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PATENT

UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): daCosta et. al
Title: MOBILITY EXTENSIONS FOR WIRELESS MULTIPLE RADIO
MESH
Filing Date: June 15, 2007
Serial Number: 11/818,899
Patent Number: 7,894,385
Conf. No.: 1037
Atty. Docket: 0357-02203

USPTO
RECEIPTS ACCOUNTING
DIVISION
2025 JAN 16 AM 9:00

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail, pursuant to 37 C.F.R. §1.8 addressed to Mail Stop Petition, Commissioner for Patents, P.O. Box 1450, Alexandria, VA, 22313-1450 on December 30, 2024.

Szymon M. Gurda
Name of Representative

Szymon M. Gurda
Signature of Representative

December 30, 2024
Date of Signature

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

903 Commerce Drive
Oak Brook, IL 60523
312-621-1330

CORRECTION OF ENTITY STATUS UNDER 37 CFR 1.28

The Applicant hereby petitions to correct an error in claiming small entity status when paying fees in this application. The facts of this case are as follows:

The applicant licensed the patent to a third party on December 20, 2014.

The applicant inadvertently failed to consider that a third-party licensee does not qualify for the small entity discount.

In light of the foregoing the applicant petitions the Office to change its records to indicate that this case is subject to large entity fees. The applicant further petitions the Office to accept its direction for payment of the deficiency owed.

The following table is a calculation and itemization of the deficiency owed:

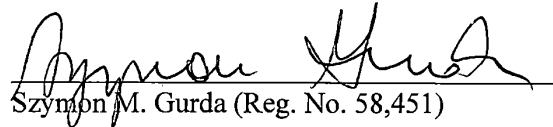
Payment Code	Description	Fee paid	Date paid	Current fee	Deficiency owed
2552	7.5 Year Maintenance Fee	\$1800	August 1, 2018	\$3760	\$1960
2553	11.5 Year Maintenance Fee	\$3850	March 31, 2022	\$7700	\$3850
				TOTAL:	\$5810

This is a full and complete disclosure of the payments mistakenly made under an assertion of small entity status in this case. The applicant contends that the mistake was made in good faith and would like to now rectify the underpayment. Attached is a credit card payment form for payment of the deficiency owed.

If a telephonic conversation would expedite the processing of this request, the Office employee is welcome to contact the undersigned.

Respectfully submitted,

CHERSKOV FLAYNIK & GURDA, LLC



Szymon M. Gurda (Reg. No. 58,451)



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.
11/818,899	02/22/2011	7894385	0357-02203	1037

27197 7590 02/02/2011
MICHAEL J. CHERSKOV
123 WEST MADISON STREET
SUITE 400
CHICAGO, IL 60602

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 830 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):

Francis daCosta, Santa Clara, CA;
Sriram Dayanandan, San Jose, CA;



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



Bib Data Sheet

CONFIRMATION NO. 1037

SERIAL NUMBER 11/818,899	FILING OR 371(c) DATE 06/15/2007 RULE	CLASS 370	GROUP ART UNIT 2617	ATTORNEY DOCKET NO. 0357-02203	
APPLICANTS Francis daCosta, Santa Clara, CA; Sriram Dayanandan, San Jose, CA; ** CONTINUING DATA ***** This appln claims benefit of 60/815,217 06/19/2006 ** FOREIGN APPLICATIONS ***** IF REQUIRED, FOREIGN FILING LICENSE GRANTED** SMALL ENTITY ** ** 07/13/2007					
Foreign Priority claimed ☐ yes ☐ no 35 USC 119 (a-d) conditions ☐ yes ☐ no ☐ Met after met Allowance Verified and Acknowledged <u>Examiner's Signature</u> <u>Initials</u>		STATE OR COUNTRY CA	SHEETS DRAWING 6	TOTAL CLAIMS 5	INDEPENDENT CLAIMS 3
ADDRESS 27197					
TITLE MOBILITY EXTENSIONS FOR WIRELESS MULTIPLE RADIO MESH					
FILING FEE RECEIVED 1240	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		

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 the Block 1 for any change of address)

271/7 7/99 01/12/2011

MICHAEL J. CHERSKOV
 123 WEST MADISON STREET
 SUITE 400
 CHICAGO, IL 60602

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.

Szymon Gurda (Depositor's name)
 /Szymon M. Gurda/ (Signature)
 January 13, 2011 via EFS-Web (Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/818,899	06/15/2007	Francis daCosta	0357-02203	0037

TITLE OF INVENTION: MOBILITY EXTENSIONS FOR WIRELESS MULTIPLE RADIO MESH

APPL. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEES DUE	DATE DUE
nonprovisional	NO	\$1510	\$0	\$0	\$1510	04/12/2011
EXAMINER	ART UNIT	CLASS-SUBCLASS				
PATEL, NIMESH	2617	370-128000				

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.303).

- ☐ Change of correspondence address (for Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-07) is 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,
 (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.

1. Cherskov & Flaynik

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

MESH DYNAMICS, INC.

(B) RESIDENCE (CITY AND STATE OR COUNTRY)

SANTA CLARA, CALIFORNIA

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 credit any overpayment, to Deposit Account Number 27197 (enclose an extra copy of this form).

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

- ☒ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27 ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant, a registered attorney or agent, or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature /Szymon M. Gurda/

Date January 13, 2011

Typed or printed name Szymon M. Gurda

Registration No. 58451

This collection of information 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 person is required to respond to a collection of information unless it displays a valid OMB control number.

Electronic Patent Application Fee Transmittal				
Application Number:		11818899		
Filing Date:		15-Jun-2007		
Title of Invention:		MOBILITY EXTENSIONS FOR WIRELESS MULTIPLE RADIO MESH		
First Named Inventor/Applicant Name:		Francis daCosta		
Filer:		Szymon Maciej Gurda		
Attorney Docket Number:		0357-02203		
Filed as Small 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	2501	1	755	755
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				755

Electronic Acknowledgement Receipt	
EFS ID:	9229236
Application Number:	11818899
International Application Number:	
Confirmation Number:	1037
Title of Invention:	MOBILITY EXTENSIONS FOR WIRELESS MULTIPLE RADIO MESH
First Named Inventor/Applicant Name:	Francis daCosta
Customer Number:	27197
Filer:	Szymon Maciej Gurda
Filer Authorized By:	
Attorney Docket Number:	0357-02203
Receipt Date:	13-JAN-2011
Filing Date:	15-JUN-2007
Time Stamp:	18:42:31
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$755
RAM confirmation Number	5659
Deposit Account	501709
Authorized User	CHERSKOV,MICHAEL J
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)	IssueFeePayment.pdf	668365	no	1
			f41ffa707d7177ef879e703e9f6ac7e60eebe3f3		
Warnings:					
Information:					
2	Fee Worksheet (PTO-875)	fee-info.pdf	30210	no	2
			1165bdc2969b1c2c743a2fc788aa6a30c0170		
Warnings:					
Information:					
Total Files Size (in bytes):			698575		
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.					



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NOTICE OF ALLOWANCE AND FEE(S) DUE

27197 7590 01/12/2011
MICHAEL J. CHERSKOV
123 WEST MADISON STREET
SUITE 400
CHICAGO, IL 60602

EXAMINER	
PATEL, NIMESH	
ART UNIT	PAPER NUMBER

2617
DATE MAILED: 01/12/2011

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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11/818,899	06/15/2007	Francis daCosta	0357-02203	1037
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TITLE OF INVENTION: MOBILITY EXTENSIONS FOR WIRELESS MULTIPLE RADIO MESH

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
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nonprovisional	NO	\$1510	\$0	\$0	\$1510	04/12/2011
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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 SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

- A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.
- B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

- A. Pay TOTAL FEE(S) DUE shown above, or
- B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

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
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P.O. Box 1450
Alexandria, Virginia 22313-1450
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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)

27197 7590 01/12/2011

MICHAEL J. CHERSKOV
123 WEST MADISON STREET
SUITE 400
CHICAGO, IL 60602

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.
-----------------	-------------	----------------------	---------------------	------------------

11/818,899	06/15/2007	Francis daCosta	0357-02203	1037
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TITLE OF INVENTION: MOBILITY EXTENSIONS FOR WIRELESS MULTIPLE RADIO MESH

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
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nonprovisional	NO	\$1510	\$0	\$0	\$1510	04/12/2011
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EXAMINER	ART UNIT	CLASS-SUBCLASS
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PATEL, NIMESH	2617	370-328000
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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 credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

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

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information 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.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/818,899	06/15/2007	Francis daCosta	0357-02203	1037
27197	7590	01/12/2011	EXAMINER	
MICHAEL J. CHERSKOV 123 WEST MADISON STREET SUITE 400 CHICAGO, IL 60602			PATEL, NIMESH	
			ART UNIT	PAPER NUMBER
			2617	
DATE MAILED: 01/12/2011				

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 578 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 578 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.

Detailed Action

1. Applicant's after final amendment filed on Nov. 26, 2010 for claims 7, 9 and 20 has been entered.
Claims 1 – 6, 8 and 10 – 19 are canceled.

Allowable Subject Matter

2. **Claims 7, 9 and 20** are allowed.
3. The following is an examiner's statement of reasons for allowance:

For independent claims 7, 9 and 20:

Handforth teaches, an access point 16 in each wireless mesh network 10 functions as an aggregation point on the wireless mesh network 10 and interconnects the wireless mesh network 10 to a higher bandwidth communication resource, such as a wide area network WAN. The mobile inter-mesh communication point functions as an access point in the lower level mesh network and as a relay point in the upper level mesh network. The access point 16 may be deployed on a mobile vehicle 26. Inter-mesh communication points deployed in personal vehicles such as cars, trucks and motorcycles, public transportation vehicles such as buses, trains and aircraft, emergency vehicles such as fire trucks and ambulances.

US PGPub: US 2005/0074019 A1 Apr. 7, 2005.

Kaidar teaches, APs may communicate with stations using, for example, frequency or BSS information and station 60 scans for channels from received beacons.

US PGPub: US 2004/0264413 A1 Dec. 30, 2004.

The entire prior-art combination disclosed fails to anticipate or render the claimed limitations of “sampling times are coordinated among multiple mesh nodes having a common current parent node, whereby the common current parent node sends tokens to each of its children in a round-robin manner” in combination with all the recited limitations of the disclosed independent claims obvious (viewed the entire claim as a whole), over any of the prior art of record, alone or in combination.

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.”

Contact Information

Any inquiry concerning this communication from the examiner should be directed to Nimesh Patel at (571) 270-1228, normally reached on Mon-Thur. 6:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rafael Perez can be reached on (571) 272-7915.

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 USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Dwayne D. Bost/
Supervisory Patent Examiner,
Art Unit 2617

/ Nimesh Patel /
Patent Examiner (2617)

Search Notes 	Application/Control No. 11818899	Applicant(s)/Patent Under Reexamination DACOSTA ET AL.
	Examiner NIMESH PATEL	Art Unit 2617

SEARCHED			
Class	Subclass	Date	Examiner
370	328, 406	4-5-2010	NP
455	436, 437, 439	4-5-2010	NP

SEARCH NOTES		
Search Notes	Date	Examiner
EAST - update search history	10-19-2010	NP
D'Agosta, Steve	4-5-2010	NP
Pate, Ajit	4-5-2010	NP

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
370	328	12-20-2010	NP

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UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Francis daCosta

Application: Mobility Extensions for Wireless Multiple Radio Mesh

Serial No.: 11/818,899

Examiner: Nimesh Patel

Art Unit: 2617

Conf. No.: 1037

OK TO ENTER: /N.P./ 12/04/2010

Case No.: 0357-02203

Submitted via EFS-Web on November 26, 2010

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

123 West Madison Street
Chicago, IL 60602
312-621-1330

AMENDMENT AND RESPONSE TO FINAL OFFICE ACTION

Dear Sir:

Applicants submit this Amendment in response to the Advisory Office Action dated November 26, 2010 and final office action dated October 28, 2010. Claims 6 and 7 were objected-to. By this amendment, the objected-to claims are consolidated. Applicant submits that the claims are allowable and requests entry of the instant amendment and that this case be passed to issuance.

Amendments to the Claims are reflected in the listing of claims beginning on page two of this paper.

Remarks/Arguments begin on page five of this paper.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S14	107	(mobile same router same train)	US-PGPUB; USPAT	OR	OFF	2010/04/05 12:37
S46	123	(mobile same router same train)	US-PGPUB; USPAT	OR	OFF	2010/10/18 08:56
S62	39	((search\$3 or looking of finding) with (mesh adj nodes))	US-PGPUB; USPAT	OR	OFF	2010/10/18 08:56
S84	36	((store same forward) with repeater) and @pd< "20050601"	US-PGPUB; USPAT	OR	OFF	2010/10/19 14:03
S88	128	(mobile same router same train)	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05
S89	3659	(bulk or group) adj hand \$5	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05
S90	1018	S89 and (train or car or plane)	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05
S95	6248	370/328.ccls.	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05
S96	401	370/406.ccls.	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05
S97	8	S95 and S96	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05
S99	9	dacosta-francis.in.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/12/04 15:05
S100	11	dayanandan-sriram.in.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/12/04 15:05
S101	1006	(ad-hoc or adhoc) same mesh same wireless	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/12/04 15:05
S102	946	(ad-hoc or adhoc) same mesh same wireless same network	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/12/04 15:05

S103	854	(ad-hoc or adhoc) same mesh same wireless same network	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05
S108	128	(mobile same router same train)	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05
S111	3659	(bulk or group) adj hand \$5	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05
S112	1018	S111 and (train or car or plane)	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05
S113	32	S112 and "370"/\$.ccls.	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05
S115	778	(mesh adj nodes)	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05
S120	4495	455/436.ccls.	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05
S121	887	455/439.ccls.	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05
S122	1270	455/437.ccls.	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05
S129	593	((dedicated or special) adj (scanning))	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05
S132	37915	(buffering or storing) with (scanning or monitoring)	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05
S133	1278	((buffering or storing) with (scanning or monitoring)) same wireless	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05
S134	96	((buffering or storing) with (scanning or monitoring)) same wireless).ab.	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05
S136	501	(scanning with communication with storing)	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05
S137	215	(scanning with communication with storing) and wireless	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05
S138	67	((scanning with communication with storing) and wireless) and @pd<"20050601"	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05
S139	1336	((communication with scanning) and wireless) and @pd<"20050601"	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05
S140	146	((data adj communication) with scanning) and wireless) and @pd<"20050601"	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05
S149	3294	(round adj robin) same buffer\$3	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05

S153	66	(round adj robin) same buffer\$3 same scanning	US-PGPUB; USPAT	OR	OFF	2010/12/04 15:05
S171	3309	(round adj robin) same buffer\$3	US-PGPUB; USPAT	OR	OFF	2010/12/20 08:51
S172	45	S171 same wireless	US-PGPUB; USPAT	OR	OFF	2010/12/20 08:51

EAST Search History (I nterference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S174	0	mesh and scanning and relay and interfering and moving and uplink and samples and discover \$3 and burre\$3 and round\$robin and token	US-PGPUB; USPAT; UPAD	OR	OFF	2010/12/20 09:04
S177	0	((discover\$3 or find\$3 or determin\$3 or sampli\$3) and (node or (access adj point) or AP) and (buffer\$3 or stor\$3) and parent and round\$robin).clm.	US-PGPUB; USPAT; UPAD	OR	OFF	2010/12/20 09:07
S178	23	((discover\$3 or find\$3 or determin\$3 or sampli\$3) and (node or (access adj point) or AP) and (buffer\$3 or stor\$3) and parent and token).clm.	US-PGPUB; USPAT; UPAD	OR	OFF	2010/12/20 09:07

12/ 20/ 2010 9:11:24 AM**C:\ Documents and Settings\ npatel10\ My Documents\ EAST\ Workspaces\ 11818899-2.wsp**

<i>Index of Claims</i> 	Application/Control No. 11818899	Applicant(s)/Patent Under Reexamination DACOSTA ET AL.
	Examiner NIMESH PATEL	Art Unit 2617

✓	Rejected
=	Allowed

-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

☐ Claims renumbered in the same order as presented by applicant					☐ CPA		☐ T.D.		☐ R.1.47	
CLAIM		DATE								
Final	Original	04/07/2010	10/22/2010	12/04/2010						
-	1	✓	✓	-						
-	2	✓	✓	-						
-	3	✓	✓	-						
-	4	✓	✓	-						
-	5	✓	✓	-						
-	6		✓	-						
1	7		O	=						
-	8		✓	-						
2	9		O	=						
-	10		✓	-						
-	11		✓	-						
-	12		✓	-						
-	13		✓	-						
-	14		✓	-						
-	15		✓	-						
-	16		✓	-						
-	17		✓	-						
-	18		✓	-						
-	19		✓	-						
3	20		O	=						

Issue Classification 	Application/Control No. 11818899	Applicant(s)/Patent Under Reexamination DACOSTA ET AL.
	Examiner NIMESH PATEL	Art Unit 2617

ORIGINAL						INTERNATIONAL CLASSIFICATION												
CLASS		SUBCLASS				CLAIMED					NON-CLAIMED							
370		328				H	0	4	W	4 / 00 (2009.01.01)								
CROSS REFERENCE(S)																		
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)																	
370	406																	
455	436	437	439															

☐ 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	-	17												
-	2	-	18												
-	3	-	19												
-	4	3	20												
-	5														
-	6														
1	7														
-	8														
2	9														
-	10														
-	11														
-	12														
-	13														
-	14														
-	15														
-	16														

/NIMESH PATEL/ Examiner.Art Unit 2617 (Assistant Examiner)	12-4-2010 (Date)	Total Claims Allowed: 3	
/Dwayne D Bost/ Supervisory Patent Examiner.Art Unit 2617 (Primary Examiner)	12/18/2010 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 2



UNITED STATES PATENT AND TRADEMARK OFFICE

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www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/818,899	06/15/2007	Francis daCosta	0357-02203	1037
27197 7590 11/26/2010 MICHAEL J. CHERSKOV 123 WEST MADISON STREET SUITE 400 CHICAGO, IL 60602			EXAMINER PATEL, NIMESH	
			ART UNIT 2617	PAPER NUMBER
			NOTIFICATION DATE 11/26/2010	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):

mail@cherskov.com
sgurda@cherskov.com
mcherskov@cherskov.com

Advisory Action Before the Filing of an Appeal Brief	Application No. 11/818,899	Applicant(s) DACOSTA ET AL.	
	Examiner NIMESH PATEL	Art Unit 2617	

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

THE REPLY FILED 18 November 2010 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

1. ☒ The reply was filed after a final rejection, but prior to or on the same day as filing a Notice of Appeal. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. The reply must be filed within one of the following time periods:

a) ☐ The period for reply expires _____ months from the mailing date of the final rejection.

b) ☒ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.

Examiner Note: If box 1 is checked, check either box (a) or (b). ONLY CHECK BOX (b) WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☒ The proposed amendment(s) filed after a final rejection, but prior to the date of filing a brief, will not be entered because

(a) ☐ They raise new issues that would require further consideration and/or search (see NOTE below);

(b) ☐ They raise the issue of new matter (see NOTE below);

(c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or

(d) ☒ They present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: See Continuation Sheet. (See 37 CFR 1.116 and 41.33(a)).

4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).

5. ☐ Applicant's reply has overcome the following rejection(s): _____.

6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).

7. ☒ For purposes of appeal, the proposed amendment(s): a) ☒ will not be entered, or b) ☐ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.

The status of the claim(s) is (or will be) as follows:

Claim(s) allowed: 9 and 20.

Claim(s) objected to: 7.

Claim(s) rejected: _____.

Claim(s) withdrawn from consideration: _____.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ The affidavit or other evidence filed after a final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).

9. ☐ The affidavit or other evidence filed after the date of filing a Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing a good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).

10. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

11. ☒ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: See Continuation Sheet.

12. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____

13. ☐ Other: _____.

/Dwayne D. Bost/
Supervisory Patent Examiner, Art Unit 2617

Continuation of 3. NOTE: All the features from which the objected claim depends on, are not being incorporated when writing an independent claim 7, as claim 7 was depending on claim 6, as if now claim 6 is still not canceled and incorporated into independent claim 7, would require further search and/or consideration.

Continuation of 11. does NOT place the application in condition for allowance because: All the features from which the objected claim depends on, are not being incorporated when writing an independent claim 7, as claim 7 was depending on claim 6, as if now claim 6 is still not canceled and incorporated into independent claim 7, would require further search and/or consideration..

UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Francis daCosta

Application: Mobility Extensions for Wireless Multiple Radio Mesh

Serial No.: 11/818,899

Examiner: Nimesh Patel

Art Unit: 2617

DO NOT ENTER: /N.P./

Conf. No.: 1037

11/19/2010

Case No.: 0357-02203

Submitted via EFS-Web on November 18, 2010

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

123 West Madison Street
Chicago, IL 60602
312-621-1330

AMENDMENT AND RESPONSE TO FINAL OFFICE ACTION

Dear Sir:

Applicants submit this Amendment in response to the Office Action dated October 28, 2010. Claims 1, 2, 4, 6, and 8-19 were rejected while claims 7, 9, and 20 were objected-to. By this amendment, the objected-to claims are re-written in independent form. Applicant submits that the claims are allowable and requests entry of the instant amendment and that this case be passed to issuance.

Amendments to the Claims are reflected in the listing of claims beginning on page two of this paper.

Remarks/Arguments begin on page five of this paper.

UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Francis daCosta

Application: Mobility Extensions for Wireless Multiple Radio Mesh

Serial No.: 11/818,899

Examiner: Nimesh Patel

Art Unit: 2617

Conf. No.: 1037

Case No.: 0357-02203

Submitted via EFS-Web on November 26, 2010

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

123 West Madison Street
Chicago, IL 60602
312-621-1330

AMENDMENT AND RESPONSE TO FINAL OFFICE ACTION

Dear Sir:

Applicants submit this Amendment in response to the Advisory Office Action dated November 26, 2010 and final office action dated October 28, 2010. Claims 6 and 7 were objected-to. By this amendment, the objected-to claims are consolidated. Applicant submits that the claims are allowable and requests entry of the instant amendment and that this case be passed to issuance.

Amendments to the Claims are reflected in the listing of claims beginning on page two of this paper.

Remarks/Arguments begin on page five of this paper.

AMENDMENTS TO THE CLAIMS

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

1-6. (Cancelled)

1 7. (Currently Amended) ~~The method of claim 6~~
2 A method for operating a mesh network having a plurality of mesh nodes, comprising:
3 for at least one mesh node of the mesh network, scanning a Radio Frequency (RF)
4 environment using a dedicated scanning radio to determine a new potential parent
5 mesh node for connecting with said at least one mesh node;
6 wherein said at least one mesh node includes, in addition to said scanning radio, at
7 least two relay radios in each mesh element and wherein said scanning radio and said
8 at least two relay radios operate on different non-interfering channels;
9 wherein said at least one mesh node is moving sufficiently rapidly that it may lose
10 connectivity with its current parent mesh node, and wherein said dedicated scanning
11 radio is utilized for discovery of potential new parent nodes and sampling of discovered
12 potential new parent nodes is performed by an uplink relay radio of said at least one
13 mesh node;
14 wherein while said at least one mesh node samples potential new parent nodes,
15 packets to be sent to said at least one mesh node from its current parent node are
16 buffered by the current parent node, and packets to be sent from said at least one mesh
17 node to its current parent are buffered by said at least one mesh node; and
18 wherein sampling times are coordinated among multiple mesh nodes having a common
19 current parent node whereby the common current parent node sends tokens to each of
20 ~~[[it's]]~~ its children in a round-robin manner.

8. (Cancelled)

9. (Currently Amended) ~~The network of claim 8~~ A mesh network comprising:
a plurality of mesh nodes; wherein
at least one mesh node of the mesh network is configured to scan a Radio
Frequency (RF) environment using a dedicated scanning radio to determine a new
potential parent mesh node for connecting with said at least one mesh node; wherein
said at least one mesh node includes, in addition to the scanning radio, at least
two relay radios in each mesh element and wherein said scanning radio and said at
least two relay radios operate on different non-interfering channels;
wherein while said at least one mesh node samples potential new parent nodes,
packets to be sent to said at least one mesh node from its current parent node are
buffered by the current parent node, and packets to be sent from said at least one mesh
node to its current parent are buffered by said at least one mesh node;
wherein sampling times are coordinated among multiple mesh nodes having a common
current parent node whereby the common current parent node sends tokens to each of
its children in a round-robin manner.

10-19. (Cancelled)

20. (Currently Amended) ~~The network of claim 19~~ A mesh network comprising:
a plurality of mesh nodes; wherein each node within said plurality of nodes
comprises at least three radios further including:
a first relay radio operating on a first RF channel at a first point in time and
dedicated to uplink connections to a single current parent node;
a second relay radio operating on a second RF channel at a first point in time
and dedicated to downlink connections to zero or more child nodes; and
a dedicated scanning radio operating on a third RF channel at a first point in time
and configured to scan a Radio Frequency (RF) environment to discover new potential
parent mesh nodes for connecting with said first relay radio; wherein
said first, second, and third RF channels are different from each other

wherein after said dedicated scanning radio discovers a potential new parent node, said first relay radio samples the RF link to said potential new parent node using its uplink radio and concurrent with said sampling, packets to be sent to the mesh node from its current parent node are buffered by the current parent node, and packets to be sent from the mesh node to its current parent node are buffered by the mesh node
wherein sampling times are coordinated among multiple mesh nodes having a common current parent node whereby the common current parent node sends tokens to each of ~~[[it's]]~~ its children in a round-robin manner.

REMARKS

In the Advisory Action dated November 26, 2010, claims 6 and 7 were objected to. Applicants hereby cancel claim 6, incorporating limitations of same into claim 7. As reviewed at the time of the final office action, claim 7 depended from claim 6, which in turn depended on claim 2, and claim 2 depended on claim 1. As presently amended, claim 7 incorporates the limitations of claims 1, 2, 6, and 7. Specifically:

- Claim 1 is contained in lines 2-8
- Claim 2 is contained in the wherein clause of lines 9-13
- Claim 6 is contained in the wherein clause of lines 14-17 and
- Claim 7 is contained in the final wherein clause of lines 18-20.

In regards to claim 2's additional limitations, there did not appear to be antecedent basis for the element "the uplink radio" therefore, line 12 now recites "an uplink relay radio." Otherwise the limitations were copied from the dependent claims.

Consequently, applicant respectfully submits that the pending claims define allowable subject matter and that the amendment to the claims be entered after Final Office Action.

While no fee payment accompanies this Response, the Commissioner is authorized to charge any necessary fees to the undersigned's Deposit Account No. 501709.

An earnest attempt has been made hereby to address the October 28, 2010 Official Action and November 26, 2010 advisory action. All claims are deemed in condition for allowance and same is respectfully requested. If the Examiner feels that a telephonic interview will expedite allowance, the Examiner is respectfully urged to contact the undersigned. Claims 7, 9, and 20 are pending. Applicant requests reconsideration of all of the aforementioned claims.

Respectfully Submitted,

November 26, 2010

/Szymon M. Gurda/
Szymon M. Gurda
Reg. No. 58,451

Electronic Acknowledgement Receipt	
EFS ID:	8916097
Application Number:	11818899
International Application Number:	
Confirmation Number:	1037
Title of Invention:	Mobility extensions for wireless multiple radio mesh
First Named Inventor/Applicant Name:	Francis daCosta
Customer Number:	27197
Filer:	Szymon Maciej Gurda
Filer Authorized By:	
Attorney Docket Number:	0357-02203
Receipt Date:	26-NOV-2010
Filing Date:	15-JUN-2007
Time Stamp:	13:55:46
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		Response.pdf	87648	yes	5
			84ed72d4d51dd03cb2e5cfd265db5d1b920f55b		

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Amendment After Final	1	1
	Claims	2	4
	Applicant Arguments/Remarks Made in an Amendment	5	5
Warnings:			
Information:			
Total Files Size (in bytes):		87648	
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 APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 11/818,899		Filing Date 06/15/2007		☐ To be Mailed	
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APPLICATION AS FILED – PART I						OTHER THAN SMALL ENTITY			
(Column 1)		(Column 2)		SMALL ENTITY ☐		OR		SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)	
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	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		N/A		
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A		N/A		N/A		
TOTAL CLAIMS (37 CFR 1.16(l))	minus 20 =	*	X \$ =		X \$ =		X \$ =		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =		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.			TOTAL		TOTAL				

APPLICATION AS AMENDED – PART II						OTHER THAN SMALL ENTITY					
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY	
AMENDMENT	11/26/2010	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)			
	Total (37 CFR 1.16(o))	* 3	Minus	** 20	= 0	X \$ =	OR	X \$2=	0		
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X \$ =	OR	X \$220=	0		
	☐ Application Size Fee (37 CFR 1.16(s))										
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
					TOTAL ADD'L FEE		TOTAL ADD'L FEE	0			

(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY	
AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)				
	Total (37 CFR 1.16(o))	*	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		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:
/JACQUELINE M. WEIR/

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.

UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Francis daCosta

Application: Mobility Extensions for Wireless Multiple Radio Mesh

Serial No.: 11/818,899

Examiner: Nimesh Patel

Art Unit: 2617

Conf. No.: 1037

Case No.: 0357-02203

Submitted via EFS-Web on November 18, 2010

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

123 West Madison Street
Chicago, IL 60602
312-621-1330

AMENDMENT AND RESPONSE TO FINAL OFFICE ACTION

Dear Sir:

Applicants submit this Amendment in response to the Office Action dated October 28, 2010. Claims 1, 2, 4, 6, and 8-19 were rejected while claims 7, 9, and 20 were objected-to. By this amendment, the objected-to claims are re-written in independent form. Applicant submits that the claims are allowable and requests entry of the instant amendment and that this case be passed to issuance.

Amendments to the Claims are reflected in the listing of claims beginning on page two of this paper.

Remarks/Arguments begin on page five of this paper.

AMENDMENTS TO THE CLAIMS

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

1-5. (Cancelled)

6. (Currently Amended) The method of claim ~~[[2]]~~ 7 wherein while said at least one mesh node samples potential new parent nodes, packets to be sent to said at least one mesh node from its current parent node are buffered by the current parent node, and packets to be sent from said at least one mesh node to its current parent are buffered by said at least one mesh node.

7. (Currently Amended) ~~The method of claim 6~~

A method for operating a mesh network having a plurality of mesh nodes, comprising:
for at least one mesh node of the mesh network, scanning a Radio Frequency (RF)
environment using a dedicated scanning radio to determine a new potential parent
mesh node for connecting with said at least one mesh node;

wherein said at least one mesh node includes, in addition to said scanning radio, at
least two relay radios in each mesh element and wherein said scanning radio and said
at least two relay radios operate on different non-interfering channels; and

wherein said at least one mesh node is moving sufficiently rapidly that it may lose
connectivity with its current parent mesh node, and wherein said dedicated scanning
radio is utilized for discovery of potential new parent nodes and sampling of discovered
potential new parent nodes is performed by the uplink radio of said at least one mesh
node;

wherein while said at least one mesh node samples potential new parent nodes,
packets to be sent to said at least one mesh node from its current parent node are
buffered by the current parent node, and packets to be sent from said at least one mesh
node to its current parent are buffered by said at least one mesh node; and

wherein sampling times are coordinated among multiple mesh nodes having a common current parent node whereby the common current parent node sends tokens to each of ~~[[it's]]~~ its children in a round-robin manner.

8. (Cancelled)

9. (Currently Amended) ~~The network of claim 8~~ A mesh network comprising:
a plurality of mesh nodes; wherein
at least one mesh node of the mesh network is configured to scan a Radio
Frequency (RF) environment using a dedicated scanning radio to determine a new
potential parent mesh node for connecting with said at least one mesh node; wherein
said at least one mesh node includes, in addition to the scanning radio, at least
two relay radios in each mesh element and wherein said scanning radio and said at
least two relay radios operate on different non-interfering channels;
wherein while said at least one mesh node samples potential new parent nodes,
packets to be sent to said at least one mesh node from its current parent node are
buffered by the current parent node, and packets to be sent from said at least one mesh
node to its current parent are buffered by said at least one mesh node;
wherein sampling times are coordinated among multiple mesh nodes having a common current parent node whereby the common current parent node sends tokens to each of its children in a round-robin manner.

10-19. (Cancelled)

20. (Currently Amended) ~~The network of claim 19~~ A mesh network comprising:
a plurality of mesh nodes; wherein each node within said plurality of nodes
comprises at least three radios further including:
a first relay radio operating on a first RF channel at a first point in time and
dedicated to uplink connections to a single current parent node;
a second relay radio operating on a second RF channel at a first point in time
and dedicated to downlink connections to zero or more child nodes; and

a dedicated scanning radio operating on a third RF channel at a first point in time and configured to scan a Radio Frequency (RF) environment to discover new potential parent mesh nodes for connecting with said first relay radio; wherein
said first, second, and third RF channels are different from each other
wherein after said dedicated scanning radio discovers a potential new parent node, said first relay radio samples the RF link to said potential new parent node using its uplink radio and concurrent with said sampling, packets to be sent to the mesh node from its current parent node are buffered by the current parent node, and packets to be sent from the mesh node to its current parent node are buffered by the mesh node
wherein sampling times are coordinated among multiple mesh nodes having a common current parent node whereby the common current parent node sends tokens to each of [[it's]] its children in a round-robin manner.

REMARKS

In a Final Office Action dated October 28, 2010, claims 1, 2, 4, 6, and 8-19 were rejected while claims 7, 9, and 20 were objected-to. Applicants hereby cancel claims 1-5, 8, 10-19 without prejudice to prosecution of these claims in a continuation filing. The application is therefore being limited to the objected-to claims 7, 9, and 20 along with claims depending thereto. The objected-to claims have been re-written into independent form with all limitations of the parent claims.

Separately, typographical errors in claims 7, 20 have also been corrected (a change from it's to its). Applicant submits that this change does not alter the scope of the previously-allowable claims.

Consequently, applicant respectfully submits that the pending claims define allowable subject matter and that the amendment to the claims be entered after Final Office Action.

While no fee payment accompanies this Response, the Commissioner is authorized to charge any necessary fees to the undersigned's Deposit Account No. 501709.

An earnest attempt has been made hereby to address the October 28, 2010 Official Action. All claims are deemed in condition for allowance and same is respectfully requested. If the Examiner feels that a telephonic interview will expedite allowance, the Examiner is respectfully urged to contact the undersigned. Claims 6, 7, 8, 9, and 20 are pending. Applicant requests reconsideration of all of the aforementioned claims.

Respectfully Submitted,

November 18, 2010

/Szymon M. Gurda/
Szymon M. Gurda
Reg. No. 58,451

Electronic Acknowledgement Receipt	
EFS ID:	8870327
Application Number:	11818899
International Application Number:	
Confirmation Number:	1037
Title of Invention:	Mobility extensions for wireless multiple radio mesh
First Named Inventor/Applicant Name:	Francis daCosta
Customer Number:	27197
Filer:	Szymon Maciej Gurda
Filer Authorized By:	
Attorney Docket Number:	0357-02203
Receipt Date:	18-NOV-2010
Filing Date:	15-JUN-2007
Time Stamp:	17:28:45
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		2203Response.pdf	74678	yes	5
			fb9d3635bf337c4b10e7727f28d3ec218ee02df5		

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Amendment After Final	1	1
	Claims	2	4
	Applicant Arguments/Remarks Made in an Amendment	5	5
Warnings:			
Information:			
Total Files Size (in bytes):		74678	
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 11/818,899		Filing Date 06/15/2007		☐ To be Mailed	
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APPLICATION AS FILED – PART I						OTHER THAN SMALL ENTITY					
(Column 1)		(Column 2)		SMALL ENTITY ☐		OR		SMALL ENTITY			
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)			
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	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		N/A				
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A		N/A		N/A				
TOTAL CLAIMS (37 CFR 1.16(l))	minus 20 =	*	X \$ =		OR	X \$ =					
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =		OR	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)		(Column 3)		SMALL ENTITY		OR		OTHER THAN SMALL ENTITY	
AMENDMENT	11/18/2010	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(o))	* 4	Minus	** 20	= 0	X \$ =		OR	X \$2=	0	
	Independent (37 CFR 1.16(h))	* 3	Minus	***4	= 0	X \$ =		OR	X \$220=	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		OR	TOTAL ADD'L FEE	0	
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		OTHER THAN SMALL ENTITY	
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(o))	*	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		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". *** 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:
/MARQUETTA MCGEE/

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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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/818,899	06/15/2007	Francis daCosta	0357-02203	1037
27197 7590 10/28/2010 MICHAEL J. CHERSKOV 123 WEST MADISON STREET SUITE 400 CHICAGO, IL 60602			EXAMINER PATEL, NIMESH	
			ART UNIT 2617	PAPER NUMBER
			NOTIFICATION DATE 10/28/2010	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):

mail@cherskov.com
sgurda@cherskov.com
mcherskov@cherskov.com

Office Action Summary	Application No.		Applicant(s)	
	11/818,899		DACOSTA ET AL.	
	Examiner		Art Unit	
NIMESH PATEL		2617		

-- 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 16 August 2010.

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

3) ☐ 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

4) ☒ Claim(s) 1,2,4 and 6-20 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1,2,4,6 and 8-19 is/are rejected.

7) ☐ Claim(s) 7, 9 and 20 is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

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

10) ☐ 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).

11) ☐ 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

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) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.	4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____. 5) ☐ Notice of Informal Patent Application 6) ☐ Other: _____.
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Detailed Action

Response to Arguments

1. Applicant's arguments filed on Aug. 16, 2010 with respect to claims 1 – 2, 4 and 6 - 20 have been considered but are moot in view of the new ground(s) of rejection.

Claims 3 and 5 are canceled.

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.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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.

Claims 1 – 2, 4, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable by

Handforth, US PGPub: US 2005/0074019 A1 Apr. 7, 2005 and in view of
Kaidar US PGPub: US 2004/0264413 A1 Dec. 30, 2004.

Regarding claim 1, Handforth discloses,

a method for operating a mesh network having a plurality of mesh nodes (an access point 16 in each wireless mesh network 10 functions as an aggregation point on the wireless mesh network 10 and interconnects the wireless mesh network 10 to a higher bandwidth communication resource, such as a wide area network WAN. The mobile inter-mesh communication point functions as an access point in the lower level mesh network and as a relay point in the upper level mesh network. The access point 16 may be deployed on a mobile vehicle 26. Inter-mesh communication points deployed in personal vehicles such as cars, trucks and motorcycles, public transportation vehicles such as buses, trains and

aircraft, emergency vehicles such as fire trucks and ambulances – ABSTRACT, paragraphs 0025, 0032), comprising:

for at least one mesh node of the mesh network (the access point 16 may be deployed on a mobile vehicle 26. Inter-mesh communication points deployed in personal vehicles such as cars, trucks and motorcycles, public transportation vehicles such as buses, trains and aircraft, emergency vehicles such as fire trucks and ambulances – ABSTRACT, paragraphs 0025, 0032), scanning a Radio Frequency – RF environment (the meshes operates in different portions of the spectrum – e.g., at 2.4 GHz and 5.0 GHz, or any other convenient area of the spectrum, by utilizing different protocols or coding schemes in different meshes, or by using different antennas designed to perform differently in the two meshes.– paragraph 0013) to determine a new potential parent mesh node for connecting with said at least one mesh node (where more than one potential inter-mesh communication is available in a given area of the level, the selection to service particular network users may be made in many different ways, reads on the claimed feature, scanning a RF environment to determine a new potential parent mesh node for connecting with – paragraph 0043. Access point 16 acts as an 802.11 access point in first level mesh network, a relay point in the second level mesh network. Access point functions operates as a relay point, an access point and a station in at least two mesh networks - paragraphs 0024, 0034,

0038); wherein

said at least one mesh node include, in addition to said scanning radio, at least two relay radios in each mesh element and wherein said scanning radio and said at least two relay radios operate on different non-interfering channels (the two wireless mesh networks are formed using different technologies and can coexist - paragraph 0024. Different 802.11 protocols can be used in both the first and second level mesh networks, or a non 802.11 protocol can be used for one of the meshes – paragraph 0038. The meshes operate in different portions of the spectrum – e.g., at 2.4 GHz and 5.0 GHz, or any other convenient area of the spectrum, by utilizing different protocols or coding schemes in different meshes, or by using different antennas designed to perform differently in the two meshes. The mobile inter-mesh communication point may be one device configured to operate on both meshes, or may be formed of several devices, each configured to operate on one of the meshes, and which are configured to communicate with each other. Where, several devices are used, a signal path between the two devices may be formed – e.g., using a non-mesh wireless link or a non-wireless link – paragraph 0013),

but, does not clearly disclose, scanning a Radio Frequency – RF environment **“using a dedicated scanning radio”**.

Kaidar teaches, APs may communicate with stations using, for example, frequency or BSS information (paragraph 0014) and station 60 scans for channels from received beacons (paragraphs 0015, 0018, 0020).

It would have been obvious to one of ordinary skill in the art, at the time of invention, to modify the mobile inter-mesh communication points in a multi-level wireless mesh network of Handforth (Handforth, ABSTRACT, paragraphs 0025, 0032), wherein, the inter-mesh communication point deployed in personal vehicles such as cars, trucks and motorcycles, public transportation vehicles such as buses, trains and aircraft, emergency vehicles such as fire trucks and ambulances, would have implemented, the teaching of Kaidar (Kaidar, paragraphs 0014, 0015, 0018, 0020) for the benefit of achieving a system that uses beacon from neighboring access points for network and/or access point reselection.

Regarding claim 2, Handforth discloses,

the method of claim 1, wherein said at least one mesh node is moving sufficiently rapidly that it may lose connectivity with its current parent mesh node, and wherein, said dedicated scanning radio is utilized for “discovery of potential new parent nodes and sampling of discovered potential new parent nodes is performed by the uplink radio of said at least one mesh” (where access to an

inter-mesh communication point is no longer available, or the inter-mesh communication point moves out of range from the mesh network users, it is necessary to select another inter-mesh communication point to service the wireless mesh. Hand-offs between inter-mesh communication points may take place in any conventional manner – paragraph 0042. The inter-mesh communication points are stationary or moving. The access points may be fixed or mobile and deployed on in vehicles. Here, the mobile inter-mesh communication point is scanning for available potential new nodes, is performed by the uplink radio of the inter-mesh communication point, as looking from the inter-mesh communication point towards the system is the uplink radio – paragraphs 0025, 0043, 0049),

but, does not clearly disclose, **“using a dedicated scanning radio”**, is utilized for discovery of potential new parent nodes.

Kaidar teaches, APs may communicate with stations using, for example, one frequency or channel at a time and provides a Basic Service Set BSS information according to IEEE 802.11 standard to clients (paragraph 0014) and station 60 scans for channels from received beacons (paragraphs 0015, 0018, 0020).

It would have been obvious to one of ordinary skill in the art, at the time of

invention, to modify the mobile inter-mesh communication points in a multi-level wireless mesh network of Handforth (Handforth, ABSTRACT, paragraphs 0025, 0032), wherein, the inter-mesh communication point deployed in personal vehicles such as cars, trucks and motorcycles, public transportation vehicles such as buses, trains and aircraft, emergency vehicles such as fire trucks and ambulances, would have implemented, the teaching of Kaidar (Kaidar, paragraphs 0014, 0015, 0018, 0020) for the benefit of achieving a system that uses beacon from neighboring access points for network and/or access point reselection.

Regarding claim 4, Handforth discloses,

a mesh network (an access point 16 in each wireless mesh network 10 functions as an aggregation point on the wireless mesh network 10 and interconnects the wireless mesh network 10 to a higher bandwidth communication resource, such as a wide area network WAN. The mobile inter-mesh communication point functions as an access point in the lower level mesh network and as a relay point in the upper level mesh network. The access point 16 may be deployed on a mobile vehicle 26. Inter-mesh communication points deployed in personal vehicles such as cars, trucks and motorcycles, public transportation vehicles such as buses, trains and aircraft, emergency vehicles such as fire trucks and

ambulances. – ABSTRACT, paragraphs 0025, 0032) comprising:

a plurality of mesh nodes; wherein at least one mesh node of the mesh network is configured to sample an Radio Frequency – RF (the meshes operates in different portions of the spectrum – e.g., at 2.4 GHz and 5.0 GHz, or any other convenient area of the spectrum, by utilizing different protocols or coding schemes in different meshes, or by using different antennas designed to perform differently in the two meshes.– paragraph 0013) to determine a new potential parent mesh node for connecting with said at least one mesh node (where more than one potential inter-mesh communication is available in a given area of the level, the selection to service particular network users may be made in many different ways, reads on the claimed feature, scanning the RF environment to determine a new potential parent mesh node for connecting with – paragraph 0043. Access point 16 acts as an 802.11 access point in first level mesh network, a relay point in the second level mesh network. Access point functions operates as a relay point, an access point and a station in at least two mesh networks - paragraphs 0024, 0034, 0038); wherein

said at least one mesh node includes, in addition to the scanning radio, at least two relay radios in each mesh element and wherein said scanning radio and said at least two relay radio operates on different non-interfering channels (the two wireless mess networks are formed using different technologies and can coexists

- paragraph 0024. Different 802.11 protocols can be used in both the first and second level mesh networks, or a non 802.11 protocol can be used for one of the meshes – paragraph 0038. The meshes operates in different portions of the spectrum – e.g., at 2.4 GHz and 5.0 GHz, or any other convenient area of the spectrum, by utilizing different protocols or coding schemes in different meshes, or by using different antennas designed to perform differently in the two meshes. The mobile inter-mesh communication point may be one device configured to operate on both meshes, or may be formed of several devices, each configured to operate on one of the meshes, and which are configured to communicate with each other. Where, several devices are used, a signal path between the two devices may be formed – e.g., using a non-mesh wireless link or a non-wireless link – paragraph 0013),

but, does not clearly disclose, scanning a Radio Frequency – RF environment **“using a dedicated scanning radio”**.

Kaidar teaches, APs may communicate with stations using, for example, one frequency or channel at a time and provides a Basic Service Set BSS information according to IEEE 802.11 standard to clients (paragraph 0014) and station 60 scans for channels from received beacons (paragraphs 0015, 0018, 0020).

It would have been obvious to one of ordinary skill in the art, at the time of

invention, to modify the mobile inter-mesh communication points in a multi-level wireless mesh network of Handforth (Handforth, ABSTRACT, paragraphs 0025, 0032), wherein, the inter-mesh communication point deployed in personal vehicles such as cars, trucks and motorcycles, public transportation vehicles such as buses, trains and aircraft, emergency vehicles such as fire trucks and ambulances, would have implemented, the teaching of Kaidar (Kaidar, paragraphs 0014, 0015, 0018, 0020) for the benefit of achieving a system that uses beacon from neighboring access points for network and/or access point reselection.

Regarding claim 18, Handforth discloses,

a mesh network (an access point 16 in each wireless mesh network 10 functions as an aggregation point on the wireless mesh network 10 and interconnects the wireless mesh network 10 to a higher bandwidth communication resource, such as a wide area network WAN. The mobile inter-mesh communication point functions as an access point in the lower level mesh network and as a relay point in the upper level mesh network. The access point 16 may be deployed on a mobile vehicle 26. Inter-mesh communication points deployed in personal vehicles such as cars, trucks and motorcycles, public transportation vehicles such as buses, trains and aircraft, emergency vehicles such as fire trucks and

ambulances. – ABSTRACT, paragraphs 0025, 0032) comprising:

a plurality of mesh nodes (the access point 16 may be deployed on a mobile vehicle 26. Inter-mesh communication points deployed in personal vehicles such as cars, trucks and motorcycles, public transportation vehicles such as buses, trains and aircraft, emergency vehicles such as fire trucks and ambulances – ABSTRACT, paragraphs 0025, 00320; wherein each node within said plurality of nodes comprises at least three radios further including:

a first relay radio (the access point 16 may be deployed on a mobile vehicle 26. Inter-mesh communication points deployed in personal vehicles such as cars, trucks and motorcycles, public transportation vehicles such as buses, trains and aircraft, emergency vehicles such as fire trucks and ambulances – ABSTRACT, paragraphs 0025, 0032) operating on a first RF channel at a first point in time and dedicated to uplink connections to a single current parent node (the two wireless mesh networks are formed using different technologies and can coexist - paragraph 0024. Different 802.11 protocols can be used in both the first and second level mesh networks, or a non 802.11 protocol can be used for one of the meshes – paragraph 0038. The meshes operate in different portions of the spectrum – e.g., at 2.4 GHz and 5.0 GHz, or any other convenient area of the spectrum, by utilizing different protocols or coding schemes in different meshes, or by using different antennas designed to perform differently in the two meshes.

The mobile inter-mesh communication point may be one device configured to operate on both meshes, or may be formed of several devices, each configured to operate on one of the meshes, and which are configured to communicate with each other. Where, several devices are used, a signal path between the two devices may be formed – e.g., using a non-mesh wireless link or a non-wireless link – paragraph 0013);

a second relay radio operating on a second RF channel at a first point in time (the access point 16 may be deployed on a mobile vehicle 26. Inter-mesh communication points deployed in personal vehicles such as cars, trucks and motorcycles, public transportation vehicles such as buses, trains and aircraft, emergency vehicles such as fire trucks and ambulances – ABSTRACT, paragraphs 0025, 00320 and dedicated to downlink connections to zero or more child nodes (the two wireless mess networks are formed using different technologies and can coexists - paragraph 0024. Different 802.11 protocols can be used in both the first and second level mesh networks, or a non 802.11 protocol can be used for one of the meshes – paragraph 0038. The meshes operates in different portions of the spectrum – e.g., at 2.4 GHz and 5.0 GHz, or any other convenient area of the spectrum, by utilizing different protocols or coding schemes in different meshes, or by using different antennas designed to perform differently in the two meshes. The mobile inter-mesh communication point may be one device configured to operate on both meshes, or may be

formed of several devices, each configured to operate on one of the meshes, and which are configured to communicate with each other. Where, several devices are used, a signal path between the two devices may be formed – e.g., using a non-mesh wireless link or a non-wireless link – paragraph 0013. The mobile access point participates as a relay point in a higher level wireless mesh network to enable request for data to have multiple paths through the higher level wireless mesh network to a source of data or other higher bandwidth transmission capacity – paragraph 0011. A first level mesh cluster has access points on two second level mesh networks. The first level access points 16 are able to participate in the second level wireless mesh network as relay points and/or second level access points – Fig. 4, paragraphs 0017, 0032, 0034); and

a scanning radio operating on a third RF channel at a first point in time and configured to scan a Radio Frequency - RF environment to discover new potential parent mesh nodes for connecting with said first relay radio (the two wireless mess networks are formed using different technologies and can coexists - paragraph 0024. Different 802.11 protocols can be used in both the first and second level mesh networks, or a non 802.11 protocol can be used for one of the meshes – paragraph 0038. The meshes operates in different portions of the spectrum – e.g., at 2.4 GHz and 5.0 GHz, or any other convenient area of the spectrum, by utilizing different protocols or coding schemes in different meshes, or by using different antennas designed to perform differently in the two meshes.

The mobile inter-mesh communication point may be one device configured to operate on both meshes, or may be formed of several devices, each configured to operate on one of the meshes, and which are configured to communicate with each other. Where, several devices are used, a signal path between the two devices may be formed – e.g., using a non-mesh wireless link or a non-wireless link – paragraph 0013. The mobile access point participates as a relay point in a higher level wireless mesh network to enable request for data to have multiple paths through the higher level wireless mesh network to a source of data or other higher bandwidth transmission capacity – paragraph 0011. A first level mesh cluster has access points on two second level mesh networks. The first level access points 16 are able to participate in the second level wireless mesh network as relay points and/or second level access points – Fig. 4, paragraphs 0017, 0032, 0034),

but, does not clearly disclose, scanning a Radio Frequency – RF environment using “**a dedicated scanning radio operating**”, and “said first, second, and third RF channels are different from each other”.

Kaidar teaches, APs may communicate with stations using, for example, one frequency or channel at a time and provides a Basic Service Set BSS information according to IEEE 802.11 standard to clients (paragraph 0014) and station 60 scans for channels from received beacons (paragraphs 0015, 0018, 0020).

It would have been obvious to one of ordinary skill in the art, at the time of invention, to modify the mobile inter-mesh communication points in a multi-level wireless mesh network of Handforth (Handforth, ABSTRACT, paragraphs 0025, 0032), wherein, the inter-mesh communication point deployed in personal vehicles such as cars, trucks and motorcycles, public transportation vehicles such as buses, trains and aircraft, emergency vehicles such as fire trucks and ambulances, would have implemented, the teaching of Kaidar (Kaidar, paragraphs 0014, 0015, 0018, 0020) for the benefit of achieving a system that uses beacon from neighboring access points for network and/or access point reselection.

Regarding claim 19, it is similar to claim 2 above, and is rejected on the same grounds.

Claims 6, 8, 10 - 17 are rejected under 35 U.S.C. 103(a) as being unpatentable by

Handforth, US PGPub: US 2005/0074019 A1 Apr. 7, 2005 and in view of

Kaidar US PGPub: US 2004/0264413 A1 Dec. 30, 2004, and further in view of

Dinkins US Patent: 5,633,876 May 27, 1997.

Regarding claim 6, both Handforth and Kaidar discloses all the claimed features,

but, does not clearly disclose, “packets buffered by the current parent node, and packets buffered by said at least one mesh node”.

Dinkins teaches, a store and forward repeater receives data signals transmitted by a local base station repeater cell and forwards the signals to local subscriber units. Responses from the local subscriber units are transmitted from the local subscriber back to the local base station repeater cell (ABSTRACT, Fig. 2, column 2, lines 27 – 44, column 3, lines 36 – 54)

It would have been obvious to one of ordinary skill in the art, at the time of invention, to modify the mobile inter-mesh communication points in a multi-level wireless mesh network of combined Handforth and Kaidar (Handforth, ABSTRACT, paragraphs 0025, 0032), wherein, the inter-mesh communication point deployed in personal vehicles such as cars, trucks and motorcycles, public transportation vehicles such as buses, trains and aircraft, emergency vehicles such as fire trucks and ambulances, would have further implemented, the teaching of store and forward repeater of Dinkins (Dinkins, ABSTRACT, Fig. 2, column 2, lines 27 – 44, column 3, lines 36 – 54) for a system to effective transmission of data signals from a local base station repeater cell to subscriber

units and from the subscribers to the local base station repeater cell, two-way data communication (Dinkins, column 2, lines 1 – 10).

Regarding claim 8, it is similar to claim 6 above and is rejected on the same grounds.

Regarding claim 10, Handforth discloses,

a method for discovering, sampling, and connecting to a new parent node in a mobile mesh network having a plurality of mesh nodes, for at least one mesh node having separate uplink and downlink radios (an access point 16 in each wireless mesh network 10 functions as an aggregation point on the wireless mesh network 10 and interconnects the wireless mesh network 10 to a higher bandwidth communication resource, such as a wide area network WAN. The mobile inter-mesh communication point functions as an access point in the lower level mesh network and as a relay point in the upper level mesh network. The access point 16 may be deployed on a mobile vehicle 26. Inter-mesh communication points deployed in personal vehicles such as cars, trucks and motorcycles, public transportation vehicles such as buses, trains and aircraft, emergency vehicles such as fire trucks and ambulances – ABSTRACT, paragraphs 0025, 0032), comprising:

a. scanning to discover all parent mesh nodes in the vicinity of the mesh node (the meshes operates in different portions of the spectrum – e.g., at 2.4 GHz and 5.0 GHz, or any other convenient area of the spectrum, by utilizing different protocols or coding schemes in different meshes, or by using different antennas designed to perform differently in the two meshes.– paragraph 0013. Where more than one potential inter-mesh communication is available in a given area of the level, the selection to service particular network users may be made in many different ways, reads on the claimed feature, scanning a RF environment to determine a new potential parent mesh node for connecting with – paragraph 0043. Access point 16 acts as an 802.11 access point in first level mesh network, a relay point in the second level mesh network. Access point functions operates as a relay point, an access point and a station in at least two mesh networks - paragraphs 0024, 0034, 0038);

d. utilizing the uplink radio of the mesh node to sample connectivity with a selected potential new parent node from the sample list; and e. returning to normal operation with no packet buffering (the two wireless mess networks are formed using different technologies and can coexists - paragraph 0024. Different 802.11 protocols can be used in both the first and second level mesh networks, or a non 802.11 protocol can be used for one of the meshes – paragraph 0038. The meshes operates in different portions of the spectrum – e.g., at 2.4 GHz and 5.0 GHz, or any other convenient area of the spectrum, by utilizing different

protocols or coding schemes in different meshes, or by using different antennas designed to perform differently in the two meshes. The mobile inter-mesh communication point may be one device configured to operate on both meshes, or may be formed of several devices, each configured to operate on one of the meshes, and which are configured to communicate with each other. Where, several devices are used, a signal path between the two devices may be formed – e.g., using a non-mesh wireless link or a non-wireless link – paragraph 0013),

but, does not clearly disclose, mesh node having separate uplink and downlink radios “operating on different channels”.

Kaidar teaches, APs may communicate with stations using, for example, one frequency or channel at a time and provides a Basic Service Set BSS information according to IEEE 802.11 standard to clients (paragraph 0014) and station 60 scans for channels from received beacons (paragraphs 0015, 0018, 0020).

It would have been obvious to one of ordinary skill in the art, at the time of invention, to modify the mobile inter-mesh communication points in a multi-level wireless mesh network of Handforth (Handforth, ABSTRACT, paragraphs 0025, 0032), wherein, the inter-mesh communication point deployed in personal vehicles such as cars, trucks and motorcycles, public transportation vehicles such as buses, trains and aircraft, emergency vehicles such as fire trucks and

ambulances, would have implemented, the teaching of Kaidar (Kaidar, paragraphs 0014, 0015, 0018, 0020) for the benefit of achieving a system that uses beacon from neighboring access points for network and/or access point reselection.

Both, Handforth and Kaidar discloses, all the claimed features,

but, does not disclose, b. creating a to-be-sampled list of potential new parent nodes;

c. receiving a token from the mesh node's current parent node to initiate sampling wherein packets intended for the current parent node are buffered in the mesh node and packets intended for the mesh node are buffered in the current parent node;

but, does not clearly disclose, "b. creating a t-be-sampled list of potential new parent nodes" and "c. packets buffered by the current parent node, and packets buffered by said at least one mesh node".

Dinkins teaches, a memory data diagram for cell list data (Fig. 29, column 39, lines 1 – 6, column 53, lines 51 - 36).

Dinkins teaches, a store and forward repeater receives data signals transmitted by a local base station repeater cell and forwards the signals to local subscriber units. Responses from the local subscriber units are transmitted from the local subscriber back to the local base station repeater cell (ABSTRACT, Fig. 2, column 2, lines 27 – 44, column 3, lines 36 – 54)

It would have been obvious to one of ordinary skill in the art, at the time of invention, to modify the mobile inter-mesh communication points in a multi-level wireless mesh network of combined Handforth and Kaidar (Handforth, ABSTRACT, paragraphs 0025, 0032), wherein, the inter-mesh communication point deployed in personal vehicles such as cars, trucks and motorcycles, public transportation vehicles such as buses, trains and aircraft, emergency vehicles such as fire trucks and ambulances, would have further implemented, the teaching of store and forward repeater of Dinkins (Dinkins, ABSTRACT, Figs. 2, 29, column 2, lines 27 – 44, column 3, lines 36 – 54, column 39, lines 1 – 6, column 53, lines 51 - 36) for a system to effective transmission of data signals from a local base station repeater cell to subscriber units and from the subscribers to the local base station repeater cell, two-way data communication (Dinkins, column 2, lines 1 – 10).

Regarding claim 11, Handforth discloses all the claimed features,

but, does not clearly disclose, the method of claim 10 further comprising the step of: f. "repeating the steps c to e with another potential new parent node parent from the sample list".

Kaidar teaches, repeating scanning periodically (paragraph 0043).

It would have been obvious to one of ordinary skill in the art, at the time of invention, to modify the mobile inter-mesh communication points in a multi-level wireless mesh network of Handforth (Handforth, ABSTRACT, paragraphs 0025, 0032), wherein, the inter-mesh communication point deployed in personal vehicles such as cars, trucks and motorcycles, public transportation vehicles such as buses, trains and aircraft, emergency vehicles such as fire trucks and ambulances, would have implemented, the teaching of repeating scanning periodically of Kaidar (Kaidar, paragraph 0043) for the benefit of achieving a system that uses beacon from neighboring access points for network and/or access point reselection.

Regarding claim 12, both Handforth and Kaidar discloses all the claimed features,

but, does not clearly disclose, the method of claim 11 wherein repeating the steps c to e further comprises repeating steps c to e "until multiple samples have

been recorded for each potential new parent node”.

Dinkins teaches, a memory data diagram for cell list data (Fig. 29, column 39, lines 1 – 6, column 53, lines 51 - 36).

Dinkins teaches, a store and forward repeater receives data signals transmitted by a local base station repeater cell and forwards the signals to local subscriber units. Responses from the local subscriber units are transmitted from the local subscriber back to the local base station repeater cell (ABSTRACT, Fig. 2, column 2, lines 27 – 44, column 3, lines 36 – 54)

It would have been obvious to one of ordinary skill in the art, at the time of invention, to modify the mobile inter-mesh communication points in a multi-level wireless mesh network of combined Handforth and Kaidar (Handforth, ABSTRACT, paragraphs 0025, 0032), wherein, the inter-mesh communication point deployed in personal vehicles such as cars, trucks and motorcycles, public transportation vehicles such as buses, trains and aircraft, emergency vehicles such as fire trucks and ambulances, would have further implemented, the teaching of store and forward repeater of Dinkins (Dinkins, ABSTRACT, Figs. 2, 29, column 2, lines 27 – 44, column 3, lines 36 – 54, column 39, lines 1 – 6, column 53, lines 51 - 36) for a system to effective transmission of data signals from a local base station repeater cell to subscriber units and from the

subscribers to the local base station repeater cell, two-way data communication (Dinkins, column 2, lines 1 – 10).

Regarding claim 13, Handforth discloses,

the method of claim 12 further comprising the step of:

g. making the decision to maintain the connection with the current parent node or to switch parents to a new parent node based on at least one of throughput and signal strength (hand-offs between inter-mesh communication points may take place in any conventional manner – paragraph 0042. The inter-mesh communication points are stationary or moving. The access points may be fixed or mobile and deployed on in vehicles. Here, the mobile inter-mesh communication point is scanning for available potential new nodes, is performed by the uplink radio of the inter-mesh communication point, as looking from the inter-mesh communication point towards the system is the uplink radio – paragraphs 0025, 0043, 0049).

Regarding claim 14, it is similar to part of claim 1 and claim 2 above, and is rejected on the same grounds.

Regarding claim 15, Handforth discloses all the claimed features,

but, does not clearly disclose, the method of claim 14 wherein “the dedicated scanning radio performs only scanning” for the discovery of potential new parent nodes.

Kaidar teaches, APs may communicate with stations using, for example, one frequency or channel at a time and provides a Basic Service Set BSS information according to IEEE 802.11 standard to clients (paragraph 0014) and station 60 scans for channels from received beacons (paragraphs 0015, 0018, 0020).

It would have been obvious to one of ordinary skill in the art, at the time of invention, to modify the mobile inter-mesh communication points in a multi-level wireless mesh network of Handforth (Handforth, ABSTRACT, paragraphs 0025, 0032), wherein, the inter-mesh communication point deployed in personal vehicles such as cars, trucks and motorcycles, public transportation vehicles such as buses, trains and aircraft, emergency vehicles such as fire trucks and ambulances, would have implemented, the teaching of Kaidar (Kaidar, paragraphs 0014, 0015, 0018, 0020) for the benefit of achieving a system that uses beacon from neighboring access points for network and/or access point reselection.

Regarding claim 16, Handforth discloses all the claimed features,

but, does not clearly disclose, the method of claim 15 wherein “the uplink and down link radios on the mesh node never operate on the same RF channel”.

Kaidar teaches, APs may communicate with stations using, for example, one frequency or channel at a time and provides a Basic Service Set BSS information according to IEEE 802.11 standard to clients (paragraph 0014) and station 60 scans for channels from received beacons (paragraphs 0015, 0018, 0020). Here, the mesh node never operate on the same RF channel, is the system and/or design/engineering decision.

It would have been obvious to one of ordinary skill in the art, at the time of invention, to modify the mobile inter-mesh communication points in a multi-level wireless mesh network of Handforth (Handforth, ABSTRACT, paragraphs 0025, 0032), wherein, the inter-mesh communication point deployed in personal vehicles such as cars, trucks and motorcycles, public transportation vehicles such as buses, trains and aircraft, emergency vehicles such as fire trucks and ambulances, would have implemented, the teaching of Kaidar (Kaidar, paragraphs 0014, 0015, 0018, 0020) for the benefit of achieving a system that uses beacon from neighboring access points for network and/or access point reselection.

Regarding claim 17, Handforth discloses all the claimed features,

but, does not clearly disclose, the method of claim 16 wherein “at some points in time the dedicated scanning radio on the mesh node scans RF channels that are different than those utilize by the uplink and down link radios on said mesh node”.

Kaidar teaches, APs may communicate with stations using, for example, one frequency or channel at a time and provides a Basic Service Set BSS information according to IEEE 802.11 standard to clients (paragraph 0014) and station 60 scans for channels from received beacons (paragraphs 0015, 0018, 0020). Here, at some points in time the dedicated scanning radio on the mesh node scans RF channels that are different than those utilize by the uplink and down link radios on said mesh node, is the system and/or design/engineering decision.

It would have been obvious to one of ordinary skill in the art, at the time of invention, to modify the mobile inter-mesh communication points in a multi-level wireless mesh network of Handforth (Handforth, ABSTRACT, paragraphs 0025, 0032), wherein, the inter-mesh communication point deployed in personal vehicles such as cars, trucks and motorcycles, public transportation vehicles such as buses, trains and aircraft, emergency vehicles such as fire trucks and ambulances, would have implemented, the teaching of Kaidar (Kaidar, paragraphs 0014, 0015, 0018, 0020) for the benefit of achieving a system that

uses beacon from neighboring access points for network and/or access point reselection.

Allowable Subject Matter

3. Claims 7, 9 and 20 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.

The entire prior-art combination disclosed fails to anticipate or render the claimed limitations of “sampling times are coordinated among multiple mesh nodes having a common current parent node, whereby the common current parent node sends tokens to each of it’s children in a round-robin manner” in combination with all the recited limitations of the disclosed independent claims obvious (viewed the entire claim as a whole), over any of the prior art of record, alone or in combination.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed

within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

Any inquiry concerning this communication from the examiner should be directed to Nimesh Patel at (571) 270-1228, normally reached on Mon-Thur. 7:30 AM to 6:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rafael, Perez-Gutierrez, can be reached at (571) 272-7915.

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/Nimesh Patel/
Patent Examiner (2617)

/Rafael Pérez-Gutiérrez/
Supervisory Patent Examiner, Art Unit 2617

Notice of References Cited	Application/Control No. 11/818,899		Applicant(s)/Patent Under Reexamination DACOSTA ET AL.	
	Examiner NIMESH PATEL		Art Unit 2617	Page 1 of 1

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*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,633,876 A	05-1997	Dinkins, Gilbert M.	370/315
*	B	US-2004/0264413 A1	12-2004	Kaidar et al.	370/332
	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.

Search Notes 	Application/Control No. 11818899	Applicant(s)/Patent Under Reexamination DACOSTA ET AL.
	Examiner NIMESH PATEL	Art Unit 2617

SEARCHED			
Class	Subclass	Date	Examiner
370	328, 406	4-5-2010	NP
455	436, 437, 439	4-5-2010	NP

SEARCH NOTES		
Search Notes	Date	Examiner
EAST - update search history	10-19-2010	NP
D'Agosta, Steve	4-5-2010	NP
Pate, Ajit	4-5-2010	NP

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

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<i>Index of Claims</i> 	Application/Control No. 11818899	Applicant(s)/Patent Under Reexamination DACOSTA ET AL.
	Examiner NIMESH PATEL	Art Unit 2617

✓	Rejected
=	Allowed

-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47										
CLAIM		DATE								
Final	Original	04/07/2010	10/22/2010							
	1	✓	✓							
	2	✓	✓							
	3	✓	✓							
	4	✓	✓							
	5	✓	✓							
	6		✓							
	7		O							
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	9		O							
	10		✓							
	11		✓							
	12		✓							
	13		✓							
	14		✓							
	15		✓							
	16		✓							
	17		✓							
	18		✓							
	19		✓							
	20		O							

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S33	5984	370/328.ccls.	US-PGPUB; USPAT	OR	OFF	2010/10/18 08:56
S34	398	370/406.ccls.	US-PGPUB; USPAT	OR	OFF	2010/10/18 08:56
S37	9	dacosta-francis.in.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/10/18 08:56
S38	11	dayanandan-sriram.in.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/10/18 08:56
S39	971	(ad-hoc or adhoc) same mesh same wireless	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/10/18 08:56
S40	913	(ad-hoc or adhoc) same mesh same wireless same network	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/10/18 08:56
S41	826	(ad-hoc or adhoc) same mesh same wireless same network	US-PGPUB; USPAT	OR	OFF	2010/10/18 08:56
S46	123	(mobile same router same train)	US-PGPUB; USPAT	OR	OFF	2010/10/18 08:56
S49	3610	(bulk or group) adj hand \$5	US-PGPUB; USPAT	OR	OFF	2010/10/18 08:56
S50	1005	S49 and (train or car or plane)	US-PGPUB; USPAT	OR	OFF	2010/10/18 08:56
S53	754	(mesh adj nodes)	US-PGPUB; USPAT	OR	OFF	2010/10/18 08:56
S54	62	(mesh adj nodes).ab.	US-PGPUB; USPAT	OR	OFF	2010/10/18 08:56
S61	24	((search\$3 or looking of finding) adj3 (mesh adj nodes))	US-PGPUB; USPAT	OR	OFF	2010/10/18 08:56

S62	39	((search\$3 or looking of finding) with (mesh adj nodes))	US-PGPUB; USPAT	OR	OFF	2010/10/18 08:56
S67	588	((dedicated or special) adj (scanning))	US-PGPUB; USPAT	OR	OFF	2010/10/18 16:39
S70	37480	(buffering or storing) with (scanning or monitoring)	US-PGPUB; USPAT	OR	OFF	2010/10/19 13:28
S71	1249	((buffering or storing) with (scanning or monitoring)) same wireless	US-PGPUB; USPAT	OR	OFF	2010/10/19 13:28
S72	94	((buffering or storing) with (scanning or monitoring)) same wireless).ab.	US-PGPUB; USPAT	OR	OFF	2010/10/19 13:29
S73	33	((buffering or storing) with (scanning or monitoring)) same wireless).ab. and @pd<"20050601"	US-PGPUB; USPAT	OR	OFF	2010/10/19 13:30
S74	497	(scanning with communication with storing)	US-PGPUB; USPAT	OR	OFF	2010/10/19 13:34
S75	212	(scanning with communication with storing) and wireless	US-PGPUB; USPAT	OR	OFF	2010/10/19 13:35
S76	67	((scanning with communication with storing) and wireless) and @pd<"20050601"	US-PGPUB; USPAT	OR	OFF	2010/10/19 13:35
S77	1336	((communication with scanning) and wireless) and @pd<"20050601"	US-PGPUB; USPAT	OR	OFF	2010/10/19 13:40
S78	146	((data adj communication) with scanning) and wireless) and @pd<"20050601"	US-PGPUB; USPAT	OR	OFF	2010/10/19 13:40
S83	86	(store same forward) with repeater	US-PGPUB; USPAT	OR	OFF	2010/10/19 14:03
S84	36	((store same forward) with repeater) and @pd<"20050601"	US-PGPUB; USPAT	OR	OFF	2010/10/19 14:03
S87	3252	(round adj robin) same buffer\$3	US-PGPUB; USPAT	OR	OFF	2010/10/19 15:52
S88	42	S87 same wireless	US-PGPUB; USPAT	OR	OFF	2010/10/19 15:52
S97	44476	((scanning or sampling) same (storing or buffering))	US-PGPUB; USPAT	OR	OFF	2010/10/19 16:04

S98	764	((scanning or sampling) same (storing or buffering) same wireless)	US-PGPUB; USPAT	OR	OFF	2010/10/19 16:04
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10/ 22/ 2010 4:35:13 PM**C:\ Documents and Settings\ npatel10\ My Documents\ EAST\ Workspaces\ 11818899-1.wsp**

UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Francis daCosta

Application: Mobility Extensions for Wireless Multiple Radio Mesh

Serial No.: 11/818,899

Examiner: Nimesh Patel

Art Unit: 2617

Conf. No.: 1037

Case No.: 0357-02203

Submitted via EFS-Web on August 16, 2010

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

123 West Madison Street
Chicago, IL 60602
312-621-1330

AMENDMENT AND RESPONSE TO OFFICE ACTION

Dear Sir:

Applicants submit this Amendment in response to the Office Action dated April 16, 2010. Claims 1-5 were rejected. By this amendment, claims 1, 2, and 4 are amended and claims 6-20 are added. Applicant submits that the claims are allowable and requests that this case be passed to issuance.

Amendments to the Claims are reflected in the listing of claims beginning on page two of this paper.

Remarks/Arguments begin on page seven of this paper.

AMENDMENTS TO THE CLAIMS

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

1. (Currently Amended) A method for operating a mesh network having a plurality of mesh nodes, comprising:

for ~~each~~ at least one mesh node of the mesh network, ~~sampling scanning a~~ Radio Frequency (RF) environment using a dedicated scanning radio to determine a new potential parent mesh node for connecting with said ~~each~~ at least one mesh node; wherein

said ~~each~~ at least one mesh node includes, in addition to said scanning radio, at least two relay radios in each mesh element ~~operating and wherein said scanning radio~~ and said at least two relay radios operate on different non-interfering channels.

2. (Currently Amended) The method of claim 1, wherein said ~~each~~ at least one mesh node is moving sufficiently rapidly that it may lose connectivity with its current parent mesh node, and wherein said dedicated scanning radio is utilized for discovery of potential new parent nodes and sampling of discovered potential new parent nodes is performed by the uplink radio of said ~~each at least one~~ mesh node ~~has dedicated scanning radios~~.

3. (Canceled)

4. (Currently Amended) A mesh network comprising:
a plurality of mesh nodes; wherein
each at least one mesh node of the mesh network is configured to sample scan a[[n]] Radio Frequency (RF) environment using a dedicated scanning radio to determine a new potential parent mesh node for connecting with said ~~each~~ at least one mesh node; wherein
said ~~each~~ at least one mesh node includes, in addition to the scanning radio, at least two relay radios in each mesh element ~~operating~~ and wherein said scanning radio and said at least two relay radios operate on different non-interfering channels.

5. (Canceled)

6. (New) The method of claim 2 wherein while said at least one mesh node samples potential new parent nodes, packets to be sent to said at least one mesh node from its current parent node are buffered by the current parent node, and packets to be sent from said at least one mesh node to its current parent are buffered by said at least one mesh node.

7. (New) The method of claim 6 wherein sampling times are coordinated among multiple mesh nodes having a common current parent node whereby the common current parent node sends tokens to each of it's children in a round-robin manner.

8. (New) The network of claim 4 wherein while said at least one mesh node samples potential new parent nodes, packets to be sent to said at least one mesh node from its current parent node are buffered by the current parent node, and packets to be sent from said at least one mesh node to its current parent are buffered by said at least one mesh node.

9. (New) The network of claim 8 wherein sampling times are coordinated among multiple mesh nodes having a common current parent node whereby the common current parent node sends tokens to each of its children in a round-robin manner.

10. (New) A method for discovering, sampling, and connecting to a new parent node in a mobile mesh network having a plurality of mesh nodes, for at least one mesh node having separate uplink and downlink radios operating on different channels, comprising:

- a. scanning to discover all parent mesh nodes in the vicinity of the mesh node;
- b. creating a to-be-sampled list of potential new parent nodes;
- c. receiving a token from the mesh node's current parent node to initiate sampling wherein packets intended for the current parent node are buffered in the mesh node and packets intended for the mesh node are buffered in the current parent node;
- d. utilizing the uplink radio of the mesh node to sample connectivity with a selected potential new parent node from the sample list; and
- e. returning to normal operation with no packet buffering.

11. (New) The method of claim 10 further comprising the step of:

- f. repeating the steps c to e with another potential new parent node parent from the sample list.

12. (New) The method of claim 11 wherein repeating the steps c to e further comprises repeating steps c to e until multiple samples have been recorded for each potential new parent node.

13. (New) The method of claim 12 further comprising the step of:

- g. making the decision to maintain the connection with the current parent node or to switch parents to a new parent node based on at least one of throughput and signal strength.

14. (New) The method of claim 10 wherein scanning and discovery are performed by a dedicated scanning radio on the mesh node and sampling of connections to potential new parent nodes is performed by the uplink radio of the mesh node.

15. (New) The method of claim 14 wherein the dedicated scanning radio performs only scanning for the discovery of potential new parent nodes..

16. (New) The method of claim 15 wherein the uplink and down link radios on the mesh node never operate on the same RF channel.

17. (New) The method of claim 16 wherein at some points in time the dedicated scanning radio on the mesh node scans RF channels that are different than those utilized by the uplink and down link radios on said mesh node.

18. (New) A mesh network comprising:

a plurality of mesh nodes; wherein each node within said plurality of nodes comprises at least three radios further including:

a first relay radio operating on a first RF channel at a first point in time and dedicated to uplink connections to a single current parent node;

a second relay radio operating on a second RF channel at a first point in time and dedicated to downlink connections to zero or more child nodes; and

a dedicated scanning radio operating on a third RF channel at a first point in time and configured to scan a Radio Frequency (RF) environment to discover new potential parent mesh nodes for connecting with said first relay radio; wherein

said first, second, and third RF channels are different from each other.

19. (New) The mesh network of claim 18 wherein after said dedicated scanning radio discovers a potential new parent node, said first relay radio samples the RF link to said potential new parent node using its uplink radio and concurrent with said sampling, packets to be sent to the mesh node from its current parent node are buffered by the current parent node, and packets to be sent from the mesh node to its current parent node are buffered by the mesh node.

20. (New) The network of claim 19 wherein sampling times are coordinated among multiple mesh nodes having a common current parent node whereby the common current parent node sends tokens to each of it's children in a round-robin manner.

REMARKS

Claims 1-5 were rejected under 35 USC Section 102 as being anticipated by Handforth (U.S. Publication No. 2005/0074019). To more closely claim one embodiment of the invention, by this amendment, claims 1, 2, and 4 are amended and claims 6-20 are added. Claims 3 and 5 are cancelled.

Applicant's Invention

In one embodiment, the multi-radio mesh network of the instant invention operates differently than the cited prior art. In order to greatly increase bandwidth, each mesh node of the claimed embodiment of the instant invention contains at least two relay radios. In normal operation of the claimed embodiment, the relay radios are dedicated to exchanging data between the nodes. These relay radios operate on different and non-interfering channels. This eliminates co-channel interference and allows one radio to receive while the other transmits, greatly increasing bandwidth.

In one embodiment, this invention also relates to a specific network architecture created by the wireless links between the nodes. The multiple-relay radio form of mesh requires a different connection architecture which is more tree-like, and where each mesh node has a single parent node and may have one or more child nodes.

The relationships between nodes are not static since the nodes are expected to be physically mobile and/or the RF environment is subject to change due to external interference, congestion, and other issues. When a mesh node becomes mobile (or the wireless link to its parent becomes too attenuated) a node begins the process of de-associating from its current parent node. It also needs to locate a new parent node to keep the mesh interconnected. Since radios in the instant multi-radio mesh architecture are often operating on different channels from each other, the best choice for a potential new parent mesh node may be operating on a different channel than the two relay radios of the mesh node in question. Thus, to scan for a new potential parent node, one of the relay radios of the node in question would have to stop data transmission and change its channel temporarily - potentially multiple times - during a search for a new parent. During this search, the node would greatly disrupt the bandwidth of data communication, even when no new parent node is available.

The solution as described in the embodiment presently claimed is to add a dedicated scanning radio which is not involved with normal data communication and whose job is specifically to discover potential new parent nodes which may be operating on any of a number of possible RF channels. The dedicated scanning radio may perform this discovery, and may also communicate with a potential new parent node to evaluate signal strength, bandwidth, and other parameters. As the velocity of movement of the mesh node is increased, however, a division of tasks is useful and a more optimum solution is to utilize the dedicated scanning radio exclusively for discovery, and subsequently utilize the uplink radio of the mesh node for the sampling process to make the final decision regarding signal strength and bandwidth. For this scenario, the uplink radio on the mesh node must temporarily cease its data transmission and in order to do this most effectively, must buffer data temporarily that would normally be sent to the current parent node. Also, the current parent node must similarly buffer data intended for the mesh node in question. Experience has shown that to perform these sampling operations most effectively with minimum disruption of overall bandwidth throughout the mesh network, a scheme for round-robin sampling performed by multiple mesh nodes may be implemented. This timing for this round-robin sampling scheme is controlled by tokens passed from parent nodes to child nodes in order to control the timing of when each child node samples.

Specification Support for Amended Claims

Claims 1, 2, 3, and 5 have been amended to recite a scanning radio and at least one relay radio and where each radio employs a non-interfering frequency. Support for these limitations is found in ¶¶ 15-18 and figure 3. In terms of claims 1 and 4, these paragraphs discuss nodes having a downlink and uplink radio (relay radios) and the addition of a dedicated scanning radio (¶17). Per ¶16 the radios are using non-interfering frequencies or channels. The mobility amendments of claim 2 are supported by the same section, specifically the discussion of a node moving away from one parent (P1) and towards parents P2 and P3 wherein the moving node must use its scanning radio to detect the new parent nodes (¶15-17).

The buffering behavior covered by claim 6 and 8 is discussed in ¶¶19-20 which

provide for the process of buffering data while a node is searching for a new parent. In regards to claim 7 and 9, the coordination of sampling periods and the use of “round-robin” sampling of nearby nodes by children of one node is discussed in ¶20. ¶20 also discusses coordination using a token signal.

Support for new method claim 10 is also found in ¶¶15-20. Per ¶16, a mesh node is scanning to discover all parent mesh nodes in the vicinity of the mesh node. Per ¶15 the mesh node creates a to-be-sampled list of potential new parent nodes. Per ¶20, the mesh node receives a token from the mesh node's current parent node to initiate sampling. Per ¶19, packets intended for the current parent node are buffered in the mesh node and packets intended for the mesh node are buffered in the current parent node. Finally, per ¶18, the uplink radio of the mesh node may be used to sample connectivity with a selected potential new parent node from the sample list.

The multiple potential parent nodes and sampling from multiple potential parent nodes is discussed in ¶21 and covered by claim 11. The sampling and recording of data for each potential new parent of claim 12 is discussed by ¶20. Support for claim 13 wherein a decision is made on the basis of throughput and signal strength is supported by ¶3 and ¶20.

Support for claim 14's use of one relay radio (the “uplink” radio) for the sampling is found in ¶38. Limiting the scanning radio to searching for new nodes (and not sampling) found in claim 15 is also supported by ¶38.

The limitation that the relay radios use different and non-interfering channels is found in ¶14. Similarly, that the mesh node scanning radio uses different frequencies than either relay radio, covered by claim 17, is supported by ¶¶16 and 17.

The mesh network of claim 18, wherein each node contains three radios, and each radio has a different RF frequency is supported by ¶15-18 as described above. The buffering behaviors covered by claim 19 are discussed by ¶19. The coordination of sampling times of claim 20 are discussed in ¶20.

Prior Art

Conventional wireless mesh networks have a single radio in each mesh node. In order to communicate with nearby mesh nodes, each node uses the exact same RF

frequency (channel). In these prior art networks, when a mobile mesh node moves away from one node and closer to another, it may connect to the new node easily because they are all operating on the same RF channel. This ease comes at the expense of low network throughput and loss of resiliency should interference occur on that one set RF channel.

Handforth and Prior Art of Record fail to
Disclose scanning functionality with Multiple
Frequencies Used Within the Mesh

The reference utilized in the office action (Handforth, Publication No. 2005/0074019) for rejection of applicant's claims under 35 USC 102(b) fails to disclose the scanning functionality of applicant's invention.

The closest element of Handforth to the instant invention's nodes are Handforth's access points (element 16). At least one of the access points of Handforth is connected to a backhaul high-bandwidth link ("first level" link) and other access point use "second level" links to exchange data with one another. (Handforth ¶34). These second level links in Handforth are akin to the conventional intra-mesh wireless communications discussed above in that they use common channels for communication within the mesh (Handforth ¶36). Per Handforth, the "first level" backhaul link is to be different from the second level link (¶37), but nothing is said about using different intra-mesh frequencies for intra-mesh communication as the presently-pending claims require. Since Handforth's nodes use the same frequencies for intra-node communication, Handforth discloses use of access control and addition of multiple nodes to increase bandwidth (¶45). In this way Handforth clearly teaches away from the multiple frequency approach of the instant invention which not only uses different frequencies for communication within the mesh, but also includes a dedicated scanning radio.

Analogously to Handford, none of the other references made of record by the examiner discuss a multiple-radio mesh node with a dedicated scanning radio. In fact, the presently-claimed functionality of scanning or sampling of RF signals in order to make a new connection between mesh nodes is not discussed in any of these references.

For the reasons explained above, applicant submits that Handford does not anticipate the presently-pending claims and requests its removal as a prior art reference.

Applicant respectfully submits that the claims, as amended, define allowable subject matter and respectfully requests that a Notice of Allowance be issued. If the Examiner feels that a telephonic interview will expedite allowance, he is urged to call the undersigned at the phone number provided. Claims 1, 2, 4, and 6-20, are pending.

Date: August 16, 2010

/Szymon M. Gurda/
Szymon M. Gurda
Reg. No. 58,451

Electronic Patent Application Fee Transmittal				
Application Number:		11818899		
Filing Date:		15-Jun-2007		
Title of Invention:		Mobility extensions for wireless multiple radio mesh		
First Named Inventor/Applicant Name:		Francis daCosta		
Filer:		Szymon Maciej Gurda		
Attorney Docket Number:		0357-02203		
Filed as Small 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:				
Extension-of-Time:				
Extension - 1 month with \$0 paid	2251	1	65	65

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				65

Electronic Acknowledgement Receipt	
EFS ID:	8224539
Application Number:	11818899
International Application Number:	
Confirmation Number:	1037
Title of Invention:	Mobility extensions for wireless multiple radio mesh
First Named Inventor/Applicant Name:	Francis daCosta
Customer Number:	27197
Filer:	Szymon Maciej Gurda
Filer Authorized By:	
Attorney Docket Number:	0357-02203
Receipt Date:	16-AUG-2010
Filing Date:	15-JUN-2007
Time Stamp:	14:13:14
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$65
RAM confirmation Number	424
Deposit Account	501709
Authorized User	CHERSKOV,MICHAEL J
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	Extension of Time	ext.pdf	79735	no	1
			4715b6035b378d29db2cb376a5d9c4c0f3a e7e73		
Warnings:					
Information:					
2		Response.pdf	74320	yes	11
			9c95fb31e47ba09bf3c7066c5374b25d166 e7e9d		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Amendment/Req. Reconsideration-After Non-Final Reject		1	1	
	Claims		2	6	
	Applicant Arguments/Remarks Made in an Amendment		7	11	
Warnings:					
Information:					
3	Fee Worksheet (PTO-875)	fee-info.pdf	29809	no	2
			a637ad140bbc0b8336b410e8b99e69cebfa 17f67		
Warnings:					
Information:					
Total Files Size (in bytes):			183864		

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

UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Francis daCosta
Application: Mobility Extensions for Wireless Multiple Radio Mesh
Serial No.: 11/818,899
Examiner: Nimesh Patel
Art Unit: 2617
Conf. No.: 1037
Case No.: 0357-02203

Submitted via EFS-Web on August 16, 2010

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

123 West Madison Street
Chicago, IL 60602
312-621-1330

PETITION TO EXTEND TIME

Sir:

It is respectfully requested that the time for response to the Official Action dated April 16, 2010, be extended one (1) month to August 16, 2010.

Payment of the \$65.00 extension of time fee will be arranged using the EFS-Web electronic filing system. The Office is authorized to charge any deficiency or credit any overpayment to the undersigned's Deposit Account No. 501709.

Respectfully submitted,

CHERSKOV & FLAYNIK

By /Szymon M. Gurda/
Szymon M. Gurda (Reg. No. 58,451)

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.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 11/818,899		Filing Date 06/15/2007		☐ 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 (\$)										
☐ 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(l))		minus 20 =		*		X \$ =				OR								
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)		(Column 3)		SMALL ENTITY		OR		OTHER THAN SMALL ENTITY							
AMENDMENT	08/16/2010		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)							
	Total (37 CFR 1.16(o))		* 18		Minus ** 20		= 0		X \$26 =		0							
	Independent (37 CFR 1.16(h))		* 4		Minus *** 3		= 1		X \$110 =		110							
	☐ Application Size Fee (37 CFR 1.16(s))																	
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))																	
									TOTAL ADD'L FEE		110		OR		TOTAL ADD'L FEE			
AMENDMENT			CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)							
	Total (37 CFR 1.16(o))		*		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.												Legal Instrument Examiner: /TINA J. BARDEN/						
** 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.																		

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.

Document code: WFEE

United States Patent and Trademark Office
Sales Receipt for Accounting Date: 08/19/2010

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BIB DATA SHEET

CONFIRMATION NO. 1037

SERIAL NUMBER 11/818,899	FILING or 371(c) DATE 06/15/2007 RULE	CLASS 370	GROUP ART UNIT 2617	ATTORNEY DOCKET NO. 0357-02203		
APPLICANTS Francis daCosta, Santa Clara, CA; Sriram Dayanandan, San Jose, CA; ** CONTINUING DATA ***** This appln claims benefit of 60/815,217 06/19/2006 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 07/13/2007						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and /NIMESH PATEL/ Acknowledged Examiner's Signature		☐ Met after Allowance /NP/ Initials	STATE OR COUNTRY CA	SHEETS DRAWINGS 6	TOTAL CLAIMS 5	INDEPENDENT CLAIMS 3
ADDRESS MICHAEL J. CHERSKOV 300 NORTH STATE STREET SUITE 5102 CHICAGO, IL 60654 UNITED STATES						
TITLE Mobility extensions for wireless multiple radio mesh						
FILING FEE RECEIVED 1130	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		

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	4968	370/328.ccls.	US-PGPUB; USPAT	OR	OFF	2010/04/05 12:12
S2	370	370/406.ccls.	US-PGPUB; USPAT	OR	OFF	2010/04/05 12:12
S5	5	dacosta-francis.in.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/04/05 12:15
S6	7	dayanandan-sriram.in.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/04/05 12:16
S7	844	(ad-hoc or adhoc) same mesh same wireless	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/04/05 12:23
S8	794	(ad-hoc or adhoc) same mesh same wireless same network	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2010/04/05 12:23
S9	713	(ad-hoc or adhoc) same mesh same wireless same network	US-PGPUB; USPAT	OR	OFF	2010/04/05 12:23
S13	322	(router same train)	US-PGPUB; USPAT	OR	OFF	2010/04/05 12:37
S14	107	(mobile same router same train)	US-PGPUB; USPAT	OR	OFF	2010/04/05 12:37
S15	11	((mobile adj router) with (mesh adj network) and wireless)	US-PGPUB; USPAT	OR	OFF	2010/04/05 12:53

S16	11	(mobile adj router) with (mesh adj network)	US-PGPUB; USPAT	OR	OFF	2010/04/05 12:53
S17	3392	(bulk or group) adj hand\$5	US-PGPUB; USPAT	OR	OFF	2010/04/05 13:53
S18	948	S17 and (train or car or plane)	US-PGPUB; USPAT	OR	OFF	2010/04/05 13:53
S19	30	S18 and "370"/\$. ccls.	US-PGPUB; USPAT	OR	OFF	2010/04/05 13:54
S20	7	train and (group near (hand\$4 near (over or off)))	US-PGPUB; USPAT	OR	OFF	2010/04/05 13:54
S21	675	(mesh adj nodes)	US-PGPUB; USPAT	OR	OFF	2010/04/05 14:17
S22	54	(mesh adj nodes). ab.	US-PGPUB; USPAT	OR	OFF	2010/04/05 14:17
S26	4025	455/436.ccls.	US-PGPUB; USPAT	OR	OFF	2010/04/05 15:00
S27	798	455/439.ccls.	US-PGPUB; USPAT	OR	OFF	2010/04/05 15:01
S28	1156	455/437.ccls.	US-PGPUB; USPAT	OR	OFF	2010/04/05 15:01
S29	24	((search\$3 or looking of finding) adj3 (mesh adj nodes))	US-PGPUB; USPAT	OR	OFF	2010/04/05 15:04
S30	32	((search\$3 or looking of finding) with (mesh adj nodes))	US-PGPUB; USPAT	OR	OFF	2010/04/05 15:09

4/ 7/ 2010 3:00:07 PM

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/818,899	06/15/2007	Francis daCosta	0357-02203	1037
27197 7590 04/16/2010 MICHAEL J. CHERSKOV 300 NORTH STATE STREET SUITE 5102 CHICAGO, IL 60654			EXAMINER PATEL, NIMESH	
			ART UNIT 2617	PAPER NUMBER
			NOTIFICATION DATE 04/16/2010	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):

mail@cherskov.com
sgurda@cherskov.com
mcherskov@cherskov.com

Office Action Summary	Application No.		Applicant(s)	
	11/818,899		DACOSTA ET AL.	
	Examiner		Art Unit	
	NIMESH PATEL		2617	

-- 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 Jun. 15, 2007.

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

3) ☐ 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

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

 4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1-5 is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

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

10) ☒ The drawing(s) filed on 15 June 2007 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).

11) ☐ 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

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) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.	4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____. 5) ☐ Notice of Informal Patent Application 6) ☐ Other: _____.
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Detailed Action

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 – 5 are rejected under 35 U.S.C. 102(b) as being unpatentable by Handforth, US PGPub: US 2005/0074019 A1 Apr. 7, 2005.

Regarding claim 1, Handforth discloses,

a method for operating a mesh network having a plurality of mesh nodes (an access point 16 in each wireless mesh network 10 functions as an aggregation point on the wireless mesh network 10 and interconnects the wireless mesh network 10 to a higher bandwidth communication resource, such as a wide area network WAN. The mobile inter-mesh communication point functions as an access point in the lower level mesh network and as a relay point in the upper level mesh network. The access point 16 may be deployed on a mobile vehicle 26. Inter-mesh communication points deployed in personal vehicles such as cars, trucks and motorcycles, public transportation vehicles such as buses, trains and aircraft, emergency vehicles such as fire trucks and ambulances. – ABSTRACT,

paragraphs 0025, 0032), comprising:

for each mesh node of the mesh network, sampling an Radio Frequency – RF environment to determine a new potential parent mesh node for connecting with said each mesh node (where more than one potential inter-mesh communication is available in a given area of the level, the selection to service particular network users may be made in many different ways, reads on the claimed feature, sampling the RF environment to determine a new potential parent mesh node for connecting with – paragraph 0043. Access point 16 acts as an 802.11 access point in first level mesh network, a relay point in the second level mesh network. Access point functions operates as a relay point, an access point and a station in at least two mesh networks - paragraphs 0024, 0034, 0038); wherein

said each mesh node includes at least two relay radios in each mesh element operating on different non-interfering channels (the two wireless mess networks are formed using different technologies and can coexists - paragraph 0024. Different 802.11 protocols can be used in both the first and second level mesh networks, or a non 802.11 protocol can be used for one of the meshes – paragraph 0038).

Regarding claim 2, Handforth discloses,

the method of claim 1, wherein said each mesh node is moving sufficiently rapidly that it may lose connectivity with current parent mesh node, and said each mesh node has dedicated scanning radios (where access to an inter-mesh communication point is no longer available, or the inter-mesh communication point moves out of range from the mesh network users, it is necessary to select another inter-mesh communication point to service the wireless mesh. Hand-offs between inter-mesh communication points may take place in any conventional manner – paragraph 0042).

Regarding claim 3, Handforth discloses,

the method of claim 1, wherein said each mesh node is moving at high speed along path and receives connectivity from a plurality of static nodes placed at regular intervals along the path (the inter-mesh communication points are stationary or moving. The access points may be fixed or mobile and deployed on in vehicles – paragraphs 0043, 0049).

Regarding claim 4, Handforth discloses,

a mesh network (an access point 16 in each wireless mesh network 10 functions as an aggregation point on the wireless mesh network 10 and interconnects the wireless mesh network 10 to a higher bandwidth communication resource, such as a wide area network WAN. The mobile inter-mesh communication point functions as an access point in the lower level mesh network and as a relay point in the upper level mesh network. The access point 16 may be deployed on a mobile vehicle 26. Inter-mesh communication points deployed in personal vehicles such as cars, trucks and motorcycles, public transportation vehicles such as buses, trains and aircraft, emergency vehicles such as fire trucks and ambulances. – ABSTRACT, paragraphs 0025, 0032) comprising:

a plurality of mesh nodes; wherein each mesh node of the mesh network is configured to sample an Radio Frequency - RF environment to determine a new potential parent mesh node for connecting with said each mesh node (where more than one potential inter-mesh communication is available in a given area of the level, the selection to service particular network users may be made in many different ways, reads on the claimed feature, sampling the RF environment to determine a new potential parent mesh node for connecting with – paragraph 0043. Access point 16 acts as an 802.11 access point in first level mesh network,

a relay point in the second level mesh network. Access point functions operates as a relay point, an access point and a station in at least two mesh networks - paragraphs 0024, 0034, 0038); wherein

said each mesh node includes at least two relay radios in each mesh element operating on different non-interfering channels (the two wireless mesh networks are formed using different technologies and can coexists - paragraph 0024. Different 802.11 protocols can be used in both the first and second level mesh networks, or a non 802.11 protocol can be used for one of the meshes – paragraph 0038).

Regarding claim 5, Handforth discloses,

a computer program product for operating a mesh network having a plurality of mesh nodes (an access point 16 in each wireless mesh network 10 functions as an aggregation point on the wireless mesh network 10 and interconnects the wireless mesh network 10 to a higher bandwidth communication resource, such as a wide area network WAN. The mobile inter-mesh communication point functions as an access point in the lower level mesh network and as a relay point in the upper level mesh network. The access point 16 may be deployed on a mobile vehicle 26. Inter-mesh communication points deployed in personal vehicles such as cars, trucks and motorcycles, public transportation vehicles

such as buses, trains and aircraft, emergency vehicles such as fire trucks and ambulances. – ABSTRACT, paragraphs 0025, 0032), the computer program product being embodied in a computer readable medium and comprising computer instructions (control logic in the IP switch processor 98 may be implemented as a set of program instructions that are stored in a computer readable memory within the network element - paragraph 0082) for:

for each mesh node of the mesh network, sampling an Radio Frequency - RF environment to determine a new potential parent mesh node for connecting with said each mesh node (where more than one potential inter-mesh communication is available in a given area of the level, the selection to service particular network users may be made in many different ways, reads on the claimed feature, sampling the RF environment to determine a new potential parent mesh node for connecting with – paragraph 0043. Access point 16 acts as an 802.11 access point in first level mesh network, a relay point in the second level mesh network. Access point functions operates as a relay point, an access point and a station in at least two mesh networks - paragraphs 0024, 0034, 0038); wherein

said each mesh node includes at least two relay radios in each mesh element operating on different non-interfering channels (the two wireless mess networks are formed using different technologies and can coexists - paragraph 0024. Different 802.11 protocols can be used in both the first and second level mesh

networks, or a non 802.11 protocol can be used for one of the meshes –
paragraph 0038).

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

1. Rayment teaches, integrated wireless distribution and mesh backhaul networks.
US Patent: US 7,164,667 B2 Jan. 16, 2007.
2. Aghvami teaches, method of discovering multi-mode mobile terminals, a train moving through the area covered by the UMTS network 11. The train having a mobile router 134 for the use by those mobile terminals 13 located in the train (Fig. 13).
US PGPub: US 2006/0166699 A1 Jul. 27, 2006.
3. Erwin teaches, establishing a wireless mesh network using multiple frequency bands.
US PGPub: US 2006/0077985 A1 Apr. 13, 2006.
4. Aramaki teaches, subnet connection switching communication system, having a mobile router in a train or moving vehicle.
US PGPub: US 2005/0078632 A1 Apr. 14, 2005.
5. Maeda teaches, mobile node 70 located in a moving vehicle 72 such as a train moving along tracks 73. The moving vehicle 72 is equipped with a mobile router 74 (Fig. 4).
US PGPub: US 2004/0142657 A1 Jul. 22, 2004.

Contact Information

Any inquiry concerning this communication from the examiner should be directed to Nimesh Patel at (571) 270-1228, normally reached on Mon-Thur. 7:30 AM to 6:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rafael, Perez-Gutierrez, can be reached at (571) 272-7915.

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.

Art Unit: 2617

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 USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ Nimesh Patel /
Patent Examiner (2617)

Notice of References Cited	Application/Control No. 11/818,899		Applicant(s)/Patent Under Reexamination DACOSTA ET AL.	
	Examiner NIMESH PATEL		Art Unit 2617	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2004/0142657 A1	07-2004	Maeda, Masahiro	455/011.1
*	B	US-2005/0074019 A1	04-2005	Handforth et al.	370/406
*	C	US-2005/0078632 A1	04-2005	Aramaki et al.	370/331
*	D	US-2006/0077985 A1	04-2006	Erwin et al.	370/400
*	E	US-2006/0166699 A1	07-2006	Aghvami et al.	455/552.1
*	F	US-7,164,667 B2	01-2007	Rayment et al.	370/329
	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. 11818899	Applicant(s)/Patent Under Reexamination DACOSTA ET AL.
	Examiner NIMESH PATEL	Art Unit 2617

✓	Rejected
=	Allowed

-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47										
CLAIM		DATE								
Final	Original	04/07/2010								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								

Search Notes 	Application/Control No. 11818899	Applicant(s)/Patent Under Reexamination DACOSTA ET AL.
	Examiner NIMESH PATEL	Art Unit 2617

SEARCHED			
Class	Subclass	Date	Examiner
370	328, 406	4-5-2010	NP
455	436, 437, 439	4-5-2010	NP

SEARCH NOTES		
Search Notes	Date	Examiner
EAST - search history	4-5-2010	NP
D'Agosta, Steve	4-5-2010	NP
Pate, Ajit	4-5-2010	NP

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/818,899	06/15/2007	Francis daCosta	MESHPO03

21912
VAN PELT, YI & JAMES LLP
10050 N. FOOTHILL BLVD #200
CUPERTINO, CA 95014

CONFIRMATION NO. 1037
POWER OF ATTORNEY NOTICE



Date Mailed: 11/13/2008

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 11/01/2008.

- 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).

/nmohammed/

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



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/818,899	06/15/2007	Francis daCosta	0357-02203

27197
CHERSKOV & FLAYNIK
THE CIVIC OPERA BUILDING
20 NORTH WACKER DRIVE, SUITE 1447
CHICAGO, IL 60606

CONFIRMATION NO. 1037
POA ACCEPTANCE LETTER



Date Mailed: 11/13/2008

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 11/01/2008.

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.

/nmohammed/

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	11/818,899
	Filing Date	June 19, 2007
	First Named Inventor	Francis daCosta
	Title	Mobility Extensions for Wireless Multiple Radio Mesh
	Art Unit	2616
	Examiner Name	Not Assigned
	Attorney Docket Number	0357-02203

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:

27197

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:

27197

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	<i>Francis daCosta</i>	Date	Oct. 31, 2008
Name	Francis daCosta	Telephone	+1 (408) 373-7700
Title and Company	President, MESH DYNAMICS INC.		

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 1 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.

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.

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: DACOSTA ET AL.

Application No./Patent No.: 11/818,899

Filed/Issue Date: 06/15/2007

Entitled: Mobility Extensions for Wireless Multiple Radio Mesh

MESH DYNAMICS INC.

, a corporation

(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 019684, Frame 0629, 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.

☐ 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.

/Szymon M. Gurda/

Signature

Oct. 31, 2008

Date

Szymon M. Gurda

Printed or Typed Name

312-621-1330

Telephone Number

Attorney

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.

Electronic Acknowledgement Receipt	
EFS ID:	4218002
Application Number:	11818899
International Application Number:	
Confirmation Number:	1037
Title of Invention:	Mobility extensions for wireless multiple radio mesh
First Named Inventor/Applicant Name:	Francis daCosta
Customer Number:	21912
Filer:	Szymon Maciej Gurda
Filer Authorized By:	
Attorney Docket Number:	MESHP003
Receipt Date:	01-NOV-2008
Filing Date:	15-JUN-2007
Time Stamp:	16:31:33
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	Power of Attorney	2203PoA.pdf	194207	no	2
			2206523596d484db4dd7561cc9e1a69675c6b46e		

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.



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
11/818,899	06/15/2007	2616	1130	MESHP003	5	3

CONFIRMATION NO. 1037

21912
VAN PELT, YI & JAMES LLP
10050 N. FOOTHILL BLVD #200
CUPERTINO, CA95014

UPDATED FILING RECEIPT

Date Mailed: 08/27/2007

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 write to the Office of Initial Patent Examination's Filing Receipt Corrections. 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)

Francis daCosta, Santa Clara, CA;
Sriram Dayanandan, San Jose, CA;

Assignment For Published Patent Application

Mesh Dynamics, Inc.

Power of Attorney: The patent practitioners associated with Customer Number 21912

Domestic Priority data as claimed by applicant

This appln claims benefit of 60/815,217 06/19/2006

Foreign Applications

If Required, Foreign Filing License Granted: 07/13/2007

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is
US11/818,899

Projected Publication Date: Request for Non-Publication Acknowledged

Non-Publication Request: Yes

Early Publication Request: No

Title

Mobility extensions for wireless multiple radio mesh

Preliminary Class

370

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.

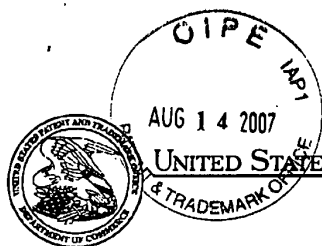
This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

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	ATTORNEY DOCKET NUMBER
11/818,899	06/15/2007	Francis daCosta	MESHP003

21912
 VAN PELT, YI & JAMES LLP
 10050 N. FOOTHILL BLVD #200
 CUPERTINO, CA 95014

CONFIRMATION NO. 1037
FORMALITIES
LETTER

Date Mailed: 07/16/2007

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

08/14/2007 WASFAW1 00000103 11818899

FILED UNDER 37 CFR 1.53(b)

01 FC:1011 300.00 OP
 02 FC:1111 500.00 OP
 03 FC:1311 200.00 OP
 04 FC:1051 130.00 OP

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 \$ 300 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:

- 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 **\$1130** for a non-small entity

- **\$300** Statutory basic filing fee.
- **\$130** Surcharge.

- The application search fee has not been paid. Applicant must submit **\$500** to complete the search fee.
- The application examination fee has not been paid. Applicant must submit **\$200** to complete the examination fee for a non-small entity.

Replies should be mailed to: Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web.
<https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html>

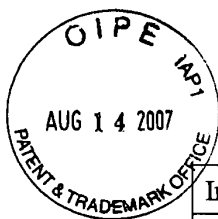
For more information about EFS-Web please call the USPTO Electronic Business Center at **1-866-217-9197** or visit our website at <http://www.uspto.gov/ebc>.

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

B. Hablenov

Office of Initial Patent Examination (571) 272-4000, or 1-800-PTO-9199

PART 2 - COPY TO BE RETURNED WITH RESPONSE



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor:	DACOSTA et al.	Examiner:	Not Assigned
Application No.:	11/818,899	Art Unit:	2616
Filed:	June 15, 2007	Docket No.:	MESHP003
Title:	MOBILITY EXTENSIONS FOR WIRELESS MULTIPLE RADIO MESH		

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in a prepaid envelope addressed to: Mail Stop Missing Parts, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on:

8/10, 2007.

Elaine Nguyen
Elaine Nguyen

RESPONSE TO NOTICE TO FILE MISSING PARTS

MAIL STOP MISSING PARTS

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

This is a Response to Notice to File Missing Parts mailed July 16, 2007.

Application Elements:

- ☒ Declaration
- ☒ Newly executed (original or copy)
- ☐ Copy from a prior application (37 CFR 1.63(d) for a continuation or divisional).
The entire disclosure of the prior application from which a copy of the declaration is herein supplied is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
- ☐ Deletion of inventors Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).

Accompanying Application Parts:

- ☐ Information Disclosure Statement with Form PTO/SB/08 ☐ Copies of IDS Citations
- ☐ Preliminary Amendment (*New claims numbered after highest original claim in prior application.*)
- ☒ Return Receipt Postcard
- ☒ Copy of Notice to File Missing Parts of NonProvisional Application
- ☐ Other:

Amendments

☐ Cancel in this application original claims _____ of the prior application before calculating the filing fee. (At least one original independent claim must be retained.)

Fee Calculation (37 CFR § 1.16)

				Small Entity		OR	Large Entity	
				Rate	Fee		Rate	Fee
Filing Fees				x \$150 = \$			x \$300 = \$	300
Search Fees				x \$250 = \$			x \$500 = \$	500
Examination Fees				x \$100 = \$			x \$200 = \$	200
CLAIMS	Filed.		Extra					
Total	5	Less 20	-0-	x \$25 = \$			x \$50 = \$	
Independent	3	Less 3	-0-	x \$100 = \$			x \$200 = \$	
Multiple Dependent Claims			-0-	x \$180 = \$			x \$360 = \$	
Declaration and Surcharge Fee				X \$65 = \$			X \$130 = \$	130
				TOTAL FILING FEE \$			TOTAL FILING FEE \$	1130.00

☐ Applicants petition for an extension of time to respond under 37 CFR § 1.136(a) as follows:

	SMALL ENTITY		OR	LARGE ENTITY	
	Rate	Add'l Fee		Rate	Add'l Fee
☐ Extension for Response within FIRST month	x \$60 = \$			x \$120 = \$	
☐ Extension for Response within SECOND month	x \$225 = \$			x \$450 = \$	
☐ Extension for Response within THIRD month	x \$510 = \$			x \$1020 = \$	
☐ Extension for Response within FOURTH month	x \$795 = \$			x \$1590 = \$	
☐ Extension for Response within FIFTH month	x \$1080 = \$			x \$2160 = \$	

☒ Check No. 3146 for \$1130.00 is enclosed.

General Authorizations

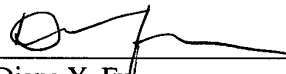
☒ Applicants hereby make and generally authorize any Petitions for Extensions of Time as needed for this or any subsequent filings. The Commissioner is also authorized to charge any extension fees under 37 CFR § 1.17 as needed to Deposit Account No. 50-0685 (Order No. MESHP003).

☒ The Commissioner is given general authorization to charge any fees or to credit any overpayment during the pendency of this application to Deposit Account No. 50-0685 (Order No. MESHP003).

☒ Please send correspondence to the following address:

Customer No. 21912
VAN PELT, YI & JAMES LLP
10050 N. Foothill Blvd.
Suite 200
Cupertino, CA 95014

Date: 8/9/07


Diana Y. Fu
Reg. No. 52,924



DECLARATION AND POWER OF ATTORNEY FOR ORIGINAL U.S. PATENT APPLICATION

Attorney's Docket No. MESHPO03

As a below-named inventor, I hereby declare that:

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

I believe that 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: **MOBILITY EXTENSIONS FOR WIRELESS MULTIPLE RADIO MESH**, the specification of which,

- (check one)
1. ☐ is attached hereto.
 2. ☒ was filed on 6/15/2007 as
U.S. Application No. 11/818,899
and was amended on _____.
 3. ☐ was filed on _____ as
International PCT Application No. _____
and was amended on _____.

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

For Assigned Inventions: I understand that the purpose of making this appointment is to permit prosecution of patent applications for the above-identified invention for the benefit of my assignee, and that this appointment does not create an attorney-client relationship between me and these appointees.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, CFR § 1.56.

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

Prior Foreign Application(s)

Priority Benefits Claimed?

(Appl. No.) (Country) (Filing Date)

☐ Yes ☐ No

I hereby claim the benefit under 35 U.S.C. §119(e) of any United States provisional application(s) listed below:

Prior Provisional Application(s)

60/815,217 6/19/2006
(Application No.) (Filing Date)

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

Prior U.S. Application(s)

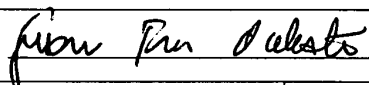
(Application No.) (Filing Date) (Status - patented, pending, abandoned)

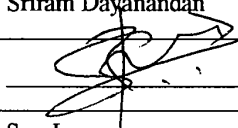
And I hereby appoint the attorneys and/or agents associated with Customer No. **21912** as my principal attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

Please Direct all Correspondence To: **Customer No. 21912**
 VAN PELT, YI & JAMES LLP
 10050 N. Foothill Blvd., Suite 200
 Cupertino, CA 95014

Direct Telephone Calls To: **Diana Y. Fu at telephone number (408) 973-2585**

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 section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Full name of sole or first inventor	Francis daCosta			
Signature of sole or first inventor			Date:	Aug 3rd, 2007
Residence: City	Santa Clara	State:	CA	Citizenship: United States of America
Mailing Address	2953 Bunker Hill Lane, Suite 400, Santa Clara, CA 95054			

Full name of second inventor	Sriram Dayanandan			
Signature of second inventor			Date:	Aug 3rd, 2007
Residence: City	San Jose	State:	CA	Citizenship: India
Mailing Address	2953 Bunker Hill Lane, Suite 400, Santa Clara, CA 95054			

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.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						11/818,899	
APPLICATION AS FILED – PART I							
(Column 1)		(Column 2)		SMALL ENTITY		OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)	
BASIC FEE (37 CFR 1.16(a), (b), or (c))						300	
SEARCH FEE (37 CFR 1.16(k), (l), or (m))						500	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))						200	
TOTAL CLAIMS (37 CFR 1.16(i))	5		X\$25=		X\$50		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 =	X\$100=		X\$200=		
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						
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))			N/A		N/A		
			TOTAL		TOTAL	1000	
* 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 (\$)	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	Minus **	=	X =		X =	
	Independent (37 CFR 1.16(h))	Minus ***	=	X =		X =	
	Application Size Fee (37 CFR 1.16(s))			N/A		N/A	
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))			TOTAL		TOTAL	
				ADD'T FEE		ADD'T FEE	
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY	
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	Minus **	=	X =		X =	
	Independent (37 CFR 1.16(h))	Minus ***	=	X =		X =	
	Application Size Fee (37 CFR 1.16(s))			N/A		N/A	
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))			TOTAL		TOTAL	
				ADD'T FEE		ADD'T 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.							

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO
11/818,899	06/15/2007	2616	0.00	MESHP003

CONFIRMATION NO. 1037

21912
VAN PELT, YI & JAMES LLP
10050 N. FOOTHILL BLVD #200
CUPERTINO, CA95014

FILING RECEIPT

Date Mailed: 07/16/2007

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 write to the Office of Initial Patent Examination's Filing Receipt Corrections. 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)

Francis daCosta, Residence Not Provided;

Assignment For Published Patent Application

Mesh Dynamics, Inc.

Power of Attorney: None

Domestic Priority data as claimed by applicant

This appln claims benefit of 60/815,217 06/19/2006

Foreign Applications

If Required, Foreign Filing License Granted: 07/13/2007

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is
US11/818,899

Projected Publication Date: Request for Non-Publication Acknowledged

Non-Publication Request: Yes

Early Publication Request: No

Title

Mobility extensions for wireless multiple radio mesh

Preliminary Class

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APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
11/818,899	06/15/2007	Francis daCosta	MESHP003

21912
 VAN PELT, YI & JAMES LLP
 10050 N. FOOTHILL BLVD #200
 CUPERTINO, CA 95014

CONFIRMATION NO. 1037
FORMALITIES
LETTER

Date Mailed: 07/16/2007

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 \$ 300 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:

- 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 **\$1130** for a non-small entity

- **\$300** Statutory basic filing fee.
- **\$130** Surcharge.

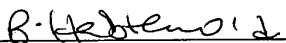
- The application search fee has not been paid. Applicant must submit **\$500** to complete the search fee.
- The application examination fee has not been paid. Applicant must submit **\$200** to complete the examination fee for a non-small entity.

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061507

17607

U.S. PTO

UTILITY PATENT APPLICATION TRANSMITTAL

(New Nonprovisional Applications Under 37 CFR § 1.53(b))

Attorney Docket No.
MESHP003**TO THE COMMISSIONER FOR PATENTS:**

Transmitted herewith is the patent application of () application identifier or (X) first named inventor, Francis daCosta,
entitled MOBILITY EXTENSIONS FOR WIRELESS MULTIPLE RADIO MESH, for a(n):

U.S. PTO
11/818899
06/15/2007

(X) Original Patent Application.

() Continuing Application (prior application not abandoned):

() Continuation () Divisional () Continuation-in-part (CIP)
of prior Application No. _____, filed _____.

() Please add after the title of the application "This is a

() Continuation () Divisional () Continuation-in-part (CIP)
of Application No. _____, filed _____, which is hereby incorporated by reference.

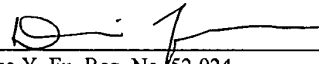
(X) This application claims the benefit of U.S. Provisional Application No. 60/815,217, filed June 19, 2006, which is hereby incorporated by reference.

Enclosed are:

- (X) Specification; 15 Total Pages. (X) Drawing(s); 6 Total Sheets.
 () Oath or Declaration:
 () A Newly Executed Combined Declaration and Power of Attorney:
 () Signed. () Unsigned. () Partially Signed.
 () A Copy from a Prior Application for Continuation/Divisional (37 CFR § 1.63(d)).
 () Signed Statement Deleting Inventor(s) Named in the Prior Application. (37 CFR § 163(d)(2)).
 () Power of Attorney. (X) Return Receipt Postcard.
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 () Preliminary Amendment. () Information Disclosure Statement and Form PTO-1449.
 () A Duplicate Copy of this Form for Processing Fee Against Deposit Account.
 () A Certified Copy of Priority Documents (if foreign priority is claimed).
 () Statement(s) of Status as a Small Entity.
 () Statement(s) of Status as a Small Entity Filed in Prior Application, Status Still Proper and Desired.
 (X) Non Publication Request.
 () Other: _____

PLEASE DO NOT CHARGE THE FILING FEE AT THIS TIME.

Respectfully submitted,

By: 
Diana Y. Fu, Reg. No. 52,924

Date: June 15, 2007

Correspondence Address:

Customer No. 21912
Van Pelt, Yi & James LLP
10050 N. Foothill Blvd.
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By: 

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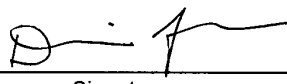
Express Mail Label No.: EV886207488US

Date of Deposit: June 15, 2007

NONPUBLICATION REQUEST UNDER 35 U.S.C. 122(b)(2)(B)(i)	First Named Inventor		Francis daCosta
	Title	MOBILITY EXTENSIONS FOR WIRELESS MULTIPLE RADIO MESH	
	Attorney Docket Number		MESHP003

I hereby certify that the invention disclosed in the attached application **has not and will not be** the subject of an application filed in another country, or under a multilateral agreement, that requires publication at eighteen months after filing.

I hereby request that the attached application not be published under 35 U.S.C. 122(b).



Signature

6/15/07

Date

Diana Y. Fu

Typed or printed name

52,924

Registration Number, if applicable

408-973-2593

Telephone Number

This request must be signed in compliance with 37 CFR 1.33(b) and submitted with the application **upon filing**.

Applicant may rescind this nonpublication request at any time. If applicant rescinds a request that an application not be published under 35 U.S.C. 122(b), the application will be scheduled for publication at eighteen months from the earliest claimed filing date for which a benefit is claimed.

If applicant subsequently files an application directed to the invention disclosed in the attached application in another country, or under a multilateral international agreement, that requires publication of applications eighteen months after filing, the applicant **must** notify the United States Patent and Trademark Office of such filing within forty-five (45) days after the date of the filing of such foreign or international application. **Failure to do so will result in abandonment of this application (35 U.S.C. 122(b)(2)(B)(iii)).**

This collection of information is required by 37 CFR 1.213(a). 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 6 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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APPLICATION FOR UNITED STATES PATENT

MOBILITY EXTENSIONS FOR WIRELESS MULTIPLE RADIO MESH

By Inventors:

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MOBILITY EXTENSIONS FOR WIRELESS MULTIPLE RADIO

MESH

CROSS REFERENCE TO OTHER APPLICATIONS

[0001] This application claims priority to U.S. Provisional Patent Application No. 60/815,217 entitled MOBILITY EXTENSIONS FOR WIRELESS MULTIPLE RADIO MESH filed June 19, 2006 which is incorporated herein by reference for all purposes.

BACKGROUND OF THE INVENTION

[0002] There is increasing interest in employing one network to support video, voice and data traffic. Currently, the video, voice and data networks are distinct since each addresses differing latency and bandwidth requirements. The challenge lies in providing within the same network the ability to address potentially conflicting latency and throughput needs of diverse applications. Some existing systems use multiple radio backhaul to provide both good throughput and latency without degradation over many hops or relays. Such systems sometimes use different non-interfering radio channels as shown in Figs. 1 and 2 labeled 104 to 108. This configuration, however, complicates mobile extensions because a mobile mesh node (Fig. 3, label 301) needs to sample multiple RF channels to determine the best parent mesh node to connect to.

Fig. 3 shows two potential parent nodes P2 303 and P3 304. Mobile node 301 has a current connection to the downlink of P1 302. The downlink P2 and P3 are on different channels to avoid RF interference. Mobile node 301 must sample downlink channels of both P2 303 and P3 304 to measure throughput and decide whether to switch from its current parent node.

[0003] Software extensions to the multi-radio backhaul (shown in Figs. 1, 2) enable mesh nodes to be mobile. A technique is described whereby mobile units scan the

environment to locate the best parent node to connect to even though all mesh nodes are operating on different channels. The system performs the following:

1. Scanning to discover all parent mesh nodes in the vicinity.
2. Place list of potential parent nodes in a to-be-sampled list
3. Receive a token from current parent to commence sampling (packets buffered)
4. Sample downlink-uplink connectivity with a selection from sample list
5. Return to normal operation (no more buffering)
6. Continue in this mode till next sampling token is received from parent
7. Repeat with another parent from sample list
8. Repeat steps above till multiple samples have been got
9. Make a decision to stay or switch parents based on throughput, signal strength et al.

BRIEF DESCRIPTION OF THE DRAWINGS

[0001] Various embodiments of the invention are disclosed in the following detailed description and the accompanying drawings.

[0002] FIG. 1 illustrates the contention on a conventional 1-radio mesh compared with a mesh having a 2-radio backhaul path.

[0003] FIG. 2 illustrates the contention on a conventional “1+1” radio mesh compared with a mesh having a 2-radio backhaul path.

[0004] FIG. 3 shows a mobile mesh node 301 connected to parent mesh node 302 with two candidate parent 303, 304.

[0005] FIG. 4 graphically illustrates the timing chart where the mobile mesh node uplink samples the two candidate parents P2 303 and P3 304 periodically in round robin fashion. When the mesh node uplink is sampling, the parent node holds its packets – no packets are lost during sampling. The parent mesh node controls when to sample by sending a token to the child node. At that time it also knows it has to buffer the packets.

[0006] FIG. 5 shows a double downlink antenna configuration on fixed parent nodes 501 along a train track or other relatively linear path 504. The downlinks use sectorized or panel antennas with 30-60 degrees angle mounted back to back and facing opposite directions 502, 503.

[0007] FIG. 6 shows a mobile unit with two uplinks, mounted back to back. A switch over from one antenna to the other is shown in two positions of the mobile unit. In the upper picture antenna 602 on the mobile unit is connected to 601 of the fixed node. In the picture below, the train has moved toward the left and the transmission from 603 on the mobile unit to downlink 604 of another parent node is better than from 601-602. A switch is made.

DETAILED DESCRIPTION

[0008] The invention can be implemented in numerous ways, including as a process, an apparatus, a system, a composition of matter, a computer readable medium such as a computer readable storage medium or a computer network wherein program instructions are sent over optical or communication links. In this specification, these implementations, or any other form that the invention may take, may be referred to as techniques. A component such as a processor or a memory described as being configured to perform a task includes both a general component that is temporarily configured to perform the task at a given time or a specific component that is manufactured to perform the task. In general, the order of the steps of disclosed processes may be altered within the scope of the invention.

[0009] A detailed description of one or more embodiments of the invention is provided below along with accompanying figures that illustrate the principles of the invention. The invention is described in connection with such embodiments, but the invention is not limited to any embodiment. The scope of the invention is limited only by the claims and the invention encompasses numerous alternatives, modifications and equivalents. Numerous specific details are set forth in the following description in order to provide a thorough understanding of the invention. These details are provided for the purpose of example and the invention may be practiced according to the claims without some or all of these specific details. For the purpose of clarity, technical material that is known in the technical fields related to the invention has not been described in detail so that the invention is not unnecessarily obscured.

[0010] A mesh node with a multiple radio backhaul in a dynamic external Radio Frequency (RF) environment is described. The RF environment is dynamic due to either its motion or others. A mobile mesh node must therefore scan/sample multiple radio channels to determine the best parent mesh node to connect to. A technique of doing so without sacrificing the overall performance of the mobile mesh unit is described in this application. The techniques described are not limited to mobility. The same technique

has also been employed to static mesh nodes operating in dynamic RF (radio frequency) environments.

Overview of Multi-radio backhaul

[0011] Radio is a shared medium where only one person can be "talking" at a time. As networks grow, performance degrades rapidly as the same AP services more clients. The AP's Basic Service Set (BSS) becomes unmanageable. The need to split up the network into smaller groups is essential to the health of a network.

[0012] For the 1-radio mesh, all of the backhaul links 102 are on the same channel (frequency) and therefore contend in the same spectrum. Since the backhaul function is performed by the same radios that service clients, there is contention between all clients and all backhaul links whenever devices and mesh APs are within range of one another. For latency sensitive transmissions, like VOIP, this situation creates the largest amount of latency and jitter since voice packets must contend again and again with voice packets in other service sets (at other mesh relay nodes) as they are relayed through the backhaul path, thereby compounding the contention and increasing latency/jitter along the way. In contrast to this, the preferred mesh with a multi-radio backhaul path uses different channels (frequencies) for different backhaul links. Thus, links 105, 106, 107, and 108 would all be on different channels and therefore are not contending with each other. Note that these backhaul links also use separate radios from the radios that service clients 109 and therefore client service transmissions do not contend with backhaul transmissions.

[0013] Fig. 2 shows an example of the preferred mesh with a 2-radio backhaul compared with a recent evolution of the 1-radio mesh. In Fig. 2, each node 201 has 2-radios, but one of these radios 202 has been dedicated to servicing clients while the other is dedicated to the backhaul link 203. Hence, this architecture is called a "1+1" mesh since the backhaul path still uses only one radio. The result is that while transmissions between clients and mesh nodes no longer contend with backhaul traffic, backhaul links still contend with each other.

[0014] Figs. 1 and 2 indicate that the multiple radio backhaul shown on the right hand side of both these figures has some clear advantages over a single radio backhaul for both throughput and latency, since contention is contained by using different non interfering channels on the uplink and downlink radios on each mesh node. For Node 104, the uplink channel is shown as 105 and the downlink channel as 106.

Addressing Mobility with Multiple Radio Backhaul (relay) nodes

[0015] Addressing Mobility with Multiple Radio Backhaul (relay) nodes poses a problem for mobile mesh node 301, Fig. 3. In this example. The mesh node is connected to P1 302 but moving towards P2 303 and P3 304. It must sample throughput available from those potential parents and collect sufficient samples to make an informed decision between P2 and P3.

[0016] If the unit is moving it is constantly in new territory and does not know of the presence of P2 or P3 ahead of time. It cannot hear them: P2 and P3 downlinks are operating on non-interfering channels than P1 and its uplink is connected to node P1's downlink. It can therefore only hear P1's channel.

[0017] One alternative is to install a separate, dedicated radio, referred to as the scanning radio. This radio scans the RF environment and discovers potential parent nodes. These are then added to the list of potential parents to be sampled, in order to determine which provides better throughput, averaged over multiple time-delayed samples.

[0018] It could be argued that the scanning radio could also sample to decide the best next parent. That is an option but it reduces the amount of time scanning. Further, if the antennas on the uplink differ from those on the scanning radio, then the conclusions made by the scanning radio may be inaccurate. Lastly, this approach requires that all mobile nodes must have a scanning radio. However, scanning radios are needed only as part of a discovery process, when the mobile mesh node uplink is traveling into

unfamiliar territory. It may not be needed if there are multiple uplink radios on the mobile unit each set to listen to a specific channel.

Buffering Packets and Sending Sampling Tokens

[0019] Packets to be sent down to it by its parent to a mesh node must be buffered when the node uplink is sampling the throughput performance from a candidate parent downlink. Likewise, packets coming into the mesh node from its downlink and intended to be transmitted upward to its parent must also be buffered till the mesh node's uplink switches back to its current parent's downlink channel and resumes normal operation.

[0020] Each parent may have multiple child nodes each requesting to sample other candidate parents. When they do so their packets must be buffered. One embodiment of this invention is to coordinate all these sampling times by having the parent node (P1 Fig. 3) send a token in a round robin manner to each of its children, periodically. The periodicity may be set by the beacon interval, for example, and the token may be sent with the beacon as an application specific information element (ASIE) to be used by the children mesh nodes to determine which child node is allowed to sample other potential parent nodes.

[0021] Fig. 4 graphically illustrates the timing chart where the mobile mesh node uplink samples the two candidate parents 303, 304 periodically in round robin fashion. When the mesh node uplink is sampling, the parent node holds its packets – no packets are lost during sampling. The parent mesh node controls when to sample by sending a token to the child node after a time interval Fig. 4, label 401. The time interval T_{int} 401 could be set as multiple of the beacon interval and the token included as part of the beacon message.

[0022] When the token is received and acknowledged by the child node, the parent will begin holding packets for it till it returns from the sampling mode and resumes normal operation.

[0023] Note that in Fig. 3 parent mesh node P1 301 has one child. Had it multiple children each child would get a token S times the time interval, where S is the number of siblings the mobile mesh node has. In other words, the more children a parent has, the less frequently does each child get a token.

Sampling Process for Mobile Nodes

[0024] In summary, the software technique described in this application applies to both scanner equipped and non-scanner equipped mobile systems. The software performs the following:

1. Scanning to discover all parent mesh nodes in the vicinity (if needed)
2. Place list of potential parent nodes in a to-be-sampled list
3. Receive a token from current parent to commence sampling (packets buffered)
4. Sample downlink-uplink connectivity with a selection from sample list
5. Return to normal operation (no more buffering)
6. Continue in this mode till next sampling token is received from parent
7. Repeat with another parent from sample list
8. Repeat steps above till multiple samples have been got
9. Make a decision to stay with or switch parents

Computing the Maximum Speed of Travel

[0025] Fig. 4 shows the timing chart for the scenario in Fig. 3. Most of time is taken up performing the normal operation of moving data packets, label 401. The uplink of the mesh node is on P1's downlink for all 401 blocks of time. In this particular case, P1 302 has only one child shown: every beacon interval (or multiples of it) the child 301 may receive a sampling token.

[0026] Since it has two contending candidate parents the sampling sequence would flip between the two. 402, 403 sample P2 and P3 respectively and then back to P1 404. A minimum number of samples is needed to make an informed decision.

[0027] In general the maximum speed the mesh node can travel is a function of:

1. *D* The distance traveled before a switch is made see label 305
2. *Tint* The time between samples, see label 405
3. *P* The number of candidate parents e.g. $P_2 + P_3 = 2$
4. *Nmin* Minimum number of samples to take before a switch is made.
5. *Childs* Number of children the parent mesh has to share tokens with.

[0028] In the worst case a switch should occur at least by the time the mobile node reaches the next node. Hence Fig. 3, 305 depicts the worst case distance. The node spacing is dependant on the radio frequency band (e.g. 2.4Ghz or 5.8Ghz) and the type of antennas (e.g. omni directional vs. sectored.). The latter provide a more focused beam and hence more range. This fact is used in the dual uplink-downlink system shown in Figs. 5,6.

[0029] If the number of samples to be taken – per parent - before making a decision is *Nmin* and the number of potential parents is *P* then the time elapsed to collect sufficient samples is:

$$T_{Time_Elapsed} = Nmin * P * Tint * Childs \quad \text{Equation 1}$$

The maximum speed of the mobile node is therefore

$$Maximum_Speed = D / (Nmin * P * Tint * Childs) \quad \text{Equation II}$$

Example: if $D = 300$ meters, $Nmin = 10$ samples, $P = 2$ candidates, $Tint = 0.25$ seconds, $Childs = 1$ then the maximum speed = $150 / (10 * 2 * 0.25) = 60$ meters/sec or 216 km per hr.

[0030] Note that the time intervals between receiving sampling tokens from the parent mesh node is dependent on both the number of siblings the mobile mesh node shares tokens with. The maximum speed is also dependent on the number of potential parents: the more potential parents, the slower the maximum speed. For fast moving mesh nodes, both *P* and *Childs* should be kept low. One such scenario is trains or a truck convoy moving string of pearls.

Extending speed with back-to-back sector antennas

[0031] If the channels that the potential parent nodes use is fixed, then the scanning radio is no longer needed. This results in a simpler system for mobility applications as with trains or convoy trucks or mining trolleys as examples. As shown in Fig 5, two panel antennas are mounted back to back, and connected to 2 separate radios. This doubles the RF energy and focuses the RF energy in one direction. The radios connected to the antennas are operating may even operate on interfering channels since the antenna coverage does not overlap.

[0032] Fig. 5 depicts the two panel antennas system mounted on fixed nodes 501 located between two tracks, 504. The fixed nodes 501 each have two sector antennas pointing in opposite directions 503, 502. They are mounted back to back and each is connected to a separate downlink radio for the mobile unit.

[0033] In addition to the two sectored service antennas to cover the tracks shown, each of the fixed nodes also has a sectored uplink and downlink backhaul radio, (not shown) that connect to each other to form a chain of relay mesh nodes. There are therefore a total of four radios on each fixed node, two as part of the fixed node backhaul and two “service” downlinks for the mobile units. This is equivalent to adding one more service radio 109 to the two backhaul radios shown as 105 and 106 in Fig. 1.

[0034] The service radios and backhaul radios in 105/106 and service radio 109 were on different frequency bands to avoid channel interference. The antennas were omni-directional, driven by the fact that uplink, downlink and service were all single radio systems. Multiple downlinks with sectored antennas reduces the cross interference and if there are sufficient channels (as in the IEEE 802.11a 5.8GHz band) then all the radios can be of the same type. This simplifies the design of both fixed and mobile mesh nodes.

[0035] Fig. 6 depicts a mobile unit – also with back-to-back panel antennas switching over from one mesh node to another. In the upper section, antennas 601/602 are transmitting data packets while antenna 603 samples the throughput from 604. When the sampled throughput is better than that available from the 601/602 combination, a switch occurs. The connected link data now becomes 603/604 and 602 begins sampling for a better link.

[0036] Notice that in this approach there has to be two service downlinks on the fixed nodes and two uplinks on the mobile unit. There is also no scanner – the channels are fixed on the back to back antennas and the antennas on the mobile unit need sample only one channel. Hence there is no discovery and therefore no need for a scanning radio.

Field Tested Embodiments of Present Invention

[0037] Three embodiments of this invention have been deployed in the field, with positive results:

[0038] The first embodiment uses a scanning radio for the purposes of discovery only and uses the uplink to perform the sampling of throughput performance by connecting to the downlink of each of the candidate parent mesh nodes.

[0039] The second embodiment eliminates the need for a scanning radio by using multiple downlinks on the fixed nodes and multiple uplinks on the mobile node, each fixed to operate on a pre-assigned channel. The non-scanner case is relevant in cases where no discovery is needed or when the potential parent channels are set. This is described in a later section.

[0040] The third embodiment is a variation of the first, where, to save costs, the functionality of the scanning radio is incorporated into the mesh relay node. The uplink radio stops sending and receiving packets and packets are buffered. It then periodically scans the RF environment. The performance of the network is not significantly affected if the scanning time is kept low.

[0041] Field tests of this third embodiment were performed to test the overall performance of the network. Mesh nodes were mounted in army vehicles. When army vehicles form a convoy there is a string of pearls connectivity to a root node and satellite link. When the vehicles are not part of a convoy there is no mesh link but there is still a service radio so client laptops and client phones may pass messages on the mesh node's local hard drive for future transmission. There is a GPS radio installed inside each mesh node, all messages are time and location stamped. When the mobile units are not connected to a mesh network they act as temporary mailboxes, storing information and queries for onward transmission. When the vehicle makes contact with other vehicles it forms a peer-to-peer mesh and data is synchronized so mesh nodes that connected with

each other now have a consolidated database of messages transmitted to individual mesh nodes. The consolidated database is uploaded when a mesh is formed or when any one of the vehicles reach the base. The mesh nodes form a mobile time delayed store and forward messaging system. It was found that the overall performance loss - without using a dedicated scanning radio – was less than 2 percent.

[0042] In another set of field tests, mesh nodes were deployed in underground mine tunnels. One set of mesh nodes formed a static string of pearls along the mining tunnel wall. Mobile mesh nodes were mounted on trolleys that moved along the tunnel. Miners with VOIP phones were able to connect to the network without significant packet loss.

[0043] In the applications described above, the mobile nodes were moving at less than 50 (fifty) miles per hour (mph). As the speed increases, more scanning time is needed to collect enough samples of data to make an informed decision regarding the best next parent. Spending more time on sampling/scanning detracts from the main task at hand for the relay nodes, namely the transfer of packets.

[0044] With a dedicated scanning radio in place, speeds of 100 (hundred) mph were achieved. In one field test, mesh nodes were placed along the side of the road, similar to what is shown in Figs. 5 and 6. The mobile node, mounted on the car, traveled along the road. Switch over from one parent node (along the road) to the next one took place reliably and in a repeatable manner.

[0045] Methods and architectures for extending the functionality of multi-radio mesh systems for mobility have been described. Although the foregoing embodiments have been described in some detail for purposes of clarity of understanding, the invention is not limited to the details provided. There are many alternative ways of implementing the invention. The disclosed embodiments are illustrative and not restrictive.

WHAT IS CLAIMED IS:

CLAIMS

1. A method for operating a mesh network having a plurality of mesh nodes, comprising:
for each mesh node of the mesh network, sampling an Radio Frequency (RF)
5 environment to determine a new potential parent mesh node for connecting with said
each mesh node; wherein
said each mesh node includes at least two relay radios in each mesh element
operating on different non-interfering channels.
2. The method of claim 1, wherein said each mesh node is moving sufficiently
10 rapidly that it may lose connectivity with current parent mesh node, and said each mesh
node has dedicated scanning radios.
3. The method of claim 1, wherein said each mesh node is moving at high speed
along path and receives connectivity from a plurality of static nodes placed at regular
intervals along the path.
- 15 4. A mesh network comprising:
a plurality of mesh nodes; wherein
each mesh node of the mesh network is configured to sample an Radio Frequency
(RF) environment to determine a new potential parent mesh node for connecting with
said each mesh node; wherein
20 said each mesh node includes at least two relay radios in each mesh element
operating on different non-interfering channels.
5. A computer program product for operating a mesh network having a plurality of
mesh nodes, the computer program product being embodied in a computer readable
medium and comprising computer instructions for:
25 for each mesh node of the mesh network, sampling an Radio Frequency (RF)
environment to determine a new potential parent mesh node for connecting with said
each mesh node; wherein

said each mesh node includes at least two relay radios in each mesh element operating on different non-interfering channels.

MOBILITY EXTENSIONS FOR WIRELESS MULTIPLE RADIO
MESH

ABSTRACT OF THE DISCLOSURE

[0026] The functionality of multiple radio backhaul is extended to mobility applications. The multiple radio backhaul uses at least one radio for the uplink and at least one radio for the downlink, both operating in different, non-interfering channels. A mobile mesh node scans and/or samples multiple radio channels to determine the best parent mesh node to connect to. Techniques devised to scan/sample the external Radio Frequency (RF) environment without sacrificing the overall up time performance of the network are described.

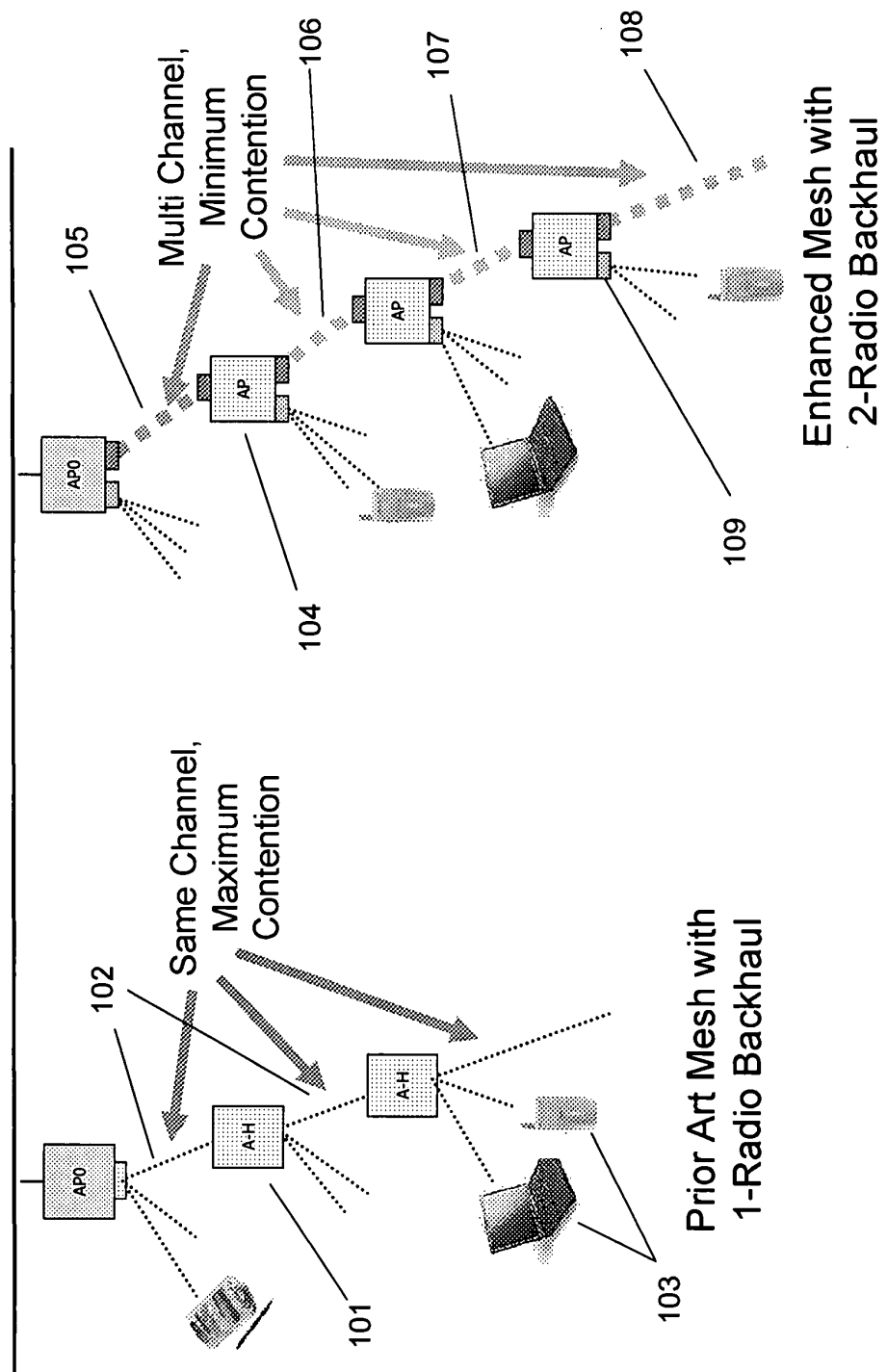


FIG. 1

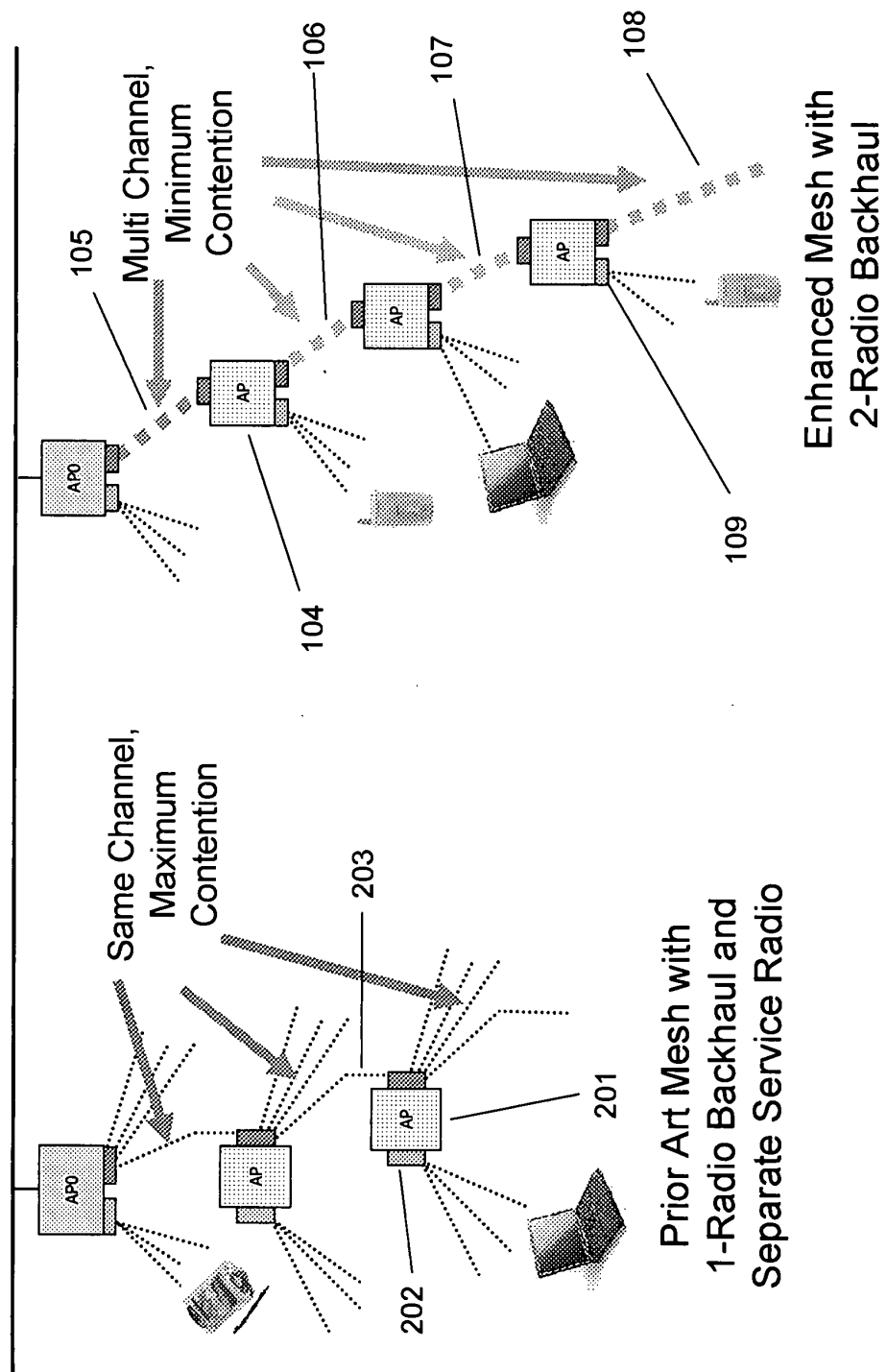


FIG. 2

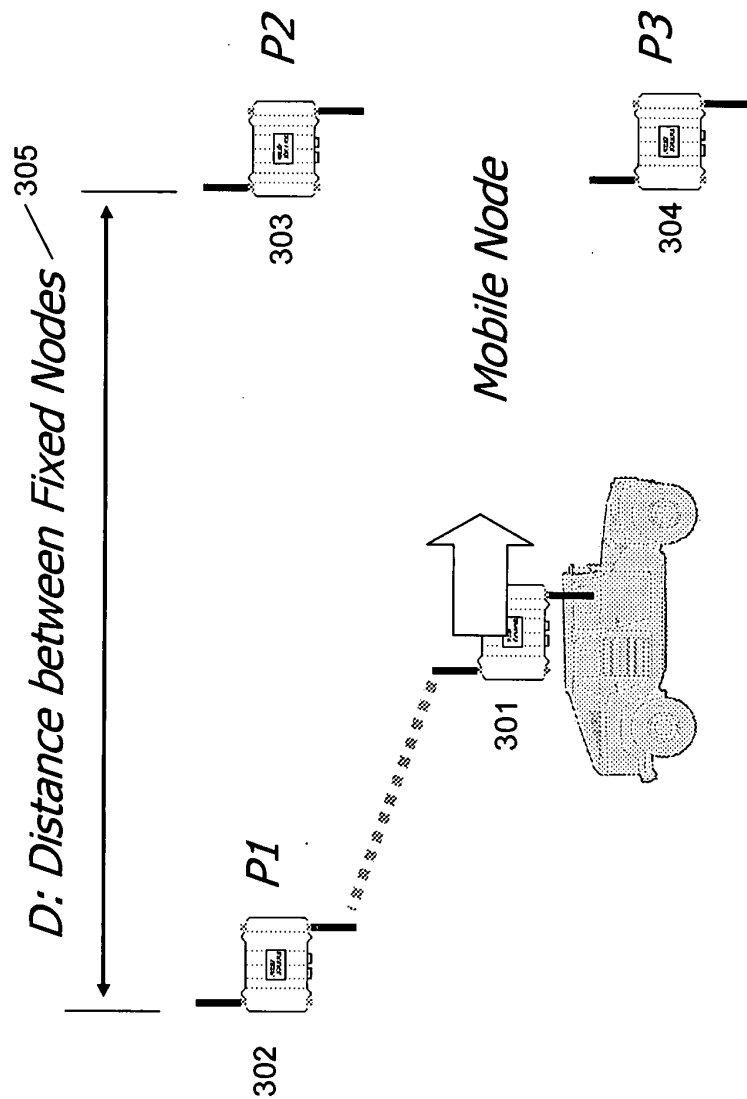


FIG. 3

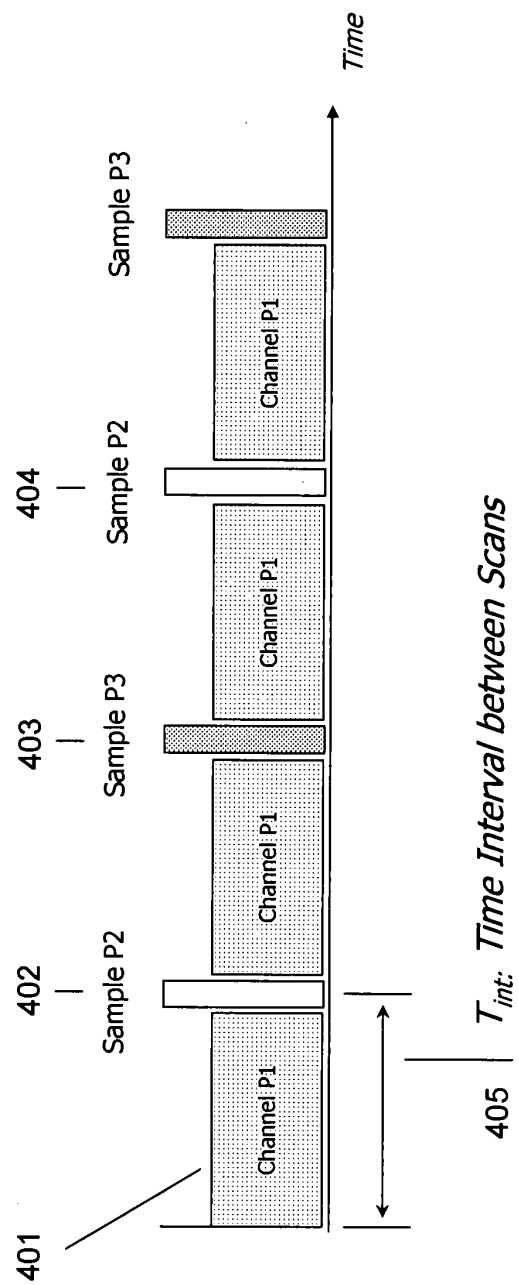


FIG. 4

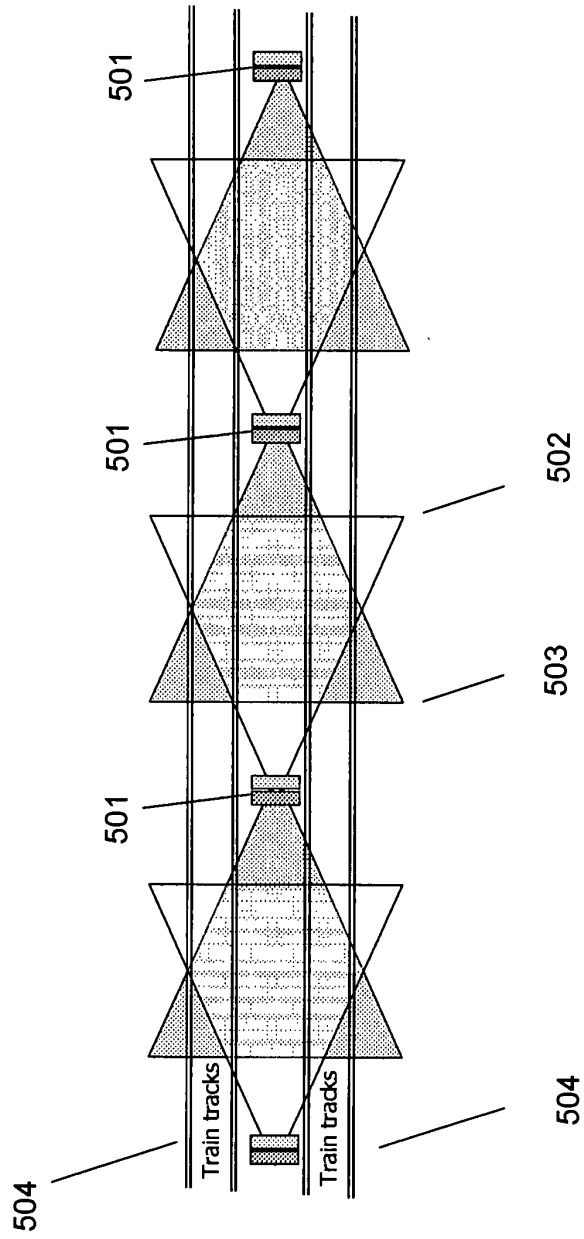


FIG. 5

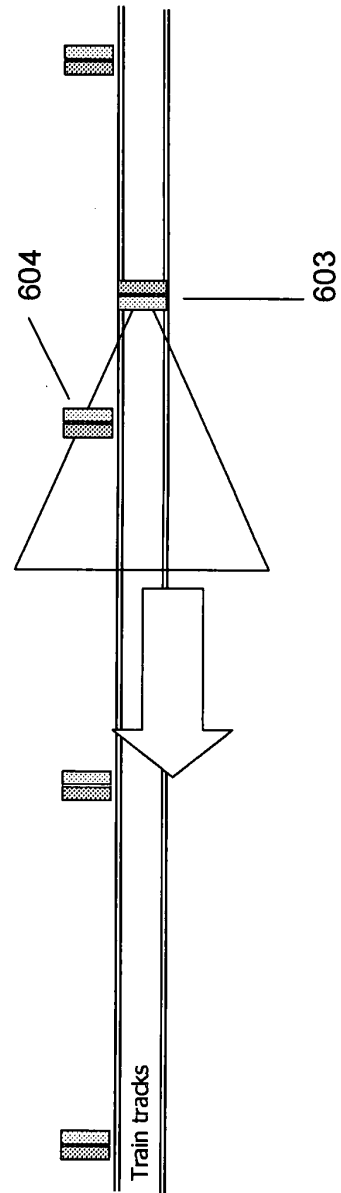
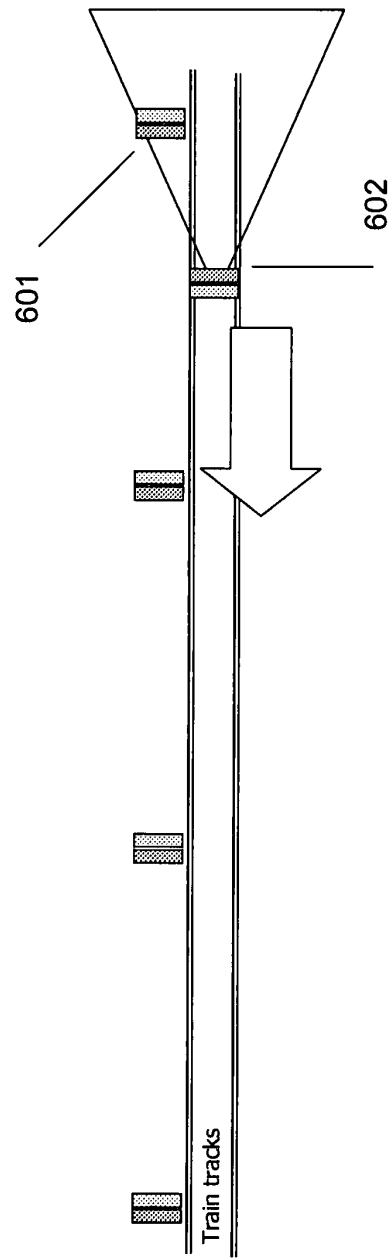


FIG. 6