER
2631	

DATE MAILED: 03/20/2014

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 640 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 640 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 12/727,049	Applicant(s) DE VECIANA ET AL.	
	Examiner MICHAEL NEFF	Art Unit 2631	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendments filed 6/28/2013.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 1-11,13-25,27,29-31 and 33. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
Certified copies:
a) ☐ All b) ☐ Some *c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)	5. ☐ Examiner's Amendment/Comment
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____	6. ☒ Examiner's Statement of Reasons for Allowance
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material	7. ☐ Other _____
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____	

/MICHAEL NEFF/ Primary Examiner, Art Unit 2631	
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DETAILED ACTION

Allowable Subject Matter

1. Claims 1-11, 13-25, 27, 29-31, 33 are allowed.
2. The following is an examiner's statement of reasons for allowance: subject matter: The prior art of record fails to anticipate or render obvious the limitations of the above cited claims.

Re claims 5, 20 and 27; the prior art of record fails to anticipate or render obvious the limitations regarding the consideration of power during idle periods in the mode selection processing.

Re claims 6 and 10; the prior art of record fails to anticipate or render obvious the limitations regarding the determination and application of each of a maximum and target rate for the MIMO and SIMO modes.

Re claims 1 and 29; the prior art of record fails to anticipate or render obvious the limitations regarding the indication of the number of users in the channel environment factoring into the mode selection determination.

Re claim 16 and 17; the prior art of record fails to anticipate or render obvious the limitations regarding the specific designation of a specific antenna identity to function and the SIMO transmitting antenna from the antenna array.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL NEFF whose telephone number is (571)270-1848. The examiner can normally be reached on Monday - Friday 8:00am - 4:30pm EST ALT Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571)272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MICHAEL NEFF/
Primary Examiner, Art Unit 2631

Issue Classification 	Application/Control No. 12727049	Applicant(s)/Patent Under Reexamination DE VECIANA ET AL.
	Examiner MICHAEL NEFF	Art Unit 2631

CPC		
Symbol	Type	Version

CPC Combination Sets				
Symbol	Type	Set	Ranking	Version

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	29	
/MICHAEL NEFF/ Primary Examiner.Art Unit 2631	03/17/2014	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	24	1

Issue Classification 	Application/Control No. 12727049	Applicant(s)/Patent Under Reexamination DE VECIANA ET AL.
	Examiner MICHAEL NEFF	Art Unit 2631

US ORIGINAL CLASSIFICATION						INTERNATIONAL CLASSIFICATION													
CLASS		SUBCLASS				CLAIMED					NON-CLAIMED								
375		219				H	0	4	B	1 / 38 (2006.01.01)									
CROSS REFERENCE(S)																			
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)																		
375	295	260																	

NONE		Total Claims Allowed:	
		29	
(Assistant Examiner)	(Date)		
/MICHAEL NEFF/ Primary Examiner.Art Unit 2631	03/17/2014	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	24	1

Issue Classification 	Application/Control No. 12727049	Applicant(s)/Patent Under Reexamination DE VECIANA ET AL.
	Examiner MICHAEL NEFF	Art Unit 2631

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	16	17	28	33										
2	2	17	18												
3	3	18	19												
4	4	24	20												
10	5	19	21												
11	6	20	22												
12	7	21	23												
5	8	22	24												
6	9	23	25												
13	10		26												
14	11	25	27												
	12		28												
7	13	29	29												
8	14	26	30												
9	15	27	31												
15	16		32												

NONE (Assistant Examiner) _____ (Date) _____		Total Claims Allowed: 29	
/MICHAEL NEFF/ Primary Examiner. Art Unit 2631 (Primary Examiner) _____ (Date) _____		03/17/2014 (Date) _____	O.G. Print Claim(s) 24 O.G. Print Figure 1

<i>Index of Claims</i> 	Application/Control No. 12727049	Applicant(s)/Patent Under Reexamination DE VECIANA ET AL.
	Examiner MICHAEL NEFF	Art Unit 2631

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant		☐ CPA		☐ T.D.		☐ R.1.47			
CLAIM		DATE							
Final	Original	10/05/2012	04/03/2013	03/17/2014					
1	1	✓	✓	=					
2	2	✓	✓	=					
3	3	✓	✓	=					
4	4	✓	✓	=					
10	5	O	O	=					
11	6	O	O	=					
12	7	O	O	=					
5	8	✓	✓	=					
6	9	✓	✓	=					
13	10	O	O	=					
14	11	O	O	=					
	12	O	O	-					
7	13	✓	✓	=					
8	14	✓	✓	=					
9	15	✓	✓	=					
15	16	O	O	=					
16	17	✓	✓	=					
17	18	✓	✓	=					
18	19	✓	✓	=					
24	20	O	O	=					
19	21	✓	✓	=					
20	22	✓	✓	=					
21	23	O	O	=					
22	24	✓	✓	=					
23	25	✓	✓	=					
	26	O	O	-					
25	27	✓	✓	=					
	28	✓	-	-					
29	29	O	O	=					
26	30	✓	✓	=					
27	31	✓	✓	=					
	32	O	O	-					
28	33	✓	✓	=					

Search Notes 	Application/Control No. 12727049	Applicant(s)/Patent Under Reexamination DE VECIANA ET AL.
	Examiner MICHAEL NEFF	Art Unit 2631

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
375	219, 295, 260	10/5/2012	MRN

SEARCH NOTES		
Search Notes	Date	Examiner
Class/subclass search performed with keyword limitations	10/5/2012	MRN
Inventor/double patenting search performed in east database	10/5/2012	MRN
Claims reviewed for 112 and 101 issues	10/5/2012	MRN
Claim language reviewed for minor issues	10/5/2012	MRN
Claims reviewed as amended	4/3/2013	MRN
Further search and consideration in light of amendments and interview discussion	4/3/2013	MRN
Updated claim review in light of the amendments and remarks filed	3/17/2014	MRN
Claims reviewed for 101 and 112 issues	3/17/2014	MRN
Updated double patenting review	3/17/2014	MRN

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
375	219	3/17/2014	MRN

	/MICHAEL NEFF/ Primary Examiner.Art Unit 2631
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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L2	2	((DE near2 VECIANA) near2 GUSTAVO).inv.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/17 14:04
L3	40	((KIM) near2 HONGSEOK).inv.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/17 14:04
L4	336	((chae) near2 (chan-byoung)).inv.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/17 14:04
L5	615	((heath) near2 (robert)).inv.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/17 14:04
L6	974	L2 or L3 or L4 or L5	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/17 14:04
L7	33	6 and MIMO.clm.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/17 14:04
L8	1	7 and SIMO.clm.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2014/03/17 14:04
S1	2	US-20100284449-\$.did.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:24
S2	2	((DE near2 VECIANA) near2 GUSTAVO).inv.	US-PGPUB;	OR	ON	2012/10/02 09:31

			USPAT; FPRS; EPO; JPO; DERWENT			
S3	12	((KIM) near2 HONGSEOK).inv.	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:32
S4	151	((chae) near2 (chan-byoung)).inv.	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:32
S5	269	((heath) near2 (robert)).inv.	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:32
S6	418	S2 or S3 or S4 or S5	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:33
S7	1	S6 and SIMO.clm.	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:33
S8	18	S6 and SIMO	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:33
S9	18	S8 and MIMO	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:33
S10	18	S9 and rate	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:33
S11	20	S6 and single.clm.	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:41
S12	11	S11 and input.clm.	US- PGPUB;	OR	ON	2012/10/02 09:41

			USPAT; FPRS; EPO; JPO; DERWENT			
S13	11	S12 and multiple.clm.	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 09:42
S14	89875	((single near2 input) or SIMO)	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 11:06
S15	18691	S14 and ((multiple near2 input) or MIMO)	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 11:06
S16	1685	S15 and (select\$4 same (transmission or transmit\$5) same mode)	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 11:07
S17	1475	S16 and rate	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 11:08
S18	167	S17 and (rate same energy)	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 11:08
S19	15	S18 and (select\$5 same MIMO same SIMO)	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 11:09
S20	3067	375/219.ccls.	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 12:53
S21	4470	375/295.ccls.	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 12:54
S22	7371	375/260.ccls.	US- PGPUB;	OR	ON	2012/10/02 12:54

			USPAT; FPRS; EPO; JPO; DERWENT			
S23	13949	S20 or S21 or S22	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 12:54
S24	283	S23 and SIMO and MIMO	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 12:55
S25	206	S24 and mode	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 12:55
S26	192	S25 and select\$4	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 12:55
S27	97	S25 and (select\$4 with mode)	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 12:56
S28	13	S25 and ((select\$4 with mode) same MIMO same SIMO)	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/02 12:56
S29	422626	(transmission or data or transmit\$5) near2 rate	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 09:43
S30	3457	S29 with MIMO	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 09:43
S31	51	S29 with SIMO	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 09:43
S32	400	S29 with (SIMO or (single near2 input))	US- PGPUB;	OR	ON	2012/10/04 09:44

			USPAT; FPRS; EPO; JPO; DERWENT			
S33	121	S30 and S32	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 09:44
S34	74	S33 and (rate with (energy or power or resource))	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 09:45
S35	422626	(transmission or data or transmit\$5) near2 rate	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 14:32
S36	3457	S35 with MIMO	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 14:32
S37	400	S35 with (SIMO or (single near2 input))	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 14:32
S38	121	S36 and S37	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 14:32
S39	121	S38	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 14:32
S40	74	S39 and (rate with (energy or power or resource))	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/04 14:32
S41	422626	(transmission or data or transmit\$5) near2 rate	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 08:40
S42	3457	S41 with MIMO	US- PGPUB;	OR	ON	2012/10/05 08:40

			USPAT; FPRS; EPO; JPO; DERWENT			
S43	400	S41 with (SIMO or (single near2 input))	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 08:40
S44	121	S42 and S43	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 08:40
S45	121	S44	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 08:40
S46	121	S45 and rate	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 08:40
S47	74	S46 and (rate with (energy or power or resource))	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 08:40
S48	16	(US-20020056066-\$ or US-20050031044-\$ or US-20090033524-\$ or US-20060274852-\$ or US-20020177447-\$ or US-20030128658-\$ or US-20060039312-\$ or US-20060105761-\$ or US-20070242766-\$ or US-20080095263-\$ or US-20100029320-\$ or US-20100215108-\$).did. or (US-6760882-\$ or US-8081698-\$).did. or (WO-2008055179-\$ or WO-2008058143-\$).did.	US- PGPUB; USPAT; EPO	OR	ON	2012/10/05 13:18
S49	0	S48 and idle	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:18
S50	0	S48 and idl\$3	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:25
S51	4	S48 and ((max or maxim\$5) with rate) and (target with rate)	US- PGPUB; USPAT; FPRS;	OR	ON	2012/10/05 13:26

			EPO; JPO; DERWENT			
S52	4	S51 and MIMO and SIMO	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:28
S53	11	S48 and (number with (user or UE or mobile or MS))	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:32
S54	6	S48 and (number with (RX or receiv\$4) with antenna)	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:39
S55	8	S48 and correlat\$5	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:47
S56	0	S48 and (mode with correlat\$5)	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:47
S57	0	S48 and (SIMO with select\$4 with antenna)	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:48
S58	3	S48 and (SIMO with select\$4 with antenna)	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2012/10/05 13:48
S59	12955	(select\$4 or chang\$4) same (mode) same ((energy or consumption or consum\$4) with (device or transmitter or transceiver or station))	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2013/04/01 14:45
S60	4640	(select\$4 or chang\$4) with (mode) with ((energy or consumption or consum\$4) with (device or transmitter or transceiver or station))	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2013/04/01 14:46
S61	255	(select\$4 or chang\$4) with (mode) with ((energy with (consumption or consum\$4)) with (device or transmitter or transceiver or station))	US- PGPUB; USPAT; FPRS;	OR	ON	2013/04/01 14:47

EAST Search History

			EPO; JPO; DERWENT			
S62	7	S61 and MIMO	US- PGPUB; USPAT; FPRS; EPO; JPO; DERWENT	OR	ON	2013/04/01 14:47

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L9	2231	375/219.ccls.	USPAT; UPAD	OR	ON	2014/03/17 14:36
L10	1	9 and SIMO.clm.	USPAT; UPAD	OR	ON	2014/03/17 14:37

3/ 17/ 2014 2:40:09 PM

C:\ Users\ mneff\ Documents\ EAST\ Workspaces\ 12727049.wsp

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

27076 7590 03/20/2014
DORSEY & WHITNEY LLP
INTELLECTUAL PROPERTY DEPARTMENT
Columbia Center
701 Fifth Avenue, Suite 6100
SEATTLE, WA 98104-7043

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/727,049	03/18/2010	Gustavo de Veciana	P215467.US.01	2452

TITLE OF INVENTION: METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	06/20/2014

EXAMINER	ART UNIT	CLASS-SUBCLASS
NEFF, MICHAEL R	2631	375-267000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) The names of up to 3 registered patent attorneys or agents OR, alternatively, 1 Dorsey & Whitney LLP
- (2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
- 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.111. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

THE BOARD OF REGENTS OF THE UNIVERSITY OF
TEXAS SYSTEM

(B) RESIDENCE: (CITY AND STATE OR COUNTRY)

AUSTIN, TEXAS

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☒ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (**Please first reapply any previously paid issue fee shown above**)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number 50-1266 (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

- ☐ Applicant certifying micro entity status. See 37 CFR 1.29
- ☐ Applicant asserting small entity status. See 37 CFR 1.27
- ☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Brandon P. Hegstrom/

Date June 19, 2014

Typed or printed name Brandon P. Hegstrom

Registration No. 59,432

Electronic Patent Application Fee Transmittal				
Application Number:		12727049		
Filing Date:		18-Mar-2010		
Title of Invention:		METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION		
First Named Inventor/Applicant Name:		Gustavo de Veciana		
Filer:		Brandon Paul. Hegstrom/Cecilia Tri		
Attorney Docket Number:		P215467.US.01		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl Issue Fee	1501	1	960	960
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				960

Electronic Acknowledgement Receipt	
EFS ID:	19358981
Application Number:	12727049
International Application Number:	
Confirmation Number:	2452
Title of Invention:	METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION
First Named Inventor/Applicant Name:	Gustavo de Veciana
Customer Number:	27076
Filer:	Brandon Paul. Hegstrom/Cecilia Tri
Filer Authorized By:	Brandon Paul. Hegstrom
Attorney Docket Number:	P215467.US.01
Receipt Date:	19-JUN-2014
Filing Date:	18-MAR-2010
Time Stamp:	19:11:37
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 960
RAM confirmation Number	5409
Deposit Account	501266
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	US-800802-01-US-REG_20140619_IssueFee.pdf	96610	no	1
			d91a5bcb445b4add0585308a97c664dba6438c33		

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30362	no	2
			4d38f1ce881ee455012e30a90711086ed6d51c86		

Warnings:

Information:

Total Files Size (in bytes):	126972
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/727,049	08/05/2014	8798120	P215467.US.01	2452

27076 7590 07/16/2014
DORSEY & WHITNEY LLP
INTELLECTUAL PROPERTY DEPARTMENT
Columbia Center
701 Fifth Avenue, Suite 6100
SEATTLE, WA 98104-7043

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment is 1002 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Gustavo de Veciana, Austin, TX;
Hongseok Kim, Chatham, NJ;
Chan-Byoung Chae, Jersey City, NJ;
Robert W. Heath JR., Austin, TX;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.



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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	PATENT NUMBER	GROUP ART UNIT	REQUEST ID
12/727,049	8798120	2631	28907

PAIR Correspondence Address/Fee Address Change

The following fields have been changed to Customer Number 119663 on 11/18/2016 via Private PAIR in view of the certification copied below that authorized the change.

- Correspondence Address

The address for Customer Number 119663 is:

119663

Xinova, LLC/Dorsey & Whitney LLP

701 5th Avenue

Seattle, WA 98104

I certify, in accordance with 37 CFR 1.4(d)(4) that I am:

An attorney or Agent of Record registered to practice before the Patent and Trademark Office who has been given power of attorney in this application

Signature:	/Jennifer L. Spaith/
Name:	Jennifer L. Spaith
Registration Number:	51916

**PATENT - POWER OF ATTORNEY
OR
REVOCATION OF POWER OF ATTORNEY
WITH A NEW POWER OF ATTORNEY
AND
CHANGE OF CORRESPONDENCE ADDRESS**

Patent Number	8,798,120
Issue Date	08/05/2014
First Named Inventor	Gustavo de Veciana
Title	METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION
Attorney Docket No.	P215467-US.01

I hereby revoke all previous powers of attorney given in the above-identified patent.

☐ A Power of Attorney is submitted herewith.

OR
☒ I hereby appoint Practitioner(s) associated with the Customer Number identified in the box at right as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

154241

OR
☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified patent to:

☒ The address associated with the above-identified Customer Number:

OR

☐ The address associated with the Customer Number identified in the box at right:

OR

☐ Firm or
Individual Name

Address

City

State

Zip

Country

Telephone

Email

I am the:

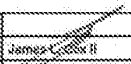
☐ Inventor, having ownership of the patent.

OR

☒ Patent owner.

☒ Statement under 37 CFR 3.73(h) (Form PTO/58/96) submitted herewith or filed on _____.

SIGNATURE of Inventor or Patent Owner

Signature		Date	08/05/2014
Name	James C. Cook II	Telephone	512-499-4462
Title and Company	Assistant General Counsel, The University of Texas System		

NOTE: Signatures of all the inventors or patent owners of the entire interest or their representative(s) are required. If more than one signature is required, submit multiple forms, check the box below, and identify the total number of forms submitted in the blank below.

☐ A total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public, which is to update (and by the USPTO to process) the file of a patent or reexamination proceeding. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 15 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Acknowledgement Receipt	
EFS ID:	33707794
Application Number:	12727049
International Application Number:	
Confirmation Number:	2452
Title of Invention:	METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION
First Named Inventor/Applicant Name:	Gustavo de Veciana
Customer Number:	119663
Filer:	Ajay K. Gambhir/Katherine Gardner
Filer Authorized By:	Ajay K. Gambhir
Attorney Docket Number:	P215467.US.01
Receipt Date:	13-SEP-2018
Filing Date:	18-MAR-2010
Time Stamp:	12:53:23
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
------------------------	----

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Assignee showing of ownership per 37 CFR 3.73	US-800802-01-01-US-REG_37CFR373b_13SEP2018.pdf	100213 faed940c57f647adff0de2d4cf3f8d200e1f150d	no	2

Warnings:

Information:					
2	Power of Attorney	US-800802-01-US-REG_POA_13SEP2018.pdf	285161	no	1
			621c0912a4a1de4ab6bc11f7fa24ca2187e31c3		
Warnings:					
Information:					
Total Files Size (in bytes):			385374		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

STATEMENT UNDER 37 CFR 3.73(b)Applicant/Patent Owner: THE BOARD OF REGENTS OF THE UNIVERSITY OF TEXAS SYSTEMApplication No./Patent No.: 12/727,049Filed/Issue Date: March 18, 2010Titled: METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION

THE BOARD OF REGENTS OF THE UNIVERSITY C, a

University

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;
2. ☐ an assignee of less than the entire right, title, and interest in (The extent (by percentage) of its ownership interest is _____ %); or
3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made) the patent application/patent identified above, by virtue of either:

- A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 025021, Frame 0634, or for which a copy therefore is attached.

OR

- B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

- ☒ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Ajay K GAMBHIR/

Signature

2018-09-13

Date

Ajay K GAMBHIR

Printed or Typed Name

Attorney for Assignee

Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/727,049	03/18/2010	Gustavo de Veciana	P215467.US.01

CONFIRMATION NO. 2452

119663
Clairvolex Inc.
Attention: Allied Inventors
111 E Broadway
Suite 725
Salt Lake City, UT 84111

MISCELLANEOUS NOTICE



Date Mailed: 09/25/2018

A communication which cannot be delivered in electronic form has been mailed to the applicant.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
 United States Patent and Trademark Office
 Address: COMMISSIONER FOR PATENTS
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 www.uspto.gov

APPLICATION NUMBER	FILING DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/727,049	03/18/2010	Gustavo de Veciana	P215467.US.01

CONFIRMATION NO. 2452

119663
 Clairvortex Inc.
 Attention: Allied Inventors
 111 E Broadway
 Suite 725
 Salt Lake City, UT 84111



OC000000102542914

Cc: 154241 IP SPRING - AI
 180 N. LASALLE ST.
 SUITE 3700
 CHICAGO, IL 60601

Date Mailed: 09/25/2018

DENIAL OF REQUEST FOR POWER OF ATTORNEY

The request for Power of Attorney filed 09/13/2018 is acknowledged. However, the request cannot be granted at this time for the reason stated below.

- ☐ The Power of Attorney you provided did not comply with the new Power of Attorney rules that became effective on June 25, 2004. See 37 CFR 1.32.
- ☒ The revocation is not signed by the applicant, the assignee of the entire interest, or one particular principal attorney having the authority to revoke.
- ☐ The Power of Attorney is from an assignee and the Certificate required by 37 CFR 3.73(b) has not been received.
- ☐ The person signing for the assignee has omitted their empowerment to sign on behalf of the assignee.
- ☐ The inventor(s) is without authority to appoint attorneys since the assignee has intervened as provided by 37 CFR 3.71.
- ☐ The signature(s) of _____, a co-inventor in this application, has been omitted. The Power of Attorney will be entered upon receipt of confirmation signed by said co-inventor(s).
- ☐ The person(s) appointed in the Power of Attorney is not registered to practice before the U.S. Patent and Trademark Office.

Questions relating to this Notice should be directed to the Application Assistance Unit.

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

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COMMISSIONER FOR PATENTS
P.O. BOX 1450
ALEXANDRIA VA 22313-1451

PRESORTED
FIRST-CLASS MAIL
U.S. POSTAGE PAID
POSTEDIGITAL
NNNNN

Clairvortex Inc.
Attention: Allied Inventors
111 E Broadway
Suite 725
Salt Lake City, UT 84111



**Courtesy Reminder for
Application Serial No: 12/727,049**

Attorney Docket No: P215467.US.01

Customer Number: 119663

Date of Electronic Notification: 09/25/2018

This is a courtesy reminder that new correspondence is available for this application. If you have not done so already, please review the correspondence. The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

An email notification regarding the correspondence was sent to the following email address(es) associated with your customer number:

Allied-Inventors-Docketing@clairvortex.com

To view your correspondence online or update your email addresses, please visit us anytime at <https://sportal.uspto.gov/secure/myportal/privatepair>. If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov or call 1-866-217-9197.

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**PATENT - POWER OF ATTORNEY
OR
REVOCATION OF POWER OF ATTORNEY
WITH A NEW POWER OF ATTORNEY
AND
CHANGE OF CORRESPONDENCE ADDRESS**

Patent Number	8,798,120
Issue Date	08/05/2014
First Named Inventor	Gustavo de Veciana
Title	METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION
Attorney Docket No.	P215467.US.01

I hereby revoke all previous powers of attorney given in the above-identified patent.

☐ A Power of Attorney is submitted herewith.OR
☒ I hereby appoint Practitioner(s) associated with the Customer Number identified in the box at right as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:**154241**OR
☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified patent to:

☒ The address associated with the above-identified Customer Number:

OR

☐ The address associated with the Customer Number identified in the box at right:

OR

☐ Firm or
Individual Name

Address

City

State

Zip

Country

Telephone

Email

I am the:

☐ inventor, having ownership of the patent.

OR

☒ Patent owner.☒ Statement under 37 CFR 3.73(h) (Form PTO/58/96) submitted herewith or filed on _____.**SIGNATURE of Inventor or Patent Owner**

Signature	Date
Name	Telephone
Title and Company	

NOTE: Signatures of all the inventors or patent owners of the entire interest or their representative(s) are required. If more than one signature is required, submit multiple forms, check the box below, and identify the total number of forms submitted in the blank below.

☐ A total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public, which is to update (and by the USPTO to process) the file of a patent or reexamination proceeding. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 15 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Acknowledgement Receipt	
EFS ID:	34031595
Application Number:	12727049
International Application Number:	
Confirmation Number:	2452
Title of Invention:	METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION
First Named Inventor/Applicant Name:	Gustavo de Veciana
Customer Number:	119663
Filer:	Ajay K. Gambhir/Katherine Gardner
Filer Authorized By:	Ajay K. Gambhir
Attorney Docket Number:	P215467.US.01
Receipt Date:	17-OCT-2018
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Application Type:	Utility under 35 USC 111(a)

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Assignee showing of ownership per 37 CFR 3.73	US-800802-01-US-REG_37CFR373b_17OCT2018.pdf	100218 1d7a434786b3c61d445c22c79bcd7833f4e6173	no	2

Warnings:

Information:					
2	Power of Attorney	US-800802-01-US- REG_POA_17OCT2018.pdf	305900	no	1
			0c294e8cb13a5800e0a9034814ef5f2fe7a35c56		
Warnings:					
Information:					
Total Files Size (in bytes):			406118		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

STATEMENT UNDER 37 CFR 3.73(b)Applicant/Patent Owner: THE BOARD OF REGENTS OF THE UNIVERSITY OF TEXAS SYSTEMApplication No./Patent No.: 12/727,049Filed/Issue Date: March 18, 2010Titled: METHODS AND COMMUNICATION SYSTEMS HAVING ADAPTIVE MODE SELECTION

THE BOARD OF REGENTS OF THE UNIVERSITY C, a

University

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;
2. ☐ an assignee of less than the entire right, title, and interest in (The extent (by percentage) of its ownership interest is _____ %); or
3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made) the patent application/patent identified above, by virtue of either:

- A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 025021, Frame 0634, or for which a copy therefore is attached.

OR

- B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

- ☒ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Ajay K. Gambhir/

Signature

2018-10-17

Date

Ajay K GAMBHIR

Printed or Typed Name

Attorney for Assignee

Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



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UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/727,049	03/18/2010	Gustavo de Veciana	P215467.US.01

CONFIRMATION NO. 2452

POWER OF ATTORNEY NOTICE



119663
Clairvolex Inc.
Attention: Allied Inventors
111 E Broadway
Suite 725
Salt Lake City, UT 84111

Date Mailed: 10/22/2018

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 10/17/2018.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/tmwilliams/



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/727,049	03/18/2010	Gustavo de Veciana	P215467.US.01

CONFIRMATION NO. 2452

POA ACCEPTANCE LETTER



154241
IP Spring - AI
180 N. LaSalle St.
Suite 3700
Chicago, IL 60601

Date Mailed: 10/22/2018

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 10/17/2018.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/tmwilliams/