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Benn

PATENT

UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): daCosta et. al
Title: PERSISTENT MESH FOR ISOLATED MOBILE AND TEMPORAL NETWORKING
Filing Date: January 29, 2010
Serial Number: 12/696,947
Patent Number: 8,520,691
Conf. No.: 1992
Atty. Docket: 0357-02217

2025 JAN 16 AM 9:00

USPTO
RECEIPTS ACCOUNTING
DIVISION

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:

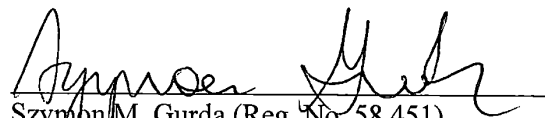
Payment Code	Description	Fee paid	Date paid	Current fee	Deficiency owed
2558	Delayed Payment Fee	\$1050	March 2, 2022	\$2100	\$1050
2552	7.5 Year Maintenance Fee	\$1880	March 2, 2022	\$3760	\$1880
2551	3.5 Year Maintenance Fee	\$800	Sept. 6, 2016	\$2000	\$1200
				TOTAL:	\$4130

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)

PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(b))				
Patent Number	Issue Date	Application Number	Filing Date	Docket Number (if applicable)
8520691	27-Aug-2013	12696947	29-Jan-2010	
CAUTION: Maintenance fee (and surcharge, if any) payment must correctly identify: (1) the patent number and (2) the application number of the actual U.S. application leading to issuance of that patent to ensure the fee(s) is/are associated with the correct patent. 37 CFR 1.366(c) and (d).				
Applicants claims the following fee status:				
☒ Small Entity				
☐ Micro Entity				
☐ Regular Undiscounted				
Applicants selects the following :				
☐ 3 1/2 ☒ 7 1/2 ☐ 11 1/2				
PETITION FEE The petition fee required by 37 CFR 1.17(m) (Fee Code 1558/2558) must be paid as a condition of accepting unintentionally delayed payment of the maintenance fee.				
MAINTENANCE FEE (37 CFR 1.20(e)-(g)) The appropriate maintenance fee must be submitted with this petition.				
STATEMENT The delay in payment of the maintenance fee for this patent was unintentional. Petitioner is reminded that a delay resulting from a deliberately chosen course of action or a change in circumstance is not an unintentional delay. Petitioner is further reminded that a person seeking reinstatement of an expired patent should not make a statement that the delay in payment of the maintenance fee was unintentional unless the entire delay was unintentional, including the period from discovery that the maintenance fee was not timely paid until payment of the maintenance fee. For example, a statement that the delay in payment of the maintenance fee was unintentional would not be proper when the patentee becomes aware of an unintentional failure to timely pay the maintenance fee and then intentionally delays filing a petition for reinstatement of the patent under 37 CFR 1.378. See MPEP 2590. NOTE: Where the petition under 37 CFR 1.378 is filed more than two years after the date the patent expired for nonpayment of the maintenance fee, the United States Patent and Trademark Office requires an additional explanation of the circumstances surrounding the delay that establishes the entire delay was unintentional. This requirement is in addition to the requirement to provide a statement that the entire delay was unintentional. See <i>Clarification of the Practice for Requiring Additional Information in Petitions Filed in Patent Applications and Patents Based on Unintentional Delay</i> , 85 FR 12222 (March 2, 2020). See MPEP 711.03(c)(II)(C)-(F) for additional guidance on the information required to establish that the entire delay was unintentional.				
PETITIONER(S) REQUEST THAT THE DELAYED PAYMENT OF THE MAINTENANCE FEE BE ACCEPTED AND THE PATENT REINSTATED				
THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES 37 CFR 1.378(c) states: "Any petition under this section must be signed in compliance with 37 CFR 1.33(b) ."				
I certify, in accordance with 37 CFR 1.4(d)(4) that I am				

- ☐ An attorney or agent registered to practice before the Patent and Trademark Office who has been given power of attorney in this application.
- ☒ An attorney or agent registered to practice before the Patent and Trademark Office
- ☐ A sole patentee
- ☐ A joint patentee; I certify that I am authorized to sign this submission on behalf of all the other patentees as evidenced by the power of attorney in the application
- ☐ A joint patentee; all of whom are signing this e-petition
- ☐ The assignee of record of the entire interest that qualifies as an authorized party under 37 CFR 1.33(b)

Patent Practitioner

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature

Signature	/Szymon M. Gurda/		
Name	Szymon Gurda	Registration Number	58451

Electronic Patent Application Fee Transmittal				
Application Number:		12696947		
Filing Date:		29-Jan-2010		
Title of Invention:		PERSISTENT MESH FOR ISOLATED MOBILE AND TEMPORAL NETWORKING		
First Named Inventor/Applicant Name:		Francis daCosta		
Filer:		Szymon Maciej Gurda		
Attorney Docket Number:		0357-02217		
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
MAINTENANCE FEE DUE AT 7.5 YEARS	2552	1	1880	1880
PET. DELAY PYMT MAINTAIN PATENT IN FORCE	2558	1	1050	1050
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				2930



UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

In re Patent No. 8520691 :
Issue Date: August 27, 2013 :
Application No. 12696947 :DECISION GRANTING PETITION
Filed: January 29, 2010 :UNDER 37 CFR 1.378(b)
Attorney Docket No. 0357-02217 :

This is a decision on the electronic petition, filed March 2, 2022, under 37 CFR 1.378(b) to accept the unintentionally delayed payment of the 7.5 year maintenance fee for the above-identified patent.

The petition is **GRANTED**.

The maintenance fee is accepted, and the above-identified patent reinstated as of March 2, 2022. This decision also constitutes notice that the fee has been accepted. An electronic copy of the petition and this decision has been created as an entry in the Image File Wrapper. Nevertheless, petitioner should print and retain an independent copy.

Telephone inquiries related to this electronic decision should be directed to the Electronic Business Center at 1-866-217-9197.

Electronic Acknowledgement Receipt	
EFS ID:	45131042
Application Number:	12696947
Patent Number:	8520691
Confirmation Number:	1992
Petition Issued Date:	March 2,2022
Title of Invention:	PERSISTENT MESH FOR ISOLATED MOBILE AND TEMPORAL NETWORKING
First Named Inventor/Applicant Name:	Francis daCosta
Customer Number:	27197
Filer:	Szymon Maciej Gurda
Filer Authorized By:	
Attorney Docket Number:	0357-02217
Receipt Date:	02-MAR-2022
Filing Date:	29-JAN-2010
Time Stamp:	18:59:31
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$2930
RAM confirmation Number	E202232I59253755
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	ePetition Request Form	petition-request.pdf	47990	no	2
			edc72469ff7ccd8d2545d5f63ac306f51fd3d18		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	40400	no	2
			12718184e1ac2af47d2b791e1c898212840c1b85		
Warnings:					
Information:					
Total Files Size (in bytes):			88390		
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.					



UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/696,947	08/27/2013	8520691	0357-02217	1992

27197 7590 08/07/2013
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 761 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, Santa Clara, CA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12696947
	Filing Date		2010-01-29
	First Named Inventor	daCosta, Francis	
	Art Unit	2473	
	Examiner Name	Yao, Kwang Bin	
	Attorney Docket Number	0357-02217	

U.S. PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	5546397		1996-08-12	Mahany	Col. 5, Lines 25-28
	2	6982960	B2	2006-01-03	Lee et al.	Page 1, Abstract
	3	5867785		1999-02-02	Averbuch et al.	Col. 7, Para. 34
	4	7103371	B1	2006-09-05	Liu	Page 1, Abstract
	5	6393261	B1	2002-05-21	Lewis	Col. 1, Lines 59-62
	6	7200130		2007-04-03	Forstadius et al.	Sheet 2, Fig. 2
	7	6046992		2000-04-04	Meier et al.	Sheet 1, Fig. 1
	8	~~7,408,928~~ ~~7,408,025~~	B2	2008-05-05	Bradd et al.	Col. 4, Lines 65-67

Change(s) applied
to document,

/C.S./

6/18/2013

EFS Web 2.1.17

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.C./

PART B - FEE(S) TRANSMITTAL

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

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

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

27197 7590 04/26/2013
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 M. Gurda	(Depositor's name)
/Szymon M. Gurda/	(Signature)
via EFS-Web on July 26, 2013	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/696,947	01/29/2010	Francis daCosta	0357-02217	1992

TITLE OF INVENTION: PERSISTENT MESH FOR ISOLATED MOBILE AND TEMPORAL NETWORKING

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$890	\$300	\$0	\$1190	07/26/2013

EXAMINER	ART UNIT	CLASS-SUBCLASS
CHENG, CHI TANG P	2463	370-408000

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,
- (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 and**
2 **Gurda, LLC**
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

Mesh Dynamics, Inc.

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

Santa Clara, CA

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)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

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

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

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

NOTE: 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 July 26, 2013

Typed or printed name Szymon M. Gurda

Registration No. 58,451

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 persons are required to respond to a collection of information unless it displays a valid OMB control number.

Electronic Patent Application Fee Transmittal				
Application Number:		12696947		
Filing Date:		29-Jan-2010		
Title of Invention:		PERSISTENT MESH FOR ISOLATED MOBILE AND TEMPORAL NETWORKING		
First Named Inventor/Applicant Name:		Francis daCosta		
Filer:		Szymon Maciej Gurda		
Attorney Docket Number:		0357-02217		
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	890	890
Publ. Fee- Early, Voluntary, or Normal	1504	1	300	300

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1190

Electronic Acknowledgement Receipt	
EFS ID:	16433504
Application Number:	12696947
International Application Number:	
Confirmation Number:	1992
Title of Invention:	PERSISTENT MESH FOR ISOLATED MOBILE AND TEMPORAL NETWORKING
First Named Inventor/Applicant Name:	Francis daCosta
Customer Number:	27197
Filer:	Szymon Maciej Gurda
Filer Authorized By:	
Attorney Docket Number:	0357-02217
Receipt Date:	26-JUL-2013
Filing Date:	29-JAN-2010
Time Stamp:	19:24:50
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$1190
RAM confirmation Number	6035
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	102738	no	2
			4ed25faa7f2225d63295471fe3b7fbcbbf31d2ce		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	32066	no	2
			73cd0e0d9959d8029409120e04c117aa5fa221260		
Warnings:					
Information:					
Total Files Size (in bytes):			134804		
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.					



UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
12/696,947	01/29/2010	2463	917	0357-02217	35	3

CONFIRMATION NO. 1992

CORRECTED FILING RECEIPT



OC000000061982226

27197
MICHAEL J. CHERSKOV
123 WEST MADISON STREET
SUITE 400
CHICAGO, IL 60602

Date Mailed: 06/17/2013

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

Inventor(s)

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

Applicant(s)

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

Power of Attorney:

Donald Flaynik Jr--30836
Michael Cherskov--33664
Charles Nissim-Sabat--42037
Szymon Gurda--58451

Domestic Priority data as claimed by applicant

This appln claims benefit of 61/148,803 01/30/2009
and is a CIP of 11/084,330 03/17/2005 ABN
which is a CIP of 10/434,948 05/08/2003 PAT 7420952
This application 12/696,947
is a CIP of 12/352,457 01/12/2009 PAT 8477762 *
(*)Data provided by applicant is not consistent with PTO records.

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

If Required, Foreign Filing License Granted: 02/17/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/696,947**

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

PERSISTENT MESH FOR ISOLATED MOBILE AND TEMPORAL NETWORKING

Preliminary Class

370

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:

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 (1-866-999-4258).

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Title 37, Code of Federal Regulations, 5.11 & 5.15

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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).

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Alexandria, Virginia 22313-1450
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NOTICE OF ALLOWANCE AND FEE(S) DUE

27197 7590 04/26/2013
MICHAEL J. CHERSKOV
123 WEST MADISON STREET
SUITE 400
CHICAGO, IL 60602

EXAMINER

CHENG, CHI TANG P

ART UNIT

PAPER NUMBER

2463

DATE MAILED: 04/26/2013

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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12/696,947

01/29/2010

Francis daCosta

0357-02217

1992

TITLE OF INVENTION: PERSISTENT MESH FOR ISOLATED MOBILE AND TEMPORAL NETWORKING

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$890	\$300	\$0	\$1190	07/26/2013

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

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

HOW TO REPLY TO THIS NOTICE:

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

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

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

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

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

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

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

PART B - FEE(S) TRANSMITTAL

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

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

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

27197 7590 04/26/2013
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.
12/696,947	01/29/2010	Francis daCosta	0357-02217	1992

TITLE OF INVENTION: PERSISTENT MESH FOR ISOLATED MOBILE AND TEMPORAL NETWORKING

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$890	\$300	\$0	\$1190	07/26/2013

EXAMINER	ART UNIT	CLASS-SUBCLASS
CHENG, CHI TANG P	2463	370-408000

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,
- (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 _____
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)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

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

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

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

NOTE: 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.
12/696,947	01/29/2010	Francis daCosta	0357-02217	1992
27197 7590 04/26/2013 MICHAEL J. CHERSKOV 123 WEST MADISON STREET SUITE 400 CHICAGO, IL 60602			EXAMINER CHENG, CHI TANG P	
			ART UNIT 2463	PAPER NUMBER

DATE MAILED: 04/26/2013

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 551 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 551 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.

Privacy Act Statement

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

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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 12/696,947 Examiner PETER CHENG	Applicant(s) DACOSTA ET AL. Art Unit 2463 AIA (First Inventor to File) Status No
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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to communication of 2/1/13.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____.

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

3. ☒ The allowed claim(s) is/are 1-35. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

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

Certified copies:
a) ☐ All b) ☐ Some *c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
* Certified copies not received: _____.

Interim copies:
a) ☐ All b) ☐ Some c) ☐ None of the: Interim copies of the priority documents have been received.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892) 2. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____ 3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material 4. ☒ Interview Summary (PTO-413), Paper No./Mail Date _____	5. ☒ Examiner's Amendment/Comment 6. ☒ Examiner's Statement of Reasons for Allowance 7. ☐ Other _____
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/P. C./ Examiner, Art Unit 2463	/Mark Rinehart/ Supervisory Patent Examiner, Art Unit 2463
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DETAILED ACTION

Response to Amendment

1. Applicant has amended claims 1, 20 and 34. Claims 1-35 are pending.

EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.
3. Authorization for this examiner's amendment was given in a telephone interview with Szymon Gurda on 4/15/13.

IN THE CLAIMS

4. The application has been amended as follows:
5. **Claim 1** has been further amended as follows:
"Claim 1: A structured mesh network capable of isolated operation, comprising:
at least two structured mesh nodes;
wherein each structured mesh node comprises at least a connectivity logic;
an uplink radio operating on an uplink frequency and a downlink radio operating
on a distinct downlink frequency;

wherein the connectivity logic determines whether each structured mesh node connects with an external network or another node using its uplink radio and client devices or other mesh nodes connect to each node using each node's downlink radio;

wherein the structured mesh network functions in two configurations selected depending on whether a connection to an external network is present;

in the first connected configuration the structured mesh network includes at least one structured mesh node's uplink radio [comprises]**comprising** a connection to an external network; and in the second isolated configuration none of the structured mesh nodes' uplink radio comprises a connection to an external network, and one of the structured mesh nodes acts as an isolated network root of the isolated configuration and all remaining nodes["] connect to the isolated network root node as isolated root children nodes forming a tree configuration;

wherein clients of nodes [a]**of the** structured network in a second isolated configuration retain full connectivity within the structured network during the isolated configuration and wherein said client connectivity is uninterrupted during any transition from the isolated configuration to the first connected configuration; wherein distinct downlink frequencies are used by nodes for communication with one or more nodes lower on the tree configuration."

Response to Arguments

6. The objection to claim 33 has been withdrawn.

7. Applicant's arguments with respect to the Section 103 rejections have been fully considered in light of the amendments made herein and are persuasive. Therefore, the Section 103 rejections have been withdrawn.

Allowable Subject Matter

8. **Amended Claims 1-35** are allowed.

9. The following is an examiner's statement of reasons for allowance:

Claims 1, 20 and 34 are allowable over the prior art since the prior art fails to disclose or render obvious the limitations recited therein.

10. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PETER CHENG whose telephone number is (571)272-9021. The examiner can normally be reached on M-Th, 8:00AM - 5:00PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Rinehart can be reached on 571-272-3632. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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

/P. C./
Examiner, Art Unit 2463

/Mark Rinehart/
Supervisory Patent Examiner, Art Unit 2463

Receipt date: 01/17/2013

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

12696947 - GAI: 2463

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

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

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12696947	
	Filing Date		2010-01-29	
	First Named Inventor	Francis daCosta		
	Art Unit	2463		
	Examiner Name	CHENG, CHI TANG P		
	Attorney Docket Number	0357-02217		

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.					

Receipt date: 01/17/2013 INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12696947	12696947 - GAU: 2463
	Filing Date		2010-01-29	
	First Named Inventor	Francis daCosta		
	Art Unit	2463		
	Examiner Name	CHENG, CHI TANG P		
	Attorney Docket Number	0357-02217		

	1		☐
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EXAMINER SIGNATURE			
Examiner Signature	/Chitang Peter Cheng/		Date Considered 03/27/2013
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			
¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.			

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

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S38	2	"20040203787"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/03/27 14:46
S39	29261	(370/254-256,328,338,408).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/04/08 17:24
S40	73	S39 and (ad hoc or manet) and tree and root and isolat\$3 and (join\$3 or attach\$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/04/08 17:24
S41	19	ad near1 hoc same cluster and frequenc\$3 with internal\$3 and (external\$3 or common\$3) with frequenc\$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/04/08 17:25
S42	29337	(370/254-256,328,338,408).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/04/14 16:52
S43	73	S42 and (ad hoc or manet) and tree and root and isolat\$3 and (join\$3 or attach\$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/04/14 16:52
S44	19	ad near1 hoc same cluster and frequenc\$3 with internal\$3 and (external\$3 or common\$3) with frequenc\$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/04/14 16:53
S45	24	(ad near1 hoc or mesh) same network\$3	US-PGPUB;	ADJ	ON	2013/04/14

		and merg\$3 same (master\$3 or root\$3 or tree) with (join\$3 or attach\$3) with (child\$5 or tree or leaf\$2 or leaves or root\$3 or master\$3)	USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			16:54
S46	7	(ad near1 hoc or cluster or mesh) and (tree\$3 or root\$3) and isolat\$6 same (connectiv\$5 or connect\$4) with (full\$3 or remain\$3 or maintain\$3 or maintenanc\$3 or retain\$3) and frequenc\$3 with ((down\$1link or down\$1stream\$3 or internal\$3) and (external\$3 or common\$3 or up\$1stream\$3 or up\$1link\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/04/14 17:15
S47	10	(mesh with dynamic\$5).as.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/04/14 17:16
S48	35	(francis with da\$1costa or dayanandan).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/04/14 17:17
S49	0	S47 and (ad near1 hoc or cluster or mesh) and (tree\$3 or root\$3) and isolat\$6 same (connectiv\$5 or connect\$4) with (full\$3 or remain\$3 or maintain\$3 or maintenanc\$3 or retain\$3) and frequenc\$3 with ((down\$1link or down\$1stream\$3 or internal\$3) and (external\$3 or common\$3 or up\$1stream\$3 or up\$1link\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/04/14 17:18
S50	0	S47 and (ad near1 hoc or cluster or mesh) and (tree\$3 or root\$3) and (isolat\$6 or (connectiv\$5 or connect\$4) with (full\$3 or remain\$3 or maintain\$3 or maintenanc\$3 or retain\$3)) and frequenc\$3 with ((down\$1link or down\$1stream\$3 or internal\$3) and (external\$3 or common\$3 or up\$1stream\$3 or up\$1link\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/04/14 17:19
S51	1	S48 and (ad near1 hoc or cluster or mesh) and (tree\$3 or root\$3) and (isolat\$6 or (connectiv\$5 or connect\$4) with (full\$3 or remain\$3 or maintain\$3 or maintenanc\$3 or retain\$3)) and frequenc\$3 with ((down\$1link or down\$1stream\$3 or internal\$3) and (external\$3 or common\$3 or up\$1stream\$3 or up\$1link\$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2013/04/14 17:19
S52	10	(MESH with dynamic\$5).as.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	ADJ	ON	2013/04/14 17:20

IBM_TDB

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S53	6	(ad near1 hoc or cluster or mesh) and (tree\$3 or root\$3) and isolat\$6 same (connectiv\$5 or connect\$4) with (full\$3 or remain\$3 or maintain\$3 or maintenanc\$3 or retain\$3) and frequenc\$3 with ((down\$1link or down\$1stream\$3 or internal\$3) and (external\$3 or common\$3 or up\$1stream\$3 or up\$1link\$3))	US-PGPUB; USPAT; UPAD	ADJ	ON	2013/04/14: 17:21

4/ 15/ 2013 5:17:18 PM**C:\ Users\ pcheng\ Documents\ EAST\ Workspaces\ 12696947.wsp**

<i>Index of Claims</i> 	Application/Control No. 12696947	Applicant(s)/Patent Under Reexamination DACOSTA ET AL.
	Examiner PETER CHENG	Art Unit 2463

✓	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	10/06/2012	04/09/2013						
1	1	✓	=						
2	2	✓	=						
3	3	✓	=						
4	4	✓	=						
5	5	✓	=						
6	6	✓	=						
7	7	✓	=						
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31	31	✓	=						
32	32	✓	=						
33	33	✓	=						
35	34	✓	=						
34	35	✓	=						

Search Notes 	Application/Control No. 12696947	Applicant(s)/Patent Under Reexamination DACOSTA ET AL.
	Examiner PETER CHENG	Art Unit 2463

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
370	254-6, 328, 338, 408	10/4/12, 4/14/13	pc

SEARCH NOTES		
Search Notes	Date	Examiner
PLUS	10/5/12	pc
inventors name search in PALM for double patenting	10/5/12, 4/14/13	pc
consulted with Mark Rinehart SPE in class 370 re restriction and patentability issues	10/5/12, 4/11/13	pc
EAST search	10/5/12, 4/14/13	pc

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
	Interference search - see search history printout	4/14/13	pc

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Issue Classification 	Application/Control No. 12696947	Applicant(s)/Patent Under Reexamination DACOSTA ET AL.
	Examiner PETER CHENG	Art Unit 2463

CPC					
Symbol				Type	Version

CPC Combination Sets				
Symbol	Type	Set	Ranking	Version

US ORIGINAL CLASSIFICATION			INTERNATIONAL CLASSIFICATION									
CLASS		SUBCLASS	CLAIMED					NON-CLAIMED				
370		408	H	0	4	L	12 / 28 (2006.01.01)					
CROSS REFERENCE(S)												
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)											

/PETER CHENG/ Examiner, Art Unit 2463 (Assistant Examiner)	4/15/13 (Date)	Total Claims Allowed: 35	
/Mark Rinehart/ Supervisory Patent Examiner, Art Unit 2463 (Primary Examiner)	 (Date)	O.G. Print Claim(s) 20	O.G. Print Figure 4

Issue Classification 	Application/Control No. 12696947	Applicant(s)/Patent Under Reexamination DACOSTA ET AL.
	Examiner PETER CHENG	Art Unit 2463

/PETER CHENG/ Examiner, Art Unit 2463 (Assistant Examiner)	4/15/13 (Date)	Total Claims Allowed: 35	
/Mark Rinehart/ Supervisory Patent Examiner, Art Unit 2463 (Primary Examiner)	 (Date)	O.G. Print Claim(s) 20	O.G. Print Figure 4

Issue Classification 	Application/Control No. 12696947	Applicant(s)/Patent Under Reexamination DACOSTA ET AL.
	Examiner PETER CHENG	Art Unit 2463

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	17	17	33	33										
2	2	18	18	35	34										
3	3	19	19	34	35										
4	4	20	20												
5	5	21	21												
6	6	22	22												
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13	13	29	29												
14	14	30	30												
15	15	31	31												
16	16	32	32												

/PETER CHENG/ Examiner, Art Unit 2463 (Assistant Examiner)	4/15/13 (Date)	Total Claims Allowed: 35	
/Mark Rinehart/ Supervisory Patent Examiner, Art Unit 2463 (Primary Examiner)	 (Date)	O.G. Print Claim(s) 20	O.G. Print Figure 4

UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Francis daCosta
Serial No.: 12/696,947
Application: PERSISTENT MESH FOR ISOLATED MOBILE AND TEMPORAL NETWORKING
Filing Date: January 29, 2010
Art Unit: 2463
Examiner: Cheng, Chi Tang P.
Atty. Docket: 0357-02217

Submitted via EFS-Web on February 1, 2013.

REQUEST FOR EXTENSION OF TIME

Dear Sir:

It is respectfully requested that the time for response to the Office Action dated October 16, 2012 be extended one (1) month to February 16, 2013. A response was previously filed. The statutory fee for this extension will be paid using the EFS-Web online payment system.

The U.S. Patent Office is authorized to credit any over payments or charge deficiencies to Account No. 501709 of the undersigned.

Respectfully submitted,
CHERSKOV FLAYNIK & GURDA, LLC

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

Electronic Patent Application Fee Transmittal				
Application Number:		12696947		
Filing Date:		29-Jan-2010		
Title of Invention:		Persistent Mesh for Isolated Mobile and Temporal Networking		
First Named Inventor/Applicant Name:		Francis daCosta		
Filer:		Szymon Maciej Gurda		
Attorney Docket Number:		0357-02217		
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	75	75

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				75

Electronic Acknowledgement Receipt	
EFS ID:	14852462
Application Number:	12696947
International Application Number:	
Confirmation Number:	1992
Title of Invention:	Persistent Mesh for Isolated Mobile and Temporal Networking
First Named Inventor/Applicant Name:	Francis daCosta
Customer Number:	27197
Filer:	Szymon Maciej Gurda
Filer Authorized By:	
Attorney Docket Number:	0357-02217
Receipt Date:	01-FEB-2013
Filing Date:	29-JAN-2010
Time Stamp:	13:07:05
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$75
RAM confirmation Number	11557
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	67064	no	1
			54925c0f57833c0668b4e17702ef98fbb8b8a3ab		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30083	no	2
			8b58d0d9eb6b7104e0a9231ce66fcdadd8337c43		
Warnings:					
Information:					
Total Files Size (in bytes):			97147		
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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27197 e 2013-01-29

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

Paper No.

Application No.:	12/696,947	Date Mailed:	2013-01-29
			
First Named Inventor:	daCosta, Francis,	Examiner:	CHENG, CHI TANG P
Attorney Docket No.:	0357-02217	Art Unit:	2463
Confirmation No.:	1992	Filing Date:	2010-01-29

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

Commissioner for Patents

NOTICE REQUIRING EXTENSION OF TIME FEE <i>No New Time Period is Provided</i>	Application No. 12/696,947	Applicant(s) DACOSTA ET AL.
		Art Unit 1600

Applicant's reply to the Office Action mailed on 17 January, 2013 was received in the Office on 17 January, 2013, which is after the expiration of the period for reply set in the Office action. The time period for reply continues to run from the mailing date of the Office action. This application will become ABANDONED unless applicant obtains an extension of time by filing a petition under 37 CFR 1.136(a) accompanied by the appropriate fee as set forth in 37 CFR 1.17(a)(1)-(5) within the maximum extendable time period for reply (*e.g.*, six months for a reply to a non-final rejection).

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 due. The expiration of the time period is determined by the amount of the fee paid. In no case may an applicant reply later than the maximum period of SIX (6) MONTHS statutory period or obtain an extension for more than FIVE (5) MONTHS beyond the date for reply set forth in an Office action.

☒ 1. The appropriate extension of time fee is missing.

☐ 2. The extension of time fee submitted is insufficient.

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

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

☒ 5. Other.

Explanation (*Provide specific details of the required correction in order to assist the applicant. Indicate whether a service charge has been added to the fee due*):
need another method of payment for extension of time fee of 3 months

THE AMOUNT OF THE FEE(S) DUE IS SUBJECT TO CHANGE, GENERALLY ON OCTOBER 1 OF EACH YEAR (37 CFR 1.17 & 1.21). THE AMOUNT OF THE FEE(S) DUE IS DETERMINED AS OF THE DATE A COMPLETE REPLY WITH THE APPROPRIATE FEE(S) IS RECEIVED BY THE OFFICE (37 CFR 1.8 & 1.10). BECAUSE THE AMOUNT DUE IS SUBJECT TO CHANGE, IT IS RECOMMENDED THAT APPLICANT CHECK THE CURRENT FEE SCHEDULE WHICH IS AVAILABLE ON THE USPTO'S WEBSITE AT: <http://www.uspto.gov/web/offices/ac/qs/ope/fees.htm>

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

Technical Support Staff (TSS): /JAMILAH Z. HARRIS/ Telephone Number: (571)272-7977

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

UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Francis daCosta
Serial No.: 12/696,947
Application: PERSISTENT MESH FOR ISOLATED MOBILE AND TEMPORAL NETWORKING
Filing Date: January 29, 2010
Art Unit: 2463
Examiner: Cheng, Chi Tang P.
Atty. Docket: 0357-02217

Submitted via EFS-Web on January 17, 2012.

RESPONSE TO NON FINAL OFFICE ACTION

Sir or Madam:

In response to the Non-Final Office Action dated October 16, 2012, Applicant hereby submits the following amendments and proffers the following remarks:

Amendments to the claims begin on page two of this paper.

Remarks/Arguments begin on page five of this paper.

Amendment to the Claims:

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

1. (Currently Amended) A structured mesh network capable of isolated operation, comprising:
at least two structured mesh nodes; wherein each structured mesh node comprises at least a connectivity logic; an uplink radio operating on an uplink frequency and a downlink radio operating on a distinct downlink frequency; wherein the connectivity logic determines whether each structured mesh node connects with an external network or another node using its uplink radio and client devices or other mesh nodes connect to each node using each node's downlink radio; wherein the structured mesh network functions in two configurations selected depending on whether a connection to an external network is present;
in the first connected configuration the structured mesh network includes at least one structured mesh node's uplink radio comprises a connection to an external network; and
in the second isolated configuration none of the structured mesh nodes' uplink radio comprises a connection to an external network, and one of the structured mesh nodes acts as an isolated network root of the isolated configuration and all remaining nodes' connect to the isolated network root node as isolated root children nodes forming a tree-like configuration; wherein clients of nodes a structured network in a second isolated configuration retain full connectivity within the structured network during the isolated configuration and wherein said client connectivity is uninterrupted during any transition from the isolated configuration to the first connected configuration; wherein distinct downlink frequencies are used by nodes for communication with one or more nodes lower on the tree configuration.
2. (Original) The structured mesh network of claim 1 wherein the connectivity logic contained by the nodes realigns connections between the nodes upon loss of an external connection to form the isolated configuration.

3. (Original) The structured mesh network of claim 2 wherein the connectivity logic contained by the nodes designates the node which in the first configuration connected to the external network as the isolated configuration root node.

4. (Original) The structured mesh network of claim 2 wherein the connectivity logic contained by the nodes designates the node which in the first configuration passed the most traffic as the isolated configuration root node.

5. (Original) The structured mesh network of claim 2 wherein the connectivity logic contained by the nodes selects the isolated configuration root node such that the resulting network's traffic traverses a minimal number of nodes.

6. (Original) The structured mesh network of claim 2 wherein the connectivity logic contained by the nodes selects the isolated configuration root node such that the isolated configuration root node is the most proximate to an external network connection point.

7. (Original) The structured mesh network of claim 2 wherein the connectivity logic contained by the nodes selects the isolated configuration root node such that the resulting network's throughput is maximized.

8. (Original) The structured mesh network of claim 2 wherein the connectivity logic contained by the nodes selects the isolated configuration root node such that the resulting network's latency is minimized.

9. (Original) The structured mesh network of claim 1 wherein the connectivity logic contained by the nodes realigns connections between the nodes upon detection of an external network connection to form the connected configuration.

10. (Original) The structured mesh network of claim 9 wherein solely the isolated network root node logic searches for the external network connection and establishes the external network connection.

11. (Original) The structured mesh network of claim 10 wherein the previously unused uplink radio of the isolated network root node is used to connect to the external network.

12. (Original) The structured mesh network of claim 1 wherein a first mesh network in the isolated configuration comprises an isolated root node and one or more isolated children nodes and a second mesh network in the isolated configuration comprises an isolated root node and at least one or more isolated children nodes and at least one child node of the first network establishes communication with a child node of the second network, thereby triggering a realignment due to joining in both networks.

13. (Original) The structured mesh network of claim 12 wherein as part of the realignment due to joining one of the isolated root nodes becomes an isolated network child node wherein the isolated root node of the smaller of the two networks becomes the child node.

14. (Original) The structured mesh network of claim 12 wherein as part of the realignment due to joining one of the isolated root nodes becomes an isolated network child node wherein the selection of the new isolated root node is made on the basis of physical position and direction of travel of the two networks.

15. (Original) The structured mesh network of claim 1 wherein a first mesh network in the isolated configuration comprises an isolated root node and one or more isolated children nodes and a second mesh network in the isolated configuration comprises an isolated root node and at least one or more isolated children nodes and the root node of the first network establishes communication with a child node of the second network, thereby the root node of the first network becomes a child node of the second network.

16. (Original) The structured mesh network of claim 15 wherein the unused uplink radio on the root node of the first network is used to connect to the child node of the second network.

17. (Original) The structured mesh network of claim 16 wherein solely the root node of the first network is able to connect to a child of the second network.

18. (Original) The structured mesh network of claim 1 wherein each network node further comprises a DHCP server used to assign addresses to client devices communicating with the node using the node's downlink radio.

19. (Original) The structured mesh network of claim 18 wherein the DHCP server within each node assigns IP addresses to client devices containing one or more random numbers within the IP addresses.

20. (Currently Amended) A multi-part mesh network comprising:
a first mesh network and a second mesh network wherein each mesh network comprises:
a) at least two structured mesh nodes; wherein each structured mesh node comprises at least a connectivity logic; an uplink radio operating on an uplink frequency and a distinct downlink radio operating on a downlink frequency; wherein the connectivity logic determines whether each structured mesh node connects with an external network or another node using its uplink radio and client devices or other mesh nodes connect to each node using each node's downlink radio; wherein the structured mesh network functions in two configurations selected depending on whether a connection to an external network is present;
b) in the first connected configuration the structured mesh network includes at least one structured mesh node's uplink radio comprises a connection to an external network; and
c) in the second isolated configuration none of the structured mesh nodes' uplink radio comprises a connection to an external network, and one of the structured mesh nodes acts as an isolated network root of the isolated configuration and all remaining nodes' connect to the isolated network root node as isolated root children nodes forming a ~~tree-like~~ configuration;

wherein a first set of frequencies, the first network frequencies, is used by the first network for communications between the nodes of the first network; a second set of frequencies, the common frequencies, is used for communications between the two networks; and a third set of frequencies, the second network frequencies, is used for communications between the nodes of the second network;
wherein each network is in the isolated configuration; and

wherein initially no communication between the first network and the second network is occurring; wherein clients of nodes of each network in the multi-part mesh network in the isolated configuration retain full connectivity within the network and wherein distinct downlink frequencies are used by nodes for communication with one or more nodes lower on the tree configuration.

21. (Original) The multi-part mesh network of claim 20 wherein the first set of frequencies and the third set of frequencies are mutually exclusive.

22. (Original) The multi-part mesh network of claim 20 wherein upon establishment of new communication between a child node of the first network and a child node of the second network the isolated root node of either the first network or the second network becomes the root node of a resulting multi-part network.

23. (Original) The multi-part mesh network of claim 22 wherein the connectivity logic of the root node of the root of the first network and the connectivity logic of the root of the second network select of the root node of the resulting multi-part network pursuant to a policy directive.

24. (Original) The multi-part mesh network of claim 23 wherein the policy directive is based on the relative sizes of each network.

25. (Original) The multi-part mesh network of claim 23 wherein the policy directive comprises a weighing of the direction of travel of each network and the position of each network.

26. (Original) The multi-part mesh network of claim 23 wherein the policy directive comprises minimizing the latency of the resulting multi-part mesh network or maximizing the throughput of the multi-part network.

27. (Original) The multi-part mesh network of claim 20 wherein upon establishment of new communication between the root node of the first network and a child node of the second network the isolated root node of the first network becomes a child node of the second network.

28. (Original) The multi-part mesh network of claim 27 wherein the unused uplink of the first network root node is used to communicate with the child node of the second network.

29. (Original) The multi-part mesh network of claim 28 wherein solely the root node of the first network may connect to a node of the second network

30. (Original) The multi-part mesh network of claim 20 wherein each network comprises one or more leaf nodes wherein leaf nodes are child nodes to which no other node communicates with using the leaf node's downlink radio, and the leaf nodes only attempt to connect using the common frequencies.

31. (Original) The multi-part mesh network of claim 20 wherein the uplink radios of the root nodes of each network attempt to connect solely using the common frequencies.

32. (Original) The structured mesh network of claim 20 wherein each network node further comprises a DHCP server used to assign addresses to client devices communicating with the node using the node's downlink radio.

33. (Currently Amended) The structured mesh network of claim ~~[[33]]~~ 32 wherein the DHCP server within each node assigns IP addresses to client devices containing one or more random numbers within the IP addresses.

34. (Currently Amended) A structured mesh network capable of isolated operation, comprising:
at least two structured mesh nodes; wherein each structured mesh node comprises at least a connectivity logic and a radio operating on an uplink frequency and a distinct downlink frequency; wherein the connectivity logic determines whether each structured mesh node connects with an external network or another node on the uplink frequency and client devices or other mesh nodes connect to each node on the downlink frequency; wherein the connectivity logic in each node contains a distributed routing table; wherein the structured mesh network functions in two configurations selected depending on whether a connection to an external network is present;

in the first connected configuration the structured mesh network includes at least one structured mesh node's uplink connection comprising a connection to an external network; and
in the second isolated configuration none of the structured mesh nodes' uplink connections comprises a connection to an external network, and one of the structured mesh nodes acts as an isolated network root of the isolated configuration and all remaining nodes connect to the isolated network root node as isolated root children and descendant nodes forming a tree-like configuration; wherein clients of the at least two structured mesh nodes in a second isolated configuration retain full connectivity within the structured network during the isolated configuration and wherein said client connectivity is uninterrupted during any transition from the isolated configuration to the first connected configuration; wherein distinct downlink frequencies are used by nodes for communication with one or more nodes lower on the tree configuration.

35. (Original) The structured mesh network of claim 33 wherein said uplink and downlink frequencies are the same frequency.

Remarks

Claims 1-35, have been rejected in the October 16, 2012 Office Action. Independent Claims 1, 20, and 34 have been amended to recite that even during isolated periods the “clients of nodes a structured network in a second isolated configuration retain full connectivity within the structured network during the isolated configuration and wherein said client connectivity is uninterrupted during any transition from the isolated configuration to the first connected configuration.”

Support for the limitation of continued access is found in ¶25 of the specification which provides that:

A feature of the instant invention is that network services, such as address allocation pursuant to DHCP, which in the usual network are provided by a single central location, continue to be delivered to clients within a mobile subpart of the larger network. An advantage of the instant invention is that clients that move out of a larger network continue to have access to services, such as DHCP, during the time the sub-part of the network is separated from the larger network

Further, figure 4 and ¶59 describe the process of dividing network communications to ensure connectivity within an isolated network:

Also depicted in FIG. 4 is a second isolated network 430. This second isolated network 430 is unable to establish communication with any full function nodes. Therefore, the clients associated with nodes participating in the sub-network 430 are only able to communicate within the sub-network 430. However, this embodiment of the instant invention provides a means for dividing network traffic into sub-domains given that communications between the clients of the sub-network occur independently of the status of the full function nodes.

Independent claims 1, 20, and 34 have further been amended to recited that the nodes use a distinct downlink frequency and as clarification, the nodes use the distinct downlink frequencies for communication with one or more nodes lower on the tree configuration. Support for this limitation is found in Figure 1(b), and is discussed in ¶43, which states that

The downlink wireless connections 135 on the three nodes depicted in FIG. 1(b) employ distinct frequencies for transmission or transmission channels. The

downlink on the root node 145 employs channel "ChX." In turn, the uplink on the first child node 155 employs "ChX" to communicate with the root node 145...

Claims 34-35, 1-3, 6 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,046,992 to Meier et al, in view of U.S. Patent Publication No. 2004/0095900 A1 to Siegel. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meier and Siegel, further in view of U.S. Patent Publication No. 2002/0082035 A1 to Aihara et al. Claims 4-5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meier and Siegel, further in view of U.S. Patent Publication No. 2007/0204021 A1 to Ekl et al. Claims 12-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meier and Siegel, further in view of U.S. Patent No. 7,738,402 to Feldman et al. Claims 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meier and Siegel, further in view of U.S. Patent Publication No. 2008/0214175 to Papadoglou, et al. Claims 20-21 and 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meier and Siegel, further in view of U.S. Patent 6,912,204 to Kossi. Claims 32-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meier and Siegel, further in view of Kossi and Papadoglou. Claims 22-25 and 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meier and Siegel, further in view of Kossi and Feldman. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Meier and Siegel, further in view of Feldman and Aihara.

Applicants' Invention

In the claimed embodiment, Applicants' invention comprises a unique network comprising network nodes, which allows communication between network clients regardless of the status of the network uplink. In prior art networks, provision of full network services requires a connection to an external network. In the claimed embodiment, the applicants' invention allows for a node to be designated a limited functionality root node, and therefore provide network services to the clients of the network, even when there is no full connectivity with any external network. As such, as presently claimed, the network nodes continue to retain full connectivity within the structured network during the isolated configuration and wherein said client connectivity is uninterrupted during any transition from the isolated configuration to the first connected configuration. Further, during times of no connectivity to the outside, the

isolated network segments take up a tree shape, rather than the usual chaotic grid shape that ad hoc networks use in prior art systems. The use of distinct downlink frequencies minimizes adjacent channel interference. The instant invention's channel selections are distinct and separated from one another to prevent interference.

Art of Record Fails to Disclose
the Claimed Elements

While the presently pending claims require the maintenance of network connectivity within the segments of the network for the benefit of the network's clients, the prior art cited by the examiner is focused on maintaining network connectivity with the external networks, rather than provisioning services in isolated network sub-clusters.

Turning first to the combination of Meier and Siegel, neither of these references, nor their combination discloses the network as presently claimed.

The Meier reference is focused on root nodes and selection of root nodes. It presents a system with many radio-equipped workstations (col 1, lines 24-32). The root nodes are the connections to the outside world (col. 2, lines 30-32). Everything in Meier is about root node communication, including the "Hello" packets that begin the process (col. 3, line 62). Nodes need a path to a root node to actually communicate (col. 4, lines 20-40). Data handling post attachment to a root node is described, but always requires a connection to the root node (col. 7, lines 52-64). The fact that connections to a root node are required is clear in the "CAPS" statement about what happens when a root node connection is lost:

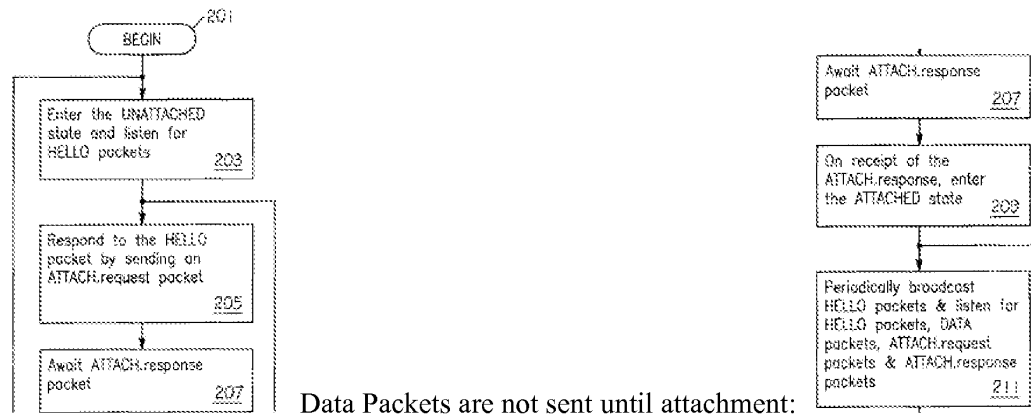
IN GENERAL, WHENEVER A NODE DISCOVERS THAT A TERMINAL IS
DETACHED, IT PURGES ITS ROUTING ENTRY FOR THE TERMINAL.
(col. 13, lines 59-65)

Otherwise the patent discusses various approaches to building spanning trees of networks involving many nodes.

Given Meier's focus on root nodes and that nodes who lose connections to root nodes are purged, it is not feasible for clients of nodes which lose their connection to a root node to maintain any sort of communications.

The sections of Meier which are being cited for the "isolated network" disclosures are Fig. 2 and cols. 4 and 14, as well as other sections. Figure 2 shows the actions performed by

nodes when a disconnected status is detected. The nodes do not attempt to provide network services, instead any detached nodes constantly attempt to re-attach to the network:



Given that Meier's nodes attempt to re-attach and will not send data packets until after attachment, the system does not provide for resilient data exchange between clients, even during times of detachment from the external network, as the present claims require.

Siegel does not provide the missing operational details. Turning specifically to the sections of Siegel cited by the Examiner, Figs. 1, 2, and 8, paragraphs 32-33 and 64-69, with their discussion of routers 20, 26, and 34 do not provide continuous connectivity within an isolated network, as the current claims require. Instead, Siegel is focused on providing optimized transmission of data packets for VoIP systems. The discussion of messages initiated from one sub-network, A, as discussed by ¶32, presumes that the network is connected to other logical networks, B and C. As discussed in Siegel ¶32, the routers act as intermediaries and facilitate routing of voice messages to the mobile communication units that cannot communicate directly. For that reason, the routers are sometimes equipped with *four* different radios, for example. The routers do not facilitate communication between isolated sub-networks, but instead act as bridges between incompatible radio types.

As such, neither Meier nor Siegel disclose the claimed elements, and specifically, the required maintenance of client communication within a sub-network even while the nodes of the sub-network enter a detached state.

Aihara's selection of a 'new cluster head' is being cited against the claim limitations relating to selection of a new limited function root node. Initially, while the present claims require the network of nodes to employ a tree structure, Aihara, as most prior art, uses an ad hoc

network layout which results in a disorganized grid. In Aihara, all network users are “slaves” of a “master” ¶7. The slaves have to carefully select the “master” or “cluster head” because direct communication between the slaves is not possible:

Since fellow slaves cannot communicate, all communications are performed by means of communications between a master and slaves. As a result, if an inappropriate cluster head is selected, it affects the communication efficiency of the entire cluster.

¶7. Aihara then describes the various techniques in selecting the “cluster head,” relying on factors such as signal strength, network load, and availability of connection. ¶34. Even in networks where client devices (or “slaves”) can communicate directly, the “cluster head” apparently manages the network connections. ¶8

Nothing in Aihara suggests maintenance of connectivity between the “cluster head” and its “slaves” during times that the “cluster head” has no network connectivity. Further, given that all of the “slaves” are directly in communication with the “cluster head” the network in Aihara does not have a tree shape as required by the current claims. Instead, it is wheel and spoke shaped.

Ekl is being cited for its disclosure of root node selection. The reference provides algorithms for selecting a root node on the basis of different variables. ¶1. Each node “acts as a router which can intelligently route the packets (e.g., data and control information) to another node until the packets eventually reach their final destination.” ¶2. Nodes may contain routing information for sending data to other nodes. ¶3. However, in Ekl a root node is required per ¶8 (“Notwithstanding these advances, there is a need for improved techniques for designating, identifying and/or selecting a root node in an ad hoc network.”). Further on, Ekl specifies that the root node is the one that performs network service provision (¶23). In passing Ekl does mention that nodes can facilitate peer-to-peer communication even in the absence of a root node:

When access to a wired network is desired, communications from nodes 220A-G, I-L, N-O can hop to an AP 220H, M (typically to the AP that is closest, but to an alternate AP if their current AP is congested or fails). It will be appreciated by those of ordinary skill in the art that while the ad hoc network 200 in FIG. 2 is shown as operating with wired APs 220H, M, the ad hoc network 200 of FIG. 2 does not necessarily require any wired network to be present. Rather, the nodes

220A-G, I-L, N-O can support peer-to peer communication without the need for wired infrastructure or other networks.

¶39. The claims require that clients retain connectivity during isolated operation, hand-offs and connected operation. Other than ¶39, nothing in Ekl actually discusses client operability. Further, the rest of the invention is concerned with selection of root nodes. For example, ¶46 is about root changes, ¶52 is about capability messages, and ¶56 is about feasibility of root nodes. Selection of a root node can be based on a centrality parameter (¶73) or other algorithms for searching out the root node (“Omniscient” versus “Myopic” versus “Hybrid”). The nodes are generally constantly seeking a root node ¶85.

The root nodes in Ekl are further much less functional than the present invention, which requires one uplink radio in each node and a tree shaped network. The use of the tree and a dedicated radio for node-to-node communications allows the instant invention to scale and function as a network stack, during periods of both connectivity and lack of connectivity to an outside network. The ad hoc network of Ekl and other prior art references is akin to a network hub where all the connections are between the network nodes. Such a configuration is easy to implement, but does not scale.

Turning to Feldman, the networks described therein are adjusted to form tree networks. The joining process (col 5, lines 40-60) is not designed to ensure that the client devices retain communication. Instead, the process is designed to ensure that a particular shape emerges. Feldman is not concerned with client devices, only with achieving the proper tree shape, as for example in the discussion of joining a tree to a branch in lines 40-60 of col. 5.

Feldman does not use distinct channels for downlinks. As presently claimed, the network tree always has the downlinks on different, distinct frequencies or channels. This minimizes adjacent channel interference – as presently claimed the channel management selection means chooses adjacent channels as far away from each other. Feldman and other prior art approaches use a single radio and hence a single common channel. As discussed in ¶43 of the specification, a single radio implementation results in co-channel interference, which is the worst form of interference. As presently claimed, the combination of both a tree based routing shape (analogous to network switches), with uplinks and downlinks on different and distinct channels that separates the instant invention from prior art approaches such as those of Feldman.

Papadoglou's network layout requires an externally-connected gateway. The gateway is designed to offer multiple connection technologies. ¶2. While Papadoglou discusses using local DHCP servers within access points, these access points are in communication with the externally-connected gateway. ¶16. Papadoglou does not suggest a device capable of maintaining local communication while the access points do not have access to the gateway or at times that the gateway loses its connection to the outside network.

Similarly, while Kossi discusses use of different frequencies for different network segments, Kossi does not address client operability within the sub-networks during detachment. Kossi is concerned with selecting operational frequencies between network sub segments, not with client communication *within* each network. In fact, due to Kossi's reliance on a global channel selector, Kossi requires all nodes to have a connection to a central network. Col. 7 lines 4-12. Furthermore, *local* channel selectors are required in every sub-segment. Col. 7, lines 14-19.

As such, applicants respectfully submit that none of the prior art of record discloses the approach used by the applicant's invention.

Separately, applicant will submit herewith an updated IDS to correct the mistake in the reference to the Naghian application. The correct number is 2004/0203787 A1, publication date is October 14, 2004.

An earnest attempt has been made hereby to respond to the October 16, 2012 Non-Final Office Action. The Applicant submits that the application is in condition for allowance. If the Examiner feels that a telephonic interview will facilitate allowance or further expedite prosecution, he is respectfully urged to contact the undersigned, prior to the issuance of another Official Action. Claims 1-35 are pending.

Respectfully submitted,

CHERSKOV FLAYNIK & GURDA

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

Electronic Acknowledgement Receipt	
EFS ID:	14724659
Application Number:	12696947
International Application Number:	
Confirmation Number:	1992
Title of Invention:	Persistent Mesh for Isolated Mobile and Temporal Networking
First Named Inventor/Applicant Name:	Francis daCosta
Customer Number:	27197
Filer:	Szymon Maciej Gurda
Filer Authorized By:	
Attorney Docket Number:	0357-02217
Receipt Date:	17-JAN-2013
Filing Date:	29-JAN-2010
Time Stamp:	13:16:49
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		Response.pdf	153744	yes	15
			856de9a3ec8361c355626c4d46494a2fc259db05		

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	8
	Applicant Arguments/Remarks Made in an Amendment	9	15
Warnings:			
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Total Files Size (in bytes):		153744	
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.			

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12696947	
	Filing Date		2010-01-29	
	First Named Inventor	Francis daCosta		
	Art Unit	2463		
	Examiner Name	CHENG, CHI TANG P		
	Attorney Docket Number	0357-02217		

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12696947
	Filing Date		2010-01-29
	First Named Inventor	Francis daCosta	
	Art Unit	2463	
	Examiner Name	CHENG, CHI TANG P	
	Attorney Docket Number	0357-02217	

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¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.			

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12696947
	Filing Date		2010-01-29
	First Named Inventor	Francis daCosta	
	Art Unit	2463	
	Examiner Name	CHENG, CHI TANG P	
	Attorney Docket Number	0357-02217	

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Szymon M. Gurda/	Date (YYYY-MM-DD)	2013-01-17
Name/Print	Szymon M. Gurda	Registration Number	58451

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PATENT

UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Francis DACOSTA
Application: Persistent Mesh for Isolated Mobile and Temporal Networking
Serial No.: 12/696,947
Filing Date: January 29, 2010
Art Unit: 2473
Examiner: CHENG, CHI TANG P
Case No.: 0357-02217
Conf. No.: 1992

Submitted via EFS-Web on January 17, 2013

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

123 W. Madison St.
Suite 400
Chicago, IL 60602

DISCLOSURE STATEMENT PER 37 C.F.R. §§ 1.97 AND 1.98

Dear Sir:

The citation listed on accompanying form PTO/SB/08B is submitted in compliance with the duty of disclosure defined in 37 C.F.R. § 1.98. Copies of non-patent literature references are enclosed. The appropriate fee has been submitted herewith.

This Disclosure Submission Statement is not to be construed as a representation that a search has been made, that additional matter material to the examination of this application does not exist, or that any one or more of these citations constitutes prior art under 35 U.S.C. 102 and/or 35 U.S.C. 103.

Respectfully submitted,

CHERSKOV & FLAYNIK

/Szymon M. Gurda/

Szymon M. Gurda
Reg. No. 58,451

Electronic Patent Application Fee Transmittal				
Application Number:		12696947		
Filing Date:		29-Jan-2010		
Title of Invention:		Persistent Mesh for Isolated Mobile and Temporal Networking		
First Named Inventor/Applicant Name:		Francis daCosta		
Filer:		Szymon Maciej Gurda/John Kale		
Attorney Docket Number:		0357-02217		
Filed as Small Entity				
Utility under 35 USC 111(a) Filing Fees				
Description		Fee Code	Quantity	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
Total in USD (\$)				180

Electronic Acknowledgement Receipt	
EFS ID:	14729140
Application Number:	12696947
International Application Number:	
Confirmation Number:	1992
Title of Invention:	Persistent Mesh for Isolated Mobile and Temporal Networking
First Named Inventor/Applicant Name:	Francis daCosta
Customer Number:	27197
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Filer Authorized By:	Szymon Maciej Gurda
Attorney Docket Number:	0357-02217
Receipt Date:	17-JAN-2013
Filing Date:	29-JAN-2010
Time Stamp:	16:28:36
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$180
RAM confirmation Number	3609
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1	Information Disclosure Statement (IDS) Form (SB08)	updated_IDS.pdf	611712	no	4
			e539b296f4a0271f0e432debdda494a8830259ed		
Warnings:					
Information:					
2	Transmittal Letter	certification.pdf	68644	no	1
			331f214b6acfa27981deaa01efca98c939edfa2		
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30365	no	2
			0d075c5b70fcd1646c6178e4f00a4d4c10fd8ed1		
Warnings:					
Information:					
Total Files Size (in bytes):			710721		
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 12/696,947		Filing Date 01/29/2010		☐ 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 (\$)	RATE (\$)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	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		N/A
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A		N/A		N/A		N/A
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$	=	OR	X \$	=	X \$	=
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$	=	OR	X \$	=	X \$	=
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				OR				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					OR				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL		OR	TOTAL		TOTAL	

APPLICATION AS AMENDED – PART II						OTHER THAN SMALL ENTITY					
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY	
AMENDMENT	DATE	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)
	01/17/2013										
	Total (37 CFR 1.16(i))	* 35	Minus	** 35	= 0	X \$31 =	0	OR	X \$ =	X \$ =	X \$ =
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X \$125 =	0	OR	X \$ =	X \$ =	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	0	OR	TOTAL ADD'L FEE		

(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY	
AMENDMENT	DATE	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =		OR	X \$ =	X \$ =	X \$ =
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =		OR	X \$ =	X \$ =	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:
/JAMILAH Z. HARRIS/

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.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/696,947	01/29/2010	Francis daCosta	0357-02217	1992

27197	7590	10/16/2012
MICHAEL J. CHERSKOV		
123 WEST MADISON STREET		
SUITE 400		
CHICAGO, IL 60602		

EXAMINER	
CHENG, CHI TANG P	

ART UNIT	PAPER NUMBER
2463	

NOTIFICATION DATE	DELIVERY MODE
10/16/2012	ELECTRONIC

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

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

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

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

Office Action Summary	Application No.		Applicant(s)		
	12/696,947		DACOSTA ET AL.		
	Examiner		Art Unit		
PETER CHENG		2463			

-- 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 10 August 2012.

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

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

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

Disposition of Claims

5) ☒ Claim(s) 1-35 is/are pending in the application.

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

6) ☐ Claim(s) ____ is/are allowed.

7) ☒ Claim(s) 1-35 is/are rejected.

8) ☐ Claim(s) ____ is/are objected to.

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

Application Papers

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

11) ☒ The drawing(s) filed on 25 March 2010 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

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

Priority under 35 U.S.C. § 119

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

a) ☐ All b) ☐ Some * c) ☐ None of:

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

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

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

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

Attachment(s)

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

1. Claim 33 is objected to because of the following informalities: Claim 33 is a dependent claim that depends from itself. Appropriate correction is required.

Information Disclosure Statement

1. With respect to the reference identified by "20051053725 to Naghian", the information disclosure statement filed 9/14/11 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because the reference identified by "20051053725 to Naghian" does not exist. It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609.05(a).

Examiner's Remarks/Comments

1. Please note that the currently recited claims have varying priority dates, due to the continuity/CIP structure of this application. Therefore the rejections below are set forth accordingly.

Claim Rejections - 35 USC § 103

1. 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.

2. **Claims 34-35, 1-3, 6 and 9-11** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,046,992 to Meier et al., in view of U.S. Patent Publication No. 2004/0095900 A1 to Siegel.

3. **As to Claim 34**, Meier discloses a structured mesh network capable of isolated operation, comprising:

at least two structured mesh nodes (see, e.g., Fig. 1, teaching a plurality of "nodes" that include "bridges" and "RF" terminals, each teaching a "structured mesh node");

wherein the connectivity logic determines whether each structured mesh node connects with an external network or another node on the uplink frequency (see, Fig. 2 and associated explanation in the Specification in cols. 4 and 14, teaching that each node is capable of determining whether it is "attached" or "unattached" [col. 3, lines 40-55, teaching that "attached" means the node is attached directly or indirectly to a spanning tree rooted in the fixed network, and that "unattached" means otherwise, thus teaching this limitation]) and client devices or other mesh nodes connect to each node on the downlink frequency (col. 6, lines 38-51, disclosing that each node has a "routing

table" that includes uplink and downlink routing information, thus teaching this limitation);

wherein the connectivity logic in each node contains a distributed routing table (col. 6, lines 38-51, disclosing that each node has a "routing table" that includes uplink and downlink routing information, thus teaching this limitation);

wherein the structured mesh network functions in two configurations selected depending on whether a connection to an external network is present (see, Fig. 2 and associated explanation in the Specification in cols. 4 and 14, teaching that each node is capable of determining whether it is "attached" or "unattached" [col. 3, lines 40-55, teaching that "attached" means the node is attached directly or indirectly to a spanning tree rooted in the fixed network, and that "unattached" means otherwise], wherein as shown in Fig. 1, the subnetwork comprising the nodes 50, 114 and 116 does not contain any node that is "attached" to the spanning tree and thus each node within this network would be "unattached", teaching a first configuration, and wherein the subnetwork comprising, e.g., all nodes rooted at node 44, would be "attached" since it is connected to the spanning tree rooted at "gateway 20" [i.e., containing a "connection to an external network", teaching a second configuration, thus teaching this limitation);

in the first connected configuration the structured mesh network includes at least one structured mesh node's uplink connection comprising a connection to an external network (see discussion above); and

in the second isolated configuration none of the structured mesh nodes' uplink connections comprises a connection to an external network, and one of the structured

mesh nodes acts as an isolated network root of the isolated configuration and all remaining nodes connect to the isolated network root node as isolated root children and descendant nodes forming a tree-like configuration (see, Fig. 2 and associated explanation in the Specification in cols. 4 and 14 and the discussion above, teaching that each node is capable of determining whether it is "attached" or "unattached" [col. 3, lines 40-55, teaching that "attached" means the node is attached directly or indirectly to a spanning tree rooted in the fixed network, and that "unattached" means otherwise], wherein as shown in Fig. 1, the subnetwork comprising the nodes 50, 114 and 116 does not contain any node that is "attached" to the spanning tree and thus each node within this network would be "unattached" and belong to a "tree" rooted at the isolated node 50, teaching this limitation).

Siegel discloses wherein each structured mesh node comprises at least a connectivity logic (see, e.g., Figs. 7 and 8, disclosing processor and other functional modules within each "router" in the system shown in Fig. 1, thus teaching "connectivity logic") and a radio operating on an uplink frequency and a downlink frequency (see, e.g., Figs. 1, 2 and 8 and paragraphs 32-33 and 64-69, disclosing, for example, routers 20, 34 and 26, having a radio for communicating uplink data to another "logical net" and a separate radio for communicating downlink data within its own "logical net", these radios collectively teaching this limitation)

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Siegel, in conjunction with the method as disclosed and taught by Meier. The suggestion or motivation would have been to

provide an improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13).

4. **As to Claim 35**, Siegel and Meier teach the network as in the parent claim 34.

Siegel further teaches wherein said uplink and downlink frequencies are the same frequency (see, e.g., Figs. 1, 2 and 8 and paragraphs 32-33 and 64-69, disclosing, for example, routers 16, 18 and 20, all within the same "logical net A", which uses the same frequency hopping scheme, wherein each of these routers has a "radio type 1" that is a two way radio capable of uplink and downlink communications, thus teaching this limitation).

5. **As to Claim 1**, please see rejection for claim 34. Please note that Siegel discloses an uplink radio operating on an uplink frequency and a downlink radio operating on a downlink frequency (see, e.g., Figs. 1, 2 and 8 and paragraphs 32-33 and 64-69, disclosing, for example, routers 20, 34 and 26, having a radio for communicating uplink data to another "logical net" and a separate radio for communicating downlink data within its own "logical net", thus teaching this limitation).

6. **As to Claim 2**, Siegel and Meier teach the network as in the parent claim 1.

Meier discloses wherein the connectivity logic contained by the nodes realigns connections between the nodes upon loss of an external connection to form the isolated configuration (Fig. 2 and col. 4, lines 30-32, disclosing that "if the bridge detects that it has become detached from the spanning tree the bridge will branch back to the block 203 to establish attachment"; also see col. 14, lines 23-25, teaching this limitation).

7. **As to Claim 3**, Siegel and Meier teach the network as in the parent claim 2.

Meier discloses wherein the connectivity logic contained by the nodes designates the node which in the first configuration connected to the external network as the isolated configuration root node. (Fig. 1, disclosing that the "unattached", i.e., "isolated", subnetwork comprising 50, 114 and 116, is rooted at the bridge 50, which would have been connected to the "spanning tree", i.e., "external network"; further see Fig. 2 and cols. 4 and 14, teaching this limitation).

8. **As to Claim 6**, Siegel and Meier teach the network as in the parent claim 2.

Meier discloses wherein the connectivity logic contained by the nodes selects the isolated configuration root node such that the isolated configuration root node is the most proximate to an external network connection point. (Fig. 1, disclosing that the "unattached", i.e., "isolated", subnetwork comprising 50, 114 and 116, is rooted at the bridge 50, which would have been connected to the "spanning tree", i.e., "external network"; further see Fig. 2 and cols. 4 and 14, teaching that the node that was formerly attached to the spanning tree, i.e., the "most proximate to an external network connection point" would attempt to reestablish connection to the node that is "closest to the root node", further teaching this limitation).

9. **As to Claim 9**, Siegel and Meier teach the network as in the parent claim 1.

Meier discloses wherein the connectivity logic contained by the nodes realigns connections between the nodes upon detection of an external network connection to form the connected configuration. (Fig. 2 and cols. 4 and 14, teaching that after the detached root node detects a connection to a node connected to the spanning, it

transitions to the "attached" state along with all children nodes connected to it, thus teaching this limitation).

10. **As to Claim 10**, Siegel and Meier teach the network as in the parent claim 9.

Meier discloses wherein solely the isolated network root node logic searches for the external network connection and establishes the external network connection. (see discussion in claim 9, Fig. 2 and cols. 4 and 14, teaching that after the detached root node detects a connection to a node connected to the spanning, it transitions to the "attached" state along with all children nodes connected to it, thus teaching this limitation).

11. **As to Claim 11**, Siegel and Meier teach the network as in the parent claim 10.

Siegel discloses wherein the previously unused uplink radio of the isolated network root node is used to connect to the external network (see, e.g., Fig. 1, wherein radio type 2, in contrast to radio type 1, is used only for connecting to the other "logical nets B/C", i.e., the "external network", and not for internal communication within "logical net A", teaching that "radio type 2" would have been "unused" when logical net A was "isolated" from the "logical nets B/C", i.e., the external network, thus the disclosed "radio type 2" teaches this limitation).

12. **Claims 7-8** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,046,992 to Meier et al., in view of U.S. Patent Publication No. 2004/0095900 A1 to Siegel., further in view of U.S. Patent Publication No. 2002/0082035 A1 to Aihara et al.

13. **As to Claim 7**, Siegel and Meier teach the network as in the parent claim 2.

Aihara discloses wherein the connectivity logic contained by the nodes selects the isolated configuration root node such that the resulting network's throughput is maximized (see Fig. 3, showing that after "optimization" and a new "cluster head" is chosen, the throughput increases, thus teaching this limitation).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Aihara, in conjunction with the method as disclosed and taught by Meier and Siegel. The suggestion or motivation would have been to provide an improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13; Aihara, paragraphs 1-30).

14. **As to Claim 8**, Siegel and Meier teach the network as in the parent claim 2.

Aihara discloses wherein the connectivity logic contained by the nodes selects the isolated configuration root node such that the resulting network's latency is minimized (see Fig. 3, showing that after "optimization" and a new "cluster head" is chosen, the throughput increases, which teaches to an ordinary artisan that the latency would decrease, thus teaching this limitation).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Aihara, in conjunction with the method as disclosed and taught by Meier and Siegel. The suggestion or motivation would have been to provide an improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13; Aihara, paragraphs 1-30).

15. **Claims 4-5 and 6** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,046,992 to Meier et al., in view of U.S. Patent Publication No. 2004/0095900 A1 to Siegel., further in view of U.S. Patent Publication No. 2007/0204021 A1 to Ekl et al.

16. **As to Claim 6**, Siegel and Meier teach the network as in the parent claim 2.

Ekl discloses wherein the connectivity logic contained by the nodes selects the isolated configuration root node such that the isolated configuration root node is the most proximate to an external network connection point (see paragraph 62).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Ekl, in conjunction with the method as disclosed and taught by Meier and Siegel. The suggestion or motivation would have been to provide an improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13; Aihara, paragraphs 1-30; Ekl, paragraphs 1-7).

17. **As to Claim 4**, Siegel and Meier teach the network as in the parent claim 2.

Ekl discloses wherein the connectivity logic contained by the nodes designates the node which in the first configuration passed the most traffic as the isolated configuration root node. (see paragraphs 68 and 69, teaching activity level of a node and "centrality parameter" used to select new root node).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Ekl, in conjunction with the method as disclosed and taught by Meier and Siegel. The suggestion or motivation would have

been to provide an improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13; Aihara, paragraphs 1-30; Ekl, paragraphs 1-7).

18. **As to Claim 5**, Siegel and Meier teach the network as in the parent claim 2.

Ekl discloses wherein the connectivity logic contained by the nodes selects the isolated configuration root node such that the resulting network's traffic traverses a minimal number of nodes. (see paragraphs 62 and 67, teaching using the "hop count" and the number of neighbors of a node to select the root node, thus teaching this limitation).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Ekl, in conjunction with the method as disclosed and taught by Meier and Siegel. The suggestion or motivation would have been to provide an improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13; Aihara, paragraphs 1-30; Ekl, paragraphs 1-7).

19. **Claims 12-17** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,046,992 to Meier et al., in view of U.S. Patent Publication No. 2004/0095900 A1 to Siegel., further in view of U.S. Patent No. 7,738,402 B2 to Feldman et al.

20. **As to Claim 12**, Siegel and Meier teach the network as in the parent claim 1.

Feldman discloses wherein a first mesh network in the isolated configuration comprises an isolated root node and one or more isolated children nodes and a second mesh network in the isolated configuration comprises and isolated root node and at

least one or more isolated children nodes and at least one child node of the first network establishes communication with a child node of the second network, thereby triggering a realignment due to joining in both networks (see Figs. 3a/b/c/d and col. 5, lines 40-60, teaching that two trees of nodes may be “fused into a single, larger tree when a first node in one of the trees, and a second node in the other tree are found to be in each other’s transmission range”).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Feldman, in conjunction with the method as disclosed and taught by Meier and Siegel. The suggestion or motivation would have been to provide an improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13; Aihara, paragraphs 1-30; Ekl, paragraphs 1-7; Feldman, cols. 1-3).

21. **As to Claim 13**, Siegel, Feldman and Meier teach the network as in the parent claim 12.

Meier discloses wherein the isolated root node of the smaller of the two networks becomes the child node (see, e.g., Fig. 1, where the isolated root node, i.e., 50, will become a child node in the spanning tree, i.e., the larger network, thus teaching this limitation).

Feldman discloses wherein as part of the realignment due to joining one of the isolated root nodes becomes an isolated network child node (see Figs. 3a/b/c/d and col. 5, lines 40-60, teaching that two trees of nodes may be “fused into a single, larger tree when a first node in one of the trees, and a second node in the other tree are found to

be in each other's transmission range", and the "fusing node is assigned new coordinates in the new tree according to the node's new position", teaching this limitation).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Feldman, in conjunction with the method as disclosed and taught by Meier and Siegel to teach the limitations of this claim. The suggestion or motivation would have been to provide an improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13; Aihara, paragraphs 1-30; Ekl, paragraphs 1-7; Feldman, cols. 1-3).

22. **As to Claim 14**, Siegel, Feldman and Meier teach the network as in the parent claim 12.

Meier discloses wherein the selection of the new isolated root node is made on the basis of physical position and direction of travel of the two networks. (see, e.g., Fig. 1, where the isolated root node, i.e., 50, will become a child node in the spanning tree, i.e., the larger network, thus teaching that the selection of the root node is based on which tree is closer to the physical infrastructure, which must be the destination of all communication within the merged spanning tree, thus teaching "physical location and direction of travel", thus teaching this limitation).

Feldman discloses wherein as part of the realignment due to joining one of the isolated root nodes becomes an isolated network child node (see Figs. 3a/b/c/d and col. 5, lines 40-60, teaching that two trees of nodes may be "fused into a single, larger tree when a first node in one of the trees, and a second node in the other tree are found to

be in each other's transmission range", and the "fusing node is assigned new coordinates in the new tree according to the node's new position", teaching this limitation).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Feldman, in conjunction with the method as disclosed and taught by Meier and Siegel to teach the limitations of this claim. The suggestion or motivation would have been to provide an improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13; Aihara, paragraphs 1-30; Ekl, paragraphs 1-7; Feldman, cols. 1-3).

23. **As to Claim 15**, Siegel and Meier teach the network as in the parent claim 1.

Feldman discloses wherein a first mesh network in the isolated configuration comprises an isolated root node and one or more isolated children nodes and a second mesh network in the isolated configuration comprises an isolated root node and at least one or more isolated children nodes and the root node of the first network establishes communication with a child node of the second network, thereby the root node of the first network becomes a child node of the second network. (see Figs. 3a/b/c/d and col. 5, lines 40-60, teaching that two trees of nodes may be "fused into a single, larger tree when a first node in one of the trees [which may be a root node of the tree], and a second node in the other tree are found to be in each other's transmission range", and thereafter the "fusing node" will be subordinated into the other tree, thus teaching this limitation).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Feldman, in conjunction with the method as disclosed and taught by Meier and Siegel. The suggestion or motivation would have been to provide an improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13; Aihara, paragraphs 1-30; Ekl, paragraphs 1-7; Feldman, cols. 1-3).

24. **As to Claim 16**, Siegel, Feldman and Meier teach the network as in the parent claim 15.

Siegel discloses wherein the previously unused uplink radio of the isolated network root node is used to connect to the second network (see, e.g., Fig. 1, wherein radio type 2, in contrast to radio type 1, is used only for connecting to the other "logical nets B/C", i.e., the "external network", and not for internal communication within "logical net A", teaching that "radio type 2" would have been "unused" when logical net A was "isolated" from the "logical nets B/C", i.e., the external network, thus the disclosed "radio type 2" teaches this limitation).

Feldman discloses wherein the root node of the first isolated network is used to connect to the child node of the second isolated network (see discussion in Claim 15).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Feldman, in conjunction with the method as disclosed and taught by Meier and Siegel, to teach "wherein the unused uplink radio on the root node of the first network is used to connect to the child node of the second network". The suggestion or motivation would have been to provide an

improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13; Aihara, paragraphs 1-30; Ekl, paragraphs 1-7; Feldman, cols. 1-3).

25. **As to Claim 17**, Siegel, Feldman and Meier teach the network as in the parent claim 16.

Meier discloses wherein solely the root node of the first network is able to connect to a child of the second network (see Figs. 1 and 2, wherein only the root node/"bridge" of a detached subtree, e.g., "bridge 50", can re-establish connection with the spanning tree, thus teaching this limitation).

26. **Claims 18-19** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,046,992 to Meier et al., in view of U.S. Patent Publication No. 2004/0095900 A1 to Siegel., further in view of U.S. Patent Publication No. 2008/0214175 A1 to Papadoglou et al.

27. **As to Claim 18**, Siegel and Meier teach the network as in the parent claim 1.

Papadoglou discloses wherein each network node further comprises a DHCP server used to assign addresses to client devices communicating with the node using the node's downlink radio (paragraph 16, teaching that each "local area network lan" comprises a DHCP server that randomly assigns IP address to client nodes in the same LAN, which teaches that each root node in the tree network in combination with its children nodes would comprise a "LAN" and thus would have local, distributed DHCP capability, thus teaching this limitation).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Papadoglou, in conjunction with the method as disclosed and taught by Meier and Siegel. The suggestion or motivation would have been to provide an improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13; Aihara, paragraphs 1-30; Ekl, paragraphs 1-7; Feldman, cols. 1-3; Papadoglou, paragraphs 1-17).

28. **As to Claim 19**, Siegel and Meier teach the network as in the parent claim 18.

Papadoglou discloses wherein the DHCP server within each node assigns IP addresses to client devices containing one or more random numbers within the IP addresses (paragraph 16, teaching that each "local area network lan" comprises a DHCP server that randomly assigns IP address to client nodes in the same LAN, which teaches that each root node in the tree network in combination with its children nodes would comprise a "LAN" and thus would have local, distributed DHCP capability, thus teaching this limitation).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Papadoglou, in conjunction with the method as disclosed and taught by Meier and Siegel. The suggestion or motivation would have been to provide an improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13; Aihara, paragraphs 1-30; Ekl, paragraphs 1-7; Feldman, cols. 1-3; Papadoglou, paragraphs 1-17).

29. **Claims 20-21 and 30-31** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,046,992 to Meier et al., in view of U.S. Patent Publication No. 2004/0095900 A1 to Siegel, further in view of U.S. Patent Publication No. 6,912,204 B2 to Kossi et al.

30. **As to Claim 20**, Meier discloses a multi-part mesh network comprising:

a first mesh network and a second mesh network (see Fig. 1, wherein there are a plurality of mesh networks, e.g., the network rooted at bridge 50 and the network rooted at gateway 20; Fig. 2 and cols. 4 and 14 further teach that any bridge may become detached from the spanning tree network rooted at gateway 20 and become "unattached", thus forming an "isolated" mesh network, teaching this limitation) wherein each mesh network comprises:

a structured mesh network capable of isolated operation, comprising:

at least two structured mesh nodes (see, e.g., Fig. 1, teaching a plurality of "nodes" that include "bridges" and "RF" terminals, each teaching a "structured mesh node");

wherein the connectivity logic determines whether each structured mesh node connects with an external network or another node on the uplink frequency (see, Fig. 2 and associated explanation in the Specification in cols. 4 and 14, teaching that each node is capable of determining whether it is "attached" or "unattached" [col. 3, lines 40-55, teaching that "attached" means the node is attached directly or indirectly to a spanning tree rooted in the fixed network, and that "unattached" means otherwise, thus teaching this limitation]) and client devices or other mesh nodes connect to each node

on the downlink frequency (col. 6, lines 38-51, disclosing that each node has a "routing table" that includes uplink and downlink routing information, thus teaching this limitation);

wherein the connectivity logic in each node contains a distributed routing table (col. 6, lines 38-51, disclosing that each node has a "routing table" that includes uplink and downlink routing information, thus teaching this limitation);

wherein the structured mesh network functions in two configurations selected depending on whether a connection to an external network is present (see, Fig. 2 and associated explanation in the Specification in cols. 4 and 14, teaching that each node is capable of determining whether it is "attached" or "unattached" [col. 3, lines 40-55, teaching that "attached" means the node is attached directly or indirectly to a spanning tree rooted in the fixed network, and that "unattached" means otherwise], wherein as shown in Fig. 1, the subnetwork comprising the nodes 50, 114 and 116 does not contain any node that is "attached" to the spanning tree and thus each node within this network would be "unattached", teaching a first configuration, and wherein the subnetwork comprising, e.g., all nodes rooted at node 44, would be "attached" since it is connected to the spanning tree rooted at "gateway 20" [i.e., containing a "connection to an external network", teaching a second configuration, thus teaching this limitation);

in the first connected configuration the structured mesh network includes at least one structured mesh node's uplink connection comprising a connection to an external network (see discussion above); and

in the second isolated configuration none of the structured mesh nodes' uplink connections comprises a connection to an external network, and one of the structured mesh nodes acts as an isolated network root of the isolated configuration and all remaining nodes connect to the isolated network root node as isolated root children and descendant nodes forming a tree-like configuration (see, Fig. 2 and associated explanation in the Specification in cols. 4 and 14 and the discussion above, teaching that each node is capable of determining whether it is "attached" or "unattached" [col. 3, lines 40-55, teaching that "attached" means the node is attached directly or indirectly to a spanning tree rooted in the fixed network, and that "unattached" means otherwise], wherein as shown in Fig. 1, the subnetwork comprising the nodes 50, 114 and 116 does not contain any node that is "attached" to the spanning tree and thus each node within this network would be "unattached" and belong to a "tree" rooted at the isolated node 50, teaching this limitation);

wherein initially no communication between the first network and the second network is occurring (see Fig. 2 and cols. 4 and 14, wherein the subnetwork/tree rooted at Bridge 50 is detached from the spanning tree and thus is isolated from the network, thus teaching this limitation).

Siegel discloses wherein each structured mesh node comprises at least a connectivity logic (see, e.g., Figs. 7 and 8, disclosing processor and other functional modules within each "router" in the system shown in Fig. 1, thus teaching "connectivity logic") and a radio operating on an uplink frequency and a downlink frequency (see, e.g., Figs. 1, 2 and 8 and paragraphs 32-33 and 64-69, disclosing, for example, routers

20, 34 and 26, having a radio for communicating uplink data to another "logical net" and a separate radio for communicating downlink data within its own "logical net", these radios collectively teaching this limitation);

wherein each network is in the isolated configuration (see, e.g., Fig. 1, wherein the three subnetworks "logical net A/B/C" are not connected to any external network/infrastructure).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Siegel, in conjunction with the method as disclosed and taught by Meier. The suggestion or motivation would have been to provide an improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13).

Kossi discloses wherein a first set of frequencies, the first network frequencies, is used by the first network for communications between the nodes of the first network; a second set of frequencies, the common frequencies, is used for communications between the two networks; and a third set of frequencies, the second network frequencies, is used for communications between the nodes of the second network (Abstract, cols. 3-4, teaching that "frequency level are selected for global use", teaching "common frequencies" and that "frequency levels" are also selected for "local communication channels", teaching first and third sets of frequencies)

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Kossi, in conjunction with the method as disclosed and taught by Meier and Siegel. The suggestion or motivation would have

been to provide an improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13; Kossi, cols. 1-2).

31. **As to Claim 21**, Siegel, Kossi and Meier teach the network as in the parent claim 20.

Kossi teaches wherein the first set of frequencies and the third set of frequencies are mutually exclusive (Abstract, cols. 3-4, teaching that the frequencies are selected to minimize undesirable effects such as interference, thus teaching that they are selected to be mutually exclusive, teaching this limitation).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Kossi, in conjunction with the method as disclosed and taught by Meier and Siegel. The suggestion or motivation would have been to provide an improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13; Aihara, paragraphs 1-30; Ekl, paragraphs 1-7; Feldman, cols. 1-3).

32. **As to Claim 30**, Siegel, Kossi and Meier teach the network as in the parent claim 20.

Meier discloses wherein each network comprises one or more leaf nodes wherein leaf nodes are child nodes to which no other node communicates with using the leaf node's downlink radio (see Fig. 1, wherein the RF terminals would be the "leaf nodes").

Kossi teaches the leaf nodes only attempt to connect using the common frequencies. (Abstract, cols. 3-4, teaching that certain "frequency levels" are selected for "global use" by all nodes, including leaf node, which would only have access to such

“global” “frequency levels” when not yet part of the network and attempting to enter the network, thus teaching this limitation).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Kossi, in conjunction with the method as disclosed and taught by Meier and Siegel, to teach the limitations of this claim. The suggestion or motivation would have been to provide an improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13; Aihara, paragraphs 1-30; Ekl, paragraphs 1-7; Feldman, cols. 1-3).

33. **As to Claim 31**, Siegel, Kossi and Meier teach the network as in the parent claim 20.

Kossi teaches wherein the uplink radios of the root nodes of each network attempt to connect solely using the common frequencies. (Abstract, cols. 3-4, teaching that certain “frequency levels” are selected for “global use” by all nodes, including root nodes as shown in Fig. 1, which would only have access to such “global” “frequency levels” when not yet part of the network and attempting to enter the network, thus teaching this limitation).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Kossi, in conjunction with the method as disclosed and taught by Meier and Siegel, to teach the limitations of this claim. The suggestion or motivation would have been to provide an improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13; Aihara, paragraphs 1-30; Ekl, paragraphs 1-7; Feldman, cols. 1-3).

34. **Claims 32-33** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,046,992 to Meier et al., in view of U.S. Patent Publication No. 2004/0095900 A1 to Siegel and U.S. Patent Publication No. 6,912,204 B2 to Kossi et al., further in view of U.S. Patent Publication No. 2008/0214175 A1 to Papadoglou et al.

35. **As to Claim 32**, Siegel, Kossi and Meier teach the network as in the parent claim 20.

Papadoglou discloses wherein each network node further comprises a DHCP server used to assign addresses to client devices communicating with the node using the node's downlink radio (paragraph 16, teaching that each "local area network lan" comprises a DHCP server that randomly assigns IP address to client nodes in the same LAN, which teaches that each root node in the tree network in combination with its children nodes would comprise a "LAN" and thus would have local, distributed DHCP capability, thus teaching this limitation).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Papadoglou, in conjunction with the method as disclosed and taught by Meier and Siegel. The suggestion or motivation would have been to provide an improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13; Aihara, paragraphs 1-30; Ekl, paragraphs 1-7; Feldman, cols. 1-3; Papadoglou, paragraphs 1-17).

36. **As to Claim 33**, Siegel, Kossi and Meier teach the network as in the parent claim 20.

Papadoglou discloses wherein the DHCP server within each node assigns IP addresses to client devices containing one or more random numbers within the IP addresses (paragraph 16, teaching that each "local area network lan" comprises a DHCP server that randomly assigns IP address to client nodes in the same LAN, which teaches that each root node in the tree network in combination with its children nodes would comprise a "LAN" and thus would have local, distributed DHCP capability, thus teaching this limitation).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Papadoglou, in conjunction with the method as disclosed and taught by Meier and Siegel. The suggestion or motivation would have been to provide an improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13; Aihara, paragraphs 1-30; Ekl, paragraphs 1-7; Feldman, cols. 1-3; Papadoglou, paragraphs 1-17).

37. **Claims 22-25 and 27-29** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,046,992 to Meier et al., in view of U.S. Patent Publication No. 2004/0095900 A1 to Siegel and U.S. Patent Publication No. 6,912,204 B2 to Kossi et al., further in view of U.S. Patent Publication 7,738,402 B2 to Feldman et al.

38. **As to Claim 22**, Siegel, Kossi and Meier teach the network as in the parent claim 20.

Feldman teaches wherein upon establishment of new communication between a child node of the first network and a child node of the second network the isolated root node of either the first network or the second network becomes the root node of a resulting multi-part network (see Figs. 3a/b/c/d and col. 5, lines 40-60, teaching that two trees of nodes may be “fused into a single, larger tree when a first node in one of the trees, and a second node in the other tree are found to be in each other's transmission range”, and the “fusing node is assigned new coordinates in the new tree according to the node's new position”, teaching this limitation)

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Feldman, in conjunction with the method as disclosed and taught by Meier and Siegel. The suggestion or motivation would have been to provide an improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13; Aihara, paragraphs 1-30; Ekl, paragraphs 1-7; Feldman, cols. 1-3).

39. **As to Claim 23**, Siegel, Feldman, Kossi and Meier teach the network as in the parent claim 22.

Feldman teaches wherein the connectivity logic of the root node of the root of the first network and the connectivity logic of the root of the second network select of the root node of the resulting multi-part network pursuant to a policy directive. (see Figs. 3a/b/c/d and col. 5, lines 40-60, teaching that two trees of nodes may be “fused into a single, larger tree when a first node in one of the trees, and a second node in the other tree are found to be in each other's transmission range”, and the “fusing node is

assigned new coordinates in the new tree according to the node's new position",
teaching a "policy directive")

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Feldman, in conjunction with the method as disclosed and taught by Meier and Siegel. The suggestion or motivation would have been to provide an improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13; Aihara, paragraphs 1-30; Ekl, paragraphs 1-7; Feldman, cols. 1-3).

40. **As to Claim 24**, Siegel, Feldman, Kossi and Meier teach the network as in the parent claim 23.

Meier teaches wherein the policy directive is based on the relative sizes of each network (Figs. 1 and 2, showing that the small subnetwork/tree rooted at bridge 50 is incorporated into the larger spanning tree network rooted at gateway 20, thus teaching this limitation).

41. **As to Claim 25**, Siegel, Feldman, Kossi and Meier teach the network as in the parent claim 23.

Meier discloses wherein the policy directive comprises a weighing of the direction of travel of each network and the position of each network (see, e.g., Fig. 1, where the isolated root node, i.e., 50, will become a child node in the spanning tree, i.e., the larger network, thus teaching that the selection of the root node is based on which tree is closer to the physical infrastructure, which must be the destination of all communication

within the merged spanning tree, thus teaching "physical location and direction of travel", thus teaching this limitation).

42. **As to Claim 27**, Siegel, Kossi and Meier teach the network as in the parent claim 20.

Feldman wherein upon establishment of new communication between the root node of the first network and a child node of the second network the isolated root node of the first network becomes a child node of the second network.. (see Figs. 3a/b/c/d and col. 5, lines 40-60, teaching that two trees of nodes may be "fused into a single, larger tree when a first node in one of the trees [which may be a root node of the tree], and a second node in the other tree are found to be in each other's transmission range", and thereafter the "fusing node" will be subordinated into the other tree, thus teaching this limitation).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Feldman, in conjunction with the method as disclosed and taught by Meier and Siegel. The suggestion or motivation would have been to provide an improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13; Aihara, paragraphs 1-30; Ekl, paragraphs 1-7; Feldman, cols. 1-3).

43. **As to Claim 28**, Siegel, Feldman, Kossi and Meier teach the network as in the parent claim 27.

Meier discloses wherein the unused uplink of the first network root node is used to communicate with the child node of the second network (Figs. 1 and 2 and cols. 4

and 14, teaching that once the tree subnetwork rooted at bridge 50 [i.e., the first network] become detached from the spanning tree network rooted at gateway 20 [i.e., the second network], the root node 50 no longer uses the "uplink" that formerly attached it to the spanning tree network, but this "uplink" may be operational again once the tree rooted at bridge 50 becomes attached again to a child node of the spanning tree network rooted at node 20, teaching this limitation).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Meier, in conjunction with the method as disclosed and taught by Siegel. The suggestion or motivation would have been to provide an improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13; Aihara, paragraphs 1-30; Ekl, paragraphs 1-7; Feldman, cols. 1-3).

44. **As to Claim 29**, Siegel, Feldman, Kossi and Meier teach the network as in the parent claim 28.

Meier discloses wherein solely the root node of the first network may connect to a node of the second network (Figs. 1 and 2 and cols. 4 and 14, teaching that after the tree subnetwork rooted at bridge 50 [i.e., the first network] become detached from the spanning tree network rooted at gateway 20 [i.e., the second network], the root node 50 is the only node of that tree-subnetwork that may re-establish connection with the spanning tree network rooted at gateway 20, thus teaching this limitation).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Meier, in conjunction with the method as disclosed and taught by Siegel. The suggestion or motivation would have been to

provide an improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13; Aihara, paragraphs 1-30; Ekl, paragraphs 1-7; Feldman, cols. 1-3).

45. **Claim 26** is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,046,992 to Meier et al., in view of U.S. Patent Publication No. 2004/0095900 A1 to Siegel, U.S. Patent Publication No. 6,912,204 B2 to Kossi et al., and Patent Publication 7,738,402 B2 to Feldman et al., further in view of U.S. Patent Publication No. 2002/0082035 A1 to Aihara et al.

46. **As to Claim 26**, Siegel, Feldman, Kossi and Meier teach the network as in the parent claim 23.

Aihara discloses wherein the policy directive comprises minimizing the latency of the resulting multi-part mesh network or maximizing the throughput of the multi-part network (see Fig. 3, showing that after "optimization" and a new "cluster head" is chosen, the throughput increases, thus teaching this limitation).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the teachings disclosed in Aihara, in conjunction with the method as disclosed and taught by Meier and Siegel. The suggestion or motivation would have been to provide an improved method of communicating data. (Meier, cols. 1-2; Siegel, paragraphs 1-13; Aihara, paragraphs 1-30).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PETER CHENG whose telephone number is (571)272-9021. The examiner can normally be reached on M-Th, 8:00AM - 5:00PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Rinehart can be reached on 571-272-3632. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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

/P. C./
Examiner, Art Unit 2463

/Mark Rinehart/
Supervisory Patent Examiner, Art Unit 2463

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	Examiner PETER CHENG	Art Unit 2463	Page 1 of 1

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*	B	US-2004/0095900	05-2004	Siegel, Neil G.	370/328
*	C	US-2007/0204021	08-2007	Ekl et al.	709/223
*	D	US-6,912,204	06-2005	Kossi et al.	370/252
*	E	US-6,046,992	04-2000	Meier et al.	370/338
*	F	US-7,738,402	06-2010	Feldman et al.	370/254
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	K	US-			
	L	US-			
	M	US-			

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	O					
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	Q					
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	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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	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. 12696947	Applicant(s)/Patent Under Reexamination DACOSTA ET AL.
	Examiner PETER CHENG	Art Unit 2463

SEARCHED			
Class	Subclass	Date	Examiner
370	254-6, 328, 338, 408	10/4/12	pc

SEARCH NOTES		
Search Notes	Date	Examiner
PLUS	10/5/12	pc
inventors name search in PALM for double patenting	10/5/12	pc
consulted with Mark Rinehart SPE in class 370 re restriction and examination issues	10/5/12	pc
EAST search	10/5/12	pc

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12696947
	Filing Date		2010-01-29
	First Named Inventor	daCosta, Francis	
	Art Unit	2473	
	Examiner Name	Yao, Kwang Bin	
	Attorney Docket Number	0357-02217	

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	3	5867785		1999-02-02	Averbuch et al.	Col. 7, Para. 34
	4	7103371	B1	2006-09-05	Liu	Page 1, Abstract
	5	6393261	B1	2002-05-21	Lewis	Col. 1, Lines 59-62
	6	7200130		2007-04-03	Forstadius et al.	Sheet 2, Fig. 2
	7	6046992		2000-04-04	Meier et al.	Sheet 1, Fig. 1
	8	7408925	B2	2008-05-05	Bradd et al.	Col. 4, Lines 65-67

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12696947	
	Filing Date		2010-01-29	
	First Named Inventor	daCosta, Francis		
	Art Unit	2473		
	Examiner Name	Yao, Kwang Bin		
	Attorney Docket Number	0357-02217		

	9	7443842	B2	2008-10-28	Miyamoto, et al.	Col. 3, Lines 105
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Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	~~1~~	~~20051053725~~	~~A1~~	~~2005-07-14~~	~~Naghian et al.~~	~~Col. 8, Para. 61-63~~
	2	20030012168	A1	2003-01-16	Elson et al.	Cols. 6-7, Para.36,38
	3	20030147424	A1	2003-08-07	Famolari	Page 4, Fig. 4
	4	20040137877	A1	2004-07-15	Crowhurst et al.	Col. 1, Para. 5
	5	20040058678	A1	2004-03-25	deTorbal	Page 4, Para. 33-34
	6	20050286464	A1	2005-12-29	Saadawi et al.	Page 1, Para. 3
	7	20040095900	A1	2004-05-20	Siegel	Page 4, Para. 37
	8	20050237992	A1	2005-10-27	Mishra et al.	Page 6, Para. 81

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12696947	
	Filing Date		2010-01-29	
	First Named Inventor	daCosta, Francis		
	Art Unit	2473		
	Examiner Name	Yao, Kwang Bin		
Attorney Docket Number		0357-02217		

	9	20020085719	A1	2002-07-04	Crosbie	Page 1 Para. 6, 9
	10	20020055978	A1	2002-05-09	Joon-Bo et al.	Page 1, Abstract
	11	20030012193	A1	2003-01-06	Novaes	Page 7, Para. 108
	12	20020159409	A1	2002-10-31	Wolfe et al.	Page 1, Para. 14

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EXAMINER SIGNATURE

Examiner Signature	/Chitang Peter Cheng/	Date Considered	10/04/2012
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	42	US-5546397-\$.DID. OR US-6982960-\$.DID. OR US-5867785-\$.DID. OR US-7103371-\$.DID. OR US-6393261-\$.DID. OR US-7200130-\$.DID. OR US-6046992-\$.DID. OR US-7408925-\$.DID. OR US-7443842-\$.DID. OR US-20051053725-\$.DID. OR US-20030012168-\$.DID. OR US-20030147424-\$.DID. OR US-20040137877-\$.DID. OR US-20040058678-\$.DID. OR US-20050286464-\$.DID. OR US-20040095900-\$.DID. OR US-20050237992-\$.DID. OR US-20020085719-\$.DID. OR US-20020055978-\$.DID. OR US-20030012193-\$.DID. OR US-20020159409-\$.DID. OR US-1331018-\$.DID.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/10/04 15:51
S2	42	US-5546397-\$.DID. OR US-6982960-\$.DID. OR US-5867785-\$.DID. OR US-7103371-\$.DID. OR US-6393261-\$.DID. OR US-7200130-\$.DID. OR US-6046992-\$.DID. OR US-7408925-\$.DID. OR US-7443842-\$.DID. OR US-20051053725-\$.DID. OR US-20030012168-\$.DID. OR US-20030147424-\$.DID. OR US-20040137877-\$.DID. OR US-20040058678-\$.DID. OR US-20050286464-\$.DID. OR US-20040095900-\$.DID. OR US-20050237992-\$.DID. OR US-20020085719-\$.DID. OR US-20020055978-\$.DID. OR US-20030012193-\$.DID. OR US-20020159409-\$.DID. OR US-1331018-\$.DID.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/10/04 16:10
S3	0	"20051053725"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/10/04 17:01
S4	26814	(370/254-256,328,338,408).CCLS.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/10/04 18:09
S5	5900	(ad hoc or manet) and tree and root and (isolat\$3 or cluster\$3)	US-PGPUB; USPAT;	OR	ON	2012/10/04 18:11

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S6	4267	(ad hoc or manet) and tree and root and isolat\$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/10/04 18:12
S7	84	S4 and (ad hoc or manet) and tree and root and isolat\$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/10/04 18:12
S8	70	S4 and (ad hoc or manet) and tree and root and isolat\$3 and (join\$3 or attach\$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/10/04 18:13
S9	20	"12352457" or "10434948" or "11084330"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/10/04 18:18
S11	146	(ad hoc or manet) with (cluster\$3 or network\$3 or sub\$1net\$5) with merg\$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/10/05 10:50
S12	2249	(ad hoc or manet) with (cluster\$3 or network\$3 or sub\$1net\$5) with (concatenat\$3 or merg\$3 or combin\$5)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/10/05 10:51
S13	855	((ad hoc or manet or wireless\$3) with (cluster\$3 or network\$3 or sub\$1net\$5) or BSS or I\$1bss) with merg\$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/10/05 11:09
S14	835	((ad hoc or manet or wireless\$3) with (cluster\$3 or network\$3 or sub\$1net\$5)) with merg\$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/10/05 11:10

S15	116	((ad hoc or manet) with (cluster\$3 or network\$3 or sub\$1net\$5)) with merg\$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/10/05 11:10
S16	245	((ad hoc or manet or mesh) with (cluster\$3 or network\$3 or sub\$1net\$5 or proxim\$5 or adjacen\$3)) with merg\$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/10/05 11:12
S17	8	(ad hoc or manet or mesh) with (cluster\$3 or network\$3 or sub\$1net\$5) with (proxim\$5 or adjacen\$3) with merg\$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/10/05 11:13
S18	186	(ad near1 hoc or manet or mesh) with (cluster\$3 or network\$3 or sub\$1net\$5) with merg\$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/10/05 11:20
S19	221	(ad near1 hoc or mesh or cluster\$3 or sub\$1net\$5) with merg\$3 same (root or child\$5)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/10/05 16:20
S20	29	(ad near1 hoc or mesh or cluster\$3 or sub\$1net\$5) with merg\$3 same (root or child\$5) with (contact\$3 or near\$3 or clos\$3 or proxim\$5 or rang\$3 or join\$3 or attach\$5)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/10/05 16:23
S21	68	(ad near1 hoc or mesh or cluster\$3 or sub\$1net\$5) with merg\$3 with (root\$3 or child\$5 or tree or leaf\$2 or leaves) and (root or child\$5) with (contact\$3 or near\$3 or clos\$3 or proxim\$5 or rang\$3 or join\$3 or attach\$5)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/10/05 16:29
S22	258	(ad near1 hoc or mesh) and merg\$3 with (root\$3 or child\$5 or tree or leaf\$2 or leaves) and (root or child\$5) with (contact\$3 or near\$3 or clos\$3 or proxim\$5 or rang\$3 or join\$3 or attach\$5)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/10/05 16:53
S23	25	(ad near1 hoc or mesh) with merg\$3 same (root\$3 or child\$5 or tree or leaf\$2 or leaves) and (root or child\$5) with (contact\$3 or near\$3 or clos\$3 or proxim\$5 or rang\$3 or join\$3 or attach\$5)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	ADJ	ON	2012/10/05 16:55

		and detect\$4)	DERWENT; IBM_TDB			
S24	90	(ad near1 hoc or mesh) and merg\$3 same (root\$3 or child\$5 or tree or leaf\$2 or leaves) and (root or child\$5) with detect\$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/10/05 16:57
S25	5	(ad near1 hoc or mesh) with network\$3 and merg\$3 same (master\$3 or root\$3) with (join\$3 or attach\$3) with (child\$5 or tree or leaf\$2 or leaves)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/10/05 17:56
S26	23	(ad near1 hoc or mesh) same network\$3 and merg\$3 same (master\$3 or root\$3 or tree) with (join\$3 or attach\$3) with (child\$5 or tree or leaf\$2 or leaves or root\$3 or master\$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/10/05 18:07
S27	3	(ad near1 hoc or mesh) and merg\$3 with (root\$3 or child\$5 or tree or leaf\$2 or leaves) with isolat\$3 and (root or child\$5) with (contact\$3 or near\$3 or clos\$3 or proxim\$5 or rang\$3 or join\$3 or attach\$5)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/10/05 18:27
S28	13	(distribut\$3 or local\$3) with DHCP with address\$3 with (random or pseudo\$1random)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/10/05 21:50
S29	12	DHCP with address\$3 with (random or pseudo\$1random) near3 number\$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/10/05 21:53
S30	21	DHCP same IP near address\$3 with (random or pseudo\$1random) near5 number\$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/10/05 21:57
S31	30	(distribut\$3 or local\$3) with DHCP same address\$3 with (random or pseudo\$1random)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/10/05 22:10
S32	16	ad near1 hoc and cluster with frequenc\$3 with (separat\$3 or unique\$3 or assign\$4) and common\$3 with frequenc\$3	US-PGPUB; USPAT; USOCR;	ADJ	ON	2012/10/05 22:25

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S33	0	ad near1 hoc and cluster with frequenc\$3 with internal\$3 and common\$3 with frequenc\$3 with external\$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/10/05 22:32
S34	2	ad near1 hoc and cluster with frequenc\$3 with internal\$3 and (external\$3 or common\$3) with frequenc\$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/10/05 22:33
S35	19	ad near1 hoc same cluster and frequenc\$3 with internal\$3 and (external\$3 or common\$3) with frequenc\$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/10/05 22:33

EAST Search History (Interference)

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10/ 6/ 2012 10:15:22 PM**C:\ Users\ pcheng\ Documents\ EAST\ Workspaces\ 12696947.wsp**



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BIB DATA SHEET

CONFIRMATION NO. 1992

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
12/696,947	01/29/2010	370	2463	0357-02217		
APPLICANTS Francis daCosta, Santa Clara, CA; Sriram Dayanandan, Santa Clara, CA; ** CONTINUING DATA ***** This appln claims benefit of 61/148,809 01/30/2009 and is a CIP of 11/084,330 03/17/2005 ABN which is a CIP of 10/434,948 05/08/2003 PAT 7,420,952 This application 12/696,947 01/29/2010 is a CIP of 12/352,457 01/12/2009 * (*)Data provided by applicant is not consistent with PTO records. ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** ** SMALL ENTITY ** 02/17/2010						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and Acknowledged <u>/PETER CHENG/</u> Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY CA	SHEETS DRAWINGS 9	TOTAL CLAIMS 35	INDEPENDENT CLAIMS 3
ADDRESS MICHAEL J. CHERSKOV 123 WEST MADISON STREET SUITE 400 CHICAGO, IL 60602 UNITED STATES						
TITLE Persistent Mesh for Isolated Mobile and Temporal Networking						
FILING FEE RECEIVED 917	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		

<i>Index of Claims</i> 	Application/Control No. 12696947	Applicant(s)/Patent Under Reexamination DACOSTA ET AL.
	Examiner PETER CHENG	Art Unit 2463

✓	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	10/06/2012								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
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PLUS Search Results for S/N 12696947, Searched Tue Oct 02 13:26:30 EDT 2012
The Patent Linguistics Utility System (PLUS) is a USPTO automated search system for U.S. Patents from 1971 to the present PLUS is a query-by-example search system which produces a list of patents that are most closely related linguistically to the application searched. This search was prepared by the staff of the Scientific and Technical Information Center, SIRA.

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UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Francis DACOSTA et al.
Application: PERSISTENT MESH FOR ISOLATED MOBILE AND
TEMPORAL NETWORKING
Serial No.: 12/696,947
Filing Date: January 29, 2010
Art Unit: 2463
Examiner: Cheng, Chi Tang P
Atty. Dkt. No.: 0357-02217

Submitted via EFS-Web on August 10, 2012.

Mail Stop Amendment
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Alexandria, VA 22313-1450

123 W. Madison St.
Suite 400
Chicago, IL 60602
(312) 621-1330

PRELIMINARY AMENDMENT

Dear Sir:

Applicant hereby submits the following amendment in order to correct a typo in
a priority claim:

Amendments to the Specification begin on page two of this document.

Remarks begin on page three of this document.

SPECIFICATION

Please make the following amendments to paragraph [02] of the specification:

[02] This application claims the benefit of claim priority of provisional filing serial number ~~61/148,809~~ 61/148,803 filed on January 30, 2009, presently expired ~~presently pending~~, and also as a continuation in part of the U.S. Utility Application No. 11/084,330 filed March 17, 2005, currently ~~pending~~ abandoned which in turn ~~is~~ was a continuation-in-part of U.S. Utility Application No. 10/434,948, filed on May 8, 2003, patented as U.S. Patent Number 7,420,952 on September 2, 2008. Further, the instant application is a continuation in part of the U.S. Utility Application No. 12/352,457, filed on January 13, 2009, currently pending.

REMARKS

By this amendment, Applicant seeks to correct a typo in the claimed priority. Applicant mistakenly inserted a 9 as the last digit of the provisional application number, when in fact the number should have been a 3. Application 61/148,809 is entirely unrelated to Applicant's invention.

Applicant has also updated the statuses of the applications contained within the priority claim.

No new matter has been submitted via this amendment. If the examiner feels that a telephonic interview is necessary to expedite the examination of this application, he is respectfully urged to contact the undersigned.

Respectfully Submitted,

Cherskov Flaynik & Gurda

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

Electronic Acknowledgement Receipt	
EFS ID:	13474461
Application Number:	12696947
International Application Number:	
Confirmation Number:	1992
Title of Invention:	Persistent Mesh for Isolated Mobile and Temporal Networking
First Named Inventor/Applicant Name:	Francis daCosta
Customer Number:	27197
Filer:	Szymon Maciej Gurda
Filer Authorized By:	
Attorney Docket Number:	0357-02217
Receipt Date:	10-AUG-2012
Filing Date:	29-JAN-2010
Time Stamp:	19:03:07
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		PrelimAmendment.pdf	64177 de294c29222a0b94c6a3025387c270c8fd56cf63	yes	3

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Preliminary Amendment	1	1
	Specification	2	2
	Applicant Arguments/Remarks Made in an Amendment	3	3
Warnings:			
Information:			
Total Files Size (in bytes):		64177	
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 12/696,947		Filing Date 01/29/2010		☐ 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(i))	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.			TOTAL		TOTAL				

APPLICATION AS AMENDED – PART II						OTHER THAN SMALL ENTITY					
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY	
AMENDMENT	08/10/2012	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	* 35	Minus	** 35	=	X \$ =		OR	X \$ =		
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	=	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			

(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(i))	*	Minus	**	=	X \$ =		OR	X \$ =		
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =		OR	X \$ =		
	☐ Application Size Fee (37 CFR 1.16(s))							OR			
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR			
					TOTAL ADD'L FEE		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:
/PEGGY YARBOROUGH/

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.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12696947
	Filing Date		2010-01-29
	First Named Inventor	daCosta, Francis	
	Art Unit	2473	
	Examiner Name	Yao, Kwang Bin	
	Attorney Docket Number	0357-02217	

U.S. PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	5546397		1996-08-12	Mahany	Col. 5, Lines 25-28
	2	6982960	B2	2006-01-03	Lee et al.	Page 1, Abstract
	3	5867785		1999-02-02	Averbuch et al.	Col. 7, Para. 34
	4	7103371	B1	2006-09-05	Liu	Page 1, Abstract
	5	6393261	B1	2002-05-21	Lewis	Col. 1, Lines 59-62
	6	7200130		2007-04-03	Forstadius et al.	Sheet 2, Fig. 2
	7	6046992		2000-04-04	Meier et al.	Sheet 1, Fig. 1
	8	7408925	B2	2008-05-05	Bradd et al.	Col. 4, Lines 65-67

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12696947	
	Filing Date		2010-01-29	
	First Named Inventor	daCosta, Francis		
	Art Unit	2473		
	Examiner Name	Yao, Kwang Bin		
	Attorney Docket Number	0357-02217		

	9	7443842	B2	2008-10-28	Miyamoto, et al.	Col. 3, Lines 105
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U.S.PATENT APPLICATION PUBLICATIONS

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Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20051053725	A1	2005-07-14	Naghian et al.	Col. 9, Para. 61-63
	2	20030012168	A1	2003-01-16	Elson et al.	Cols. 6-7, Para.36,38
	3	20030147424	A1	2003-08-07	Famolari	Page 4, Fig. 4
	4	20040137877	A1	2004-07-15	Crowhurst et al.	Col. 1, Para. 5
	5	20040058678	A1	2004-03-25	deTorbal	Page 4, Para. 33-34
	6	20050286464	A1	2005-12-29	Saadawi et al.	Page 1, Para. 3
	7	20040095900	A1	2004-05-20	Siegel	Page 4, Para. 37
	8	20050237992	A1	2005-10-27	Mishra et al.	Page 6, Para. 81

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12696947	
	Filing Date		2010-01-29	
	First Named Inventor	daCosta, Francis		
	Art Unit	2473		
	Examiner Name	Yao, Kwang Bin		
	Attorney Docket Number	0357-02217		

	9	20020085719	A1	2002-07-04	Crosbie	Page 1 Para. 6, 9
	10	20020055978	A1	2002-05-09	Joon-Bo et al.	Page 1, Abstract
	11	20030012193	A1	2003-01-06	Novaes	Page 7, Para. 108
	12	20020159409	A1	2002-10-31	Wolfe et al.	Page 1, Para. 14

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FOREIGN PATENT DOCUMENTS

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Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
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NON-PATENT LITERATURE DOCUMENTS

Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵
	1		☐

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12696947
	Filing Date		2010-01-29
	First Named Inventor	daCosta, Francis	
	Art Unit	2473	
	Examiner Name	Yao, Kwang Bin	
	Attorney Docket Number	0357-02217	

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		12696947
	Filing Date		2010-01-29
	First Named Inventor	daCosta, Francis	
	Art Unit	2473	
	Examiner Name	Yao, Kwang Bin	
	Attorney Docket Number	0357-02217	

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Szymon M. Gurda/	Date (YYYY-MM-DD)	2011-09-14
Name/Print	Szymon M. Gurda	Registration Number	58,451

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt	
EFS ID:	10951688
Application Number:	12696947
International Application Number:	
Confirmation Number:	1992
Title of Invention:	Persistent Mesh for Isolated Mobile and Temporal Networking
First Named Inventor/Applicant Name:	Francis daCosta
Customer Number:	27197
Filer:	Szymon Maciej Gurda
Filer Authorized By:	
Attorney Docket Number:	0357-02217
Receipt Date:	14-SEP-2011
Filing Date:	29-JAN-2010
Time Stamp:	20:02:02
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	Transmittal Letter	CoverLetter.pdf	68252 6b1f80f532518017e463dbecaa61d5bc0419a707	no	1

Warnings:

Information:

2	Information Disclosure Statement (IDS) Form (SB08)	IDS.pdf	612835 40e580d091e9aeaaf215eade2e995a1d705 cde28	no	6
Warnings:					
Information:					
Total Files Size (in bytes):				681087	
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

UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Francis DACOSTA
Application: Persistent Mesh for Isolated Mobile and Temporal Networking
Serial No.: 12/696,947
Filing Date: January 29, 2010
Art Unit: 2473
Case No.: 0357-02217
Conf. No.: 1992

Submitted via EFS-Web on September 14, 2011

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

123 W. Madison St.
Suite 400
Chicago, IL 60602

DISCLOSURE STATEMENT PER 37 C.F.R. §§ 1.97 AND 1.98

Dear Sir:

The citation listed on accompanying form PTO/SB/08B is submitted in compliance with the duty of disclosure defined in 37 C.F.R. § 1.98. Copies of non-patent literature references are enclosed.

This Disclosure Submission Statement is not to be construed as a representation that a search has been made, that additional matter material to the examination of this application does not exist, or that any one or more of these citations constitutes prior art under 35 U.S.C. 102 and/or 35 U.S.C. 103.

Respectfully submitted,

CHERSKOV & FLAYNIK

/Szymon M. Gurda/

Szymon M. Gurda
Reg. No. 58,451



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/696,947	01/29/2010	Francis daCosta	0357-02217

CONFIRMATION NO. 1992

PUBLICATION NOTICE



27197
MICHAEL J. CHERSKOV
300 NORTH STATE STREET
SUITE 5102
CHICAGO, IL 60654

Title:Persistent Mesh for Isolated Mobile and Temporal Networking

Publication No.US-2010-0177703-A1

Publication Date:07/15/2010

NOTICE OF PUBLICATION OF APPLICATION

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

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

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

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

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

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



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Address: COMMISSIONER FOR PATENTS
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
12/696,947	01/29/2010	2617	917	0357-02217	35	3

CONFIRMATION NO. 1992

UPDATED FILING RECEIPT



0000000040915621

27197
MICHAEL J. CHERSKOV
300 NORTH STATE STREET
SUITE 5102
CHICAGO, IL 60654

Date Mailed: 04/05/2010

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

Applicant(s)

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

Power of Attorney:

Donald Flaynik Jr--30836
Michael Cherskov--33664
Charles Nissim-Sabat--42037
Szymon Gurda--58451

Domestic Priority data as claimed by applicant

This appln claims benefit of 61/148,809 01/30/2009
and is a CIP of 11/084,330 03/17/2005
which is a CIP of 10/434,948 05/08/2003 PAT 7,420,952
This application 12/696,947
is a CIP of 12/352,457 01/12/2009 *
(*)Data provided by applicant is not consistent with PTO records.

Foreign Applications

If Required, Foreign Filing License Granted: 02/17/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/696,947**

Projected Publication Date: 07/15/2010

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

Persistent Mesh for Isolated Mobile and Temporal Networking

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).

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

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UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Francis daCosta
Serial No.: 12/696,947
Application: PERSISTENT MESH FOR ISOLATED MOBILE AND TEMPORAL NETWORKING
Filing Date: January 29, 2010
Atty. Docket: 0357-02217

Submitted via EFS-Web on March 25, 2010

RESPONSE TO NOTICE TO FILE MISSING PARTS

Sir or Madam:

In response to the Notice to File Missing Parts, dated January 29, 2010, attached herewith please find payment of the \$917 small entity filing fee to be arranged using EFS-Web electronic filing system, signed declaration, replacement figures, and a letter to the official draftsman.

Inasmuch as this Response is being filed online, no return copy of the Notice is attached. The Office is authorized to charge any deficiency or credit any overpayment to the undersigned's Deposit Account No. 501709.

Respectfully submitted,
CHERSKOV & FLAYNIK

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

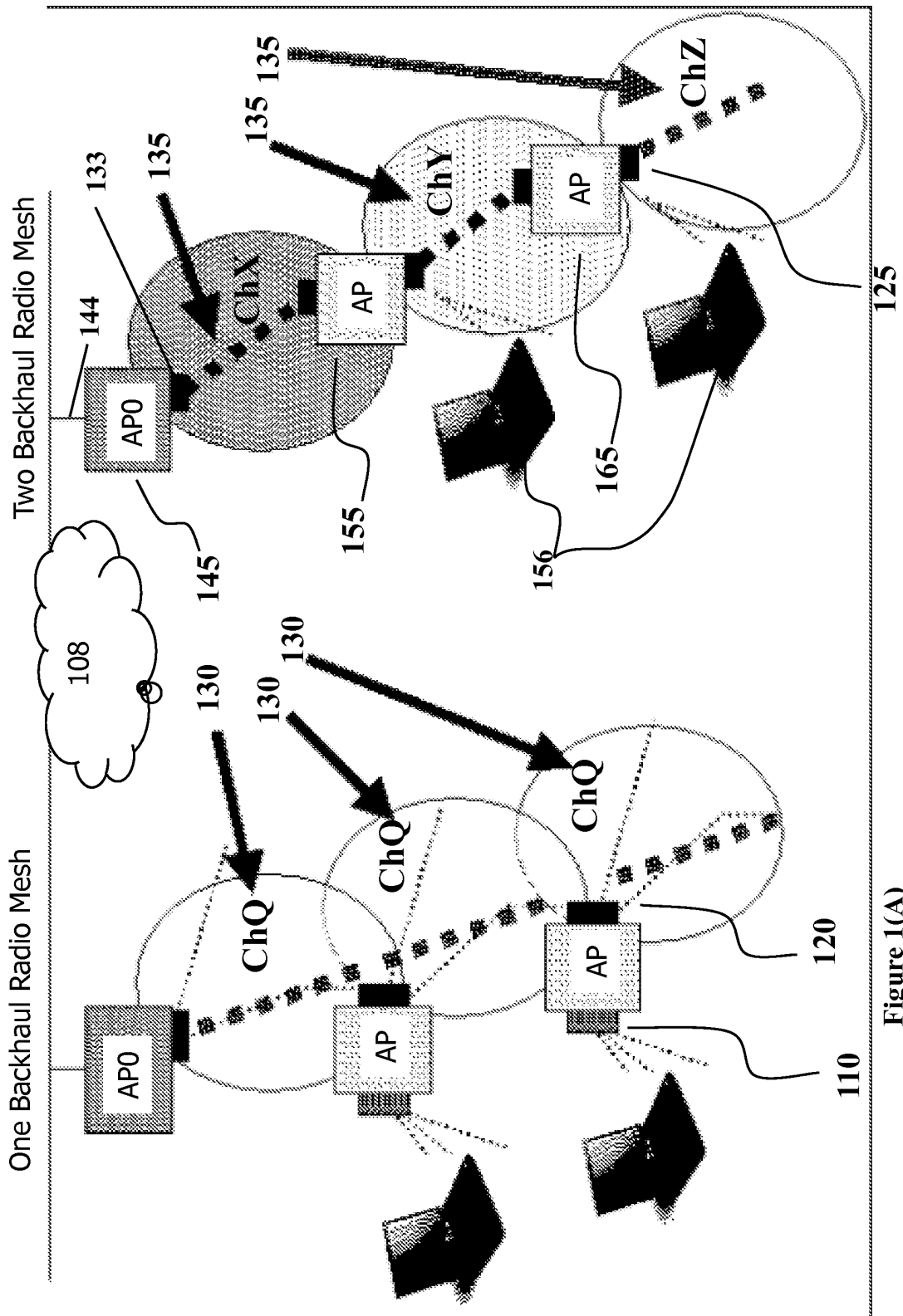


Figure 1(A)
Prior Art

Figure 1(B)

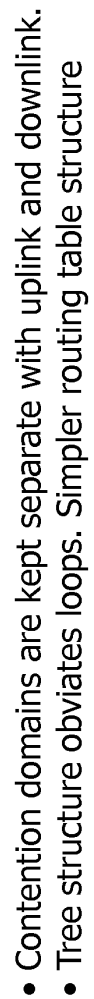


Figure 2 Prior Art

DECLARATION FOR PATENT APPLICATION WITH POWER OF ATTORNEY

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 I am the original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled "PERSISTENT MESH FOR ISOLATED MOBILE AND TEMPORAL NETWORKING" (Attorney Ref. No. 0357-02217), the specification of which

(Check one) _____ is attached hereto.

X was filed on January 29, 2010

with serial no 12/696,947

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.

I acknowledge the duty to disclose to the Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, §1.56 (a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119, of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign applications for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

<u>Prior Foreign Application(s)</u>			<u>Priority Claimed</u>	
<u> </u> (Number)	<u> </u> (Country)	<u> </u> (Day/Month/Year Filed)	<u> </u> Yes	<u> </u> No

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

<u>61/148,809</u>	<u>Jan. 30, 2009</u>	<u>Pending</u>
(App. Ser. No.)	(Filing Date)	(Status)
<u>11/084,330</u>	<u>March 17, 2005</u>	<u>Pending</u>
(App. Ser. No.)	(Filing Date)	(Status)

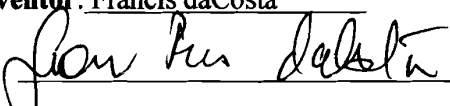
In re: DaCosta (Serial Number 12/696,947)
Declaration with Power of Attorney
Page -2-

<u>10/434,948</u> (App. Ser. No.)	<u>May 8, 2003</u> (Filing Date)	<u>Patented as 7,420,952 on 9/2/2008</u> (Status)
<u>12/352,457</u> (App. Ser. No.)	<u>Jan. 13, 2009</u> (Filing Date)	<u>Pending</u> (Status)

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 of any patent issuing thereon.

And I hereby appoint Donald G. Flaynik (Reg. No. 30,836) and Michael J. Cherskov (Reg. No. 33,664), Szymon M. Gurda (58,451), Charles Nissam-Sabat (42,037), are all members of the Bar of the State of Illinois, using the address CHERSKOV & FLAYNIK, 300 North State Street, Suite 5102, Chicago, IL 60654 (Telephone 312-621-1330), my attorneys with full power of substitution and revocation, to prosecute this application, and to transact all business in the Patent and Trademark Office connected therewith. It is requested that all correspondence should be directed to CHERSKOV & FLAYNIK, 300 North State Street, Suite 5102, Chicago, IL 60654.

Full name of **first inventor**: Francis daCosta

Inventor's Signature: 

Date: 02-03-2010

Residence: 2953 Bunker Hill
Suite 400
Santa Clara, CA 95054
USA

Citizenship: USA

Post Office Address: 2953 Bunker Hill
Suite 400
Santa Clara, CA 95054
USA

In re: DaCosta (Serial Number 12/696,947)
Declaration with Power of Attorney
Page -3-

Full name of **second inventor**: Sriram Dayanandan

Inventor's Signature: _____

Date: 02/02/2010

Residence: 2953 Bunker Hill
Suite 400
Santa Clara, CA 95054
USA

Citizenship: India

Post Office Address: 2953 Bunker Hill
Suite 400
Santa Clara, CA 95054
USA

Electronic Patent Application Fee Transmittal				
Application Number:	12696947			
Filing Date:	29-Jan-2010			
Title of Invention:	Persistent Mesh for Isolated Mobile and Temporal Networking			
First Named Inventor/Applicant Name:	Francis daCosta			
Filer:	Szymon Maciej Gurda			
Attorney Docket Number:	0357-02217			
Filed as Small Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Utility filing Fee (Electronic filing)	4011	1	82	82
Utility Search Fee	2111	1	270	270
Utility Examination Fee	2311	1	110	110
Pages:				
Claims:				
Claims in excess of 20	2202	15	26	390
Miscellaneous-Filing:				
Late filing fee for oath or declaration	2051	1	65	65

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				917

Electronic Acknowledgement Receipt	
EFS ID:	7289745
Application Number:	12696947
International Application Number:	
Confirmation Number:	1992
Title of Invention:	Persistent Mesh for Isolated Mobile and Temporal Networking
First Named Inventor/Applicant Name:	Francis daCosta
Customer Number:	27197
Filer:	Szymon Maciej Gurda
Filer Authorized By:	
Attorney Docket Number:	0357-02217
Receipt Date:	25-MAR-2010
Filing Date:	29-JAN-2010
Time Stamp:	19:51:27
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 917
RAM confirmation Number	8892
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	Miscellaneous Incoming Letter	DraftspersonLetter.pdf	63805	no	1
			d06b8330c9e9af68a683e810c422bc3be280c2cd		
Warnings:					
Information:					
2	Applicant Response to Pre-Exam Formalities Notice	NoticeResponse.pdf	63499	no	1
			fa8abb39ca5e472ebad8a09eed198f89ceeb46c1		
Warnings:					
Information:					
3	Drawings-only black and white line drawings	ReplacementSheets.pdf	184154	no	2
			667cd85370fc4e74021421b4a6071996f18f752b		
Warnings:					
Information:					
4	Oath or Declaration filed	Decl.pdf	102878	no	3
			f9cefecab97a2ec5981c0e477ed6ae140c55d631		
Warnings:					
Information:					
5	Fee Worksheet (PTO-875)	fee-info.pdf	38230	no	2
			0171e858ef003e461837c8dfa01afe7703cd672		
Warnings:					
Information:					
Total Files Size (in bytes):			452566		

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

Applicant: Francis daCosta
Serial No.: 12/696,947
Application: PERSISTENT MESH FOR ISOLATED MOBILE AND
TEMPORAL NETWORKING
Filing Date: January 29, 2010
Atty. Docket: 0357-02217

Submitted via EFS-Web on March 25, 2010

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

300 North State Street
Suite 5102
Chicago, IL 60654
312-621-1330

LETTER TO THE OFFICIAL DRAFTSPERSON

Sir:

Pursuant to the Notice to File Corrected Application Papers dated February 19, 2010, attached are replacement sheets for FIGS. 1A, 1A and 2. The replacement sheets are designed to improve the readability of the text that appeared on the originally-submitted drawings.

The changes are submitted to address scanning errors. No new matter has been added to the formal drawings.

Respectfully submitted,

CHERSKOV & FLAYNIK

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

Date: March 25, 2010

Electronic Acknowledgement Receipt	
EFS ID:	7289745
Application Number:	12696947
International Application Number:	
Confirmation Number:	1992
Title of Invention:	Persistent Mesh for Isolated Mobile and Temporal Networking
First Named Inventor/Applicant Name:	Francis daCosta
Customer Number:	27197
Filer:	Szymon Maciej Gurda
Filer Authorized By:	
Attorney Docket Number:	0357-02217
Receipt Date:	25-MAR-2010
Filing Date:	29-JAN-2010
Time Stamp:	19:51:27
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 917
RAM confirmation Number	8892
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	Miscellaneous Incoming Letter	DraftspersonLetter.pdf	63805	no	1
			d06b8330c9e9af68a683e810c422bc3be280c2cd		
Warnings:					
Information:					
2	Applicant Response to Pre-Exam Formalities Notice	NoticeResponse.pdf	63499	no	1
			fa8abb39ca5e472ebad8a09eed198f89ceeb46c1		
Warnings:					
Information:					
3	Drawings-only black and white line drawings	ReplacementSheets.pdf	184154	no	2
			667cd85370fc4e74021421b4a6071996f18f752b		
Warnings:					
Information:					
4	Oath or Declaration filed	Decl.pdf	102878	no	3
			f9cefecab97a2ec5981c0e477ed6ae140c55d631		
Warnings:					
Information:					
5	Fee Worksheet (PTO-875)	fee-info.pdf	38230	no	2
			0171e858ef003e461837c8dfa01afe7703cd672		
Warnings:					
Information:					
Total Files Size (in bytes):			452566		

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.

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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	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/696,947	01/29/2010	Francis daCosta	0357-02217

CONFIRMATION NO. 1992

FORMALITIES LETTER



27197
MICHAEL J. CHERSKOV
300 NORTH STATE STREET
SUITE 5102
CHICAGO, IL 60654

Date Mailed: 02/19/2010

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

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

- The statutory basic filing fee is missing.
Applicant must submit \$82 to complete the basic filing fee for a small entity.
- The oath or declaration is unsigned.

The application is informal since it does not comply with the regulations for the reason(s) indicated below.

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

- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
 - The drawings submitted to the Office are not electronically reproducible because portions of figures 1A, 1B, 2 are missing and/or blurry.

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

The applicant needs to satisfy supplemental fees problems indicated below.

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

- Additional claim fees of **\$390** as a small entity, including any required multiple dependent claim fee, are required. Applicant must submit the additional claim fees or cancel the additional claims for which fees are due.
- To avoid abandonment, a surcharge (for late submission of filing fee, search fee, examination fee or oath or declaration) as set forth in 37 CFR 1.16(f) of **\$65** for a small entity in compliance with 37 CFR 1.27, must be submitted with the missing items identified in this notice.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is **\$917** for a small entity

- **\$82** Statutory basic filing fee.
- **\$65** Surcharge.
- The application search fee has not been paid. Applicant must submit **\$270** to complete the search fee.
- The application examination fee has not been paid. Applicant must submit **\$110** to complete the examination fee for a small entity in compliance with 37 CFR 1.27.
- Total additional claim fee(s) for this application is **\$390**
 - **\$390** for **15** total claims over 20.

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.

/atesfaye/

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



UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
12/696,947	01/29/2010	2617	0.00	0357-02217	35	3

CONFIRMATION NO. 1992

FILING RECEIPT



0000000040130653

27197
MICHAEL J. CHERSKOV
300 NORTH STATE STREET
SUITE 5102
CHICAGO, IL 60654

Date Mailed: 02/19/2010

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

Applicant(s)

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

Power of Attorney: None

Domestic Priority data as claimed by applicant

This appln claims benefit of 61/148,809 01/30/2009
and is a CIP of 11/084,330 03/17/2005
which is a CIP of 10/434,948 05/08/2003 PAT 7,420,952
This application 12/696,947
is a CIP of 12/352,457 01/12/2009 *
(*)Data provided by applicant is not consistent with PTO records.

Foreign Applications

If Required, Foreign Filing License Granted: 02/17/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/696,947**

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

Non-Publication Request: No

Early Publication Request: No

** SMALL ENTITY **

Title

Persistent Mesh for Isolated Mobile and Temporal Networking

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).

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

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0357-02217
		Application Number	
Title of Invention	Persistent Mesh for Isolated Mobile and Temporal Networking		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Applicant Information:

Applicant 1					Remove
Applicant Authority		☒ Inventor		☐ Legal Representative under 35 U.S.C. 117	☐ Party of Interest under 35 U.S.C. 118
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Francis		daCosta		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	Santa Clara	State/Province	CA	Country of Residence i	US
Citizenship under 37 CFR 1.41(b) i		US			
Mailing Address of Applicant:					
Address 1	2953 Bunker Hill				
Address 2	Suite 400				
City	Santa Clara	State/Province	CA		
Postal Code	95054	Countryi	US		
Applicant 2					Remove
Applicant Authority		☒ Inventor		☐ Legal Representative under 35 U.S.C. 117	☐ Party of Interest under 35 U.S.C. 118
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Sriram		Dayanandan		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	Santa Clara	State/Province	CA	Country of Residence i	US
Citizenship under 37 CFR 1.41(b) i		IN			
Mailing Address of Applicant:					
Address 1	2953 Bunker Hill				
Address 2	Suite 400				
City	Santa Clara	State/Province	CA		
Postal Code	95054	Countryi	US		
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.					Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ An Address is being provided for the correspondence Information of this application.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0357-02217	
		Application Number		
Title of Invention	Persistent Mesh for Isolated Mobile and Temporal Networking			
Customer Number	27197			
Email Address	mail@cherskov.com		Add Email	Remove Email

Application Information:

Title of the Invention	Persistent Mesh for Isolated Mobile and Temporal Networking		
Attorney Docket Number	0357-02217	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	9	Suggested Figure for Publication (if any)	

Publication Information:

☐	Request Early Publication (Fee required at time of Request 37 CFR 1.219)
☐	Request Not to Publish. I hereby request that the attached application not be published under 35 U.S.C. 122(b) and 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 international agreement, that requires publication at eighteen months after filing.

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Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	61148809	2009-01-30
Prior Application Status		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Continuation in part of	11084330	2005-03-17

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number		0357-02217	
		Application Number			
Title of Invention	Persistent Mesh for Isolated Mobile and Temporal Networking				
Prior Application Status	Pending		Remove		
Application Number	Continuity Type		Prior Application Number	Filing Date (YYYY-MM-DD)	
11084330	Continuation in part of		10434948	2003-05-08	
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
		10434948	2003-05-08	7420952	2008-09-02
Prior Application Status			Remove		
Application Number	Continuity Type		Prior Application Number	Filing Date (YYYY-MM-DD)	
	Continuation in part of		12352457	2009-01-13	
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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0357-02217
		Application Number	
Title of Invention	Persistent Mesh for Isolated Mobile and Temporal Networking		

Signature	/Szymon M. Gurda/		Date (YYYY-MM-DD)	2010-01-29
First Name	Szymon	Last Name	Gurda	Registration Number 58451

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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 I am the original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled "PERSISTENT MESH FOR ISOLATED MOBILE AND TEMPORAL NETWORKING" (Attorney Ref. No. 0357-02217), the specification of which

(Check one) X is attached hereto.
 _____ was filed on _____
 _____ with serial no _____

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.

I acknowledge the duty to disclose to the Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, §1.56 (a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119, of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign applications for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

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

_____	_____	_____
61/148,809	Jan. 30, 2009	Pending
(App. Ser. No.)	(Filing Date)	(Status)

<u>11/084,330</u> (App. Ser. No.)	<u>March 17, 2005</u> (Filing Date)	<u>Pending</u> (Status)
<u>10/434,948</u> (App. Ser. No.)	<u>May 8, 2003</u> (Filing Date)	<u>Patented as 7,420,952 on 9/2/2008</u> (Status)
<u>12/352,457</u> (App. Ser. No.)	<u>Jan. 13, 2009</u> (Filing Date)	<u>Pending</u> (Status)

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 of any patent issuing thereon.

And I hereby appoint Donald G. Flaynik (Reg. No. 30,836) and Michael J. Cherskov (Reg. No. 33,664), Szymon M. Gurda (58,451), Charles Nissam-Sabat (42,037), are all members of the Bar of the State of Illinois, using the address CHERSKOV & FLAYNIK, 300 North State Street, Suite 5102, Chicago, IL 60654 (Telephone 312-621-1330), my attorneys with full power of substitution and revocation, to prosecute this application, and to transact all business in the Patent and Trademark Office connected therewith. It is requested that all correspondence should be directed to CHERSKOV & FLAYNIK, 300 North State Street, Suite 5102, Chicago, IL 60654.

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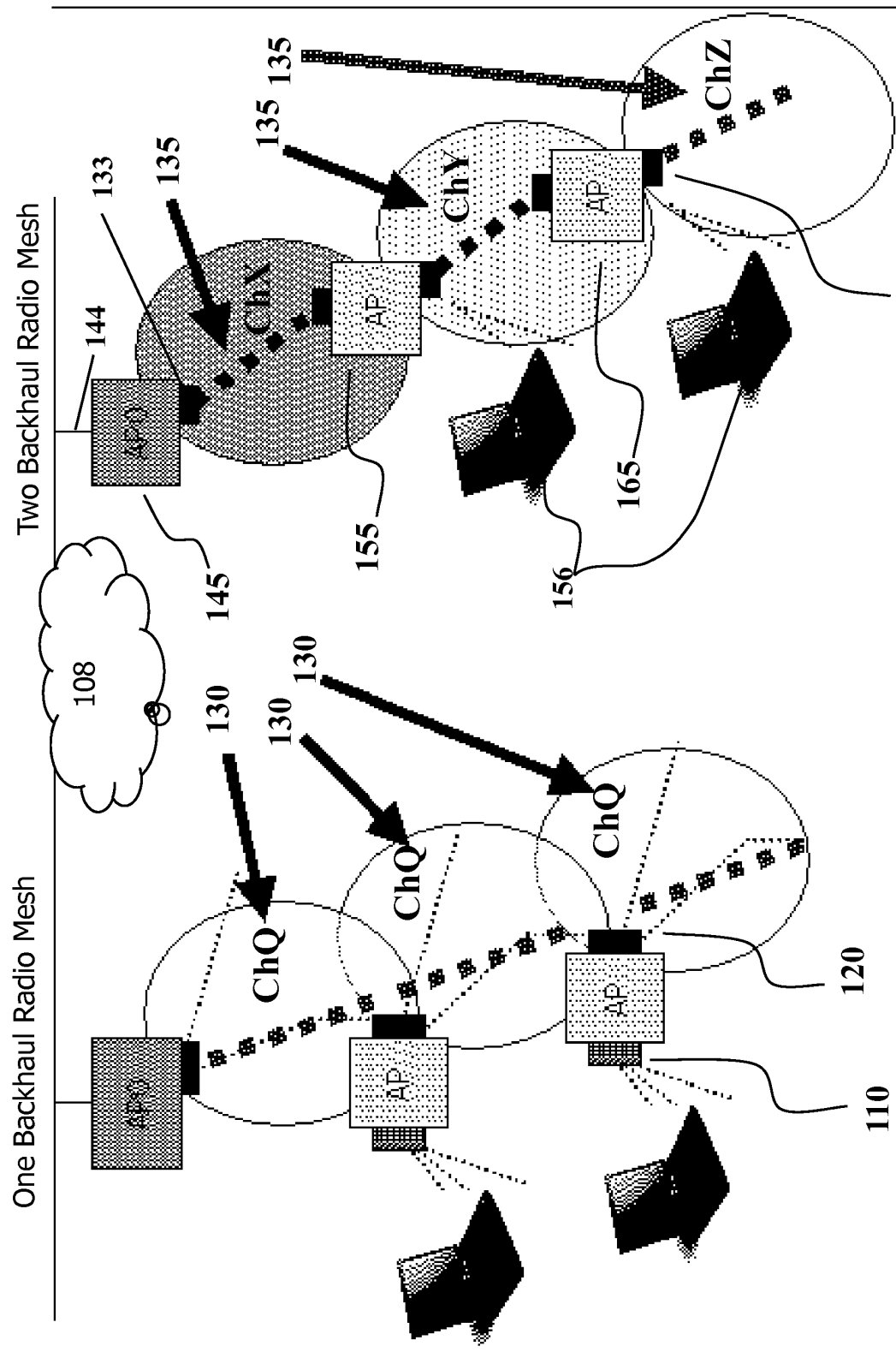
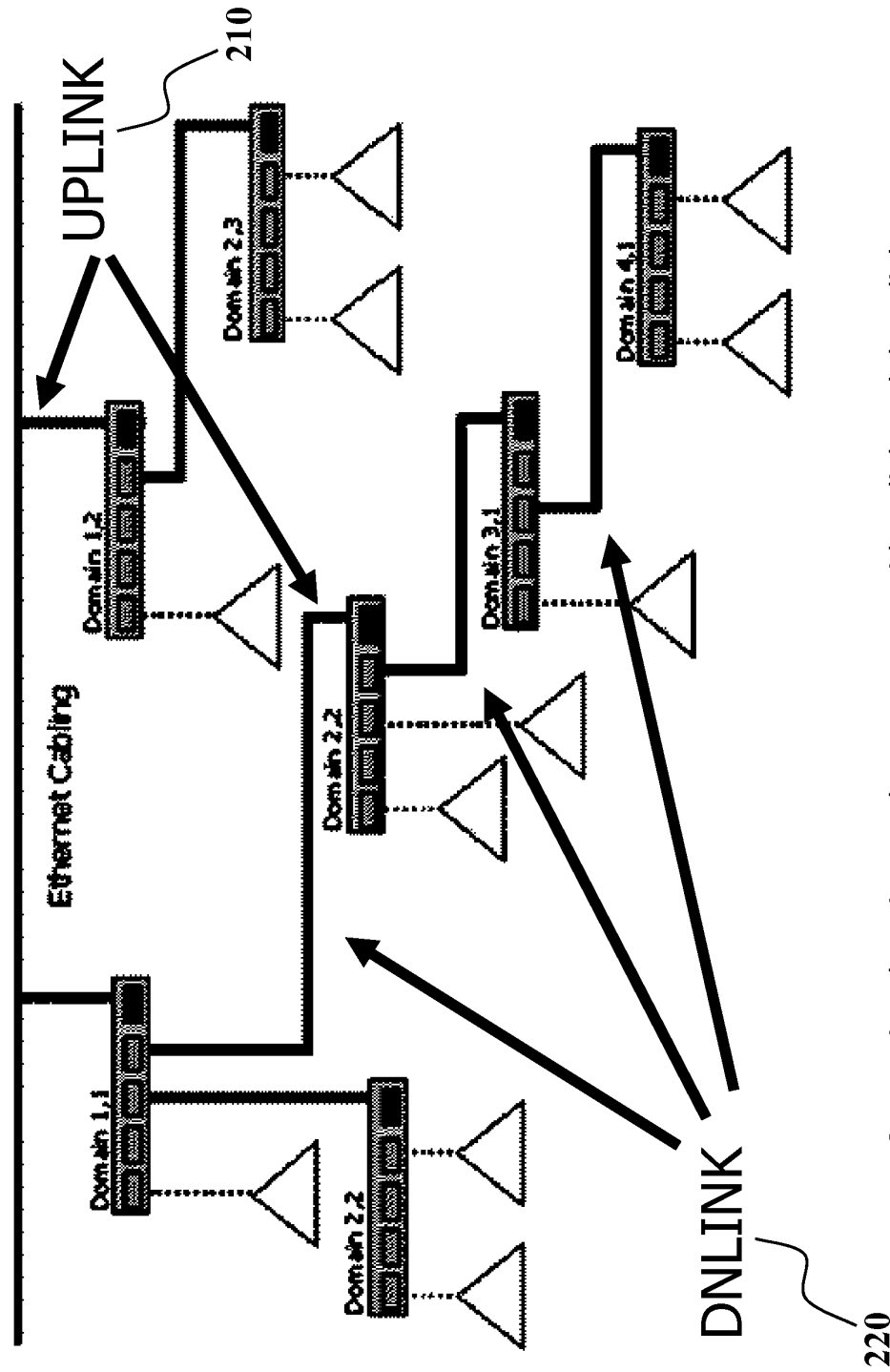


Figure 1(A)
Prior Art

Figure 1(B)



- Contention domains are kept separate with uplink and downlink.
- Tree structure obviates loops. Simpler routing table structure

Figure 2
Prior Art

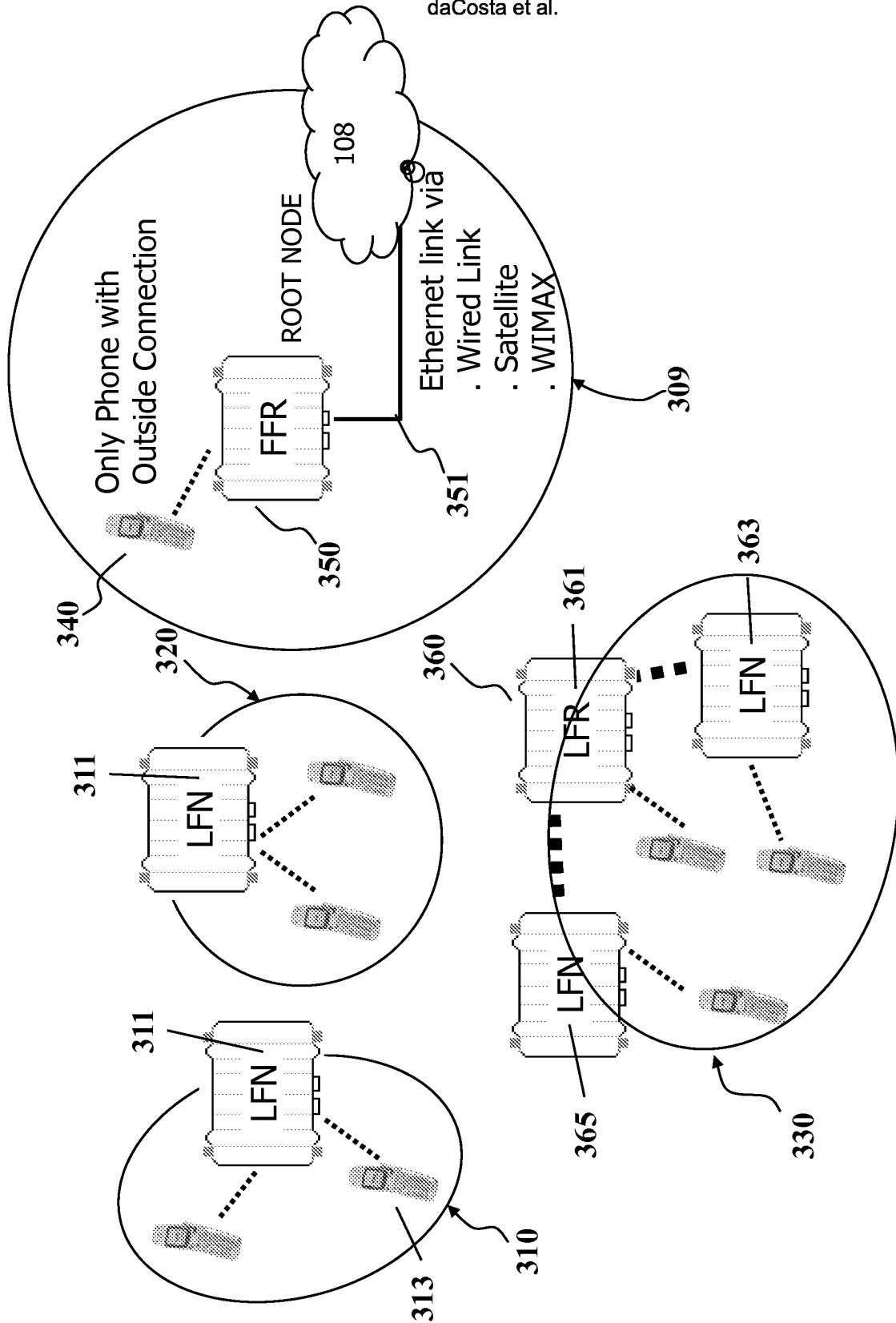


Figure 3

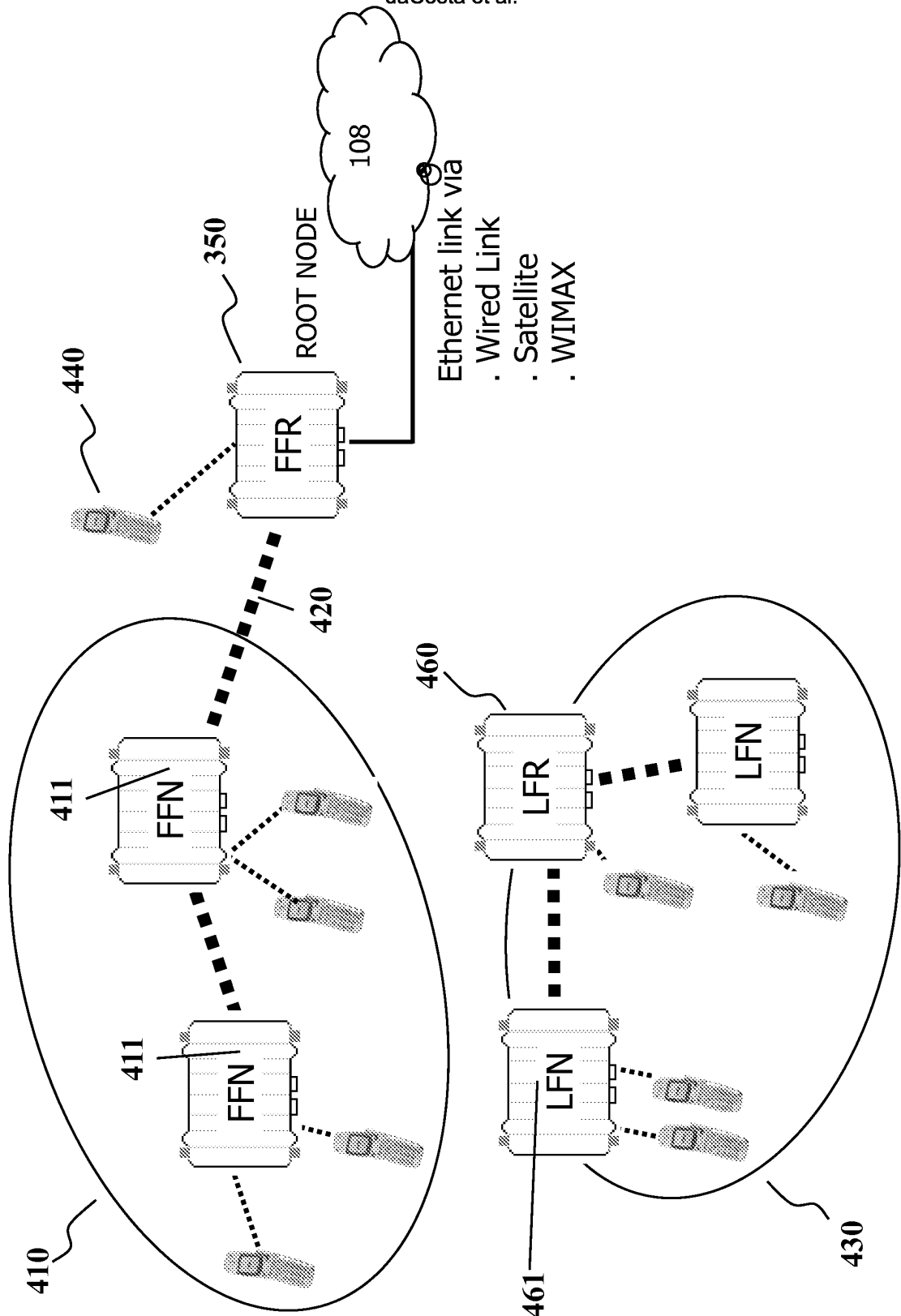


Figure 4

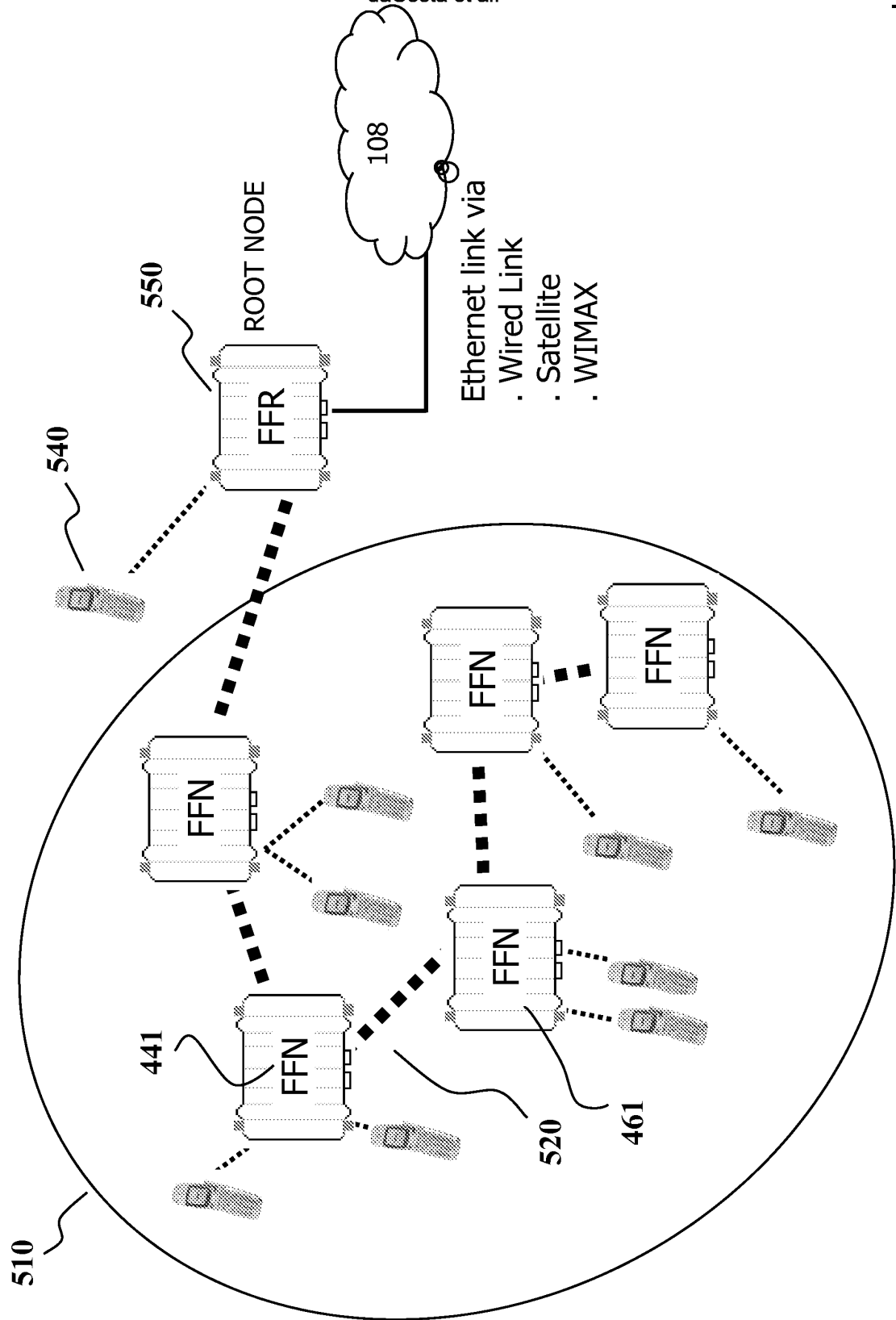
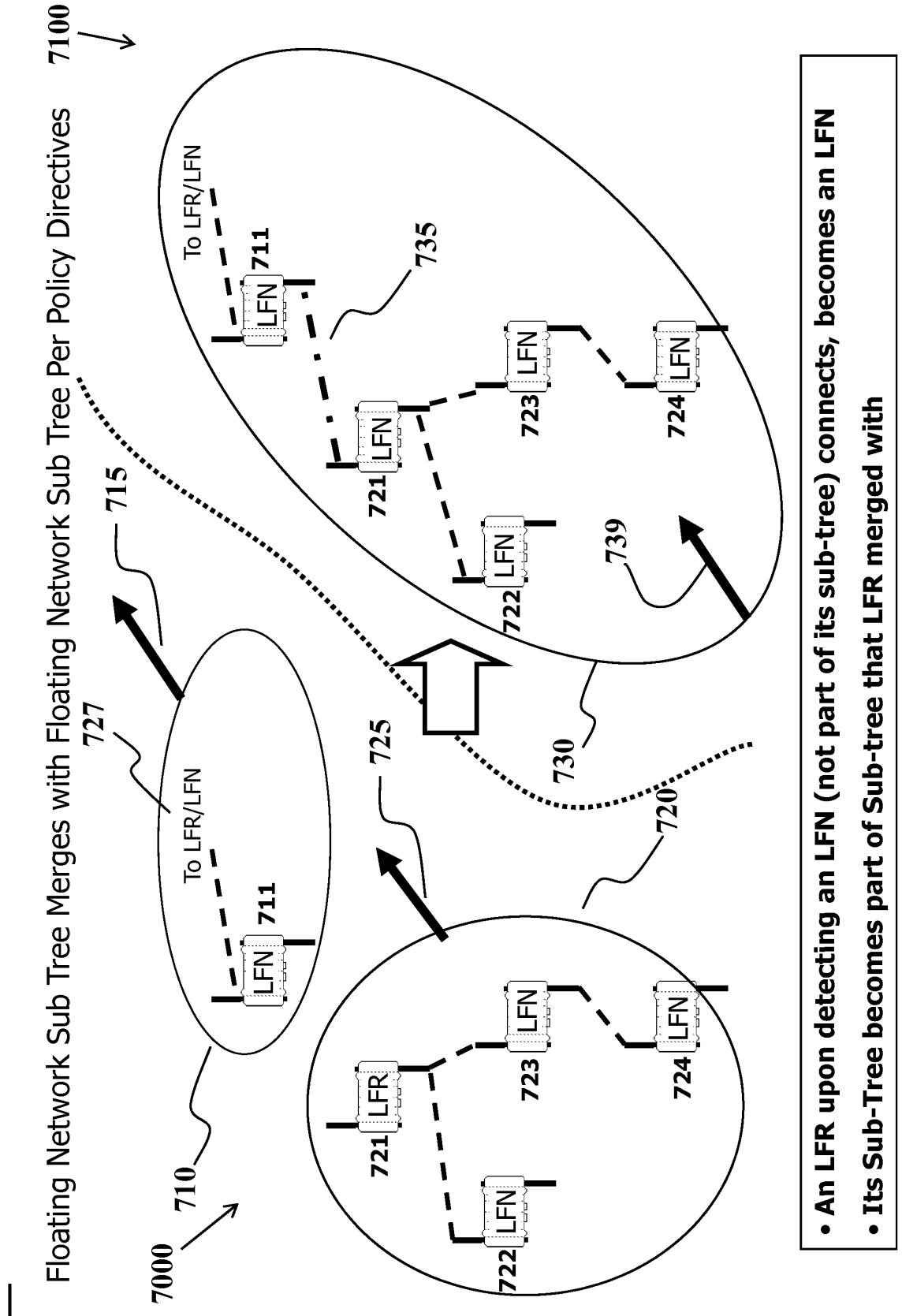


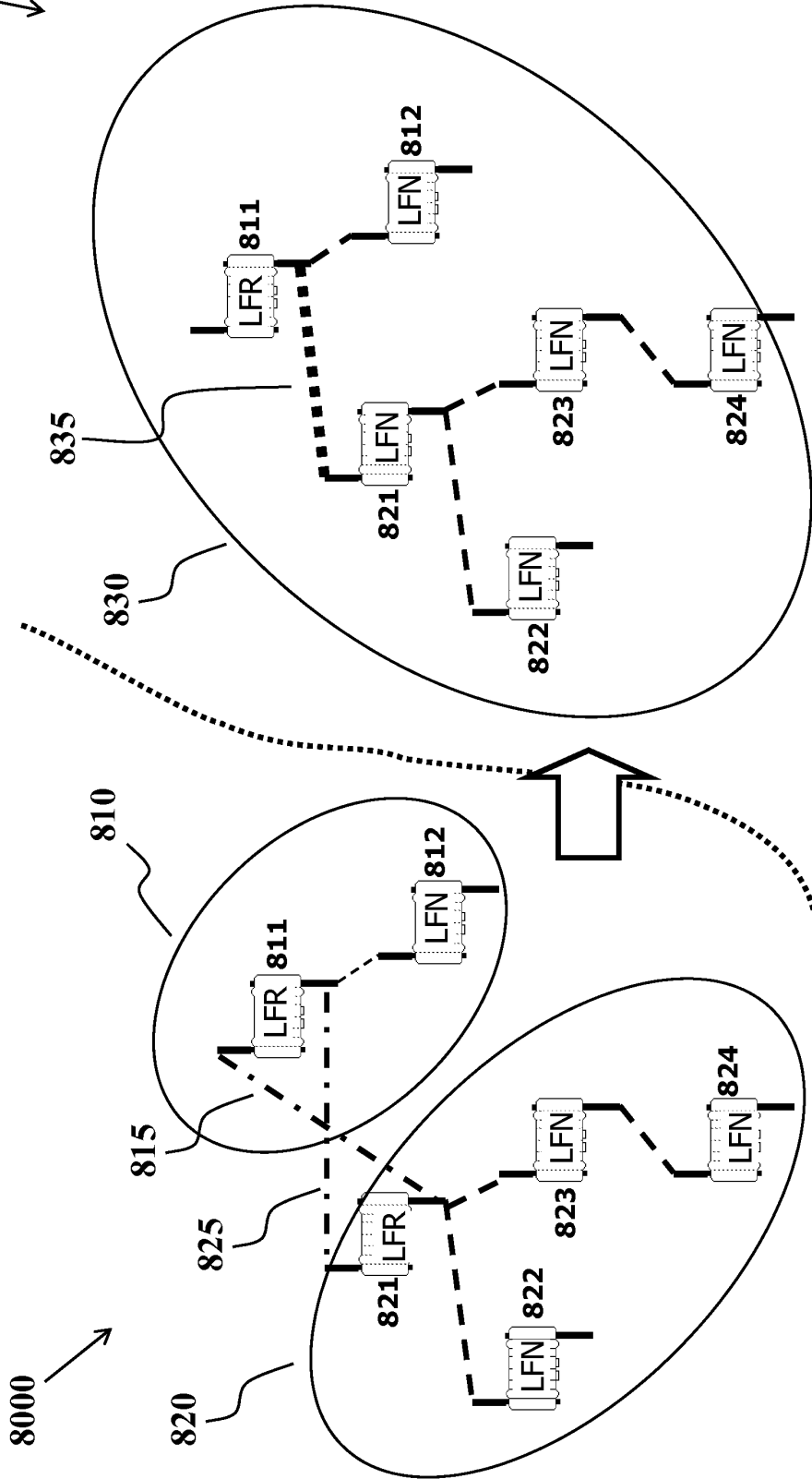
Figure 5



Figure 6



Floating Network Sub Tree Merges with Floating Network Sub Tree Per Policy Directives 8100



- When two LFRs see each other, one becomes LFN and joins the other
- A Tie Breaker Function (TBF) decides which one becomes an LFN

Figure 8

DISTRIBUTED DHCP SERVICE WITH INHERENT CONFLICT RESOLUTION

ASSUME A FIXED SUBNET MASK OF *255.0.0.0* IS USED

- IP ADDRESSES OF THE FORM *A.x.y.k* where
- *A* defines the *CUSTOMER-NETWORK-ID* 16 bit (0 -255)
- *k* is *CLIENT BASED ID* 16 bit (0-255)
- *x, y* are each 16 bit : 2^{32} unique networks each with up to 255 clients possible

POLICY DIRECTIVE: SPLIT UP ADDRESS SPACE BETWEEN STATIC and MOBILE networks

- Assign 15 bits to distributed DHCP services for floating networks
- Let NODES CHOOSE A RANDOM 15-bit NUMBER '*R*' AT STARTUP and
 1. LET '*M*' BE THE DECIMAL EQUIVALENT OF THE 7-MSBs OF '*R*'
 2. LET '*N*' BE THE DECIMAL EQUIVALENT OF THE 8-LSBs OF '*R*'

THE DHCP ADDRESS SPACE OF THE NODE WOULD BE

A.255-M.N.0 to *A.255-M.N.254* where $0 \leq M \leq 127$ and $0 \leq N \leq 255$

Figure 9

UTILITY PATENT APPLICATION

PERSISTENT MESH FOR ISOLATED MOBILE AND
TEMPORAL NETWORKING

Francis DACOSTA
Sriram DAYANANDAN

PERSISTENT MESH FOR ISOLATED MOBILE AND TEMPORAL NETWORKING

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CROSS REFERENCE TO RELATED APPLICATIONS

[02] This application claims the benefit of claim priority of provisional filing serial number 61/148,809 filed on January 30, 2009, presently pending, and also as a continuation in part of the U.S. Utility Application No. 11/084,330 filed March 17, 2005, currently pending which in turn is a continuation-in-part of U.S. Utility Application No. 10/434,948, filed on May 8, 2003, patented as U.S. Patent Number 7,420,952 on September 2, 2008. Further, the instant application is a continuation in part of the U.S. Utility Application No. 12/352,457, filed on January 13, 2009, currently pending.

BACKGROUND OF THE INVENTION

1. Field of the Invention.

[03] The present invention relates to wireless mesh networks and in particular mesh networks used for mobile applications where continuity of operation is critical. In particular, the invention relates to clusters of mesh nodes that may become isolated from a wired or grounded network, but where communication remains possible within the isolated cluster, resolving issues pertaining to mesh topology, channel management and address management.

2. Background of the Invention.

[04] The instant invention relates to wireless networks comprising a set of wireless access points, commonly referred to as a mesh network.

[05] In mesh architectures, mesh nodes act as central structural elements providing means of connectivity to a broad range of client devices. In some embodiments of the invention, mesh nodes are wireless access points. Each client device communicates with an available mesh node or access point. The communication between client devices and access points may occur using any means.

[06] A “mesh” forms when a set of access points establishes communication with one another. The communication between the access points forms the strands of an ethereal mesh. Client devices sit in the spaces between the strands and establish communication with the access points which are found at the intersections of the mesh strands.

[07] While wireless mesh networks provide additional functionality not available using other network topologies, certain difficulties are created by wireless mesh networks described in the prior art.

[08] A serious problem for mesh networks is created by the wireless medium used for communication within the mesh. Radio is a shared medium where only one transmission may occur on each frequency at a time. The RF spectrum is divided into frequency ranges, or channels, to allow more concurrent transmissions. However, the channels cannot be made too small so as to interfere with one another. Consequently,

useable communication frequencies are generally divided into no more than a dozen channels, not all of which may be used concurrently.

[09] In simplest mesh networks, known as ad-hoc mesh networks, all communication occurs on a single frequency or channel. In such simple networks, each access point (or AP) comprises a single radio and antenna (forming a single node) which provides communication means with client devices and other nearby mesh nodes. The benefit inherent in this mesh is that the mesh coverage may be easily increased by introducing an additional wireless access point. The sole configuration step for a simple ad-hoc mesh is the selection of the communication channel. One drawback of ad-hoc mesh is that each access point and client device contends with other access points to use the single communication frequency. Another drawback is that each access point or node in a simple ad-hoc mesh carries the entire routing table for the mesh network as a whole, and must traverse the table each time a packet arrives in order to know how to process the packet. As a result of both of these characteristics, when the size of the mesh and the distance between access points increases, performance characteristics of the network decrease dramatically.

[10] As networks grow, each access point's basic service set (BSS) increases to the point where it can become unmanageable. The ability to subdivide the network into smaller groups is an approach to prevent scaling problems, and one approach to subdividing the network is to introduce two radios into each access point.

[11] In a prior art dual radio mesh, as is depicted in FIG. 1(A), access points include two radios: a relay radio 120 and a client-service radio 110. The relay radio 120 operates at a first frequency, or channel ChQ 130, to perform duplex (two-way) communication between the access points forming the mesh. Within this prior art mesh, all relay radios operate on the same channel, and each access point contains the routing table for the entire mesh network. Each access point in turn provides access to one or more clients using the client-service radio 110 operating on a second frequency. Essentially, these are one radio ad-hoc mesh nodes with a client-service radio added.

[12] This prior art system, while simple to implement, does not scale beyond a limited number of radios. Rather, throughput drops exponentially as the number of access points increases, especially in instances where downstream access points

attempt to connect to an exterior network 108. In essence, the access points in this conventional mesh form the wireless equivalent of a hub. Like hubs, single radio mesh backhauls do not scale as well as multi-radio backhauls in addressing high bandwidth requirements for mission critical mesh networks, especially when the single radio solution carries the entire routing table for the mesh in each node.

[13] In contrast with the hub-like operation of FIG. 1(A) is the wired network switch presented in FIG. 2. As shown in FIG 2, each network switch includes uplinks 210 and one or more downlinks 220 forming a tree-like structure. The traffic within each switch comprising this conventional wired switch stack operates within specified sub-domains. Therefore, the size of any one sub domain is limited and ensures that local traffic inside a sub domain, or between multiple sub domains does not slow down the entire network. This multi-domain switch architecture is more efficient than hub configurations in that it allows for scalable networking. Contributing to this scalability is the distributed routing table methodology that is typically implemented in a conventional wired network switch. However, drawbacks exist. Namely, the prior-art switch architecture has been implemented using physical wireline connections between discrete switches and not a flexible mesh architecture employing wireless connections.

[14] The present invention is designed to overcome the challenges inherent in the prior art solutions. In one embodiment, the instant invention is based on a two-radio mesh network, where each mesh node includes one radio for the uplink backhaul and another servicing clients and providing the downlink backhaul to other nodes (descendent nodes) of the network. Mesh nodes implemented with such a multi-radio backhaul form a hierarchical tree-like network topology called a "Structured Mesh", when they connect to each other, and as described in the referenced applications 11/084,330, 10/434,948, and 12/352,457, operate in a manner similar to a wired switch stack where the routing table is distributed, thus aiding network scalability. A distributed routing table is constructed such that each node only contains information related to its descendant nodes and its parent node, but no other nodes in the network hierarchy tree above its parent. This way, the processing load for each node to process a packet is reduced. Although the highest performance for a "Structured Mesh" network occurs when separate radios are utilized for uplink and downlink connections, performance

may also be enhanced when only a single relay radio is used as long as a distributed routing table methodology is utilized thus simplifying the routing computational task and thereby increasing the performance of the processor within the mesh node. For mission critical mesh applications such as military or first responder, it is also advantageous to include both single and multi-radio nodes whereby they can all communicate with a consistent routing protocol.

[15] In some embodiments of the invention, the root of the hierarchical tree structure includes an external network connection to a server, to a WAN (Wide Area Network), to the Internet, or to any combination of these options. When a group of nodes implemented as such become separated or isolated such that the sub-network does not include a root connection as described above, challenges exist in maintaining a the required tree-like structure.

[16] Unlike prior art mesh networks, a need exists in the art for a system capable of maintaining communication within a cluster during physical realignment of cluster components, as occurs during movement of wireless nodes in a mobile mesh network implemented as a tree-like structured mesh network.

SUMMARY OF INVENTION

[17] An object of the invention is to provide a mesh network which overcomes many of the disadvantages of the prior art.

[18] Another object of the invention is to provide a mesh network which retains structural integrity during all phases of usage, repair, or upgrading. A feature of the invention is that the logical relationship between network wireless access points or nodes is reconfigured by the nodes following changes to the physical environment of the network. An advantage of the invention is that it maintains the benefits of its structured approach even following additions, subtractions, or readjustment of network components, and regardless of whether mesh nodes contain one or multiple relay radios.

[19] Yet another object of the invention is to maintain a structure to a mesh network such that separate data domains are maintained throughout the mesh network. A feature of the instant invention is that the structure of the mesh creates separate data

domains within a larger network mesh. An advantage of the instant invention is that traffic within one or more domains does not impact non-involved domains.

[20] Another object of the invention is to maintain connectivity with a mesh network, when connections to external networks are compromised. A feature of the invention is that network connectivity within a sub-part of the mesh network is maintained during the time the sub-part of the mesh network is not connected to an external network. An advantage of the invention is that it maintains a structure to support connectivity within the sub-part of the mesh even when the sub-part moves away from an external network link.

[21] Another object of the invention is to facilitate re-connection to an external network subsequent to loss of an external network connection. A feature of the instant invention is that a sub-part of a mesh network which loses a connection to an external network may be configured to continuously scan for an available external network link. An advantage of the instant invention is that any part of the network separated from an external link, if directed to, will attempt to reconnect to the external link as soon as possible and therefore limit the amount of time a subpart lacks external network connectivity.

[22] An object of the instant invention is to support orderly changes of configuration in a mesh network. A feature of the invention is that one or more components of the invention may be mobile. An advantage of the instant invention is that the underlying logical structure is updated to reflect physical changes in an orderly manner so as to maximize connectivity within each network subcomponent.

[23] Yet another object of the invention is to facilitate joining of previously disparate structured mesh networks. A feature of the invention is that the logical structure of the network facilitates the joining of two previously distinct sub-networks. An advantage of the instant invention is that the mesh network can resume its structure upon the joining of two or more networks to form a larger structured mesh network.

[24] Still another object of the invention is to facilitate orderly loss of a mesh participant. A feature of the invention is that the structure of the mesh is realigned following the loss or departure of one or more access points previously participating in the mesh. An advantage of the instant invention is that the mesh network structure can

accommodate the withdrawal of one or more of the participating nodes with minimal disruption to the remaining network.

[25] An object of the invention is to provide continuous access to network services upon the separation of one or more nodes from a larger network. A feature of the instant invention is that network services, such as address allocation pursuant to DHCP, which in the usual network are provided by a single central location, continue to be delivered to clients within a mobile subpart of the larger network. An advantage of the instant invention is that clients that move out of a larger network continue to have access to services, such as DHCP, during the time the sub-part of the network is separated from the larger network.

[26] In one embodiment, the invention consists of at least two structured mesh nodes; wherein each structured mesh node comprises at least a connectivity logic; an uplink radio operating on an uplink frequency and a downlink radio operating on a downlink frequency; wherein the connectivity logic determines whether each structured mesh node connects with an external network or another node using its uplink radio and client devices or other mesh nodes connect to each node using each node's downlink radio; wherein the structured mesh network functions in two configurations selected depending on whether a connection to an external network is present; in the first connected configuration the structured mesh network includes at least one structured mesh node's uplink radio comprises a connection to an external network; and in the second isolated configuration none of the structured mesh nodes' uplink radio comprises a connection to an external network, and one of the structured mesh nodes acts as an isolated network root of the isolated configuration and all remaining nodes' connect to the isolated network root node as isolated root children nodes forming a tree-like configuration.

[27] In another embodiment, the invention consists of at least two structured mesh nodes; wherein each of said at least two structured mesh nodes comprises at least a connectivity logic and a single relay radio; wherein the connectivity logic determines how each structured mesh node connects with an external network or another node; wherein the structured mesh network functions in two configurations selected depending on whether a connection to an external network is present; in the

first connected configuration the structured mesh network includes a connection to an external network; and in the second isolated configuration none of the structured mesh nodes comprises a connection to an external network, and one of the structured mesh nodes acts as an isolated network root of the isolated configuration and all remaining nodes' connect to the isolated network root node as isolated root children and descendant nodes forming a tree-like configuration.

BRIEF DESCRIPTION OF DRAWING

[28] The invention together with the above and other objects and advantages will be best understood from the following detailed description of the preferred embodiment of the invention shown in the accompanying drawings, wherein:

[29] FIG. 1(a) depicts a prior art mesh network;

[30] FIG. 1(b) depicts a mesh network featuring a dual-radio backhaul or relay pursuant to the instant invention;

[31] FIG. 2 depicts a prior-art wired stack of network switches;

[32] FIG. 3 depicts an embodiment of the instant invention comprising three sub-networks featuring the mesh structure of the instant invention;

[33] FIG. 4 depicts an embodiment of the instant invention comprising two sub-networks featuring the mesh structure of the instant invention;

[34] FIG. 5 depicts an embodiment of the instant invention comprising one overall network featuring the mesh structure of the instant invention;

[35] FIG. 6 depicts two configurations of an embodiment of the instant invention;

[36] FIG. 7 depicts two configurations of an embodiment of the instant invention;

[37] FIG. 8 depicts two configurations of an embodiment of the instant invention; and

[38] FIG. 9 shows a summary of the operation of a distributed DHCP service pursuant to the instant invention.

DETAILED DESCRIPTION OF THE INVENTION

[39] The foregoing summary, as well as the following detailed description of certain embodiments of the present invention, will be better understood when read in conjunction with the appended drawings.

[40] In some embodiments of the instant invention, the inter-access point communication occurs using agreed-upon wireless communication protocols, but a mesh may employ any communications means, wired or wireless. Further, one or more of the access points may be connected to an external network whereby client devices in communication with the mesh are capable of accessing the same external network.

[41] Depicted in FIG. 1(B) and in FIG. 2 are two examples of mesh networks featuring links to an external network. Turning first to FIG. 1(B), depicted there are three nodes 145, 155, 165, wherein each node comprises an uplink connection and a downlink connection. Each node is considered an access point or “AP,” and each node is physically identical, in one embodiment. For example, the top-most or root node 145 includes an uplink connection 144 and a downlink 133.

[42] The root node 145 comprises an uplink 144 to an external network 108. A downlink wireless connection 135 on the root node 145, connects the root node 145 to its immediate child node 155. Inasmuch as the root node 145 includes a connection to both its child node 155 and the remaining descendant nodes in the mesh (nodes 155 and 165). Combined with a connection to the external network 108, the root node 145 is considered a full functionality root (or FFR) node. (If the root node 145 did not include a connection to the external network 108, it would be considered a limited functionality root (or LFR) node.)

[43] The downlink wireless connections 135 on the three nodes depicted in FIG. 1(b) employ distinct frequencies for transmission or transmission channels. The downlink on the root node 145 employs channel “ChX.” In turn, the uplink on the first child node 155 employs “ChX” to communicate with the root node 145. In turn, the first child node 155 uses a different frequency or channel “ChY” to communicate with its immediate child node 165. The child node 165 uses the same ChY channel on its uplink so as to be able to communicate with its parent node 155. Finally, the child node 165 uses a third channel “ChZ” to communicate with any one or more nodes downstream (not pictured). In one embodiment of the present invention each of AP

145, 155, and 165 may employ separate radios for uplink and downlink connections. In another embodiment, a single radio may be employed in these APs. When a single radio is employed, it may utilize separate frequencies for uplink and downlink connections such as channels X, Y, and Z shown in Figure 1B. Alternately, a single radio implementation may utilize the same frequency for uplink and downlink, essentially making channels X, Y, and Z all the same. A single channel implementation creates more co-channel interference in the mesh than a multi-channel implementation, but has some simplifications of operation that may be advantageous in some circumstances. Regardless of whether single or multiple relay radios are used, or how many RF channels are utilized for communication within the mesh, according to the present invention the connection topology will always be formed in a tree-like structure and each mesh AP or node will contain routing table data and connectivity logic consistent with a distributed routing table structure and a tree-like connectivity structure.

[44] Each node connects with one or more client devices 156 wherein the client devices use the downlink channel on each node to communicate with the node. Therefore, for the specific implementation shown in figure 1B, the client 156 of node 155 communicates with node 155 using ChY. The client of node 165 communicates with node 165 employing ChZ.

[45] Inasmuch as the child nodes 155 and 165 are able to communicate with the external network through the root node 145, these nodes are considered full functionality nodes (or FFN). Conversely, if the link 144 to the external network 108 was unavailable the child nodes would be considered limited functionality nodes (or LFN).

[46] The benefit of the design of FIG 1(b) stems from the structural division of communications between distinct devices. For example, a client 156 of a node 165 will not interfere with a client 156 of a different node, such as node 155. Inasmuch as channels ChX, ChY, and ChZ are selected so as to limit interference between these nearby frequencies, the wireless system divides clients of different nodes into different domains. This is the benefit of the instant invention whose system acts as much as the wired switch stack depicted in FIG. 2.

[47] The structured approach of the instant invention may be implemented using any number of strategies. In the case of *fixed-point* wireless access points, the network channel assignments may be managed manually so as to create the separation of network domains discussed herein. However, an entirely different approach is required when dealing with mobile access points. In these instances, the mesh network must be capable of both maintaining the structure described above as well as accommodating movement of constituent access points and client devices.

[48] Wireless mesh networks must be able to maintain the overall structure while accommodating change over time. The movement of a node, or set of nodes, may result in status changes for the moved nodes. For instance, when a node is communicating with an external network, its status is that of a full functionality node, or a full functionality root node. However, this node may move away from the external network link, losing communications with same. The invention enables the remaining neighboring structured nodes to realign and compensate for the loss of the node. The transient node is reconfigured to reflect its new status and a new position.

[49] The instant invention is a mesh network undergoing configuration changes. The mesh network starts in a first configuration and then enters a second configuration upon the occurrence of one or more events. A series of changes to the network may define overlapping sets of changing configurations. For example, if in an established mesh network, one node moves away from the network, and then returns to the mesh, the network has gone through a plurality of status changes.

[50] As depicted in FIG. 1(B), the mesh network contains a link 144 to the external network 108. Such a network is considered "grounded" in that the network includes external access. The external network link 144 need not be a physical grounding, and may be accomplished through a wireless connection. Inasmuch as all the nodes 145, 155, 165, in FIG. 1(b) include a connection to the external network 108 these nodes are all considered grounded. In other words, while nodes 155 and 165 are embedded within the network such that the node 145 is intermediate the nodes 155 and 165 and the external network, nonetheless, all nodes are grounded to the network 108 simultaneously. If another node (not pictured) was not in communication with the external network 108 it would be considered a floating node or an isolated node.

[51] Turning now to FIG. 3, depicted therein is an array of several access points having different connectivity status and therefore different roles. For example, one node 350 is connected to an external network 108 using a link 351. The link may employ any one of several network connectivity methods, including a wired Ethernet link, a satellite link, or a radio-based wireless link such as wifi or wimax. Inasmuch as node 350 is directly connected to the external link it is considered a full functionality node. Further, inasmuch as it is not connected to another node on its uplink, the node 350 is a root node. Combining the two node statuses, node 350 is a full functionality root node or FFR. On the downlink side of the FFR node 350, one client device 340, shown as a phone, is communicating with the FFR node 350. Given the client device 340 association with a FFR node 350, this client device 340 is able to communicate with the external network 108.

[52] FIG. 3 also depicts three other networks 310, 320, and 330. These remaining networks do not have a connection to the external network 108 and therefore are considered to be floating networks or isolated networks. Networks 310 and 320 consist of single nodes 311 not associated with other nodes. Inasmuch as nodes comprising networks 310, 320, and 330 lack a connection to the external network 108, these nodes are considered limited functionality nodes. Clients of the limited functionality nodes, such as the client device 313 of the limited functionality node 311, do not have access to the external network 108.

[53] Nodes comprising floating networks may form sub-networks between proximate nodes. In sub-network 330, one node 361 acts as a root node and is associated with two client nodes 363 and 365. The three nodes 361, 363, and 365, are able to communicate with one another. Therefore, the clients 364 associated with these three nodes are able to communicate with one another despite the lack of a connection to an external network 108 and the services available on the external network.

[54] As shown in FIG. 3 both the grounded network 309 and the floating or isolated networks 310, 320, 330 share a common tree-like structure in that both types of networks encompass nodes with at least one node being a root node for all networks having more than one node. The roles and labels applied to each type of node are important to the functioning of an embodiment of the invention described below.

[55] Inasmuch as the mesh nodes described by the instant invention comprise mobile nodes, one of the possible status changes is the establishment of communication between an isolated node, which would be a limited functionality node, with a grounded full functionality node.

Joining of Isolated Nodes to Grounded Nodes

[56] As shown in FIG. 3, isolated nodes 311 lack a connection to the external network 108. Full network functionality is achieved through connection to the external network 108. In some embodiments of the invention, limited functionality nodes, such as nodes 311 will continuously scan to evaluate whether a connection to a full functionality node, such as node 350, is available. In other embodiments, the nodes do not focus on connection to a full-functionality node, inasmuch as the connection logic within the nodes 311 is programmed to follow a different set of policies. For example, limited functionality nodes may scan in an attempt to connect with other limited functionality nodes and/or full functionality nodes. In sub-networks comprising more than one node, such as sub network 330, the connection logic of each node is set to search for connections to other nodes thereby increasing the area where a connection may be found.

[57] Pursuant to a searching directive, networks 310 and 320 coalesce by establishing a link between their two limited functionality nodes 311. Further, the expanded network, may in turn establish a connection with the full functionality node 350. This expanded network is depicted in FIG. 4.

[58] Turning now to FIG. 4, the grounded network, previously consisting of only one node 350 currently includes the full function root 350 as well as the sub-network 410 comprising nodes 411. The nodes 411 are considered full function nodes 411 inasmuch as these nodes, and the nodes' respective clients, are now connected to the external network 108. The external network is accessible through the connection 420 between one of the full function nodes 411 and the full function root node 350. The clients of the full function nodes 411 may continue to communicate within the sub-network 410 or exchange information with the external network 108 using the connection 420 to the full function root node 350 which in turn is connected to the external network 108.

[59] Also depicted in FIG. 4 is a second isolated network 430. This second isolated network 430 is unable to establish communication with any full function nodes. Therefore, the clients associated with nodes participating in the sub-network 430 are only able to communicate within the sub-network 430. However, this embodiment of the instant invention provides a means for dividing network traffic into sub-domains given that communications between the clients of the sub-network occur independently of the status of the full function nodes.

[60] In one embodiment, the limited functionality nodes of the sub-network 430 continuously scan in an attempt to establish connectivity between the limited functionality nodes and a full functionality node. For example, node 461 continues to scan for any full-functionality nodes nearby using its uplink and downlink radios.

[61] Turning now to FIG. 5, depicted there is a change of configuration of the system wherein the node 461 establishes a communication link 520 with a full-functionality node 411. Upon the establishment of the link 520, the node 461 becomes a full functionality node inasmuch as the node is now able to communicate with an external network 108. All nodes in the newly established network 510 have become full function nodes inasmuch as every node in the network 510 is connected to the external network 108 through the full function root node 550.

[62] The network transformations depicted in FIGS. 3 to 5 are driven by policy directives within each network node. A network node comprises connectivity logic which allows the node to react to similar environmental circumstances in different ways depending on the policy directives set as part of the initialization process of the connectivity logic. For instance, in FIG. 4, one of the nodes 411 established a link 420 to the full functionality root 350 inasmuch as the connectivity logic on the node 411 instructed the node to search for opportunities to connect to full functionality nodes. The initialization procedure is discussed below.

Initialization of Nodes

[63] In one embodiment of the invented system, the directives for each node are set using a policy server during a node initialization step. As part of the node initialization, the policy server directs the node to take on one or a plurality of roles. For example, the node may be instructed to continuously look for a full functionality node

(either a root or another node). Conversely, the node may be instructed to follow a radio silence policy where it specifically avoids contact with other nodes. For purposes of illustration, the embodiments described herein generally seek out other networks to increase network coverage by establishing connections between limited functionality and full functionality nodes. In light of the type of mission to be served by the mesh being initialized, the policy directive may involve any one of several alternative instructions.

[64] The invention provides several methods of joining sub-networks, wherein the sub-networks are either grounded (connected to an external network) or floating (isolated from an external network). FIGS. 6 to 8 describe algorithms for connecting various types of networks.

Joining of Sub-Networks

[65] Turning now to FIG. 6, described therein are three sub-networks 610, 620, and 630. Sub-network 610 comprises a root node 611 and three child nodes 612, 613, and 614 connected to the root node 611. At a first time interval 6000 shown in FIG. 6, node 613 is establishing a link 625 with a node 621 of another sub network 620. At time interval 6000, the nodes of sub-network 610 are limited functionality nodes inasmuch as the nodes contain connections to each other, but not an external network (not shown). The second sub-network 620, however, includes a full functionality node 621 which is in communication with a full function node or the full function root (not shown).

[66] A second time Interval 6100 shown in FIG. 6 occurs following the establishment of the link 625. The node 613 has successfully established a stable link 626 with the node 621. The resulting network 630 now features full functionality nodes inasmuch as each node includes a connection to the full functionality root (not shown) through the full functionality node 621. Node 611 functioned as a limited functionality root at the first time interval 6000 inasmuch as nodes 612 and 613 were in communication with it. However, at the second time interval 6100, node 611 lost its status as a root given that its traffic now reaches the destination through another node 613. The loss of the root node role by node 611 was caused by the fact that one of its child nodes 613 detected the full function node 621.

[67] While channel management policies (described below) ensure that the joining of the networks 610 and 620 is possible, it may be preferred to allow only the

limited functionality root node 611 to initiate the connection with the full function node 621. If the limited function root node 611 initiates the connection 626, the structure of the sub network 610 need not change logical structure. While the limited functionality root node 611 would cease to operate as a root node 611 upon connection with the full functionality node 621, no structural changes are necessary to the sub-network 610.

[68] Consequently, in some embodiments of the invention, one of the policy directives set during the initialization of the nodes is to limit scanning for full function nodes to solely the roots of each floating or isolated network.

[69] FIGS. 7 and 8 demonstrate embodiments of the invention wherein joining of networks requires the resolution of several conflicts prior to the joining of several sub-networks.

[70] Turning first to FIG. 7, depicted there at a time interval 7000 are two sub-networks 710 and 720. Sub-network 715 is traveling in the Northeast direction 715. Sub-network 720 is also traveling in the Northeast direction 725. Node 721 of sub-network 720 is a limited functionality root. Node 711 of sub-network 710 is a limited functionality node which connects through its uplink to another limited functionality root (not shown) upstream 727 from node 711.

[71] If the policy directive instilled in the node 721 is to join with any new nodes detected, even if the new node is a limited functionality one, then node 721 would have to give up its status as a root node upon connecting to the detected node. In the embodiment shown in FIG. 7, at time interval 7100, node 721 establishes a link 735 with the node 711. Inasmuch as the node 721 is now connected with another node 711, the node 721 ceases to be a root node.

[72] In the embodiment shown in FIG. 7, the nodes comprising the two sub-networks 710 and 720 are aware of the direction of travel of the two nodes. Inasmuch as node 721 realizes that node 711 is ahead of node 721, node 721 considers itself to be "downstream" in the direction of travel from node 711. Consequently, in connecting with node 711, node 721 relinquished its status as a root node and instead became a standard limited function node. The resulting network 730 shown at time interval 7100 continues to travel in the same Northeastern direction 739 with a single limited functionality root node (not shown).

[73] As is shown in FIG. 7, in some embodiments of the invention, the nodes comprising the mesh network or sub-networks contain movement-detection means. In one embodiment, the movement detection means comprises a GPS sensor, however, other methods, such as radio signal triangulation of cellular telephone signals may be used. The nodes comprising the mesh network shown in FIG. 7 exchange with each other each node's current position as well as each node's direction of travel so as to be able to determine which node is downstream of which node.

[74] Turning now to FIG. 8, depicted therein are two time intervals 8000 and 8100. At time interval 8000, two sub-networks 810 and 820 are separated from one another. Sub-network 820 comprises four nodes 821, 822, 823, 824 with one node 821 being the root. Conversely, sub-network 810 comprises two nodes 811 and 812 wherein node 811 is the root. Inasmuch as neither sub-network includes a connection to an external network (not shown), both networks are floating networks and all nodes comprising the networks are limited functionality nodes.

[75] At point 8000, root node 821 detects root node 811 by a running a scan 825. Simultaneously, root node 811 detects root node 821 by operating a scan 815. Before the two sub networks may join together, one of the nodes must relinquish its role as a root node. In FIG. 7, the decision as to which node will become the root node was determined by the direction of travel of each sub network. In the embodiment shown in FIG. 8, the sub networks are not aware of their respective directions of travel. Therefore, the choice of a new root node must be made using a conflict resolution policy.

[76] Several alternative policies may be implemented to determine which node should relinquish its role. For example, the root node of the larger network (node 821) could be allowed to remain the root node pursuant to one policy. In another tie-breaker policy directive, a root node is chosen randomly. Depending on the embodiment of the invention involved in the conflict, it may be decided that the root node closest to the external network maintains its status. This "geographic proximity" policy requires nodes to contain means of detecting geographic position as well as being provided the last known position of a full function node (i.e. a node with a connection to an external

network). Another tie-breaker policy may factor which node is farther downstream, as was the case in FIG. 7.

[77] Other reasons to select a root node relate to the data traffic found on both sub-networks. In one traffic-based method, the root node traversed by more traffic is allowed to keep its status. Alternate traffic-based analysis methods compare the properties of the several possible resulting networks. For example, in one method, a root node is chosen such that the resulting network's traffic must traverse the fewest number of nodes in order to reach its destination. Minimizing the number of access points that must be traversed for traffic to reach destinations results in improved performance of the network. In terms of performance, the root may also be chosen such that the resulting network features maximum bandwidth or minimum delay of traffic due to signal loss (jitter). Another approach seeks to minimize the latency of the resulting network.

[78] Any one of the above policies is employed to achieve the performance goals of a given mesh network implementation.

[79] In FIG. 8, the policies of the root nodes 821 and 811 resulted in the selection of node 811 as the root node. Therefore a new connection 835 was established at time interval 8100 and the node 821 ceased to be a root node but instead became a standard node. Node 811 remained the root node and at time interval 8100 became the root node of a new combined network 830.

Provision of Network Services

[80] Network devices generally rely on one or more services provided by one or more servers connected to the network used by the network devices. For example, in order for network client devices to communicate with each other and with the nodes, each client device and each node must be assigned an identifier, such as an IP address. While it is possible to manually assign IP addresses to devices, this manual apportionment of addresses creates significant overhead in that each device must be tracked and its IP address assignment recorded so as to ensure that no two devices are assigned the same IP address.

[81] In order to avoid manual assignments of addresses, wired networks employ network-wide services such as a Dynamic Host Configuration Protocol server,

(hereinafter “DHCP”) to assign IP addresses to clients. In an embodiment of the invention, only one DHCP server exists in a network to ensure that no IP conflicts are created. While wired networks may employ a single DHCP server, isolated networks have no access to this single server. Therefore each isolated network node servicing clients according to the instant invention will include its own DHCP server.

[82] When previously-isolated sub-networks establish network connectivity for the first time, there is a possibility of IP address conflicts between the client devices, especially if the nodes rely on a conventional DHCP server. An enhanced DHCP server is discussed *infra*. A conventional DHCP server may have previously assigned addresses to clients in either cluster, and inadvertently assigned redundant addresses. To avoid this problem, a means for assigning IP address is disclosed *infra* for the distributed DHCP server capability in network nodes according to this invention.

[83] While an IP address conflict may be resolved through arbitration, prevention of address conflicts is preferable. An approach to reducing the probability of a conflict to less than 1 in 2^{15} is described. Note that the same approach may be used to reduce the probability even further to 1 in 2^{32} or lower. Further, the approach is applicable to any device network identification scheme, such as IPv4 or IPv6.

[84] The reduction in the probability of a conflict is accomplished by splitting up or otherwise separating the IP domains in an autonomous and randomized manner such that each mesh node has a range of IP addresses that it can freely assign to clients with de minimis risk of IP conflicts occurring. Each mesh node randomly selects a DHCP range to assign client addresses. As part of the process of discovering and connecting with new network nodes, this DHCP range is broadcast in a special information packet to other nodes when the node is scanning to join other nodes. If there is a conflict in the range, it is resolved by one node selecting a new DHCP address range, a random number range set is selected and tie breaker functions are employed all before the nodes become part of the same network. This pre-emptive measure is a means to ensure minimal disruption of client services.

[85] IPv4 addresses assigned by DHCP servers take the form A.X.Y.K. wherein each number is an integer from 0 to 255. Let A arbitrarily be set based on a customer identifier for the mesh network layout. K is chosen as an identifier for a client

attached to the network node. Therefore, each client of a single node will share the same first three digits of an IP address, with the last digit “K” being incremented for each client device connected to a single node.

[86] With A and K selected, X and Y combinations provide a total of 2^{16} integers or 232 possibilities. This amounts to over 65,336 network nodes coexisting in the same place each with up to 255 clients each with no inherent IP conflicts.

[87] Let us assume that a 15 bit random number generator is used to generate the values for X and Y at each isolated network node. Sections of the random number may be used to set the values for X and Y for the DHCP server at each node. Let M and N be the decimal equivalent of the 7 MSB and 8 LSB of the 15 bit random number. The DHCP address space is then:

$A.[255-M].N.0$ to $A.[255-M].N.254$ where $0 \leq M \leq 127$ and $0 \leq N \leq 255$

[88] This allows for a network of up to 32768 network nodes with distributed DHCP capability - each of them having up to 255 clients each.

[89] The improved DHCP server is summarized in FIG. 9.

Channel Management

[90] As shown in FIG. 1(b), the mesh nodes follow the switch-stack approach of FIG. 2 inasmuch as FIG. 1(b) nodes utilize a separate uplink and downlink communications means. In case of wireless nodes, each uplink and downlink communication means comprises a wireless radio wherein the frequency or channel of each respective radio is distinct and therefore non-conflicting. Every backhaul radio is on a different, non-interfering channel creating independent subnets which split the larger mesh into successive sub-domains.

[91] The downlink and uplink frequency selections create relationships between nodes. For example, in FIG. 6, at time interval 6000, node 611 is the root node with nodes 612 and 613 being its immediate children. Inasmuch as node 611 is a wireless node it uses two frequencies, an uplink frequency and a downlink frequency. The uplink frequency on node 611 is not being used for communication inasmuch as node 611, being a root, is not connected to another node above it. However, the

separate downlink frequency is being used to communicate with both children nodes 612 and 613. Node 613 is shown extending a scan 625 searching for another node, via the uplink of node 613.

[92] The joining of two previously separated networks, as is shown in FIG. 6, 7, and 8, may create channel conflicts within the resulting network inasmuch as previous child-root relationships may be disrupted. An example of a disrupted relationship is shown in FIG. 6 at time interval 6100 wherein the node 611 became a child node of node 613 while at the prior time interval 6000 the node 611 had been a parent of node 613.

[93] In order to facilitate the transition between node statuses, the instant invention applies a series of policies which are introduced into each node during the mesh initialization step described above. In other embodiments, the merging conflict resolution policies are updated regularly during mesh deployment. Regardless of the way in which the policies are introduced, the policies must be able to accommodate any number of possible network join events. FIG. 6-8 demonstrated only a few possible join scenarios. Consequently, the conflict resolutions must not be exceedingly strict.

[94] In some embodiments, one of the goals of the conflict resolution policies is to decrease the number of channel changes necessary upon joining of networks. For example, in FIG. 7, node 721 uses its otherwise unoccupied uplink to detect node 711 at time interval 7000. In establishing a connection 735 between the uplink of node 721 and the downlink of node 711, the uplink node 721 changed the node 721 uplink channel to match the downlink channel of node 711. This channel switch was the only change of channel necessary to bring the two networks together. At time 7100, the uplink channel of node 721 was non-conflicting with the downlink channel of node 721. In one embodiment, one of the policies of joining stored in the nodes is to accept a partial channel conflict upon joining so as to minimize cascading channel changes.

[95] The more common circumstance is that a node other than a root is the one that establishes a new connection. In such instances, more than one channel change may be required. The invented system therefore comprises several methods of changing channels.

The Least Ripple Match

[96] One approach to changing channels is minimizing the number of channel changes within the mesh needed to maintain separation. For example, in FIG. 6, the establishment of a network link 626 between node 613 and 621 forces node 613 to adopt as node 613 uplink frequency the downlink frequency of node 621. If node 613 has to change its uplink frequency, then the connection to node 611 would be terminated, unless node 611 also changes its downlink frequency accordingly. However, changing the downlink frequency of node 611 would force a change of frequencies by node 612. Consequently, changing the frequency by node 613 results in at least three changes of frequencies. This number of frequency changes is unfavorable inasmuch as any client devices in communication with nodes 611, 612, and 613 would also have to change communication frequencies and may temporarily lose a connection.

[97] The alternative scenario at time interval 6000 is for node 613 to maintain its uplink frequency and for node 621 to change its downlink frequency. If node 621 changes its downlink frequency to match the uplink frequency of node 613, then at time 6100 the link 626 may be established. However, the link was established with only a single frequency change – the change of the node 621 downlink frequency to match that of the node 613 uplink.

[98] The second scenario described above results in the fewest changes and consequently would be the one adopted by the system in one embodiment wherein joining of networks is to occur with the fewest changes. The nodes comprising the mesh are able to keep track of the frequencies of nodes participating in the mesh so as to be able to calculate the number of changes necessary in an expedient manner.

[99] In some embodiments the mesh network nodes calculate all possible changes necessary and select the alternate with the fewest changes required. In other embodiments, the mesh network selects a scenario resulting in an *acceptable* local minimum number of channel changes.

[100] Further, while in FIG. 6, solely node 613 detected the presence of node 621 using its scan 625, some of the frequency adjustments may have been avoided if node 611, the limited functionality root, had been the one to connect with node 621. Consequently, in some embodiments of the invention, only unused uplinks on roots

nodes are used for scanning for new connections. However, the networks are most likely to join together if all the nodes are scanning for possible neighbor nodes within range.

Local Optimization

[101] In some embodiments of the invention, each node determines locally as to whether to change frequencies upon joining with another node. In this default environment, no frequencies are set aside and each node attempts to determine which channel change results in the best local outcome.

[102] The software for making autonomous choices for each node is described in applicant's earlier patent application US Application No. 10/434,948 filed on May 8, 2003, now US Patent No. 7,420,952, whose contents are incorporated by reference. As described in that earlier application, the autonomous choices are designed to fulfill one or more local efficiency goals.

[103] The first goal is to ensure that there is sufficient channel separation between uplink and downlink radios on the local node to ensure adequate adjacent channel separation. Channel separation is considered sufficient when the frequencies of one channel are so different as to result in no interference with the transmissions on another frequency.

[104] Second, each node seeks to limit ripple effects caused by changing an uplink or downlink frequency where the local node is connected to other nodes either on the downlink side or the uplink side. If no conflict can be avoided, after a scan of the environment, downlink channels are selected based on the least congested channel that also satisfies conditions for channel separation between uplink and downlink.

[105] The alternative methods rely on specifying sets of channels to a node or groups of nodes. Internal channel sets are designed for communication between nodes while common sets are designed for communication with other networks. By assigning non-conflicting channels sets, sub network combinations can occur with less contention.

Internal Channel Sets

[106] A further approach to minimizing channel switches during joining of networks is to assign different channel subsets to each network during the initialization of the nodes which are predetermined to comprise a given network.

[107] In some embodiments, the mesh member nodes are allowed to change membership as the physical position of each member node changes. In other embodiments, the member nodes stay within one general group, forming a substantially permanent sub network. While the sub network may be mobile, the member nodes comprising the mesh remain constant.

[108] Given a circumstance where the sub networks have at least partially permanent membership, certain channels are dedicated for use by a particular sub network or a plurality of sub networks, and no other sub network within the area. Consequently, upon joining of several sub networks, the sub networks do not suffer from internal conflicts, but must only negotiate frequencies to facilitate inter-sub-network communication.

Use of Common Channel Sets

[109] A further addition to methodology is to dedicate certain frequencies to act as joining frequencies dedicated to serve as the uplink channels of root nodes and the downlink channels of leaf nodes of the tree. In other words, the leaf nodes use special downlink frequencies if no other node is connected on the downlink frequency. By employing the common channels, two networks are able to join together while leaving channel assignments inside the network constant.

[110] For example, in FIG. 7, each sub network 710 and 720 may represent a single convoy of military trucks. In some embodiments, the convoys are physically designed to meet only at the head and the tail, much like the joining of train carriages. Consequently, there is never any intermixing of the access points within the sub networks, only on the boundary access points.

[111] If the two sub-networks had previously dedicated a set of one or more frequencies to be the “common” frequencies not used internally within each network, then the two networks may now join with no frequency changes for connections within each network. The joining of node 721 and 711, forming a new link 735 will use the common frequency. By definition, the common frequency does not interfere with the

frequencies used internally within each network. Inasmuch as the two networks do not intermix, the internal frequencies used by each network are arbitrary. Even if the internal frequencies of sub networks 720 and 710 are identical, no interference will occur since frequencies different from those used internally in either sub network will be used for joining. The sole point of communication between the two networks is the new link 735 which may adopt the common frequency for communications between the two networks without any internal frequency reassignments.

Joining Using Underutilized Frequencies

[112] An additional means for facilitating network combinations is to include the capability to operate in more than one frequency range. For example, if two nodes have detected one another, the nodes may exchange radio capability information prior to establishing a permanent link. Upon exchanging capabilities information, the nodes may detect that each node includes the capability to broadcast in frequencies beyond the usual frequencies used within the network. Consequently, joining on this previously unexploited frequency range virtually guarantees a network join without having channel changes propagated within each sub network.

[113] For example, in FIG. 7, in one embodiment, nodes comprising the sub network 720 all communicate in various frequencies in and around 2.4GHz. Similarly, sub network 710 uses a similar set of frequencies in and around 2.4GHz. The 2.4GHz frequencies were chosen for the two sub networks to accommodate the client devices within each sub-network. However, for the communication between the two nodes, node 721 and node 711 may adopt a completely different range. In one embodiment, node 711 being the tail node, and node 721 being the root node, include an additional 5GHz communication capability which can be accomplished with multiple frequency range radios and wideband antennas, or by including additional radios and/or antennas.. Consequently, the two nodes 721 and 711 are able to establish a link 735 without any chance of interference with the respective internal links within each sub-network.

[114] Each node contains connectivity logic which allows the node to adopt one or more of the above-described contention resolution policies. Further, the connectivity logic is designed to update the list of possible alternate policies which may be applied

by individual nodes separately, or in unison. Each policy is activated depending on the environmental circumstances encountered by each mesh network. For example, in the event that the mesh networks are deployed as part of a structured convoy, certain policies are more applicable than others (as described above). Upon the joining of two networks together, the connectivity logic of each constituent node may be updated to reflect the common network created by the nodes.

[115] To the extent that the figures illustrate diagrams of the functional blocks of various embodiments, the functional blocks are not necessarily indicative of the division between hardware circuitry. Thus, for example, one or more of the functional blocks (e.g. processors or memories) may be implemented in a single piece of hardware (e.g. a general purpose signal processor or a block of random access memory, hard disk or the like). Similarly, the programs may be stand-alone programs, may be incorporated as subroutines in an operating system, may be functions in an installed software package, and the like. It should be understood that the various embodiments are not limited to the arrangements and instrumentality shown in the drawings.

[116] It is to be understood that the above description is intended to be illustrative, and not restrictive. For example, the above-described embodiments (and/or aspects thereof) may be used in combination with each other. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from its scope. While the dimensions and types of materials described herein are intended to define the parameters of the invention, they are by no means limiting, but are instead are exemplary embodiments. Many other embodiments will be apparent to those of skill in the art upon reviewing the above description. The scope of the invention should, therefore, be determined with reference to the appended claims, along with the full scope of equivalents to which such claims are entitled. In the appended claims, the terms “including” and “in which” are used as the plain-English equivalents of the terms “comprising” and “wherein.” Moreover, in the following claims, the terms “first,” “second,” and “third,” are used merely as labels, and are not intended to impose numerical requirements on their objects. Further, the limitations of the following claims are not written in means-plus-function format and are not intended to be interpreted based on 35 U.S.C. § 112, sixth paragraph, unless and

until such claim limitations expressly use the phrase “means for” followed by a statement of function void of further structure.

CLAIMS

The embodiment of the invention in which an exclusive property or privilege is claimed is defined as follows:

1. A structured mesh network capable of isolated operation, comprising:
at least two structured mesh nodes; wherein each structured mesh node comprises at least a connectivity logic; an uplink radio operating on an uplink frequency and a downlink radio operating on a downlink frequency; wherein the connectivity logic determines whether each structured mesh node connects with an external network or another node using its uplink radio and client devices or other mesh nodes connect to each node using each node's downlink radio; wherein the structured mesh network functions in two configurations selected depending on whether a connection to an external network is present;
in the first connected configuration the structured mesh network includes at least one structured mesh node's uplink radio comprises a connection to an external network; and
in the second isolated configuration none of the structured mesh nodes' uplink radio comprises a connection to an external network, and one of the structured mesh nodes acts as an isolated network root of the isolated configuration and all remaining nodes' connect to the isolated network root node as isolated root children nodes forming a tree-like configuration.

2. The structured mesh network of claim 1 wherein the connectivity logic contained by the nodes realigns connections between the nodes upon loss of an external connection to form the isolated configuration.

3. The structured mesh network of claim 2 wherein the connectivity logic contained by the nodes designates the node which in the first configuration connected to the external network as the isolated configuration root node.

4. The structured mesh network of claim 2 wherein the connectivity logic contained by the nodes designates the node which in the first configuration passed the most traffic as the isolated configuration root node.

5. The structured mesh network of claim 2 wherein the connectivity logic contained by the nodes selects the isolated configuration root node such that the resulting network's traffic traverses a minimal number of nodes.

6. The structured mesh network of claim 2 wherein the connectivity logic contained by the nodes selects the isolated configuration root node such that the isolated configuration root node is the most proximate to an external network connection point.

7. The structured mesh network of claim 2 wherein the connectivity logic contained by the nodes selects the isolated configuration root node such that the resulting network's throughput is maximized.

8. The structured mesh network of claim 2 wherein the connectivity logic contained by the nodes selects the isolated configuration root node such that the resulting network's latency is minimized.

9. The structured mesh network of claim 1 wherein the connectivity logic contained by the nodes realigns connections between the nodes upon detection of an external network connection to form the connected configuration.

10. The structured mesh network of claim 9 wherein solely the isolated network root node logic searches for the external network connection and establishes the external network connection.

11. The structured mesh network of claim 10 wherein the previously unused uplink radio of the isolated network root node is used to connect to the external network.

12. The structured mesh network of claim 1 wherein a first mesh network in the isolated configuration comprises an isolated root node and one or more isolated children nodes and a second mesh network in the isolated configuration comprises an isolated root node and at least one or more isolated children nodes and at least one child node of the first network establishes communication with a child node of the second network, thereby triggering a realignment due to joining in both networks.

13. The structured mesh network of claim 12 wherein as part of the realignment due to joining one of the isolated root nodes becomes an isolated network child node wherein the isolated root node of the smaller of the two networks becomes the child node.

14. The structured mesh network of claim 12 wherein as part of the realignment due to joining one of the isolated root nodes becomes an isolated network child node wherein the selection of the new isolated root node is made on the basis of physical position and direction of travel of the two networks.

15. The structured mesh network of claim 1 wherein a first mesh network in the isolated configuration comprises an isolated root node and one or more isolated children nodes and a second mesh network in the isolated configuration comprises an isolated root node and at least one or more isolated children nodes and the root node of the first network establishes communication with a child node of the second network, thereby the root node of the first network becomes a child node of the second network.

16. The structured mesh network of claim 15 wherein the unused uplink radio on the root node of the first network is used to connect to the child node of the second network.

17. The structured mesh network of claim 16 wherein solely the root node of the first network is able to connect to a child of the second network.

18. The structured mesh network of claim 1 wherein each network node further comprises a DHCP server used to assign addresses to client devices communicating with the node using the node's downlink radio.

19. The structured mesh network of claim 18 wherein the DHCP server within each node assigns IP addresses to client devices containing one or more random numbers within the IP addresses.

20. A multi-part mesh network comprising:
a first mesh network and a second mesh network wherein each mesh network comprises:

- a) at least two structured mesh nodes; wherein each structured mesh node comprises at least a connectivity logic; an uplink radio operating on an uplink frequency and a downlink radio operating on a downlink frequency; wherein the connectivity logic determines whether each structured mesh node connects with an external network or another node using its uplink radio and client devices or other mesh nodes connect to each node using each node's downlink radio; wherein the structured mesh network functions in two configurations selected depending on whether a connection to an external network is present;
- b) in the first connected configuration the structured mesh network includes at least one structured mesh node's uplink radio comprises a connection to an external network; and
- c) in the second isolated configuration none of the structured mesh nodes' uplink radio comprises a connection to an external network, and one of the structured mesh nodes acts as an isolated network root of the isolated configuration and all remaining nodes' connect to the isolated network root node as isolated root children nodes forming a tree-like configuration;

wherein a first set of frequencies, the first network frequencies, is used by the first network for communications between the nodes of the first network; a second set of frequencies, the common frequencies, is used for communications between the two networks; and a third set of frequencies, the second network frequencies, is used for communications between the nodes of the second network;
wherein each network is in the isolated configuration; and
wherein initially no communication between the first network and the second network is occurring.

21. The multi-part mesh network of claim 20 wherein the first set of frequencies and the third set of frequencies are mutually exclusive.

22. The multi-part mesh network of claim 20 wherein upon establishment of new communication between a child node of the first network and a child node of the second network the isolated root node of either the first network or the second network becomes the root node of a resulting multi-part network.

23. The multi-part mesh network of claim 22 wherein the connectivity logic of the root node of the root of the first network and the connectivity logic of the root of the second network select of the root node of the resulting multi-part network pursuant to a policy directive.

24. The multi-part mesh network of claim 23 wherein the policy directive is based on the relative sizes of each network.

25. The multi-part mesh network of claim 23 wherein the policy directive comprises a weighing of the direction of travel of each network and the position of each network.

26. The multi-part mesh network of claim 23 wherein the policy directive comprises minimizing the latency of the resulting multi-part mesh network or maximizing the throughput of the multi-part network.

27. The multi-part mesh network of claim 20 wherein upon establishment of new communication between the root node of the first network and a child node of the second network the isolated root node of the first network becomes a child node of the second network.

28. The multi-part mesh network of claim 27 wherein the unused uplink of the first network root node is used to communicate with the child node of the second network.

29. The multi-part mesh network of claim 28 wherein solely the root node of the first network may connect to a node of the second network

30. The multi-part mesh network of claim 20 wherein each network comprises one or more leaf nodes wherein leaf nodes are child nodes to which no other node communicates with using the leaf node's downlink radio, and the leaf nodes only attempt to connect using the common frequencies.

31. The multi-part mesh network of claim 20 wherein the uplink radios of the root nodes of each network attempt to connect solely using the common frequencies.

32. The structured mesh network of claim 20 wherein each network node further comprises a DHCP server used to assign addresses to client devices communicating with the node using the node's downlink radio.

33. The structured mesh network of claim 33 wherein the DHCP server within each node assigns IP addresses to client devices containing one or more random numbers within the IP addresses.

34. A structured mesh network capable of isolated operation, comprising:
at least two structured mesh nodes; wherein each structured mesh node comprises at least a connectivity logic and a radio operating on an uplink frequency and a downlink frequency; wherein the connectivity logic determines whether each structured mesh node connects with an external network or another node on the uplink frequency and client devices or other mesh nodes connect to each node on the downlink frequency; wherein the connectivity logic in each node contains a distributed routing table; wherein the structured mesh network functions in two configurations selected depending on whether a connection to an external network is present;
in the first connected configuration the structured mesh network includes at least one structured mesh node's uplink connection comprising a connection to an external network; and
in the second isolated configuration none of the structured mesh nodes' uplink connections comprises a connection to an external network, and one of the structured mesh nodes acts as an isolated network root of the isolated configuration and all

remaining nodes connect to the isolated network root node as isolated root children and descendant nodes forming a tree-like configuration.

35. The structured mesh network of claim 33 wherein said uplink and downlink frequencies are the same frequency.

ABSTRACT

A structured wireless mesh network is disclosed where a tree-like connection topology is formed. In one embodiment, each node has separate uplink and downlink radios operating on different channels. When a cluster of such nodes becomes isolated as in the case of a mobile mesh application, a node in the cluster according to this invention acts as a root node thus enabling the tree structure to persist, even in isolation. Example methods of joining sub networks are disclosed that guide the joining of mesh networks and channel management. Nodes that may operate in isolation also support a distributed DHCP capability such that IP addresses are assigned to clients even when a connection to a central DHCP server is unavailable.

Electronic Acknowledgement Receipt	
EFS ID:	6914514
Application Number:	12696947
International Application Number:	
Confirmation Number:	1992
Title of Invention:	PERSISTENT MESH FOR ISOLATED MOBILE AND TEMPORAL NETWORKING
First Named Inventor/Applicant Name:	Francis DACOSTA
Customer Number:	27197
Filer:	Szymon Maciej Gurda
Filer Authorized By:	
Attorney Docket Number:	0357-02217
Receipt Date:	29-JAN-2010
Filing Date:	
Time Stamp:	17:49:02
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	ADS.pdf	1104402	no	5
			dB6a69a24e883c3f8d7f1aa07498e7ab53434b3c		

Warnings:

Information:

2	Oath or Declaration filed	dec.pdf	74243 b77e6962a3de560244e50b908438e3588493b86e	no	3
Warnings:					
Information:					
3	Drawings-only black and white line drawings	Drawings.pdf	979282 d32e256bacd994086d31b18b544ca6088ba6059	no	9
Warnings:					
Information:					
4		Utility.pdf	131758 d2cb922397195ee7788902d303062c9bd5d32ffa	yes	37
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	28	
	Claims		29	36	
	Abstract		37	37	
Warnings:					
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Total Files Size (in bytes):			2289685		
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Application Number: 12696947

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Form Revision Date: February 8, 2006

Date: 01/29/10

Approved for use through 7/31/2006. OMB 0651-0032

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

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 12/696,947																																																							
APPLICATION AS FILED – PART I																																																											
(Column 1)		(Column 2)																																																									
FOR	NUMBER FILED	NUMBER EXTRA																																																									
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A																																																									
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A																																																									
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A																																																									
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INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 =		*																																																							
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$260 (\$130 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR																																																										
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* 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. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">SMALL ENTITY</th> <th colspan="2" style="text-align: center;">OR</th> <th colspan="2" style="text-align: center;">OTHER THAN SMALL ENTITY</th> </tr> <tr> <th style="text-align: center;">RATE (\$)</th> <th style="text-align: center;">FEE (\$)</th> <th></th> <th></th> <th style="text-align: center;">RATE (\$)</th> <th style="text-align: center;">FEE (\$)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">N/A</td> <td style="text-align: center;">82</td> <td></td> <td></td> <td style="text-align: center;">N/A</td> <td></td> </tr> <tr> <td style="text-align: center;">N/A</td> <td style="text-align: center;">270</td> <td></td> <td></td> <td style="text-align: center;">N/A</td> <td></td> </tr> <tr> <td style="text-align: center;">N/A</td> <td style="text-align: center;">110</td> <td></td> <td></td> <td style="text-align: center;">N/A</td> <td></td> </tr> <tr> <td style="text-align: center;">x\$26</td> <td style="text-align: center;">390</td> <td></td> <td></td> <td style="text-align: center;">x\$52</td> <td></td> </tr> <tr> <td style="text-align: center;">x\$110</td> <td></td> <td></td> <td></td> <td style="text-align: center;">x\$220</td> <td></td> </tr> <tr> <td style="text-align: center;">195</td> <td></td> <td></td> <td></td> <td style="text-align: center;">390</td> <td></td> </tr> <tr> <td style="text-align: center;">TOTAL</td> <td style="text-align: center;">852</td> <td></td> <td></td> <td style="text-align: center;">TOTAL</td> <td></td> </tr> </tbody> </table>						SMALL ENTITY		OR		OTHER THAN SMALL ENTITY		RATE (\$)	FEE (\$)			RATE (\$)	FEE (\$)	N/A	82			N/A		N/A	270			N/A		N/A	110			N/A		x\$26	390			x\$52		x\$110				x\$220		195				390		TOTAL	852			TOTAL	
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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.

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