PTO/SB/05 (09-04)
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16569 U.S.PTO 092704

UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	SYS05-GN001
First Inventor	Wilson, W. David
Title	SATELLITE DISTRIBUTED HIGH SPEED IN
Express Mail Label No.	EL796510280US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. ☑ **Fee Transmittal Form** (e.g., PTO/SB/17)
   (Submit an original and a duplicate for fee processing)
2. ☑ **Applicant claims small entity status.** See 37 CFR 1.27.
3. ☑ **Specification** [*Total Pages* 18]
   Both the claims and abstract must start on a new page
   (For information on the preferred arrangement, see MPEP 608.01(a))
4. ☑ **Drawing(s)** (*35 U.S.C. 113*) [*Total Sheets* 4]
5. **Oath or Declaration** [*Total Sheets* 2]
   a. ☑ ~~Newly executed (original or~~ copy) *unsigned*
   b. ☐ A copy from a prior application (37 CFR 1.63(d))
   (for continuation/divisional with Box 18 completed)
   i. ☐ DELETION OF INVENTOR(S)
   Signed statement attached deleting inventor(s) name in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. ☐ **Application Data Sheet.** See 37 CFR 1.76
7. ☐ **CD-ROM or CD-R** in duplicate, large table or Computer Program *(Appendix)*
   ☐ Landscape Table on CD
8. **Nucleotide and/or Amino Acid Sequence Submission**
   (if applicable, items a. – c. are required)
   a. ☐ Computer Readable Form (CRF)
   b. Specification Sequence Listing on:
      i. ☐ CD-ROM or CD-R (2 copies); or
      ii. ☐ Paper
   c. ☐ Statements verifying identity of above copies

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Alexandria VA 22313-1450

ACCOMPANYING APPLICATION PARTS

9. ☐ **Assignment Papers** (cover sheet & document(s))
   Name of Assignee _____
10. ☐ **37 CFR 3.73(b) Statement** *(when there is an assignee)* ☐ **Power of Attorney**
11. ☐ **English Translation Document** *(if applicable)*
12. ☐ **Information Disclosure Statement** (PTO/SB/08 or PTO-1449)
    ☐ Copies of citations attached
13. ☐ **Preliminary Amendment**
14. ☑ **Return Receipt Postcard** (MPEP 503)
    (Should be specifically itemized)
15. ☐ **Certified Copy of Priority Document(s)**
    (if foreign priority is claimed)
16. ☐ **Nonpublication Request** under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.
17. ☐ Other: _____

17548 10/950860 U.S.PTO 092704

18. If a CONTINUING APPLICATION, *check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:*

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: .....

Prior application information: *Examiner* _____ *Art Unit:* _____

19. CORRESPONDENCE ADDRESS

☑ The address associated with Customer Number: 030074 ***OR*** ☐ Correspondence address below

Name	Taft, Stettinius & Hollister LLP				
Address					
City		State		Zip Code	
Country		Telephone		Fax	

Signature		Date	09-27-2004
Name (Print/Type)	David A. Mancino	Registration No. (Attorney/Agent)	39,289

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FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☑ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 619.00

Complete if Known	
Application Number	
Filing Date	09-27-2004
First Named Inventor	Wilson, W. David
Examiner Name	
Art Unit	
Attorney Docket No.	SYS05-GN001

METHOD OF PAYMENT *(check all that apply)*

☑ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

☐ Deposit Account:

Deposit Account Number: 50-3072

Deposit Account Name: Taft Stettinius & Hollist

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	770	2001	385	Utility filing fee	385.00
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) ($) 385.00

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

		Extra Claims		Fee from below	Fee Paid
Total Claims	46	-20** =	26	x 9	= 234.
Independent Claims	3	- 3** =	0	x 43	= 0
Multiple Dependent					=

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
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1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple dependent claim, if not paid
1204	86	2204	43	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($) 234.00

***or number previously paid, if greater; For Reissues, see above*

FEE CALCULATION (continued)

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Other fee (specify) _____

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SUBTOTAL (3) ($)

SUBMITTED BY				(Complete *(if applicable)*)	
Name *(Print/Type)*	David A. Mancino	Registration No. *(Attorney/Agent)*	39,289	Telephone	513-357-9406
Signature				Date	9-27-2004

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☐ Deposit Account:

Deposit Account Number: 50-3072

Deposit Account Name: Taft Stettinius & Hollist

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1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) _____

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SUBTOTAL (3) ($)

SUBMITTED BY				(Complete *(if applicable)*)	
Name *(Print/Type)*	David A. Mancino	Registration No. *(Attorney/Agent)*	39,289	Telephone	513-357-9406
Signature				Date	9-27-2004

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Title: SATELLITE DISTRIBUTED HIGH SPEED INTERNET ACCESS

CROSS-REFERENCE TO RELATED APPLICATIONS

[**0001**] This application claims priority of provisional application Serial No. 60/507,022, filed September 29, 2003, provisional application Serial No. 60/517,044, filed November 4, 2003, and provisional application Serial No. 60/523,061, filed November 18, 2003.

BACKGROUND

[**0002**] The continued development of high speed wireless Internet connections permitting the transceiving of real time information has greatly increased the volume and efficiency of work, both commercial and personal, that can be accomplished. This efficiency saves both time and money for its users and is quickly becoming a necessary part of our overall telecommunications infrastructure.

[**0003**] This efficiency however, is not easily accessible unless one has a wireless ready PC, and their own satellite dish and transceiver or is located in or near a city with providers who sell access subscriptions to their equipment. Anyone in transit, such as salesmen, executives, truckers and private individuals has virtually no access while traveling, especially in rural areas. Even in populated areas, one must find a hard-wired commercial access point to get to the Internet. This is time consuming, costly and severely limits the benefits of the Internet in most areas of the country.

SUMMARY

[**0004**] The present invention provides rural "Hotspots" (such as Wi-Fi access, for example) to enable wireless and hardwired, satellite distributed Internet access for anyone with a PC or other web-ready device (wireless ready or cabled) and a valid credit card. The "Hotspots" can be located anywhere there is 120 volt electricity available or access to the sun for a solar panel and enough space to house the transceiver and mount a satellite dish. These "Hotspots" would best be located in areas that experience high

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American Airlines, et. al. v. Intellectual Ventures, et.al.
IPR2025-00782

volume transient traffic, such as rest areas, restaurants, truck stops, rural hotels, conference centers, motels and state park lodges. A Hotspot may allow access to users with cabled devices, wireless devices, or both.

[0005] Accordingly, it is a first aspect of the present invention to provide a method for establishing and operating an Internet Hotspot that includes the steps of: providing a satellite dish communicating with the Internet via data link with a satellite; providing at least one router operatively coupled to the satellite dish; installing the satellite dish and router in a rural location, which experiences a relatively high volume of transient traffic; and allowing a user to access the Internet at the rural location by connecting a user's web-ready device to the Internet via the router and satellite dish. In a more detailed embodiment, the router includes at least one jack to which a web-ready device may be connected via a cable. In a further detailed embodiment the method further includes a step of providing a subscriber access unit operatively coupled between the satellite dish and the router, where a user opens a subscription account via a remote server before the user is enabled to access other websites. Alternately, a user purchases a quantity of subscription-based access time using a credit card via the remote server before the user is enabled to access other websites. The subscription-based access time may be purchased in a definite quantity, or the subscription-based access time may be purchased on a "continued until canceled" basis. The credit card billing may performed by an existing merchant service and the existing merchant service may be reciprocal with other Internet subscription providers nationwide. Optionally, a user's account status is first authenticated by the remote server each time the user establishes a connection with the Hotspot before the user is enabled to access other websites. This authentication of the user's account is performed by a subscriber merchant service.

[0006] In an alternate detailed embodiment of the first aspect of the present invention, the connecting step includes a step of communicating the user's web-ready device to the router via a wireless connection. Further, a plurality of users can simultaneously access the Internet by communicating wireless web-ready devices with the router. Further, the method may include a step of operatively coupling a subscriber

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American Airlines, et. al. v. Intellectual Ventures, et.al.
IPR2025-00782

access between the satellite dish and the router, where a user opens a subscription account via a remote server before the user is enabled to access other websites. With this, a user may purchase a quantity of subscription-based access time using a credit card via the remote server before the user is enabled to access other websites. The subscription-based access time may be purchased in a definite quantity, or the subscription-based access time may be purchased on a "continued until canceled" basis. The credit card billing may performed by an existing merchant service and the existing merchant service may reciprocate with other Internet subscription providers nationwide. Optionally, a user's account status is first authenticated by the remote server each time the user establishes a connection with the Hotspot before the user is enabled to access other websites. With this the authentication of the user's account is performed by a subscriber merchant service. Alternatively, the method further includes the steps of operatively coupling at least one wireless transceiver extender unit between the satellite dish and the router to extend the range of Internet access at the rural location.

[0007] The method of the first aspect may further include the steps of operatively coupling at least one wireless transceiver extender unit between the satellite dish and the router to extend the range of Internet access at the rural location.

[0008] It is a second aspect of the present invention to provide a method for providing satellite-distributed high-speed Internet access that includes the steps of: providing a router to which a web-ready device may be connected via at least one of a cable and a wireless data link; assigning a dynamic IP address to the web-ready device that has been connected to the router; forwarding by the router of the user's connection to a subscriber access unit; retrieving from memory by the subscriber access unit of the static IP address of a remote server; forwarding the user's connection to a satellite dish; establishing communication by the satellite dish with a satellite, which is enabled to send and receive data over the Internet; establishing a connection over the Internet with the remote server, whose interface is viewed by the user as a webpage on the web-ready device; prompting by the remote server of the user for a username and password; accessing a database by the remote server to verify the username and password;

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prompting the user to create a new account, if the username and password are invalid or the user's account has zero time remaining; charging the user's credit card, if a new account is created; allowing the user to access other websites, until the user's account has zero time remaining or the user logs off the network; and updating the user's account in the database by the remote server to subtract the amount of time used during the just-completed session when the user logs off the network. In a detailed embodiment the method further includes the step of installing the router and the satellite dish in a rural location experiencing a relatively high volume of transient traffic.

[0009] It is a third aspect of the present invention to provide an Internet Hotspot that includes: a satellite dish installed in a remote location experiencing a relatively high volume of transient traffic, and the satellite dish communicating with the Internet via data link with a satellite; at least one router operatively coupled to the satellite dish and installed in the remote location, where a user may access the Internet at the remote location by establishing a data connection with the router via a user's web-ready device. In a more detailed embodiment, the data connection is a wireless data connection. In another detailed embodiment, a plurality of users may access the Internet simultaneously at the remote location by respectively establishing data connections with the router via their web-ready devices. The data connections may be wired and/or wireless connections. The Hotspot may also include a subscriber access unit operatively coupled between the satellite dish and the router and/or at least one wireless extender transceiver wirelessly, operatively coupled between the router and the satellite dish.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIG.1 shows an exemplary embodiment of the invention with a cabled router providing access to the Hotspot for cabled users.

[0011] FIG.2 shows an exemplary embodiment of the invention with an Ethernet wireless access point (wireless router) providing access to the Hotspot for wireless users.

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[**0012**] FIG.3 shows an exemplary embodiment of the invention with wireless transceiver extender units, allowing the access point (Ethernet wireless access point or router) to be located remotely from the remainder of the Hotspot apparatus.

[**0013**] FIG.4 shows an exemplary embodiment of the invention with a Vivato outdoor switch used as the wireless access point, providing long range operation.

DETAILED DESCRIPTION

[**0014**] The present invention provides rural "Hotspots" (such as Wi-Fi access, for example) to enable wireless and hardwired, satellite distributed Internet access for anyone with a PC or other web-ready device (wireless ready or cabled) and a valid credit card or prepaid coupon. The "Hotspots" can be located anywhere there is 120 volt electricity available, either from an electric utility service or from an on-site power source such as a solar panel with a bridged access point, and enough space to house the transceiver and mount a satellite dish. These "Hotspots" would best be located in areas that experience high volume transient traffic, such as rest area, restaurants, truck stops, rural hotels, conference centers, motels and state park lodges. Since the signal is always "live," all a potential wireless user would have to do is to move within the transceiver's field (an approximately radius of 0.2 to 0.4 miles when an amplifier used , in an exemplary embodiment) and turn on his/her wireless ready PC to know the service was available. Alternatively, for those with cabled web-ready devices, signage can announce the availability of access to internal network ports. Because these internal network ports, if available, would always be "live," all a potential user would have to do is to plug in a web-ready device and logon. Several transceivers/routers (providing cabled and/or wireless access) can be installed to provide coverage for large or multi-floor sites.

[**0015**] In the exemplary embodiment, when a client attempts to access the Internet, they are routed through the "Subscriber Access Unit." This unit, utilizing radius client, automatically forces the user to first logon via satellite through a third party commercial site that houses the radius server. Internet access is granted upon activation

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of a valid credit card, or existing valid account. Access time is sold by the hour, day, week, or month, or as a "continued until canceled" subscription, and the validation and billing are done by an existing merchant service. Time purchased is durable until used within the purchased time unit (or one day, if purchased by the hour or day-- whichever is less) and credits and accounts are reciprocal with other subscription providers nation-wide. Invalid credit cards or expired accounts are not permitted beyond the logon screen. Detailed transaction records are provided by the existing telecommunications infrastructure.

[0016] An exemplary embodiment of the system providing access to cabled users is shown in FIG.1. The Hotspot 10 comprises all the equipment installed at the rural location that is necessary to provide Internet access via satellite 12. The equipment installed at the rural location includes a satellite dish 14 for communicating with the satellite, a subscriber access unit 16 operatively coupled to the satellite dish 14 and a router 18 operatively coupled to the subscriber access unit 18. As used herein, the term "operatively coupled" refers to any configuration in which two or more devices interact in any way, by wired or wireless connections. Some or all of the components of the Hotspot 10 may be powered by a solar panel 19. User web-enabled devices, such as PC 20, laptop computer 22 and PDA 24 are directly coupled to the router via wired connections (i.e., cables). The user can access the Hotspot using his own web-ready device to acquire a dynamic IP address from one of many wired jacks located all over the router 18 using DHCP (Dynamic Host Configuration Protocol). The router 18 then forwards the user access to the subscriber access unit 16. Each router 18 can allow 254 concurrent users to gain access to the Internet.

[0017] At a central location 26, a radius server 28 includes a database 30 and modem 32 operatively coupled thereto. The radius server 28 is operatively coupled to the Internet 34 through an Internet server 36 and is protected by a firewall 38. The satellite 12 communicates to the radius server over the internet (via another satellite dish and associated computer – not shown).

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[**0018**] The subscriber access unit 16 has the static IP address 36 of the Radius server 28 pre-programmed. It then uses Radius client software to send the user directly to the satellite dish 14. The user's connection then passes to the satellite 12 then through the Internet 34 where, using the Radius server's IP address 36, it finds the Radius server 28. The Static IP address 36 routes the traffic through the firewall 38.

[**0019**] Upon establishing a user connection to the Radius server 28, the Radius server is viewed as a webpage in SSL (Secure Socket Layer) by the user. The user is prompted for a username and password. The Radius server 28 uses the database 30 to validate username and password and check that the number of minutes left in the user's account is greater than 0. If the user cannot submit a valid username and password for an account that has more than zero minutes left, the user will be prompted to create a new account. Upon creating an account, the Radius server 28 will charge the credit card furnished by the user using the modem 32 or Internet 34.

[**0020**] Upon validation by database 30, the user can browse the Internet 34 until the minutes are used up or the user is logged off the network. When the user logs off, the database 30 will be updated, subtracting the minutes used during the just-completed session.

[**0021**] Another exemplary embodiment 10′ of the system providing access to wireless users is shown in FIG.2. The basic system architecture and operation are substantially the same as described above. The main difference in the wireless access Hotspot of FIG.2 is that the cabled router 18 of FIG.1 has been replaced by an Ethernet wireless access point or router 40. The user can access the Hotspot using his own wireless web-ready device, such as a personal digital assistant (PDA) 24′, web-enabled cell phone 23′, or laptop computer with wireless network card 22′ to acquire a dynamic IP address from the Ethernet wireless access point 40 using DHCP (Dynamic Host Configuration Protocol). The Ethernet wireless access point 40 then forwards the user access to the subscriber access unit 16. Each Ethernet wireless access point 40 can allow 254 concurrent users to gain access to the Internet 34. The Ethernet wireless access point

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40 can employ a security protocol of a type that is known to persons skilled in the art, such as the 802.11b security protocol, or any subsequent or future versions of the 802.11 standard. Such security protocols may be generally designated as 802.11*x*, where *x* can be any version or implementation of the 802.11 standard.

[**0022**] From the subscriber access unit 16, a connection is established with the Radius server 28 in the substantially same manner as described above. The Radius server prompts the user to log in and verifies the user's password and account status, including the amount of time remaining, in substantially the same manner as described above.

[**0023**] In another exemplary embodiment 10", as illustrated in FIG.3, the Ethernet wireless access point 40 may be separated from, and communicate wirelessly with, the subscriber access unit 16. The Ethernet wireless access point 40 is connected by wire to wireless transceiver extender unit "1" (42). Utilizing a different channel from the Ethernet wireless access point 40, the wireless transceiver extender unit "1" (42) transmits and receives wirelessly to and from wireless transceiver extender unit "2" (44). Wireless transceiver extender unit "2" (44) will run directly by wire to the subscriber access unit 16. This use of wireless transceiver extender units 42, 44 allows the Ethernet wireless access point 40 to be placed further away, extending the effective range of the hotspot. The wireless transceiver extender units 42, 44 can employ a security protocol of the 802.11*x* form, as explained above, where *x* can be any version or implementation of the 802.11 standard. From the subscriber access unit 16, a connection is established with the Radius server 28 in substantially the same manner as described above. The Radius server 28 prompts the user to log in and verifies the user's password and account status, including the amount of time remaining, in substantially the same manner as described above.

[**0024**] This wireless extension embodiment may also be practiced with a cabled router connected to wireless transceiver extender unit "1" (42) in place of Ethernet wireless access point 40, thus allowing cabled access with the router located remotely from the subscriber access unit 16.

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[0025] In the exemplary embodiments 10′ and 10″ of the system shown in FIGS.2 and 3, respectively, the Ethernet wireless access point can be operatively coupled to an amplifier 46 and antenna 48. The antenna 48 can be an omni-directional antenna or a directional antenna such as a yagi antenna. The amplifer in conjunction with the antenna can increase the DBi gain to 28 to 35 based on the DBi gain for the antenna selected. The total output of the antenna will not exceed the 36 DBi limited by current Federal Communications Commission regulations. Additional wireless access points or antennas can be added to widen the coverage area as needed, provided that the wireless beams of overlapping signal coverage will need to use different channels to prevent interference.

[0026] Alternatively, as shown in FIG.4, the wireless Ethernet access point can be replaced with a Vivato® outdoor switch 50 (such as the VP1210 available from Vivato, Inc), which includes an amplifier and antenna. The Vivato® outdoor switch features an electronically controlled phased array antenna that can be used to create high gain beams of Wi-Fi on three channels simultaneously. In order to prevent interference, three nonadjacent channels (e.g., channels 1, 6, and 11, as shown in FIG.4) can be selected from the eleven channels supported by the 802.11*x* communication protocol. This embodiment can provide Wi-Fi access for many kilometers along a line of sight from the antenna, providing three simultaneous beams of Wi-Fi throughout the coverage area with extended range.

[0027] Having described the invention with reference to exemplary embodiments, it is to be understood that the invention is defined by the claims and it not intended that any limitations or elements describing the exemplary embodiment set forth herein are to be incorporated into the meanings of the claims unless such limitations or elements are explicitly listed in the claims. Likewise, it is to be understood that it is not necessary to meet any or all of the identified advantages or objects of the invention disclosed herein in order to fall within the scope of any claims, since the invention is

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defined by the claims and since inherent and/or unforeseen advantages of the present invention may exist even though they may not have been explicitly discussed herein.

[0028] What is claimed is:

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1. A method for establishing and operating an Internet Hotspot comprising the steps of:

providing a satellite dish communicating with the Internet via data link with a satellite; and

providing at least one router operatively coupled to the satellite dish;

installing the satellite dish and router in a rural location, which experiences a relatively high volume of transient traffic;

allowing a user to access the Internet at the rural location by connecting a user's web-ready device to the Internet via the router and satellite dish.

2. The method of claim 1, wherein the router includes at least one jack to which a web-ready device may be connected via a cable.

3. The method of claim 2, further comprising a step of providing a subscriber access unit operatively coupled between the satellite dish and the router, wherein a user opens a subscription account via a remote server before the user is enabled to access other websites.

4. The method of claim 3, wherein the user opens a subscription account using a prepaid coupon via the remote server before the user is enabled to access other websites.

5. The method of claim 3, wherein the user purchases a quantity of subscription-based access time using a credit card via the remote server before the user is enabled to access other websites.

6. The method of claim 5, wherein the subscription-based access time may be purchased in a definite quantity.

7. The method of claim 5, wherein the subscription-based access time may be purchased on a "continued until canceled" basis.

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8. The method of claim 5, wherein the credit card billing is performed by an existing merchant service.

9. The method of claim 8, wherein the existing merchant service is reciprocal with other Internet subscription providers nationwide.

10. The method of claim 5, wherein the user's account status is first authenticated by the remote server each time the user establishes a connection with the Hotspot before the user is enabled to access other websites.

11. The method of claim 10, wherein the authentication of the user's account is performed by a subscriber merchant service.

12. The method of claim 1, wherein the connecting step includes a step of communicating the user's web-ready device to the router via a wireless connection.

13. The method of claim 12, wherein a plurality of users can simultaneously access the Internet by communicating wireless web-ready devices with the router.

14. The method of claim 13, further comprising a step of operatively coupling a subscriber access between the satellite dish and the router, wherein a user opens a subscription account via a remote server before the user is enabled to access other websites.

15. The method of claim 14, wherein the user opens a subscription account using a prepaid coupon via the remote server before the user is enabled to access other websites.

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16. The method of claim 14, wherein the user purchases a quantity of subscription-based access time using a credit card via the remote server before the user is enabled to access other websites.

17. The method of claim 16, wherein the subscription-based access time may be purchased in a definite quantity.

18. The method of claim 16, wherein the subscription-based access time may be purchased on a "continued until canceled" basis.

19. The method of claim 16, wherein the credit card billing is performed by an existing merchant service.

20. The method of claim 19, wherein the existing merchant service is reciprocal with other Internet subscription providers nationwide.

21. The method of claim 16, wherein a user's account status is first authenticated by the remote server each time the user establishes a connection with the Hotspot before the user is enabled to access other websites.

22. The method of claim 21, wherein the authentication of the user's account is performed by a subscriber merchant service.

23. The method of claim 12, further comprising the steps of operatively coupling at least one wireless transceiver extender unit between the satellite dish and the router to extend the range of Internet access at the rural location.

24. The method of claim 2, further comprising the steps of operatively coupling at least one wireless transceiver extender unit between the satellite dish and the router to extend the range of Internet access at the rural location.

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25. The method of claim 1, further comprising the steps of operatively coupling at least one wireless transceiver extender unit between the satellite dish and the router to extend the range of Internet access at the rural location.

26. A method for providing satellite-distributed high-speed Internet access, comprising the steps of:

providing a router to which a web-ready device may be connected via at least one of a cable or a wireless data link;

assigning a dynamic IP address to the web-ready device that has been connected to the router;

forwarding by the router of the user's connection to a subscriber access unit;

retrieving from memory by the subscriber access unit of the static IP address of a remote server;

forwarding the user's connection to a satellite dish;

establishing communication by the satellite dish with a satellite, which is enabled to send and receive data over the Internet;

establishing a connection over the Internet with the remote server, whose interface is viewed by the user as a webpage on the web-ready device;

prompting by the remote server of the user for a username and password;

accessing a database by the remote server to verify the username and password;

prompting the user to create a new account, if the username and password are invalid or the user's account has zero time remaining;

allowing the user to access other websites, until the user's account has zero time remaining or the user logs off the network; and

updating the user's account in the database by the remote server to subtract the amount of time used during the just-completed session, when the user logs off the network.

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27. The method of claim 26, wherein the interface of the remote server is viewed by the user as a webpage on the web-ready device using Secure Socket Layer encryption.

28. The method of claim 26, wherein the user may create an account using a prepaid coupon.

29. The method of claim 26, further comprising, after the step of prompting the user to create a new account, if the username and password are invalid or the user's account has zero time remaining, the step of:

charging the user's credit card, if a new account is created.

30. The method of claim 29, wherein the user may purchase access time in a definite quantity when creating an account.

31. The method of claim 29, wherein the user may purchase access time on a "continue until canceled" basis when creating an account.

32. The method of claim 29, wherein the charging of the user's credit card is performed by an existing merchant service.

33. The method of claim 32, wherein the existing merchant service is reciprocal with other Internet subscription providers nationwide.

34. The method of claim 29, further comprising the step of installing the router and the satellite dish in a rural location experiencing a relatively high volume of transient traffic.

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35. An Internet Hotspot comprising:

a satellite dish installed in a remote location experiencing a relatively high volume of transient traffic, and the satellite dish communicating with the Internet via data link with a satellite;

at least one router operatively coupled to the satellite dish and installed in the remote location;

wherein a user may access the Internet at the remote location by establishing a data connection with the router via a user's web-ready device.

36. The Internet Hotspot of claim 35, wherein the data connection is a wireless data connection.

37. The Internet Hotspot of claim 35, wherein a plurality of users may access the Internet simultaneously at the remote location by respectively establishing data connections with the router via their web-ready devices.

38. The Internet Hotspot of claim 37, wherein the data connections include wired data connections.

39. The Internet Hotspot of claim 38, wherein the data connections include wireless data connections.

40. The Internet Hotspot of claim 39, further comprising an amplifier and antenna operatively coupled to the router.

41. The Internet Hotspot of claim 39, wherein the router is a Vivato outdoor switch.

42. The Internet Hotspot of claim 37, wherein the data connections include wired data connections.

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43. The Internet Hotspot of claim 37, further comprising a subscriber access unit operatively coupled between the satellite dish and the router.

44. The Internet Hotspot of claim 43, further comprising an amplifier and antenna

45. The Internet Hotspot of claim 43, further comprising at least one wireless extender transceiver wirelessly, operatively coupled between the subscriber access unit and the router.

46. The Internet Hotspot of claim 37, further comprising at least one wireless extender transceiver wirelessly, operatively coupled between the router and the satellite dish.

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ABSTRACT

A satellite distributed high-speed Internet "Hotspot" enables wireless and hardwired, satellite distributed Internet access for anyone with a PC or other web-ready device (wireless ready or cabled) and a valid credit card or prepaid coupon. The Hotspots can be located anywhere there is 120 volt electricity available or access to the sun for a solar panel and enough space to house the transceiver and mount a satellite dish. Upon connecting to the Hotspot, the user is directed to a remote server for log-on and validation of the user's account. During validation, the remote server verifies that prepaid access time remains in the user's account. Upon validation, the user may browse the web until the prepaid access time runs out. Alternatively, an account may be set up on a "continue until canceled" basis, wherein the user's credit card will be charged for the amount of time used during each session.

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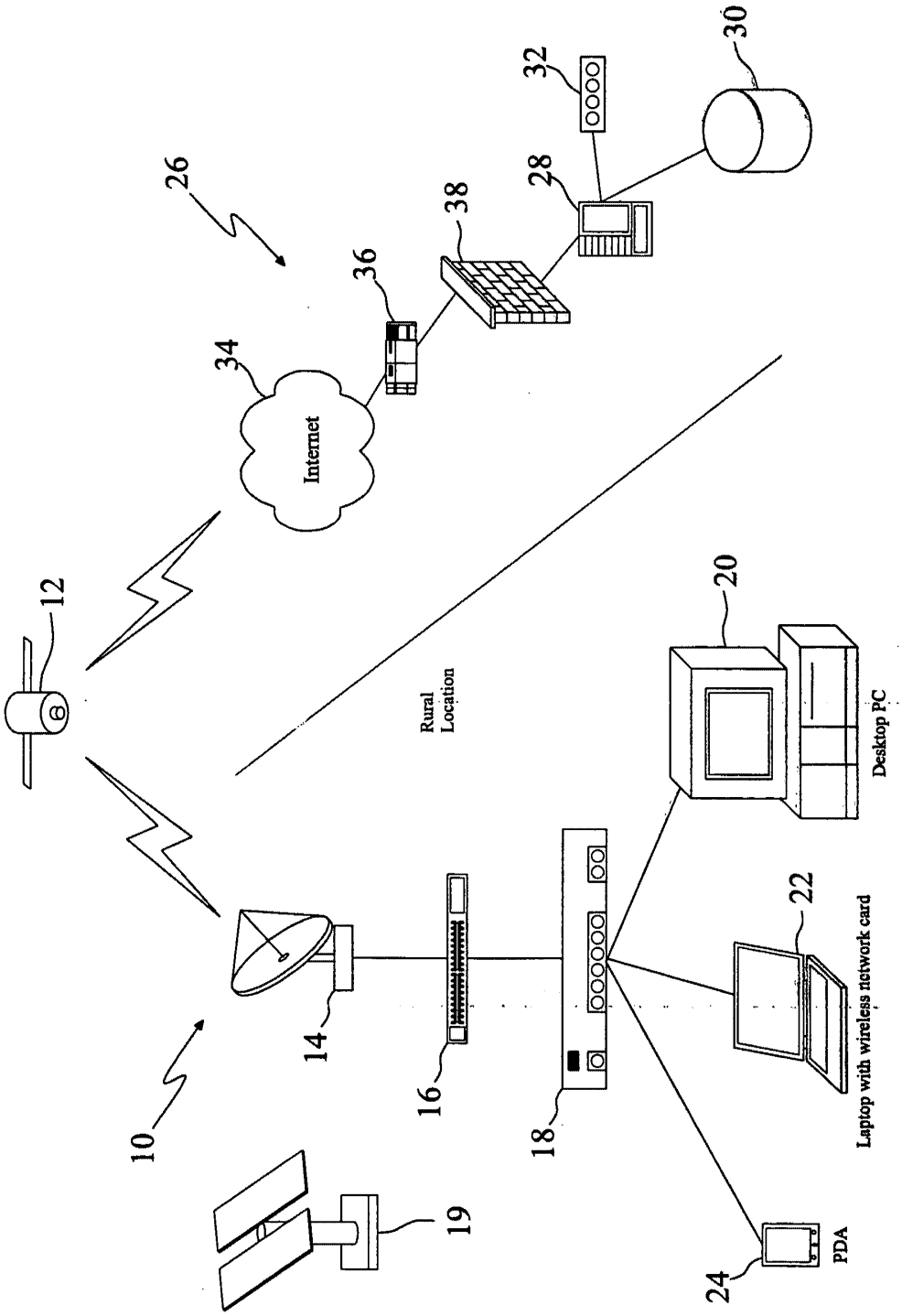
26
32
30
28
38
36
34
Internet
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Rural Location
20
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22
Laptop with wireless network card
14
16
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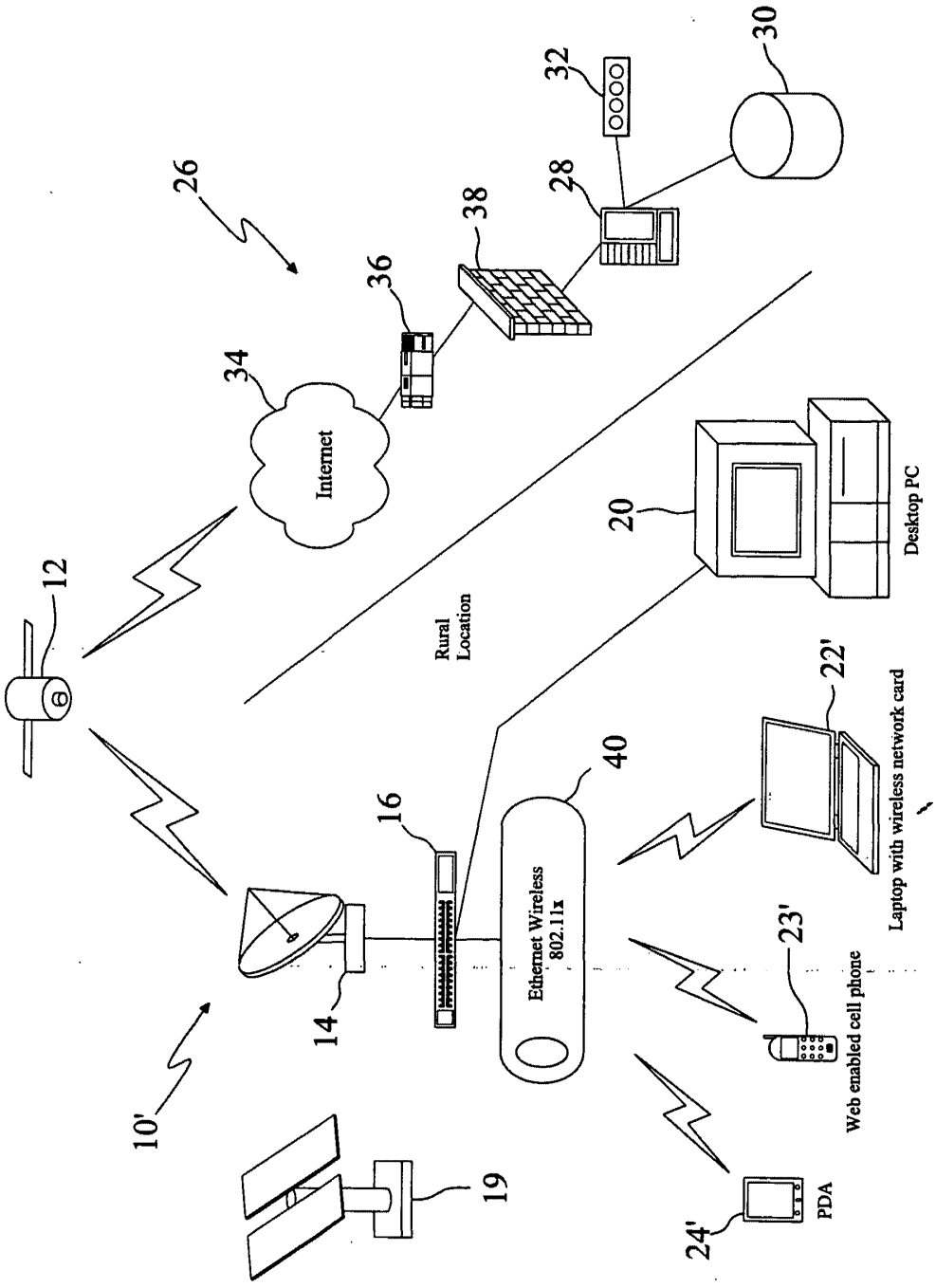
10
19
24
PDA

FIG.1


30
32
28
26
38
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34
Internet
12
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Desktop PC
Rural Location
22'
Laptop with wireless network card
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Web enabled cell phone
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19
24'
PDA

FIG.2

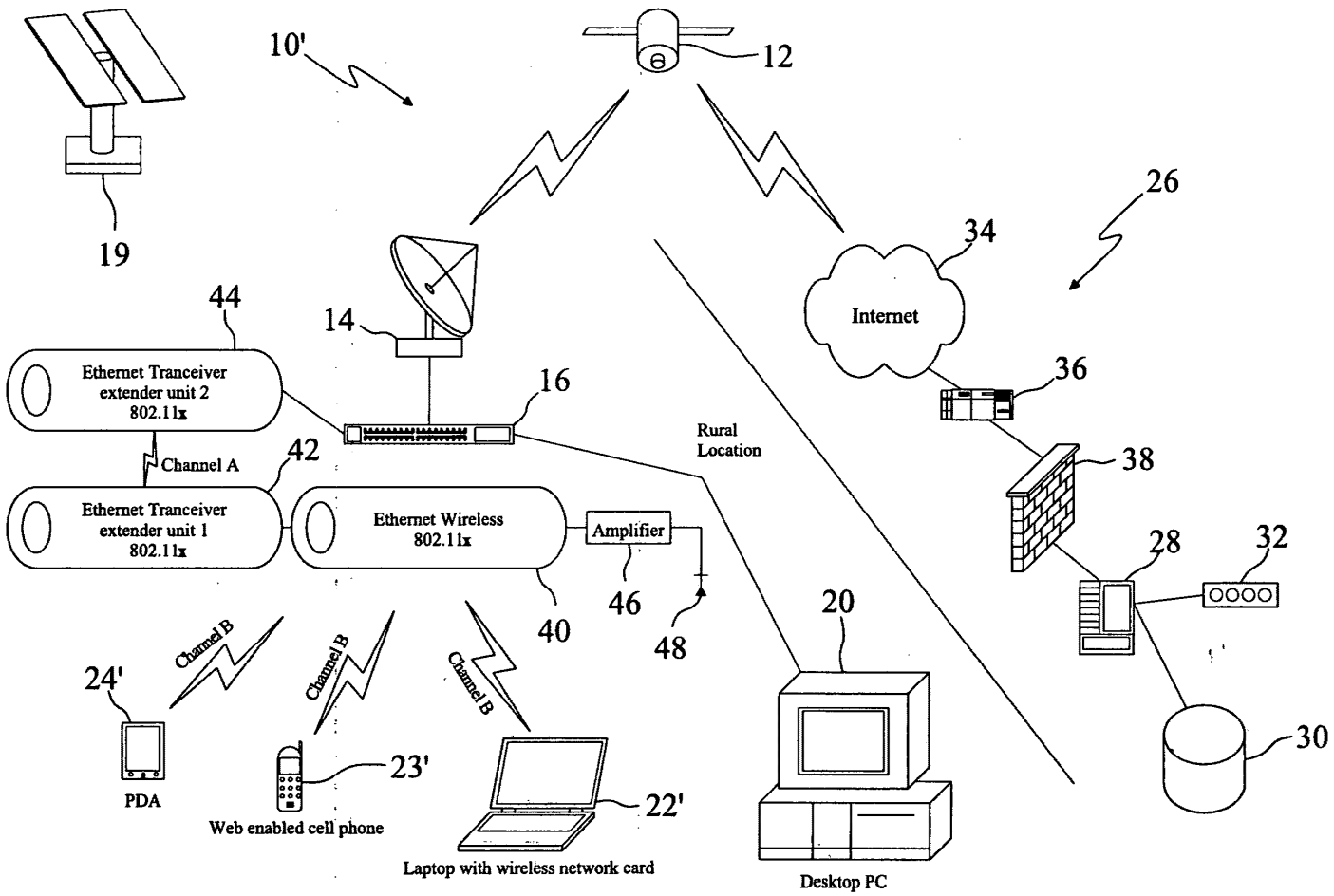
10'
12
19
26
34
Internet
44
14
16
36
Ethernet Tranceiver extender unit 2 802.11x
Channel A
42
Rural Location
38
Ethernet Tranceiver extender unit 1 802.11x
Ethernet Wireless 802.11x
Amplifier
28
32
46
40
48
20
Channel B
Channel B
Channel B
24'
23'
22'
30
PDA
Web enabled cell phone
Laptop with wireless network card
Desktop PC

FIG. 3

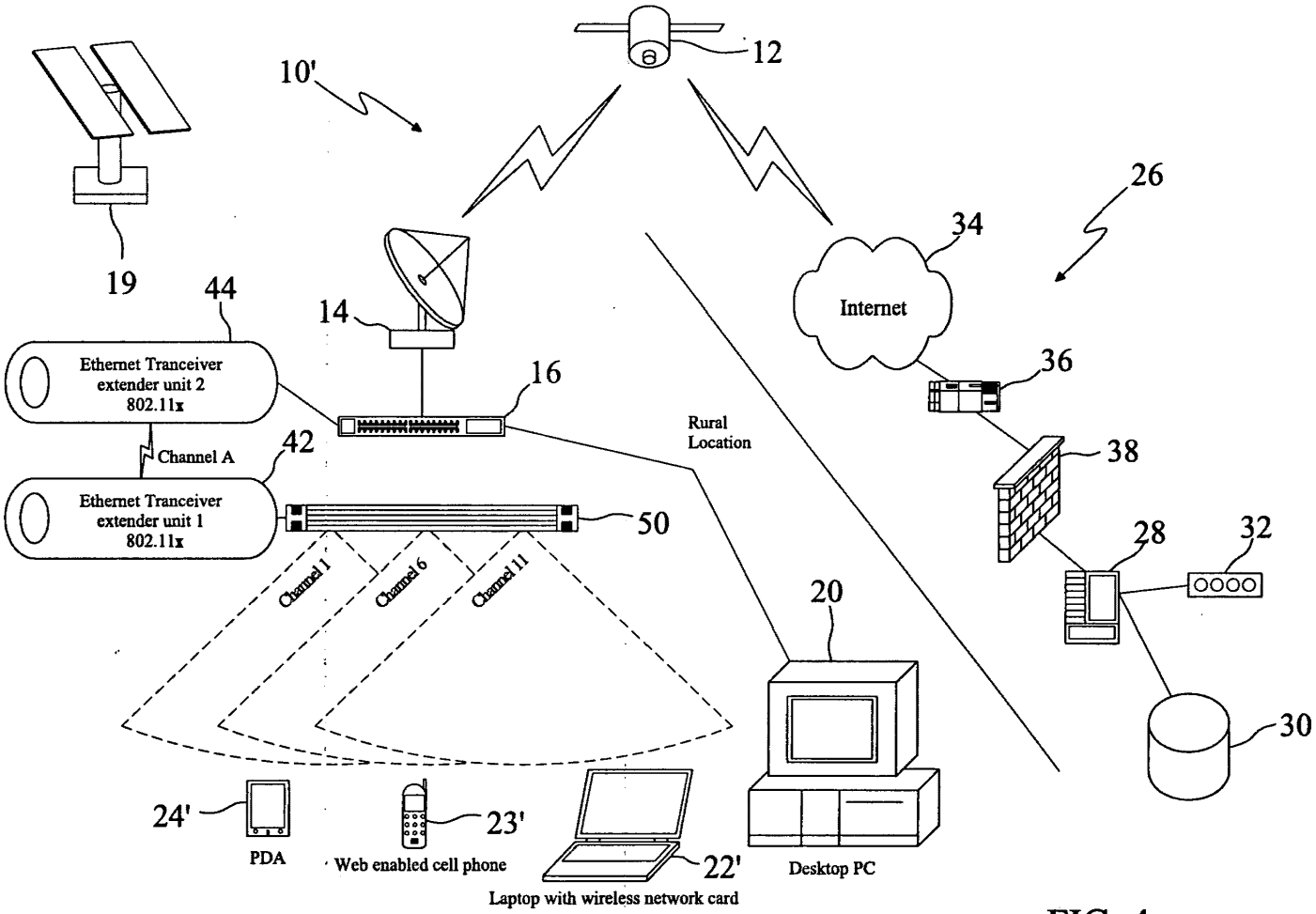

FIG. 4

Title: SATELLITE DISTRIBUTED HIGH SPEED INTERNET ACCESS
Inventor: Wilson, W. David
S/N: [new nonprovisional application]
Filed: September 27, 2004
Docket No: SYS05-GN001
4 / 4

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DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

☐ Declaration Submitted With Initial Filing **OR** ☑ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)

Attorney Docket Number	SYS05-GN001
First Named Inventor	Wilson, W. David
COMPLETE IF KNOWN	
Application Number	
Filing Date	09-27-2004
Art Unit	
Examiner Name	

I hereby declare that:

Each inventor's residence, mailing address, and citizenship are as stated below next to their name.

I believe the inventor(s) named below to be the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

SATELLITE DISTRIBUTED HIGH SPEED INTERNET ACCESS

(Title of the Invention)

the specification of which

☐ is attached hereto

OR

☑ was filed on (MM/DD/YYYY) 09-27-04 as United States Application Number or PCT International Application Number ☐ and was amended on (MM/DD/YYYY) ☐ (if applicable).

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

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

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

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached? YES	NO
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 21 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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Name: Taft, Stettinius & Hollister, LLP		
Address		
City	State	ZIP
Country	Telephone	Fax

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Mailing Address: 806 Old South Riverside Drive			
City: Batavia	State: OH	Zip: 45103	Country: US

NAME OF SECOND INVENTOR: ☐ A petition has been filed for this unsigned inventor

Given Name (first and middle [if any])		Family Name or Surname	
Inventor's Signature			Date
Residence: City	State	Country	Citizenship
Mailing Address			
City	State	Zip	Country

☐ Additional inventors or a legal representative are being named on the _____supplemental sheet(s) PTO/SB/02A or 02LR attached hereto.

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PATENT APPLICATION SERIAL NO. _____

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
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01 FC:2001 385.00 OP
02 FC:2202 234.00 OP

PTO-1556
(5/87)

*U.S. Government Printing Office: 2002 — 489-267/69033

PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 2003

Application or Docket Number: 10950860

CLAIMS AS FILED - PART I

	(Column 1)		(Column 2)
TOTAL CLAIMS	46		
FOR	NUMBER FILED		NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	46	minus 20=	* 26
INDEPENDENT CLAIMS	3	minus 3 =	* -
MULTIPLE DEPENDENT CLAIM PRESENT			☐

* If the difference in column 1 is less than zero, enter "0" in column 2

SMALL ENTITY TYPE ☐		OR	OTHER THAN SMALL ENTITY	
RATE	FEE		RATE	FEE
BASIC FEE	385.00	OR	BASIC FEE	770.00
XS 9=	234	OR	XS18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL	619	OR	TOTAL	

CLAIMS AS AMENDED - PART II

AMENDMENT A	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM ☐				

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT B	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM ☐				

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT C	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM ☐				

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. 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.

AA/SWA Ex. 1004, p.30 of 147
American Airlines, et. al. v. Intellectual Ventures, et.al.
IPR2025-00782

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
10/950,860	09/27/2004	W. David Wilson	SYS05-GN001

CONFIRMATION NO. 7056

030074
TAFT, STETTINIUS & HOLLISTER LLP
SUITE 1800
425 WALNUT STREET
CINCINNATI, OH 45202-3957

FORMALITIES LETTER

OC0000000014343148

Date Mailed: 11/12/2004

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 oath or declaration is unsigned.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(e) of $65 for a small entity in compliance with 37 CFR 1.27, must be submitted with the missing items identified in this letter.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is **$65** for a Small Entity

- **$65** Late oath or declaration Surcharge.

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

A copy of this notice MUST be returned with the reply.

E-24

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Initial Patent Examination Division (703) 308-1202

PART 3 - OFFICE COPY

OIPE JC
JAN 13 2005
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PTO/SB/21 (09-04)
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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission: 7

Application Number	10/950,860
Filing Date	09-27-2004
First Named Inventor	WILSON, W. DAVID
Art Unit	2661
Examiner Name	
Attorney Docket Number	SYS05-GN001

ENCLOSURES *(Check all that apply)*

- [x] Fee Transmittal Form
  - [ ] Fee Attached
- [ ] Amendment/Reply
  - [ ] After Final
  - [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
- [ ] Express Abandonment Request
- [ ] Information Disclosure Statement
- [ ] Certified Copy of Priority Document(s)
- [x] Reply to Missing Parts/ Incomplete Application
  - [x] Reply to Missing Parts under 37 CFR 1.52 or 1.53
- [ ] Drawing(s)
- [ ] Licensing-related Papers
- [ ] Petition
- [ ] Petition to Convert to a Provisional Application
- [ ] Power of Attorney, Revocation Change of Correspondence Address
- [ ] Terminal Disclaimer
- [ ] Request for Refund
- [ ] CD, Number of CD(s) _____
  - [ ] Landscape Table on CD
- [ ] After Allowance Communication to TC
- [ ] Appeal Communication to Board of Appeals and Interferences
- [ ] Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- [ ] Proprietary Information
- [ ] Status Letter
- [x] Other Enclosure(s) (please Identify below):
  ITEMIZED RETURN POSTCARD, EXECUTED DECLARATION

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	TAFT, STETTINIUS & HOLLISTER LLP		
Signature			
Printed name	DAVID A. MANCINO		
Date	01-10-2005	Reg. No.	39,289

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature	Sharon A. Shelton		
Typed or printed name	SHARON A. SHELTON, PARALEGAL	Date	01-10-2005

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and1.14. This collection is estimated to 2 hours 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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OIPE JC#9
JAN 13 2005
PATENT & TRADEMARK OFFICE

PTO/SB/17 (12-04v2)
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Effective 12/8/2004.
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL
For FY 2005

☑ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 65.00

Complete if Known	
Application Number	10/950,860
Filing Date	09-27-2004
First Named Inventor	WILSON, W. DAVID
Examiner Name	
Art Unit	2661
Attorney Docket No.	SYS05-GN001

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☑ Deposit Account Deposit Account Number: 503072 Deposit Account Name: Taft, Stettinius & Hollis

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☑ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, **except for the filing fee**

☑ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 ☐ Credit any overpayments

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

	FILING FEES		SEARCH FEES		EXAMINATION FEES		
		Small Entity		Small Entity		Small Entity	
Application Type	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fees Paid ($)
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

Total Claims	Extra Claims	Fee ($)	Fee Paid ($)
_____ - 20 or HP =	_____	x _____	= _____

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims	Extra Claims	Fee ($)	Fee Paid ($)
_____ - 3 or HP =	_____	x _____	= _____

HP = highest number of independent claims paid for, if greater than 3.

Multiple Dependent Claims	
Fee ($)	Fee Paid ($)
_____	_____

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), 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).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee ($)	Fee Paid ($)
_____ - 100 =	_____	/ 50 = _____ (round up to a whole number)	x _____	= _____

4. OTHER FEE(S)

	Fees Paid ($)
Non-English Specification, $130 fee (no small entity discount)	
Other (e.g., late filing surcharge): late Declaration surcharge	65.00

SUBMITTED BY

Signature		Registration No. (Attorney/Agent) 39,289	Telephone 513-357-9331
Name (Print/Type)	DAVID A. MANCINO		Date 01-10-2005

This collection of information is required by 37 CFR 1.136. 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 30 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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OIPE JC:6 JAN 13 2005 PATENT & TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
10/950,860	09/27/2004	W. David Wilson	SYS05-GN001

CONFIRMATION NO. 7056

030074
TAFT, STETTINIUS & HOLLISTER LLP
SUITE 1800
425 WALNUT STREET
CINCINNATI, OH 45202-3957

FORMALITIES LETTER

OC0000000014343148

Date Mailed: 11/12/2004

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 oath or declaration is unsigned.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(e) of $65 for a small entity in compliance with 37 CFR 1.27, must be submitted with the missing items identified in this letter.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is **$65** for a Small Entity

- **$65** Late oath or declaration Surcharge.

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

01/19/2005 MMEKONEN 00000010 503072 10950860
01 FC:2051 65.00 DA

*A copy of this notice **MUST** be returned with the reply.*

E.R

Customer Service Center
Initial Patent Examination Division (703) 308-1202
PART 2 - COPY TO BE RETURNED WITH RESPONSE

OIPE
JAN 13 2005
PATENT & TRADEMARK OFFICE

PTO/SB/01 (09-04)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

☐ Declaration Submitted With Initial Filing *OR* ☑ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)

Attorney Docket Number	SYS05-GN001
First Named Inventor	Wilson, W. David
COMPLETE IF KNOWN	
Application Number	10/950,860
Filing Date	09-27-2004
Art Unit	
Examiner Name	

I hereby declare that:

Each inventor's residence, mailing address, and citizenship are as stated below next to their name.

I believe the inventor(s) named below to be the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

SATELLITE DISTRIBUTED HIGH SPEED INTERNET ACCESS

(Title of the Invention)

the specification of which

☐ is attached hereto

OR

☑ was filed on (MM/DD/YYYY) 09-27-04 as United States Application Number or PCT International Application Number 10/950,860 and was amended on (MM/DD/YYYY) _____ (if applicable).

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

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

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

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached? YES	NO
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 21 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 completing the form, call 1-800-PTO-9199 and select option 2.

PTO/SB/01 (09-04)
Approved for use through 07/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

DECLARATION — Utility or Design Patent Application

Direct all correspondence to:	☑ The address associated with Customer Number:	030074	OR	☐	Correspondence address below

Name: Taft, Stettinius & Hollister, LLP		
Address		
City	State	ZIP
Country	Telephone	Fax

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

NAME OF SOLE OR FIRST INVENTOR:	☐ A petition has been filed for this unsigned inventor		
Given Name (first and middle [if any]): W. David	Family Name or Surname: Wilson		
Inventor's Signature: x W. David Wilson Pres		Date: 12-29-04	
Residence: City: Cincinnati	State: OH	Country: US	Citizenship: US
Mailing Address: 806 Old South Riverside Drive			
City: Batavia	State: OH	Zip: 45103	Country: US

NAME OF SECOND INVENTOR:	☐ A petition has been filed for this unsigned inventor		
Given Name (first and middle [if any])	Family Name or Surname		
Inventor's Signature		Date	
Residence: City	State	Country	Citizenship
Mailing Address			
City	State	Zip	Country

☐ Additional inventors or a legal representative are being named on the _____ supplemental sheet(s) PTO/SB/02A or 02LR attached hereto.

PTO/SB/21 (09-04)
Approved for use through 07/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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OIPE
APR 06 2005
PATENT & TRADEMARK OFFICE

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission: 6

Application Number	10/950,860
Filing Date	09-27-2004
First Named Inventor	WILSON, W. DAVID
Art Unit	2661
Examiner Name	
Attorney Docket Number	SYS05-GN001

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☑ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☑ Other Enclosure(s) (please Identify below):
  ITEMIZED RETURN POSTCARD

Remarks

INCLUDING FORMS PTO/SB/08A & 08B

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	TAFT, STETTINIUS & HOLLISTER LLP		
Signature			
Printed name	DAVID A. MANCINO		
Date	04-01-2005	Reg. No.	39,289

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature	Sharon A. Shelton		
Typed or printed name	SHARON A. SHELTON, PARALEGAL	Date	04-01-2005

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and1.14. This collection is estimated to 2 hours 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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4/1/2005 Sharon A. Shelton

(Date) Sharon A. Shelton

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:

Applicant	:	Wilson,W. David
Serial No.	:	10/950,860
Filed On	:	09-27-2004
Title	:	SATELLITE DISTRIBUTED HIGH SPEED INTERNET ACCESS
Docket No.	:	SYS05-GN001
Examiner	:	
Art Unit	:	2661

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

Dear Sir:

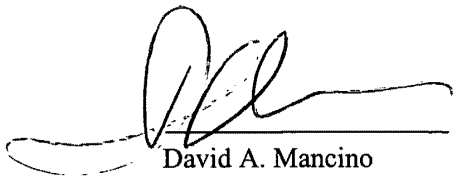
INFORMATION DISCLOSURE STATEMENT

Pursuant to 37 C.F.R. § 1.97, the Examiner's attention is directed to the references listed on the attached Form PTO-SB-08A & 08B. A copy of each of the non patent and foreign document references is provided.

It is to be understood that the present disclosure of art is in no way intended to be a waiver of any arguments or defenses available to the Applicant under the rules of the U.S. Patent

and Trademark Office and the statutes of the United States. No fee is required. The Commissioner is hereby authorized to charge any additional fees that may be required by this paper, or to credit any overpayment to Deposit Account 50-3072.

Respectfully submitted,



David A. Mancino
Reg. No. 39,289

030074
TAFT, STETTINIUS & HOLLISTER LLP
425 Walnut Street, Suite 1800
Cincinnati, OH 45202-3957
(513) 357-9331
Mancino@taftlaw.com

AA/SWA Ex. 1004, p.41 of 147
American Airlines, et. al. v. Intellectual Ventures, et.al.
IPR2025-00782

OIPE JC1
APR 0 6 2005
PATENT & TRADEMARK OFFICE

PTO/SB/08A (08-03)
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Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 2

Complete if Known	
Application Number	10/950,860
Filing Date	09-27-2004
First Named Inventor	WILSON, W. DAVID
Art Unit	2661
Examiner Name	
Attorney Docket Number	SYS05-GN001

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US- 5,081,703	01-14-1992	LEE	
		US- 5,678,172	10-14-1997	DINKINS	
		US- 6,035,178	03-07-2000	CHENNAKESHU ET AL.	
		US- 6,072,768	06-06-2000	WIEDEMAN ET AL.	
		US- 6,212,550 B1	04-03-2001	SEGUR	
		US- 6,243,450 B1	06-05-2001	JANSEN ET AL.	
		US- 6,414,635 B1	07-02-2002	STEWART ET AL.	
		US- 6,522,865 B1	02-18-2003	OTTEN	
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Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]
		EP 1 024 610 A2	02-08-2000	GLOBALSTAR L.P.		

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NON PATENT LITERATURE DOCUMENTS

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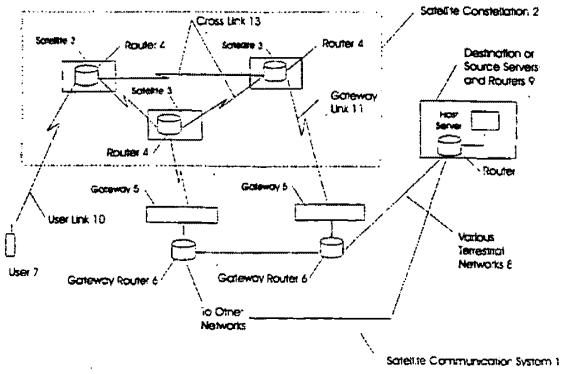
(54) An Internet Service Provider system using non-geosynchronous orbit satellites

(57) A satellite communication system (1) includes a plurality of satellites (3), such as low earth orbit satellites, and a plurality of gateways (5). The satellite communication system (1) is bidirectionally coupled to a terrestrial communication system (8) through at least the plurality of gateways (5). The satellite communication system (1) and the terrestrial communications system (8) together form a data communication network having a plurality of nodes including source nodes, destination nodes and intermediate nodes. Multiple copies of a packet (P1,P2) can coexist within the data communication network, and the packet (P1,P2) and its one or more copies are routed, using at least in part satellite-resident routers (4) and gateway-resident routers (6), over a plurality of different paths between a particular source node and a particular destination node. At least one duplicate copy of a given packet (P1,P2) is simply not used during the execution of a packet reordering procedure in the destination node, or at an intermediate node. Certain of the paths are carried over satellite-to-satellite cross-links (13a,13b), while certain other ones of the paths are carried over satellite-to-gateway uplinks (11a) and downlinks (11b), and at least one path exists between a user terminal (7) and at least one satellite. In a preferred embodiment the packets are TCP/IP (or equivalent protocol) packets containing information for enabling the selective destruction of a duplicate packet to occur.

Figure 3
Connection Less Satellite Internet Access System



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Description

Field of the Invention

[0001] This invention relates generally to data communications networks and systems, such as the Internet, and more particularly to satellite-based communications systems capable of supporting data communications network traffic.

Background to the Invention

[0002] The Internet has had an explosive impact on the telecommunications businesses of the world in the recent past, and a need has developed for worldwide access for Internet Services. However, many potential users cannot gain access to the Internet due to lack of telecommunications in rural and wilderness areas. Low Earth Orbit (LEO) mobile satellite systems (LEO-MSS) are now in the early stages of introduction. However, the data rates offered by these systems are typically below 9600 Bps and are therefore are not suited for an Internet application which typically requires speeds of at least 56000 Bps or higher.

[0003] In the past LEO-MSS systems have developed around connection oriented systems, modeled after the telephone system. Conventionally, to communicate to someone a number is dialed and a connection is established through a number of switches, after which communications is passed via that dedicated connection path, until that traffic is finished, after which the connection is released. The essential aspect of a connection is that it acts like a tube: i.e., the sender places objects (bits) into one end, and the receiver takes them out of the other end. The IRIDIUM™ system acts in this manner, with the switching system in space for defining a route via from one to many satellites from a user to a dedicated downlink, from a specified satellite to a specified gateway, the specification of which depends on the sender's selection of destination as indicated by a number that is dialed.

[0004] In contrast, a connection-less service is modeled after the postal system. Each message carries the full source and destination address, and each one is routed through the system independent of all the others. Normally, when two messages are sent to the same destination, the first one sent will be the first one to arrive. However, it is possible that the first one sent will be delayed such that the second one arrives first. With a connection oriented service this is impossible.

[0005] It should be noted that not all applications require connections, and services and protocols are distinct concepts. In general a service is a set of operations that a network layer (a layer is the organization of a network) performs, wherein one computer (or machine) carries on a conversation with another computer (or machine), and may provide input to another layer above it. The service defines what operations the layer is prepared to perform on behalf of its users. A protocol, in contrast, is a set of rules governing the format and meaning of the frames, packets, or messages exchanged by peer entities within a layer. For example, the OSI (Open Systems Interconnection) model has seven layers, a Physical Layer (Layer 1) consisting of the physical equipment, and a Data Link Layer (Layer 2) which breaks the input data into data frames which are transmitted sequentially and processes any acknowledgement frames sent back by the receiver. In addition, there is a Network Layer (Layer 3), which determines how packets are routed from source to destination, which controls congestion due to too many packets, and in some cases accounts for how many packets or bits are sent. There is also a Transport Layer (Layer 4) which accepts data from a Session Layer (described next), splits it up into smaller units if needed, passes them to the network layer, and decides on what type of service to provide the session layer, including multiplexing several message streams onto one channel. In addition the Transport Layer takes care of establishing and deleting connections across the network, and provides flow control. The Session Layer (Layer 5) allows users on different machines (computers) to establish sessions between them. A session allows data transport and provides enhanced services useful in some applications, such as remote login to a remote timesharing system or to transfer a file between two machines. The Session Layer can provide token management if necessary, and synchronization services for file transfer. The Presentation Layer (Layer 6) performs and enables functions of a general nature that are often requested, such as encoding data in a standard method. The Application Layer (Layer 7) contains a variety of protocols that are commonly needed due to incompatible hardware or software.

[0006] The widespread use of TCP/IP as the protocol used to connect multiple networks together has employed the above described OSI model. The requirements of the packet network called the "Internet" led to a connection-less internetwork layer referred to as the Internet Layer, equivalent to the "Network Layer" of the OSI model, wherein the function of the layer is to deliver IP (the official packet format and protocol of this layer) packets where they are intended to go. The Presentation and Session Layers are generally not present in the TCP/IP model. The Transport layer is present in the TCP/IP model and has two end-to-end protocols defined. The first one is the TCP (Transmission Control Protocol) which provides a byte stream originating on one machine to be delivered without error on another in the Internet. The TCP fragments the incoming byte stream into discrete messages and passes each one onto the Internet Layer. At the destination the receiving TCP process reassembles the received messages into the output stream. The TCP also handles flow control to ensure that a fast sender cannot swamp a slow receiver with more messages than it can handle. The second

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protocol is known as UDP (User Datagram Protocol), which is an unreliable single shot protocol used for applications that do not want sequencing or flow control.

[0007] The Application Layer is included in the TCP/IP model and contains all the higher level protocols such as TELNET, electronic mail (SMTP), Domain Name Service (DNS), Hyper Text (HTTP), which is a protocol useful for fetching pages on the World Wide Web (WWW), and many others. The use of TCP/IP is optimized for the Internet and connection-less systems.

[0008] The end delivery of messages utilizing TCP/IP can be over a connection system such as one shown in Fig. 1A. In this example, a connection is made from the user to a satellite, which is switched according to a route or path to another satellite with a switching unit, which in turn can switch the connection to another satellite or to a gateway. The gateway in turn is connected by a switch to an Internet Service Provider (ISP) which provides a connection to the Internet via a router. This router, acting on information in the traffic packets provided to it, then routes the packets via the Internet to a host router and thence to a host server where the packets are delivered.

[0009] Many previously proposed LEO-MSS systems have been connection-based systems. GLOBALSTAR™ is a satellite system which is switch based, with the switch being located in the gateway. IRIDIUM™ is a satellite system which is switch based, with the switch being located in the satellite. The IRIDIUM™ system uses satellite-to-satellite switched links to establish a connection between a user and another user, or a user and a telephone connected to the Public Switched Telephone System. This is made clear in U.S. Patent No.: 5,410,728, which defines a communication system that includes satellite switches in space, where the satellite switches route the call through the appropriate satellites. The optimum path for the communications is determined by each satellite from itself to the next appropriate satellite. The data or voice is received on a Frequency Division Multiplexed (FDM) basis, demodulated, and then (in the satellite) packetized. The Inter-Satellite Links (ISLs) provide various paths that can be chosen by the satellites to use, however, only one single path is chosen. The paths are chosen by the satellite based on the office code portion of the telephone number of the called user, and a single path is developed based on the telephone number, as the call is "cross-linked" from one satellite to another.

[0010] Typically a connection based system utilizes the Public Switched Telephone Network (PSTN) based on various relay technologies. The early versions of the PSTN used analog techniques. Later the Frame Relay added services which provided a bare-bones connection-oriented way to move bits from point A to point B at reasonable speeds. Frame Relay can be best thought of as a virtual leased line. The difference between a leased line and a virtual leased line is that users can lease virtual circuits between two points and send packets of up to 1600 bytes between them. The Frame Relay provides a way to determine the start and end of each frame, but does not provide acknowledgements or flow control.

[0011] Alternatively, the broadband integrated services digital network (typically referred to as B-ISDN) may be used. B-ISDN employs an Asynchronous Transfer Mode (ATM) which transmits all information in small, fixed-size packets referred to as cells, each of which is 53 bytes in length. ATM uses cell switching technology, and is a clear break with traditional circuit switching. ATM networks are connection oriented, and making a call requires first sending a message to set up the connection.

[0012] In any case, from the point of view of the PSTN the system is divided into two parts, i.e., local loops and trunks. A local loop may be a local exchange which includes a home telephone, or it may be a cellular telephone system, or a mobile satellite system gateway to the user. Generally, it connects a user's device to a switch of some sort. In the case of satellite mobile systems the user is connected to a mobile telephone switching office (an MTSO), also called a MSC (mobile switching center), via a satellite. The satellite may or may not have on-board switching as described above.

[0013] Alternatively, a connection less system or packet switched system is not necessarily connected through the PSTN, but may use portions of it for the transport of traffic packets. Typically, the user encodes the packets with TCP/IP information and transmits the packets into the Internet via a router. A router, which is considerably different in architecture than a circuit switch, operates on the network layer of OSI (called the Internet layer of TCP/IP) to deliver packets from the source to the destination. The IP protocols in a connection less system or packet switched system therefore, are imposed on each packet, wherein each packet carries the full destination address. This is because each packet sent is carried independently of its predecessors, if any. This is clearly the opposite of a circuit-switched system, wherein packets are not necessarily identified, nor do they need to be, since the path between the two ends of the transmission circuit do not vary (while virtual circuits may be setup as in frame relay or ATM they are essentially fixed with respect to the user, and do not require that the user encode his packets with any information as to routing).

[0014] In the case of the IRIDIUM™ system described above the user dials a number, and that number is used within the satellite to define a path. The user need not packetize his transmission, since that will be accomplished in the satellite. A difference between a connection based system and a connection-less system is thus whether or not a call set up is required. In the case of a connection based system a call setup is required, while it is not required for a connection-less system.

[0015] There exist today two examples of the two types of telecommunications systems in common us-

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age. The Internet represents a connection-less based system while the PSTN, with its ATM networks, represents a connection based system. The Internet can work over the PSTN's ATM network by having the source host first establish an ATM network layer connection to the destination host, and by then sending independent IP packets over it. However, the typical PSTN services of telephony in general cannot be sent over the Internet directly.

[0016] In a connection-less system, successive packets may follow different routes. The independent packets of the connection-less system are called datagrams. For the case of datagram usage, routers have a table describing which output port to use for each possible destination router. In contrast, connection-based switches which setup virtual or real circuits maintain a table with one entry per open virtual (or real) circuit passing through it. Each packet traveling through the network must contain a virtual circuit number field in its header, in addition to sequence numbers, checksums and the like. Returning now to the datagram in a connection-less system, when a packet arrives the router looks up in the table the output port to use and sends the packet on its way. The establishment and release of transport layer connections does not require any special work on the part of the routers. Various routing algorithms are used to route packets from the source machine to the destination machine. In most networks, packets will require multiple hops to make the journey. The routing algorithm that is part of the network layer software is responsible for deciding which output port an incoming packet should be transmitted on. The internal decisions on routing are made anew for every arriving packet, since the best route may have changed since the last arrival of the last packet. The routing algorithms are designed for correctness, simplicity, robustness, stability, fairness, and optimality. Routing algorithms may be Non-adaptive or Adaptive. Non-adaptive algorithms do not base their decisions on measurements or estimates of current traffic or topology, while Adaptive reflect changes and are dynamic.

[0017] At the network layer, the Internet can be viewed as a collection of sub-networks that are connected together. There is no real structure, but many backbone networks, high bandwidth lines, and fast routers. Attached to the backbones are regional, national and commercial networks, and attached to these networks are various Local Area Networks (LANs) at many universities, companies, and Internet Service Providers (ISPs). Fig. 2 shows this quasi-hierarchical organization. The enabling protocol that holds the Internet together is the network layer protocol referred to as the IP (Internet Protocol).

[0018] Communication in the Internet works as follows. The Transport Layer takes data streams and breaks them up into datagrams. In theory, datagrams can be up to 64 Kbytes in length, but are typically only about 1.5 Kbytes in length. Each datagram is transmitted through the Internet, and may be fragmented into smaller units as it goes. When all the pieces finally arrive at the destination machine they are reassembled by the Network Layer into the original datagram. This datagram is then handed to the Transport Layer, which inserts it into the receiving process's input stream. Every host and router on the Internet has a 32-bit IP address, which encodes its network number and host number, the combination for each host and router being unique. A user on one network can send a packet to a user on another network by using this address. Not to be confused as a telephone number, which is used to set up a call over a specific route and to provide billing information, the IP address is instead analogous to that of a mail box, wherein each message is provided the address, with the actual route of delivery being optional.

[0019] The system operates in the following manner. The user wanting to send a packet first determines the IP address of the destination. This is accomplished by using a system known as the Domain Name System (DNS). The upper layer software on the user's machine builds a packet with the IP address for the receiving machine, and gives it to the IP software to transmit. In general, the host network then outputs a broadcast message requesting who owns that address. When the receiving machine is local, it responds with an Address Resolution Protocol (ARP) reply to the ARP request by the sending machine. The ARP reply contains the physical address of the receiving machine. At this point, the IP software builds a frame addressed to the receiving machine, puts the IP packet in the payload field, and places the frame onto the network. The receiving machine reads the frame, and the software on the receiving machine then extracts the IP packet from the frame, and passes it to the IP software, where it determines if is properly addressed, and processes it to extract the message. Various optimizations of ARP and mapping of networks have been derived, however, this simple method serves as an adequate illustration. Sending packets from the user to very distant networks is similar, except that the router's lookup tables tell it to use a Wide Area Network (WAN) Router, and it chooses to route the packet onto a network other than the local one.

[0020] As should be evident, the routers perform the task of moving packets through the network. There are, at this time, four classes of routers; Internal Routers (wholly within one area), Area Border Routers (which connect two or more areas), Backbone Routers (on the backbone), and Autonomous System Routers (for communicating between other autonomous systems). These classes overlap, with border routers automatically being part of the backbone, etc. These routers exchange information with one another during normal operation. These messages allow the routers to discover who its neighbors are, provide the sender's costs to its neighbors, acknowledge link states, announce updates, and request information from neighbor routers. Packets are transmitted over these networks, with various rout-

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ers operating on each packet to determine its path to the destination. Since following packets, with the same address, may be passed through different routers depending on various factors, such as traffic loading, availability, etc., it may be possible that the following packets arrive earlier than the previous ones. The software at the network layer then rearranges these packets into the correct order. This situation, as discussed before, is not possible with the connection-oriented system utilizing switches, as each packet would follow the preceding packet from end of the connection to the other.

[0021] A different type of satellite-based telecommunications system is described in, for example, U.S. Patents 5,736,959, "Earth-Fixed Cell Beam Management for Satellite Communication System Using Dielectric Lens-Focussed Scanning Beam Antennas", by Patterson et al.; 5,740,164, "Traffic Routing for Satellite Communication System", by Liron; and 5,796,715, "Non-Blocking Dynamic Fast Packet Switch for Satellite Communication Systems", by Patterson et al. This system employs datagram switching with cross-linked satellites and satellites that contain packet switches, wherein at each node of the system delay vectors are calculated to estimate a time delay that a given packet will experience along various paths, and the packet is routed to the destination via the pathway that insures both the lowest end-to-end delay and the best overall traffic management of the network. The routing algorithm is said to be an adaptive dynamic distributed routing algorithm where packets are switched through the network in a store and forward fashion. Both satellites and gateways may possess routing capabilities. Based on position information relating to neighboring satellites and expected delay information, an adaptive routing processor selects the 'best' pathway from a particular satellite to a single neighboring satellite, and the packet is then moved through internal switch circuitry on the satellite to the next satellite.

Summary of the Invention

[0022] In one aspect this invention solves the foregoing problems by integrating an Internet Access Point (IAP) directly into a satellite. Since the Internet uses a protocol known as TCP/IP (Transmission Control Protocol/Internet Protocol) as its transport mechanism, and since minimizing the delay of packet data is important, this invention provides a low delay, global transport mechanism to optimize satellite delivery of Internet Services (IS).

[0023] A method in accordance with this invention, and apparatus that operates in accordance with the method, routes multiple copies of a given packet between a source node and a destination node using a plurality of satellites and at least one gateway.

[0024] This invention provides a satellite communication system that includes a plurality of satellites, such as low earth orbit satellites, and a plurality of gateways. The satellite communication system is bidirectionally coupled to a terrestrial communication system through at least the plurality of gateways. The satellite communication system and the terrestrial communications system together form a data communication network having a plurality of nodes including source nodes, destination nodes and intermediate nodes. Multiple copies of a packet can coexist within the data communication network and the packet and its one or more copies are routed, using at least in part satellite-resident routers and gateway-resident routers, over a plurality of different paths between a particular source node and a particular destination node. At least one duplicate copy of a given packet is simply ignored during the execution of a packet reordering procedure in the destination node. Certain of the paths are carried over satellite-to-satellite cross-links, while certain other ones of the paths are carried over satellite-to-gateway uplinks and downlinks, and at least one path exists between a user terminal and at least one satellite.

[0025] In a preferred embodiment the packets are TCP/IP (or equivalent protocol) packets containing information for enabling the selective destruction of a duplicate packet to occur.

[0026] The plurality of gateways couple the satellite communication system to the terrestrial communication system at a plurality of points, including at least at one of regional networks, national networks, commercial networks, Internet Service Providers (ISPs), or directly to a backbone network.

[0027] In accordance with a method of this invention for packet data transmission through a data communications system comprising satellite routers and terrestrial routers, the following steps are executed: originating a stream of packets at a source node; selectively duplicating individual ones of the stream of packets and operating the satellite routers to route duplicate packets over different paths, including wireless paths through a medium subject to transmission impairments; and reconstructing the stream of packets from received packets while ignoring an arrival of an already received and valid packet.

[0028] The step of selectively duplicating is performed in at least one satellite router in response to at least one criterion. The at least one criterion can be one of a measure of the quality of the medium; whether the packet was previously duplicated; a number of remaining hops from the satellite router to a destination node; a current available bandwidth; a user service agreement; a direction of transmission, from source to destination or from destination to source; and whether multicasting is desired.

Brief Description of the Drawings

[0029] Examples of the present invention will now be described in detail with reference to the accompanying drawings, in which:

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Fig. 1A is simplified block diagram of conventional connection based Internet access satellite communication system;

Fig. 1B is a simplified block diagram of connection-less based Internet access satellite communication system in accordance with an embodiment of this invention;

Fig. 2 is a simplified network diagram of the conventional Internet;

Fig. 3 depicts an embodiment of a connection-less satellite Internet access system in accordance with an embodiment of this invention;

Fig. 4A is related to Fig. 3, and illustrates the operation of sending packets from a user to a host in a first embodiment;

Fig. 4B illustrates the operation of sending packets from the user to the host in a second embodiment of this invention, wherein the same packet is sent from one node to two or more connected nodes;

Fig. 5A is also related to Fig. 3, and illustrates the operation of sending packets from the host to the user in a first embodiment;

Fig. 5B illustrates the operation of sending packets from the host to the user in accordance with the second embodiment, wherein the same packet is sent from one node to two or more connected nodes;

Fig. 6 is a network diagram, partly in block diagram form, that illustrates an example of how the connection-less satellite Internet access system of this invention can be integrated with the Internet;

Fig. 7 is a block diagram of the satellite system in accordance with this invention, and shows a more detailed block diagram of one of the communication satellites;

Fig. 8 is a block diagram of a satellite mobile Internet access user terminal;

Fig. 9 is a depiction of IP and TCP packet structures;

Fig. 10 is a block diagram illustrating the IP processor segment of the satellite mobile Internet access user terminal of Fig. 8;

Fig. 11 depicts an example of outbound user terminal to satellite constellation links;

Fig. 12 depicts another example of outbound user terminal to satellite constellation links;

Fig. 13 illustrates an example of return path links through a satellite-based router;

Fig. 14 illustrates an example of user terminal to user terminal communications; and,

Figs. 15A-15F are diagrams that are useful in explaining the arrival and use of multiple packets having the same sequence number.

Detailed Description

[0030] By way of introduction, and in opposition to the prior art connection oriented system to and from the Internet Service Provider (ISP) that was described above, this invention utilizes satellites with routers to extend the edge of the Internet to the user. In the connection-less Internet access system shown in Fig. 1B there exists a plurality of nodes. A node may be a source node, a destination node, or an intermediate node. A given user or user terminal 7 may be either a source node or a destination node, while a gateway 5 may typically be an intermediate node, as would be individual ones of the satellites 3.

[0031] In Fig. 1b a user 7 establishes a connection to one or more satellites 3, each having a satellite router 4, for exchanging TCP/IP information. TCP/IP is connection-oriented protocol. The packets of TCP/IP information are routed over a Satellite Internet Network (SIN) through inter-satellite links (cross-links) 13 to a ground service introduction point (GSIP), such as a gateway 5, which includes a gateway router 6. The packets of TCP/IP information are then introduced into the Terrestrial Internet Network (TIN) 8 and flow therein in a normal manner.

[0032] A more detailed diagram of the Satellite-based Connectionless Internet Access (CLIA) system of this invention is shown in Fig. 3. A satellite communication system 1 has a constellation 2 of satellites 3, each of which incorporates a router 4. A user 7 can bi-directionally couple to the constellation 2 or to an individual satellite 3 with a wireless communication link 10. The routers 4 are interconnected within the constellation 2, allowing independent and multiple links or paths for packets sent or received by the user 7. The satellites 3 are also bi-directionally coupled with links 11 to gateways 5 (two of which are shown for convenience). The gateways 5 may each include a gateway router 6 which is connected to various terrestrial networks 8. The gateway routers 6 may be connected to each other for interconnecting system users 7, or via the other various terrestrial networks 8 to destination or source routers, and host servers 9. An important purpose of the system 1 is to send data packets to and receive data packets from the users 7. In a most preferred embodiment of this invention the packets are TCP/IP packets, although in other embodiments the packets may conform to some other standard or protocol.

[0033] A user 7 sending two consecutive packets of data through the system 1 to a host server 9 is shown in Fig. 4A. The packets are formed in the user terminal 7 and are sent via the user link 10 to the constellation of satellites 2. For a simple example, first consider reception by a single satellite 3a of packets formed and sent by user 7. The satellite 3a receives the packets P1 and P2 sequentially, and provides them to its router 4. The router 4, when operating on the packet received first, calculates an optimal path depending on the routing algorithm used. In one example it determines that, at that instant, satellite 3b will receive the packet P1, and the router 4 in satellite 3a puts it on the cross-link 13 to that satellite, and sends it on its way. Then when operating on the packet P2 the router 4 of satellite 3a determines that, at that instant, satellite 3c is optimum

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for transmitting the packet, and router 4 puts it on the cross-link 13 to that satellite. While it is possible that sequential packets may be sent to the same satellite, it is not necessary, and the path is chosen independently for each packet depending on the state of the information of the router 4 in satellite 3a. In any case, packet P1 is received by satellite 3b and operated on by its router 4. This router determines if it should be sent on to another router in another satellite or sent to a ground node gateway 5. Assuming that the determination of the router 4 in satellite 3b is that it should be sent to a gateway 5, it puts it on the gateway link 11 to the gateway 5 and transmits it to the ground where it is received by the gateway and sent to the gateway router 6. The gateway router 6 then operates on the packet P1 and places it on the network 8 for delivery to the destination router 9 and eventual delivery to the host server. In a similar manner, packet P2 is processed by various satellite, gateway, and terrestrial network routers, which enable the packet P2 to arrive at the destination router 9. The network layer and transport layer software at the destination router 9 then reassembles the IP fragments, puts the packets in their proper order, and delivers them to the server application.

[0034] Fig. 4B shows an embodiment wherein satellite 3a has elected to send packet P1 to satellite 3b, but to send packet P2 to both satellites 3a and 3b. In this embodiment multiple copies of the same packet can coexist within the system 1, and can arrive at different times at the final destination. In this case the normal TCP/IP packet handling procedures are responsible for detecting the presence of multiple copies of packets, and for deleting the unnecessary (duplicate) copies. This embodiment of the invention may be considered to be similar to or a variant of flood routing, or to be a modified flood routing technique. The decision to route duplicate copies of a given packet over two or more paths can be made on a packet-by-packet basis, based on system considerations, or can be done automatically for all packets. By example, every packet arriving at satellite 3b may be automatically routed to every neighbor satellite (e.g., satellites 3b and 3c), and the same can be done at satellite 3b and satellite 3c. Automatically downlinking a packet to any available gateway 5 may be done as well, in addition to routing the packet via cross-links 13 to other satellites. Alternatively, if a given packet is downlinked to a gateway 5, then additional copies of that packet may not be further transmitted via cross-links 13 to other satellites 3.

[0035] Referring to Fig. 5A, a host server located in a destination or source location sends packets to the user 7 in a similar method to that of Fig. 4A. The packets are formed in the host server or computer and sent to a router 9 and thence to various terrestrial networks 8. For a simple example, first consider transmission of the packets to the user 7 by a single satellite 3a. The router 9 makes decisions about the paths to send the packets. The example in Fig. 5A shows packet P1 following one path, and packet P2 following another. In fact, sequential packets may be routed via various paths or over a single path to gateway router(s) 6. When a packet arrives at gateway 5 it is uplinked via gateway link 11 to one or more of the satellites 3. Packets such as P2 which arrive at a different gateway 5 are also processed and sent to a satellite 3 over link 11. In the illustrated example the satellite 3b receives the packet P1 and the satellite 3c receives packet P2, and then individually provide them to their respective routers 4. The routers 4 operate on the received packets first by calculating an optimal path, depending on the routing algorithm used. In this example satellite 3b determines that, at that instant, satellite 3a will receive the packet P1 and puts it on the link to that satellite, and sends it on its way. Satellite 3c operating on the packet P2 determines that, at that instant, satellite 3a is also optimum for transmitting the packet and puts it on the link to that satellite. While it is possible that sequential packets may be sent to the same satellite, it is not necessary, and in this embodiment the path is chosen independently for each packet depending on the state of the information of the router 4 in the satellites 3b and 3c. In any case, packets P1 and P2 are received by satellite 3a and operated on by its router 4. This router determines if it should be sent on to another router in another satellite or sent to the user. Assuming that the determination of the router in satellite 3a is that the packets should be sent to the user 7, it puts P1 and P2 on the user link 10 and transmits them to the ground where they are received by the user 7. The Network Layer and transport layer software at the destination 9 then reassembles the IP fragments, puts the packets in their proper order and delivers them to the server application.

[0036] Fig. 5B shows an embodiment wherein satellite 3b has elected to send packet P1 to satellite 3a, and to also send packet P1 to satellite 3c. As in the embodiment of Fig. 4B, in this embodiment multiple copies of the same packet can coexist within the system 1, and can arrive at different times at the final destination, in this case the user terminal 7. Note that satellite 3c routes both the uplinked packet P2 to satellite 3a, as well as the cross-linked copy of packet P1. Satellite 3a then subsequently transmits three packets to the user terminal 7, specifically packet P2, followed by two copies of packet P1. At some other time the order may be P2, P1, P1; or P1, P2, P1, depending on path lengths and propagation delays. The TCP/IP software operating in the user terminal 7 (described below with reference to Fig. 10) is responsible for detecting and deleting the duplicate copy of P1, as well as reordering, if necessary, the packets into the correct order P1 followed by P2. It is within the scope of this invention to also provide for the detection of duplicate packets in one or more of the satellites 3, and to delete the duplicate packets in space. By example, the satellite 3a may be operable for detecting the presence of duplicate packets, and for ensuring that only one packet is transmitted on the downlink to the user terminal 7. Data in the TCP portion of the pack-

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et, such as the sequence number (see Fig. 9), can be used for this purpose, as described in further detail below.

[0037] In general, multiple packets can be generated in two ways. First, the user terminal 7 when communicating toward the host can send its packets via two or more satellites 3, by simply transmitting the same packet towards more than one satellite from an omni-directional or near omni-directional antenna. The multiple copies of the same packets are then received by the individual satellites 3 and the operation is as described above. The packets received by each satellite 3 are processed and are transmitted toward a destination gateway 5. As such, it can be appreciated that there may be two or more independent paths taken by the multiple copies of the same packet, and that the same packet may arrive at the gateway 5 from two or more different satellites 3. Alternatively, the multiple copies of the same packets may arrive at two or more different gateways 5 and be injected independently into the Internet. This robustness is important in the satellite environment, since the links involved are generally less robust than terrestrial links.

[0038] As an example, Fig. 15A shows packets arriving at the destination over three different paths. The sender sends four packets 1, 2, 3 and 4 to the destination. There is a TCP time-out associated with these packets. If all the paths are good, then the destination will receive three packets (for example, 1, 1' and 1" as shown in Fig. 15A) for every packet transmitted by the sender. In other words, the receiver may receive multiple, duplicate packets. In general, several possibilities then exist at the receiver, as discussed below.

[0039] As shown in Fig. 15B, the packets arrive in a timely manner, and are not corrupted. In this case the redundant packets are simply ignored when sending packets 1, 2, 3 and 4 to the application that will consume or otherwise use the packets.

[0040] As shown in Fig. 15C, the packets arrive timely, but one packet (packet 2) of the multiple packets is corrupted. A redundant packet (arriving within the time-out period (packet 2' in the example)) is recognized, and is used in place of the earlier arriving but corrupted packet 2. Any subsequently arriving redundant packet(s) are ignored.

[0041] Referring now to the case shown in Fig. 15D, the packets again arrive in a timely manner, but all packets with the same sequence number (sequence number 2 in this example) are corrupted. The first (packet 2) and the subsequent packets (packets 2' and 2") of this sequence number are thus ignored. After the timeout period, and in the absence of an acknowledgement or in the presence of a specific non-acknowledgment, the sender equipment starts the retransmission of packet 2 and all the packets subsequent to packet 2 (packets 3 and 4 in this example). When the receiving host computer receives packet 2 (in the form of 2, 2' or 2"), it reassembles all the packets (in this case, packets 1,2,3,4) and lets the sender know through acknowledgement that it is waiting for packet 5 if the sender intends to send it. If the sender then receives this acknowledgement before it has finished retransmission of packets 2, 3 and 4, the sender will abort retransmission activity, and begin to transmit packet 5.

[0042] Referring to Fig. 15E, the packets arrive in a partially timely manner, for example, the first packet of a sequence number (for example packet 2) is within time, but the redundant packets 2', 2" are not. If the first packet of sequence 2 is not corrupted it is used, and the subsequent packets that are in time or late are ignored.

[0043] Finally, and referring to Fig. 15F, the packets again arrive in a partially timely manner, but one packet (e.g. packet 2) is corrupted. In this case one of the subsequent redundant packets (e.g. packet 2') that arrives within the timeout period is recognized and used, and any subsequent redundant packet is ignored. If, however, no redundant packet is received before the timeout, then a packet that arrives after the timeout, and that is not corrupted, is used.

[0044] One of the advantages of sending multiple packets over multiple paths can be clearly seen in the case of Fig. 15E. If there were only one path, then the sender would time out if it did not receive an acknowledgement from the receiver. If the packet 2 was corrupted, then the receiver will not send the acknowledgement. In this case the receiver will simply wait until the retransmitted packet 2 arrives. However, the use of multiple paths increases the possibility of receiving an instance of the packet 2. Even if an instance of a packet arrives at the receiver after the timeout, the use of the "late" packet will still normally save time over the case of waiting for the arrival of a retransmission of the packet by the sender. Also, the arrival of an instance of the packet (before or after a timeout) can reduce significantly a required number of packet retransmissions from the sender.

[0045] In the reverse direction, the host computer 9 generates packets and introduces them sequentially into the Internet, and these packets arrive at the destination gateway 5. The gateway 5 can generate a single stream of packets and direct them to a satellite 3. Alternatively, the gateway 5 can, according to stored algorithms, operate on a user by user basis to generate multiple packets. The gateway 5 can send duplicate packets for all, or for only some users, via the satellites 3 that it can "see". Alternatively, the gateway 5 can transmit the single stream of packets to a single satellite 3, whose router 4 can then generate multiple packets that are transmitted by a least one, but preferably two or more satellites 3 in the direction of the destination user terminal 7. The user terminal 7 can receive the multiple packets and the process described above with respect to Figs. 15A-15F can be applied.

[0046] Briefly, billing can be accounted for in several ways. First, the satellite system operator may simply account for the total number of packets sent through the

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system. The utilization of individual satellites 3 and/or a gateway 5 by a user can be determined on an individual session basis, or accumulated over time. Other means of billing are possible, as discussed in further detail below.

[0047] The above described system and operational method is integrated with various networks in the world, as depicted in Fig. 6. Four gateways 5 and routers 6 are shown, however, there can be more or less than this number. The gateways 5 may be connected via their routers 6 and external network connections 12 to routers of various and different other networks. In general, the gateways 5 will be connected to Regional Networks, National Networks, Commercial Networks, Internet Service Providers (ISPs) or directly to the high speed international backbone network. These external network connections 12 may be of various types of physical communication channels, such as copper wire, baseband coaxial cable, broadband coaxial cable, fiber optics, or wireless transmission (radio, microwave, or laser). Fig. 6 makes it clear that the user terminal 7 can obtain data from a wide variety of local area networks, interne users of all sorts, and a vast array of Internet users and servers on a global basis.

[0048] A discussion will now be made of the satellite constellation 2. It is first noted that there is no limit on the number of satellites 3 or the configuration of the orbits used by the constellation 2. However, in a preferred embodiment a Low Earth Orbit (LEO) constellation is used. Since one of the difficulties of data transmission using TCP/IP or other protocols is the inherent delay in the transmission of the packets, the LEO constellation has an advantage over other constellations such as medium earth orbit (MEO) or geosynchronous earth orbit (GEO). LEO satellites situated closer to the surface of the earth are able to communicate with the user 7 in a shorter length of time than satellites located at higher altitudes. Further, LEO satellites can offer diversity and better connectivity to local gateways. However, LEO (and MEO) satellites move from point to point in their orbits over the surface of the earth and therefore are not stationary with respect to their coverage zones. In previous LEO Mobile Satellite Systems, which are connection based, this means that the call (i.e. the connection) must be handed off from one satellite to another as the satellites move around the earth with respect to a user who is located in some geometric service area on the ground. However, in accordance with this invention the necessity to "hand off" the call is avoided and is not necessary. In fact, the user is constantly in communication with the constellation 2, not necessarily any specific satellite, and is receiving packets from any satellite router 4 which can "see" the user. Since the routers 4 are individually routing packets to the user in a connectionless manner, there is no need to hand off the user. With this invention, the user 7 may be located in a specific location, or may be mobile and moving. Since the addressing uses TCP/IP or other similar protocols, there is no need for a telephone number, although it may be convenient to represent the address as one. In addition, there is no need for a Home Location Register (HLR) or a Visitor Location Register (VLR) to log users in and out of the system 1 as in cellular systems, although they may be used for convenience. Since users only transmit packets when they have traffic, and since they are operated in a connection-less manner, the user may be always connected to the system 1 much in the same manner that user PCs are always connected to a local area network, and only transmit data when they have traffic. Since the network software in the gateway 5 is processing the packets of data to and from the user 7 to the external networks (e.g., regional and national networks), it has knowledge of the amount of traffic in, for example, bits or bytes that the user 7 is handling, as well as a time stamp of the initiation and final delivery of messages.

[0049] The gateways 5 are preferably connected together by a Wide Area Network (WAN). For the cases where the user communication goes through multiple gateways 5, the communication between the gateways 5 enables proper billing. Therefore, it is possible to account for the traffic to and from a given user terminal 7 individually, and to bill the user terminal 7 in an appropriate manner for his or her system usage. A gateway router is receiving packets from the user terminal 7 and those being sent to the user terminal 7. The gateways 5 can be connected together either by a dedicated network, also called the GDN (Ground Data Network). Alternatively, the gateway routers 6 can interface to each other through the Internet to deliver billing information. Since the user terminal 7 can always be connected to the system there is no need for a log-in procedure, although it may be convenient for other purposes.

[0050] A description of a typical satellite 3 is provided in Fig. 7, which represents but one of potentially many different suitable configurations. The basic premise is that signals arriving from either users 7 or gateways 5 are received, down-converted, and processed as baseband signals wherein the TCP/IP packets are detected and processed. In Fig. 7 the user 7 signals are transmitted to the satellite 3 on link 10a and received by the satellite antenna 301 and sent to the receiver of the satellite communication payload 310. After reception by the payload 310, the Radio Frequency (RF) signal is down-converted from RF to baseband and sent to demodulators of the payload modem(s). The demodulated signal data output bit stream is then applied to an on-board computer which uses stored algorithm and which operates to send the packets of user data to the router 4. In the manner discussed above, the router 4 determines the destination path for the packet to be routed to. This path may be to a ground transmit antenna 302 or 304, or to another satellite or satellites via cross-link transmit antenna(s) 305. In any case, the packet is then sent back to the computer and thence to the modem(s) where the packet is mixed with other similar destined packets and

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applied to the proper up-converter for transmission to the destination path. After up-conversion the bit stream containing the user 7 packet is amplified and transmitted to its next destination. If the choice of destination is another satellite it is amplified by the cross-link transmitter and applied to the cross-link transmit antenna 305 and sent over the cross-link 13a. If the choice was to send the packet to the ground node the packet is amplified by the gateway satellite transmitter and applied to downlink link 11b through gateway transmit antenna 304.

[0051] The packets from a gateway 5 are sent over uplink link 1 Ia and are received by satellite gateway receive antenna 303 and applied to the gateway/satellite receiver of the satellite communication payload 310. After reception by the payload, the RF signal is down converted from RF to baseband and sent to demodulators of the payload modem(s). The demodulated signal data output bit stream is then applied to the on-board computer which, using the stored algorithms, operates to send the packets of user data to the router 4. In the manner discussed above, the router 4 determines the destination path for the packet to be routed to. This path may be to the user transmit antenna 302, or to a specified other satellite or satellites via the cross-link antenna(s) 305. In any case, the packet is then sent back to the computer and thence to the modem(s) where the packet is mixed with other similar destined packets and applied to the proper up-converter for transmission to the destination path. After up-conversion the bit stream containing the gateway 5 packet is amplified and transmitted to its next destination. If the choice of destination is another satellite it is amplified by the cross-link transmitter and applied to the cross-link antenna 305 and sent over the cross-link 13a. If the choice was to send the packet to the user 7 the packet is amplified by the user satellite transmitter and applied to user downlink 10b through transmit antenna 302.

[0052] The satellite 3 includes multi-beam user receive and transmit antennas which may be static or directed toward specific locations. The satellite gateway antennas 303, 304 may be a single beam which is fixed, pointed or steered to a particular point on the ground. Alternatively, the satellite gateway antenna may be a multibeam configuration. The cross-link antennas 305, 306 may be simple or complex, and will in general track other satellites 3 of the constellation 2, and may be able to be pointed on command or under the control of the onboard computer. There may be more than one set of equipment for each of the Transmit/Receive functions. For example, there can be several cross-link Transmit/Receive (T/R) systems for tracking and communicating with more than one satellite at a time. This payload may be interconnected with other satellite communication payloads for further flexibility of communications. The satellite 3 also has a power system 312 which includes solar arrays for generating power from the sun, batteries for use when the satellite 3 is in eclipse, and a power conditioning system to regulate the power. In addition, there are other bus subsystems 311 which point, support, process telemetry and command data, and perform other functions. A satellite memory 314 is used to store the above-mentioned routing algorithm(s) and any tables and data associated therewith, as well as to provide temporary storage of received packets (store and forward), as well as to provide whatever other program and data storage is required by the onboard computer (s).

[0053] Fig. 8 depicts a user terminal 7 configuration. The user terminals 7 receive packets of data, decode the received packets, and deliver the data payloads contained within the packets to other devices, such as computers or display devices, and associated software to perform various tasks. User terminals 7 also form packets of payload data, encode the packets, and transmit them to the satellite constellation 2. These user terminal functions may be combined with other user terminal functions, including previous circuit switched (connection based) types to form multiple mode terminals capable of acting as both a connection based or a connection-less based communication device. These multi-mode terminals may, in addition, be capable of functioning in both in the satellite mode or in a terrestrial mode. Such "dual mode" or even "tri-mode" devices can be operational in either a satellite based circuit switched (connection based) system or a terrestrial based circuit switched system. For the purposes of this invention, "dual operation" is considered to mean a capability of operating within either a connection based or a connection-less network, while "dual mode" is considered to mean a capability of operating in either a terrestrial network or a satellite network.

[0054] For simplicity, only a single mode, single operation user terminal will be described. Referring to Fig. 8, a User Terminal (UT) 7 contains a Radio Segment 701 which is bi-directionally coupled to the satellite constellation 2. The wireless links coupling the UT 7 to the satellite constellation 2 are received and transmitted on frequencies F1 (transmit) and F2 (receive). These frequencies can be in different portions or bands of the radio spectrum, different frequencies within a specified band of frequencies of the radio spectrum, or they can both be on the same frequency of the radio spectrum.

[0055] In any case, the received frequency (F2) is amplified in a low noise amplifier (LNA) 701a, and then down converted to an intermediate frequency (IF) or to baseband using components 701b and 701c. Fig. 8 shows the case where the received frequency is down converted to an intermediate frequency. The signal can be further down converted or may be utilized in some other manner. In any case the signal is converted from analog to digital in an analog to digital converter (ADC) 701d and applied to a doppler correction circuit 701e and thence to a demodulator 701f. The demodulator 701f can be of any type which is able to decode the signals transmitted from the satellite(s). For example, the demodulator 701f may be capable of demodulating a

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particular kind of modulation such as Frequency Division Multiple Access (FDMA), Time Division Multiple Access (TDMA) signals of various types (including Frequency Hopped), or Code Division Multiple Access (CDMA). The remainder of this description describes a CDMA modulation type, but those skilled in the art will recognize that many types of modulation (and corresponding demodulation) are possible. The received signal(s) are thus applied to a CDMA demodulator 107f which separates signals received from one or more satellites and, after detection, applies them to a combiner to get the maximum signal strength. After combining the signals are deinterleaved in unit 710g and sent to a decoder 701h. The decoder 701h further processes the signals and sends the decoded signals to an IP processor 705 (shown in Fig. 10). The IP processor 705 extracts the message payload from the packet and either sends it to an audio segment 702 for voice extraction, or to a data segment 703 for data formatting. If the signal is voice it is applied to a vocoder 702a thence to a codec 702b and is finally amplified and applied to a speaker 702c. If the message is data, the payload is applied to a data portion 703 and may then be routed to a data I/O connector 704 which sends the received data to another device, such as a computer or any other device capable of utilizing data. The data I/O connector 704 could be connected to a data communication network, and the other device or devices utilizing the received data could be located at considerable distance from the UT 7. In general, the other device may be integrated into the satellite mobile interne access user terminal 7, or they may be separate therefrom.

[0056] The UT 7 is also capable of transmitting data, acknowledgements and other information. In order to perform this function the UT 7 encodes the data with the TCP/IP protocol, forms a packet with this information, and transmits the packet towards the satellite communications system. The UT 7 can provide and transmit at least two kinds of messages, specifically voice messages and data messages. For voice messages the UT 7 audio segment 702 has a microphone 702d which amplifies the voice input and sends it to the codec 702b. The codec 702b converts the voice input to a digital signal and sends it to the vocoder 702a, which takes the codec output and reduces the data rate to a smaller value. Typical vocoders can produce packetized voice in various packet time lengths (such as 20ms) at data rates from 14 Kbps down to 2.4 Kbps. Voice quality depends on the algorithms used, the rate sent, and other factors. Both fixed and variable rate vocoders can be used in the UT 7. In any case, the vocoded packets are sent to the IP processor segment 705 of the UT 7 where further operations are performed. Data, on the other hand, is inputted from the data I/O connector 704 and routed to the data portion 703 of the UT 7. The data portion 703 operates on the input data to packetize it into various formats as required. Alternatively this function can be accomplished in the IP processor segment 705 after the input data stream is applied to the IP processor segment 705. In either case, the packetized voice or data is wrapped as a payload and placed into a packet that conforms to the TCP/IP protocol (or any other packet protocol that may be of interest). Other functions can be performed by the IP processor segment 705, such as adding another protocol specific to the transmission over the wireless system, such as a Radio Link Protocol (RLP). If used, the RLP can be stripped off either in the satellite 3 or in the gateway 5, leaving the TCP/IP packet intact. While there may be various versions of protocols, or different protocols than TCP/IP that can be used by this invention, it is instructive to use TCP/IP as a model for explanation.

[0057] The structure of a conventional TCP/IP packet is shown in Fig. 9. One important feature of interest is the Transfer Service Access Point (TSAP). The TSAP is the end point definitions of the pair of machines that are communicating. The TSAP is made up of two parts, and each of these parts are further made up of two elements. The first part is the Source end point, and the second is the Destination end point. Considering first the Source, its definition is the IP Source Address plus the TCP Source Port number. These two sequences are stored in the UT 7 or are passed to the UT 7 from another connected machine or computer. During the initial period of transmission to the destination the source machine determines the Destination Address and the Destination Port number and fills out the fields of the TCP/IP packet header. The other fields are used for transport control and integrity checking, verification of reception, triggers to start and stop additional packets of data, and to signal end of transmission. Every host computer and router on the Internet has an IP address. In this invention the UT 7 can sometimes be the host, and at other times can be a device coupled to a host. Therefore, the UT 7 has its own IP address, and an ability to bypass the IP address and to use instead the IP address of a host coupled to the UT 7.

[0058] Referring now as well to Fig. 10, the IP processor segment 705 of the UT 7 is shown. The IP processor segment 705 includes a processor 751 which is coupled to a memory system 752, which stores an IP address 753 and a Port Number 754. These IP addresses are unique, with no two machines or UT's having the same number. The processor 751 and memory 752 are coupled to packet assemblers and disassemblers 755 and 757, respectively. In addition to these devices, there is a voice/data detector 756 to process the packets differently according to the needs of these two services. The voice/data detector 756 is coupled to the processor 751 which modifies the choice of packet header data in accordance with a stored algorithm 758.

[0059] The IP segment 705 operates in the following manner. For outgoing packets the IP segment 705 receives either voice IN or data IN packets through I/O buffers, which are then applied to the voice/data detector 756. The detector 756 then instructs the processor

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751 as to which type of data is active. The processor 751, according to the algorithm 758 stored in memory 752, operates to selectively fill TCP/IP header fields in the packet assembler 755 with TCP/IP data as required. The detector 756 passes the packet to the packet assembler 755 where it is acted upon to append the data payload to complete the packet. The packet is then placed into an I/O buffer, if necessary, and is then sent to an encoder 701i of the UT 7 (see Fig. 8) for further processing. The packet is next passed through the transmit chain of the radio segment 701 of the UT 7, and is coupled to the UT antenna for transmission to the satellite constellation 2 at the transmit frequency F1. The transmit chain is constructed so as to be essentially the inverse of the receiver chain and includes, in addition to the encoder 701i, an interleaver 701j, a CDMA modulator 701k, a Doppler pre-corrector 7011, a digital to analog converter (DAC) 701m, an IF unit 701n, an up converter (IF to F1) 701o and a power amplifier (PA) 701p.

[0060] The UT 7 can also receive data, acknowledgements and other information. In order to perform this function the UT 7 decodes the input data, with the TCP/IP protocol, and applies the packets to a disassembler which separates the payload data and header information, and finally utilizes the information contained in the payload or passes it on to another device. The UT 7 can receive at least two kinds of messages, namely voice messages and data messages. Received packets are sent from the UT decoder 701h of radio segment 701 to the I/O buffers of the IP processor segment 705, if necessary.

[0061] Referring again now to Fig. 10, the decoded packets are received into the packet disassembler 757 where, acting under instructions of the processor 751, the packets are disassembled, with the header information being sent to the processor 751 and the payload being sent to the voice/data detector 756. The arriving (received) packets may be in a different order than the order in which they were first transmitted from the host. However, the packets can be reassembled in the proper order by an order reassembler 759, acting on instructions from the processor 751. Since at disassembly the header information in the TCP portion of the packet contains the sequence number of the packet, with respect to the other packets sent from the same host, the processor 751 is enabled to instruct the order reassembler 759 how to reorder the packets. After reordering, the data stream containing the packets is applied to the voice/data detector 756. The data payloads arriving at the detector 756 are parsed, under control of the processor 751, into either voice or data and are applied to an output buffer if required, and are thence sent to either the data segment 703 or the audio segment 702 of the UT 7 for further processing.

[0062] As was discussed earlier, the TCP/IP software operating in the user terminal 7, specifically the packet processing algorithm 758, may also be responsible for detecting and deleting duplicate copies of received packets, as well as reordering, if necessary, the packets into the correct sequence order. The sequence number field of the TCP portion of the packet can be used for this purpose.

[0063] With regard to satellite reception from the user terminal 7, the constellation 2 receives RF signals (at Fig. 3) from the UTs. These signals may be directed toward one or more of the satellites using a directional antenna, or may be broadcast toward all visible satellites. Fig. 11 provides a graphic illustration of two techniques for the UT 7 to transmit to the constellation 2. In Fig. 11 there is shown a UT 7 with an omnidirectional antenna 720. Packets are transmitted toward the constellation 3 and, in accordance with this example, the packets are received independently by a satellite 3a in an orbit 15a and by a satellite 3b in an orbit 15b. In the other case, a UT 7 with a directional antenna 721 directs its transmission toward a specific satellite 3c in an orbit 15c. Neither UT can view or transmit to satellite 3d in orbit 15d. In general, a UT will be able to see and transmit towards about two to three satellites at any given time. Only in the case of the omni-directional antenna 720 are two copies of the same packet intentionally received by two or more satellites. The redundancy afforded by the reception of the packets by two or more satellites provides diversity reception and, therefore, a more robust communications link, an especially important consideration for mobile communications systems. On the other hand, single satellite reception simplifies the transmission and overall signal processing operation. In either case at least one satellite receives the signals transmitted by a given one of the user terminals 7. The satellite communications signals deliver the baseband packets transmitted to the satellite router 4 (see Figs, 1, 3, 4A, 4B, 5A, 5B and 7). The router 4, since no particular path has been worked out in advance, is charged with the responsibility of deciding what to do with the packet, and since each successive packet may be sent on different paths, cannot rely on what path the preceding packet has taken to make its decision. In order to perform this decision, the router 4 must know what paths it has available and what paths cannot (at least at the present time) be supported. Since the satellite-based routers 4 are moving with respect to the ground based gateway routers 6, the satellite routers 4 continually update their path availability, and keep track of nearby and distant other satellites routers, as well as the available gateways 5 and gateway routers 6.

[0064] There are several techniques for performing these functions. First, since the satellites of the constellation 2 are predictable in their orbits, and since the gateways 5 are not moving with respect to the surface of the earth, it is possible to maintain a database of these router addresses, and to map IP addresses onto the satellites of the constellation 2 according to a calculation algorithm based on geometry and system availability according to time. A second technique is to have each router 4 (and 6) broadcast its address periodically, and then

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have each router that receives the broadcast update its list of destination paths accordingly.

[0065] In any case, the router 4 knows at any given time which adjacent and neighbor routers 4 and 6 that it can communicate with. Various routing algorithms can be used to decide on the path to send the packet based on its detected destination address. One algorithm that can be used is referred to as an Open Shortest Path First or OSPF technique. OSPF is a common used algorithm for multi-access networks that have multiple routers. OSPF operates by abstracting the collection of available paths into a directed graph in which each path is assigned a distance, delay, and cost etc. Weighting of the various elements are assigned depending on the state of the network. In accordance with the teaching of this invention the satellite network could use availability, traffic loading, battery status, or other parameters to provide path selection data, as well as path weighting. A serial connection between any two routers on the graph is then represented by a pair of arcs, one in each direction. Their weights may be different, (i.e. the forward link may be substantially different than the return link). The end result is that the router can determine from the destination address the best path to the next router (shortest delay, or lowest cost, or best for traffic loading, or other parameters) to send the packet. Other algorithms may be used to achieve the same purpose.

[0066] In any case, the packet with its TCP/IP header intact is sent on to either another satellite and its router 4, or to a gateway 5 and its router 6. Two possibilities exist for forwarding subsequent packets to the same destination. If the satellite sub-network uses datagrams internally, this decision is made for every arriving data packet since the best route may have changed since the last time a packet was sent. If the satellite sub-net uses virtual circuits internally, path decisions are made only when a new virtual circuit is established. This latter case is useful to minimize packet delay and processing for voice over IP networks. Routing algorithms may be non-adaptive or adaptive. If a non-adaptive algorithm is used the paths are pre-chosen depending on, by example, previous historical data on traffic, and a router path lookup table can be used to send the packet with the specified destination to a predetermined path, based on the time of arrival, the available routers, and the satellite constellation ephemeris. In contrast, an adaptive routing may be used wherein the router 4 changes its routing decisions to reflect changes in the network topology and traffic in accordance with the packet destination. In either case a given one of the satellites (3a, 3b,...) that receives the packet must resolve an east, west, north, south issue.

[0067] For example, consider the case where the user is in New York, New York, and uplinks a packet with a destination of Moscow, Russia to a satellite overhead.

[0068] The satellite router may determine that there are two paths that can be derived, for example a path to a satellite east of itself or a satellite north of itself. In this case, additional decision parameters may be needed to resolve the ambiguity. In principle, the least delay will generally be the best path. In this case, since the router knows for this instant which satellite can be transmitted toward to achieve the lowest total delay, not just the lowest delay to the next satellite, it can determine which path to chose. Alternatively, it may calculate the total number of hops that the packet would have to make for each and choose the lowest hop count. Other routing algorithms may use Shortest Path Routing, Flooding or Selective Flooding, Flow based Routing, Distance Vector Routing, Link State Routing, Hierarchical Routing, either alone or in combination.

[0069] With the omni-directional UT antenna 720, multiple copies of the packet may be injected into the system simultaneously. The UT 7 does not actually send multiple packets, but copies of the transmitted packet are constructed in the two (or more) different receiving satellites. These packets then begin individual paths through the system. Since the destination of each packet is the same, and the sequence number of each packet is the same, the duplicate packet(s) can either be eliminated or used. For example, consider the same packet arriving at different times at two different satellites. One packet is routed to gateway X the other to gateway Y. Since each gateway does not know that the other is dealing with the same packet, each sends it on its way to the destination server. The destination server operates on the first packet and, since it knows its sequence number, it can destroy the duplicate copy or copies when they arrive. If one of the copies of the same packet is destroyed during propagation, then another copy of the packet can be used. If two or more copies of the same packet happen to be sent to the same gateway X, then gateway X may destroy the duplicate copy or copies after sending the first packet to arrive on into the Interne. Likewise, it is possible for the satellite routers 4 to detect the presence of redundant packets, and to destroy all but one (typically the first to be received).

[0070] The inter-satellite cross-links 13 were described previously. The cross-links 13 are used to route packets from one satellite to another so as to provide a path from a packet source to a packet destination. Multiple copies of the same packet may be automatically or selectively generated and transmitted by each satellite of the constellation 2 to adjacent satellite(s) and/or gateway(s) 5. Duplicate copies of the same packet can be selectively deleted at the receiving node (e.g., in the UT 7), or at an intermediate network link (such as in the gateways 5). The use of this type of flood routing or modified flood routing provides robustness in that it is less likely that a given packet will be lost, thereby requiring fewer retransmissions. Furthermore, the overall packet routing algorithm can be reduced in complexity over those techniques that compute a lowest cost or delay path. For example, if each satellite of the constellation 3 automatically forwards a received packet to each neighbor node (satellite and/or gateway), then it can be

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assumed that the most optimum path has been used.

[0071] The overall operation of satellite communication system 1 is such that optimum paths can be established based on the destination router. When there are thousands or millions of host computers to connect to, having lookup tables at every node in the system is not efficient. To solve this problem the known type of DNS (Domain Name System) can be used. The essence of DNS is a hierarchical, domain-based naming scheme. To map a name onto an IP address, an application layer program calls a library procedure known as the resolver, passing to it the name as a parameter. The resolver sends a UDP (User Data Protocol), which supports a connection-less transport layer, that seeks a response without requiring a connection setup. The UDP is sent to a local DNS server, which then looks up the name and returns the IP address to the resolver, which then returns it to the caller. Armed with the IP address, the program can then establish a TCP dialog with the destination, or send it packets. For the purposes of this invention, the user software transmits to the resolver a request to map a name onto an IP address. Alternatively it may send this direct to the satellite where a stored onboard application performs the same function. The resolver in the application software forms a UDP and sends it to the satellite, where it is processed.

[0072] There are at least two techniques to perform this processing. A first places the "local" DNS server in the satellite as software executed by the satellite's computer (see Fig. 7), thereby requiring each satellite to store the necessary information in its memory 314. On the other hand, it is possible to store this information on the ground. Two techniques of ground access to the DNS are possible. Firstly, the gateway router 6 itself can be a DNS server. Secondly, the gateway router 6 may contact a "local" DNS server and act only as a relay. In any of these cases the UDP is processed and the user is provided with the DNS information.

[0073] The top-level domains have two types, generic and countries. Generic domains are xxx.com, xxx.edu, etc. Country domains are listed by country, xxx.com.us for the United States, xxx.edu.jp for Japan etc. Each country has its own domain name. With this information the satellite router 4 can make decisions about the "best" satellite or satellites to route the packet to.

[0074] By example, and referring to Fig. 12, the UT 7, after having determined the destination IP address by using DNS, includes this address in each packet sent. Since this address is included in the IP and the TCP header, a next path router can be chosen based on this IP address. Based on the selected algorithm in use at the time the satellite router 4 places the packet on the data stream destined for the best satellite or satellites chosen at that moment in time. The selected next path router(s) may be the router or routers that ultimately send the packet to the ground, via one or more gateways 5, or may be an intermediate step router. Fig. 12 shows the first case, that being the next satellite with a connection or gateway 5.

[0075] Consider a UT 7 located in service area 300a (the U.S.A.) that sends a packet encoded with the following destination domain name: cs.keio.ac.jp (e.g. 131.130.70.1) and source IP address (e.g. 146.16.18.223), otherwise known as the user. The satellite 3a, upon learning the address of the packet from the destination information, can rapidly determine the destination gateway to the gateway in Japan. Assuming that Japan has a gateway 5 with router 6, the routing algorithm in router 4 of satellite 3a can determine if there is a satellite (or satellites) that its router is in contact with. Fig. 12 shows a condition where satellite 3a has a direct line of sight to satellite 3d. Other satellites may be closer to satellite 3a, or they may be more heavily loaded. In either case, the serving satellite 3a chooses to put the packet onto a data stream being sent to satellite 3d. Satellite 3d, upon receiving the packet and passing it to its router 4, determines that it is in contact with the gateway 5 in Japan, and places the packet onto the downlink data stream to the Japanese gateway. The Japanese gateway 5, upon receiving the packet, passes the packet to its router 6 which determines that the packet can be delivered in Japan. The router 6 then forwards the packet onto the Japanese national network where it is processed to cs.keio.ac.jp as any other packet with that destination would be. The server at cs.keio.ac.jp then processes the packet according to its own application layer software. Responses are then formed and after the data is packaged is sent to a packetizing software where the received source address (of the UT 7) becomes the destination address and the cs.keio.ac.jp destination address becomes the source address. The server then sends the packet toward the UT 7, the packet is picked up by the national network and according to the destination (the previous UT 7 source address) determines the entry point to be the Japanese gateway's router 6. The reason this occurs is because it is the "local" IP address for the satellite communication system 1 connected to the national network in Japan. The packet and its header arriving at the gateway router 6 is inspected by the router 6. Depending on the destination location the "best" path to send the packet on is determined by a stored algorithm in the gateway router 6.

[0076] There may be some time that elapses between the reception of the user's packet by the gateway 5 and the reception of the responding packet form the destination server. During this time the satellite constellation may move, or change condition with respect to loading, or have some other reason or reasons to cause it to "look different" to the gateway router 6. Therefore, the return path selected for the response to the inbound packet may be quite different than the outbound packet sent from the user.

[0077] An example of the return path is provided in Fig. 13. While the path shown is extreme, with different satellites handling the return packets, it should be apparent that some, if not all, of the satellites may be the

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same as those used when the outbound packet is sent from the user 7. The host response packets are sent from the host server 9 to its designated routers. The router either sends the completed packet to another local network router or it injects the packet onto a local or national network. In any case the destination address of the packet will cause the packet to arrive at the router 6 of the nearest local gateway 5. The gateway router 6 then makes a decision about which satellite 3 to send the packet toward. This decision is based on a routing algorithm which optimizes the path as described before. Alternately, two packets can be formed at the gateway router 6 and a redundant packet sent over a different path. In any case, the signal is received by the satellite 3, is demodulated, and is sent to the satellite router 4. In the example of Fig. 13 the signal is sent from gateway 5 to satellite 3C and router 4C. The router 4C receives the packet and detects the destination address. The router 4C can then plan the next satellite 3 to handle the packet, or it may determine to send the packet down to another gateway 5, or to send the packet directly to a user 7. In the example of Fig. 13 the satellite routes 4C determines that the "best" path is to send the packet toward satellite 3B. The satellite router 4B, upon determining the packet address, determines that satellites 3E with router 4E can deliver the packet, and thus routes the packet on a path toward satellite 3E.

[0078] With regard to the determination of the location of the user 7, the router 4 in the satellite 3 that will deliver the inbound packet must know where the user 7 is located, e.g., in which beam and if the user is active, in order to deliver the packet. One means of accomplishing this now described.

[0079] The position of the user terminal 7 can be located by several means. The position location can be determined by including a GPS receiver in the user terminal 7, and reporting the latitude and longitude of the user terminal 7 to the user terminal software. Alternatively the user terminal 7 can range on several satellite 3 at a time, and using well established techniques, calculate its position and report that position to the software. Finally, if only one satellite is in view, multiple position fixes from the same satellite, which is moving in space, can be used. In any case, the user terminal 7 forms a UDP packet which is destined to one or more satellites, and which contains the user terminal 7 address and physical location. The satellite 3 receives the UDP packet, demodulates the received packet, and detects the information. After processing the satellite 3 adds the user terminal 7 to a list of dynamic on-line user terminals contained in the satellite computer memory 314. The satellite router 4 has access to the user terminal 7 address stored in the satellite memory 314, and a special router can be employed to merge the function of using a dynamic list of on-line users. The satellite router 4 also needs to update other satellite routers of the new user coming on-line, and of the fact that it is the serving router. Each router in turn processes an update message and sends the update message to the other satellite routers 4 that it is in contact with. By this means each satellite router 4 knows which user terminals 7 are on-line.

[0080] Next, it is important for the system routers to know how to route packets. The current downlink destination (serving) router address is included with the update to each router 4. In addition to the user terminal 7 address, the serving satellite 3 and router 4 must know in which beam to send the downlink packet. This may be accomplished by maintaining a grid map in the satellite memory 314 which represents the service area. The grid can be any arbitrary size, such as about 10km square. The onboard satellite computer, with stored antenna patterns, in conjunction with the position of the user terminal 7, can calculate on an instant by instant the proper beam in which to transmit the inbound packet toward the user terminal 7. The location of each user terminal 7 need be carried only on the serving satellite (or satellites if more than one is selected to serve the user). This means that when a satellite moves away from the user terminal 7 and another begins to cover the area, the new satellite 3 must become aware of the user terminal 7, the location, and the address. Several means of accomplishing this are now disclosed.

[0081] One technique provides the serving satellite 3 and router 4 with a stored database of satellite coverage and antenna patterns, and calculates a time appropriate to transfer service control to another satellite. When this time approaches, a UDP message containing the user terminal 7 address and physical location is sent from the serving router 4 to the next serving satellite. The next satellite then updates its database of on-line users to show that it is now the serving satellite, and informs all neighbor routers that the user is now being served by it.

[0082] Another possible means of updating the routers does not require a transfer of data between satellites. This approach uses periodic data exchange between the user terminal 7 and the serving satellite(s) 3. In this case, the user terminal 7 forms a UDP message that includes the user terminal address and its physical location. This message is sent at certain intervals, such as every one to two seconds. In this manner, the satellites coverage can overlap, and more than one satellite can serve the user terminal 7. If there are sufficient satellite resources then this method is well suited for use. However, if satellite resources are restricted, it may be important to have only one or a selected set of satellites serve the user terminal. In this case a satellite 3 under control of the onboard computer, based on a stored algorithm and antenna patterns, can determine if it should be the sole server or one of a plurality of servers, and then may either enable or disable the transmit function from the satellite 3 to the user terminal 7.

[0083] In accordance with an aspect of this invention, one user terminal 7 may send data to and receive data from another user terminal 7 without interventions by the ground infrastructure. In a similar manner to sending a

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packet to a host computer on another network, (by sending the packets through a gateway 5) a user terminal 7 can send packets directly to another user terminal 7. Referring to Fig. 14, the requesting user terminal 7 performs the following procedure. First, the user terminal 7 sends a UDP message requesting the IP address of the other (destination) user terminal 7. This can be accomplished by having an application layer program call a library routine, known as a resolver, and passing to the resolver the domain name as a parameter. As before, the resolver sends a UDP that supports a connectionless transport layer, that seeks a response without requiring a connection set-up. The UDP is sent to a satellite 3 wherein it checks all stored "local to it" IP addresses of on-line user terminals 7. If this satellite router 4 is not carrying the address, it queries another satellite 3, either directly using an inter-satellite link or through some ground infrastructure, to determine if the IP address is available. If it is not, the satellite 3 flood broadcasts a system wide request for the IP address of the other user terminal 7. If the serving satellite 3 has the IP address it returns the address to router 4 and processes a response message to the user terminal 7 with the IP address that is obtained from the neighboring satellite routers 4, or from more distant satellite routers 4, or from a ground DNS. If the IP address of the destination user terminal 7 is not available, an error message is formed and sent to the originating user terminal 7. After the IP address is found and delivered to the originating user terminal 78, the process proceeds as before, wherein the router 4 in the serving satellite 3 monitors the packets sent to and received from the user terminal 7, and the packets sent to and received from the other user terminal 7. The TCP/IP header fields contain the total length and the header length, therefore the router (s) 4 can collect transmitted data and either transmit it directly to a specific gateway router 6, or they may accumulate some number (N) of packets worth of data and then send summary data toward the specified gateway 5. Billing can then take place by notifying the source, destination, data length (i.e. in bytes) and, if desired, appending a time stamp to the data, and transmitting this data to one (or more) gateways 5 for providing billing information.

[0084] Having described the overall functionality and interworking of the various constituent parts of the satellite-based data communications network in accordance with the teachings of this invention, a description will now be made of some variations and enhancements to the system described heretofore.

[0085] For example, "Voice over IP" is a relatively new technique of providing voice services by packetizing vocoded voice samples, adding the TCP/IP header to the encoded voice packets, and routing these packets through an IP network to a destination where the voice is decoded and provided to the user. In accordance with an aspect of this invention a user having a computer device, such as a laptop, with proper software and a microphone can provide a non-vocoded data stream or a vocoded data packet stream to the user terminal 7. The user terminal 7 can then voice code (vocode) the signal, if required, and transmit it over the IP network via the one or more satellites 3 and their associated satellite routers 4. The vocoded signal can then be received by a voice gateway 5 connected to the internet, which decodes (performs the opposite of the original vocoder) the signal and applies it to the PSTN. Alternatively, a user terminal 7 (without the associated laptop) can generate and send vocoded user voice packets directly. As can be appreciated, with a voice system the time of arrival of the packets at the destination is important. While it is not necessary that the packets arrive sequentially, it is important that there is low delay, low jitter and a reduced out of sequence rate, etc. To alleviate this problem terrestrial systems are known to employ "tunneling". Tunneling is a means of setting up a semi-permanent path for the duration of a call.

[0086] In accordance with an aspect of this invention the tunneling technique is applied for establishing semi-permanent paths through the satellite-based data network, including the satellite (space) segment, as well as in a portion of the terrestrial (ground) segment. Tunneling in this context means two different things.

[0087] Bandwidth Reservation: When the voice is transmitted over data packets, the reception of the voice may be of poor quality because of inherent delays and jitter involved in data transmission. This can be avoided by establishing a virtual path between a source and a destination, and reserving bandwidth for this path. The routers on the satellite as well the routers in the gateways take part in the bandwidth reservation. The protocols such as RSVP (Resource Reservation Protocol) can be used for this purpose. Once the virtual path is identified, all the routers in this path are required to reserve the bandwidth for the duration of the call.

[0088] Protocol Encapsulation: The voice packets are encapsulated in the IP packets. Once this is done, the satellite routers now need to handle only IP packets. The logical path through which the encapsulated packets travel makes the tunnel. Once the encapsulated voice frames reach their destination, the frames are unencapsulated and forwarded to their destination.

[0089] The IP packets containing voice are most likely to pass through the public Internet after they pass through a number of satellites and through a gateway. To provide additional security, the voice packets may be encrypted before they are encapsulated.

[0090] In accordance with the teachings of this invention, routers are placed on satellites, and these routers are capable of duplicating packets so that the same IP packets can be directed to at least two different satellites. The UT 7 is also assumed to have this capability. If a UT 7 has an omni-directional antenna, then a packet sent by the UT 7 will go to multiple number of satellites. These satellites may also duplicate the packet to some number of neighbors. Finally, more than one copy of a

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given packet will arrive at the destination server. The TCP/IP protocol, however, allows rejection of redundant packets by the server.

[0091] It can be realized that in some situations the most efficient policy may not be to always make copies of the packets and distribute the copies to as many neighbors as possible. The extreme is, of course, to never duplicate the packets. While this latter method may prove useful in a loss-less medium, for the lossy medium used for satellite communication the use of this latter technique can be expected to result in substantial numbers of requests for retransmission, thereby significantly reducing the overall packet transmission rate.

[0092] Further in accordance with an aspect of this invention the routing algorithm can employ a selective duplication of packets. Whether the satellite router 4, or a UT 7, should send a packet to one neighbor or multiple neighbors (and how many and which neighbors) can be made to depend on one or more of the following exemplary criteria.

(A) A measure of the quality of the transmission medium, such as the Bit Error Rate (BER) of the medium, can be used as a packet duplication criterion. From the Bit Error Rate (BER) of the medium, one can calculate the probability that a packet will be corrupted by the medium. A high bit error rate that can be found in a LEO satellite medium is one motivating factor for generating duplicate packets. As such, the generation of more copies of a packet is justified for the transmissions with high BER. Other transmission medium-quality criteria, such as SNR, Word Error Rate (WER), and Symbol Error Rate (SER), may be used as well, either alone or in combination with the BER.

(B) A determination as to whether the packet been duplicated before can be used as a packet duplication criterion. That is, the number of neighbors a satellite will distribute packets to can be made to be a function of whether a packet that was just received by a given satellite has already been duplicated by any of the previous nodes in the path of the packet. For example, a particular bit can be set in the packet to indicate that the packet is one of a duplicate set packets. If the packet has already been duplicated by a previous node, then there may be less need for duplication of a packet at the present node.

(C) The selective packet duplication decision may also depend on how many hops are required to go from the current satellite to the final destination. For example, if the medium is relatively error free (e.g., exhibits a low BER), then it may not be advantageous to duplicate a particular packet if the next hop is the final destination. However, if there still several hops until the packet's final destination, then it may be better to duplicate the packet, even if the medium is relatively error free. This is true because the probability of bit error is higher during multiple hop propagation of packets than during a single hop propagation.

(D) The decision on whether to duplicate or not may also be made to depend upon the current available bandwidth. If the particular channel is currently not heavily loaded, then packet duplication may be desirable. However, if the channel is currently heavily loaded, then the packet duplication may not be desirable, since it will further load the channel causing more delays and less quality of service for the users.

(E) The system may duplicate packets only for those users who have paid a premium for a guaranteed quality of service. That is, packet duplication may be made a value added feature that is offered to a user. This feature may be one that is always in effect, or may be one that can be selectively turned on or off by a user before beginning a particular packet transmission session.

(F) Further related to selective packet duplication, the system may duplicate packets going in one direction, and not the other. For example, in a file transfer application, the system may duplicate packets from the source to the destination, but the acknowledgments coming back from the destination to the source may not be duplicated. This method of duplication may be preferred in TCP/IP implementations that implement fast retransmit algorithms (see, for example, High Speed Networks - TCP/IP and ATM Design Principle by Stallings.) The Fast Retransmit algorithm interprets duplicate acknowledgements as implying system congestion.

(G) Further related to selective packet duplication, the system may duplicate packets if multicasting is desired, wherein a packet is forwarded to a plurality of selected destinations.

[0093] These various criteria can be used by the packet routing algorithm either in isolation or in combination. As but one example, for a case where channel BER is at or near to the threshold where packet duplication begins, the current channel loading may be used as a deciding factor, and vice versa.

[0094] The intelligent duplication and distribution of packets made possible by the teachings of this invention can result in reduced numbers of required retransmissions and reduced system delays for all users or for those willing to subscribe to the packet duplication service. The duplication of packets can also reduce the overall complexity of the routing algorithm and its required routing tables and the like. The packet duplication also provides a multicasting capability, wherein a given pack-

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et stream can be directed to multiple selected destinations.

[0095] While the invention has been particularly shown and described with respect to preferred embodiments thereof, it will be understood by those skilled in the art that changes in form and details may be made therein without departing from the scope and spirit of the invention. By example, it is also within the scope of this invention to wrap larger frames with further destination routers such that not all of the packets have to be decoded and dealt with individually. That is, a set of packets can be sent in a "bundled" fashion through the system 1, and subsequently unbundled and processed individually.

[0096] In this invention a stream of data packets originated by a source node is comprised of at least two data packets, which preferably conform to a TCP/IP or equivalent protocol, and which may contain data and/or a digital representation, possibly encrypted, of a user's voice, or more generally a digital representation of any analog input signal, including music. The teachings of this invention may be used to transmit a single packet or a stream of packets from a source to a destination.

[0097] The teachings of this invention are also not intended to be limited to any of the specific hardware or software embodiments, routing algorithms or techniques, packet formats, or numbers and types of satellites, modulation schemes and the like that were described above, and all equivalents to the disclosed embodiments are intended to be encompassed as well. Furthermore, the teachings of this invention are not limited for use only in a LEO satellite constellation, as MEO or GEO constellations, or combinations of LEO, MEO and/or GEO constellations can be used as well.

Claims

1. A satellite communication system (1) comprising a plurality of satellites (3) and a plurality of gateways (5), said satellite communication system being bidirectionally coupled to a terrestrial communication system (8) through at least said plurality of gateways (5), said satellite communication system (1) and said terrestrial communications system (8) comprising together a data communication network having a plurality of nodes including source nodes, destination nodes and intermediate nodes, wherein multiple copies of a packet (P1,P2) coexist within the data communications network and are routed, using at least in part satellite-resident routers (4) and gateway-resident routers (6), over a plurality of different paths (10,11,13) between a particular source node and a particular destination node, and wherein at least one duplicate copy of a given packet is not used during the execution of a packet (P1,P2) reordering procedure in the destination node, or at an intermediate node.

2. A system according to claim 1, wherein certain of said paths are carried over satellite-to-satellite cross-links (13).

3. A system according to claim 1 or 2, wherein certain of said paths are carried over satellite-to-gateway uplinks (11) and downlinks (11).

4. A system according to any preceding claim, wherein said packets (P1,P2) are TCP/IP or equivalent packets.

5. A system according to any preceding claim, wherein at least some of said packets (P1,P2) comprise voice data and wherein at least some of said packets (P1,P2) that comprise voice data comprise vocoded voice data that is generated external to a user terminal and that is input to the user terminal for transmission to at least one satellite.

6. A system according to any preceding claim, wherein at least some of said packets (P1,P2) comprise voice data and wherein said at least some of said packets (P1,P2) that comprise voice data comprise vocoded voice data that is generated internal to a user terminal (7) for transmission to at least one satellite.

7. A system according to any preceding claim, wherein said duplicate packets (P1,P2) are transmitted from a plurality of satellite-resident routers (4) to a single gateway-resident router (6), and are injected into the Internet by the single gateway-resident router (6).

8. A system according to any of claims 1 to 6, wherein said duplicate packets (P1,P2) are transmitted from a plurality of satellite-resident routers (4) to a plurality of gateway-resident routers (6), and are injected into the Internet by each of the plurality of gateway-resident routers (6).

9. A satellite communication system (1) comprising a plurality of satellites (3) and a plurality of gateways (5), said satellite communication system being bidirectionally coupled to a terrestrial communication system through at least said plurality of gateways (5), said satellite communication system (1) and said terrestrial communications system (8) comprising together a data communication network having a plurality of nodes including source nodes, destination nodes and intermediate nodes, wherein multiple copies of a packet (P1,P2) are selectively generated within the data communications network, and wherein the multiple copies of the packet (P1,P2) are routed, using at least in part satellite-resident routers (4) and gateway-resident routers (6), over a plurality of different paths (10,11,13) be-

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tween a particular source node and a particular destination node, and wherein at least one of the multiple copies of a packet (P1,P2) is not used during the execution of a packet reordering procedure in the destination node, or at an intermediate node.

10. A system according to claim 9, wherein the multiple copies of packet (P1,P2) are selectively generated based on at least one of a plurality of criteria.

11. A system according to claim 10, wherein one of the plurality of criteria is a measure of the quality of the transmission medium.

12. A system according to claim 10 or 11, wherein one of the plurality of criteria is whether the packet (P1,P2) was previously duplicated by a previous node.

13. A system according to any of claims 10 to 12, wherein one of the plurality of criteria is a number of remaining hops from the current node to the destination node.

14. A system according to any of claims 10 to 13, wherein one of the plurality of criteria is the current available bandwidth.

15. A system according to any of claims 10 to 14, wherein one of the plurality of criteria is based on a user service agreement.

16. A system according to any of claims 10 to 15, wherein one of the plurality of criteria is based on a direction of transmission, from source to destination or from destination to source.

17. A system according to any of claims 10 to 16, wherein one of the plurality of criteria is based on whether multicasting is desired.

18. A system according to any of claims 9 to 17, wherein certain of said paths (10,11,13) carried over satellite-to-gateway uplinks (11a) and downlinks (11b), and certain other paths are carried over satellite-to-satellite cross-links (13a,13b).

19. A system according to any preceding claim, wherein at least one of said paths is carried over a satellite-to-user terminal uplink (10a) and downlink (IOb).

20. A system according to any preceding claim, wherein said packets (P1,P2) are TCP/IP packets (or packets with equivalent protocol) containing information for enabling said duplicate packets to be ignored.

21. A system according to any preceding claim, wherein said plurality of gateways (5) couple said satellite communication system (1) to said terrestrial communication system (8) at a plurality of points, including at least at one of regional networks, national networks, commercial networks, Internet Service Providers (ISPs), or directly to a backbone network.

22. A system according to any preceding claim, wherein said plurality of satellites (3) comprise a constellation (2) of non-geosynchronous orbit satellites.

23. A system according to any preceding claim, wherein said plurality of satellites (3) comprise a constellation of low earth orbit satellites.

24. A system according to any preceding claim, wherein said plurality of satellites (3) comprise a constellation of medium earth orbit satellites.

25. A system according to claim 9, wherein individual ones of said packets conform to TCP/IP or an equivalent protocol.

26. A system according to claim 9, wherein at least some of said packets comprise voice data.

27. A system according to claim 26, wherein said system routes said packets comprised of voice data over semi-permanent paths that are established during the duration of a call.

28. A system according to claim 26 or 27, wherein said at least some of said packets that comprise voice data comprise encrypted voice data.

29. A system according to claim 9, wherein said multiple copies of a packet are transmitted from a plurality of satellite-resident routers to a single gateway-resident router, and are injected into the Internet by the single gateway-resident router.

30. A system according to claim 9, wherein said multiple copies of a packet are transmitted from a plurality of satellite-resident routers to a plurality of gateway-resident routers, and are injected into the Internet by each of the plurality of gateway-resident routers.

31. A method for packet data transmission through a data communications system comprising satellite routers and terrestrial routers, comprising steps of:

originating a stream of packets at a source node;

selectively duplicating individual ones of the stream of packets and operating said satellite routers to route duplicate packets over different

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paths, including wireless paths through a medium subject to transmission impairments; and reconstructing the stream of packets from received packets while ignoring an arrival of an already received and valid packet.

32. A method as in claim 31, wherein the step of selectively duplicating is performed in at least one satellite router in response to at least one criterion.

33. A method as in claim 32, wherein said at least one criterion is one of a measure of the quality of the medium; whether the packet was previously duplicated; a number of remaining hops from the satellite router to a destination node; a current available bandwidth; a user service agreement; a direction of transmission, from source to destination or from destination to source; and whether multicasting is desired.

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Figure 1
Connection vs. Connectionless Systems

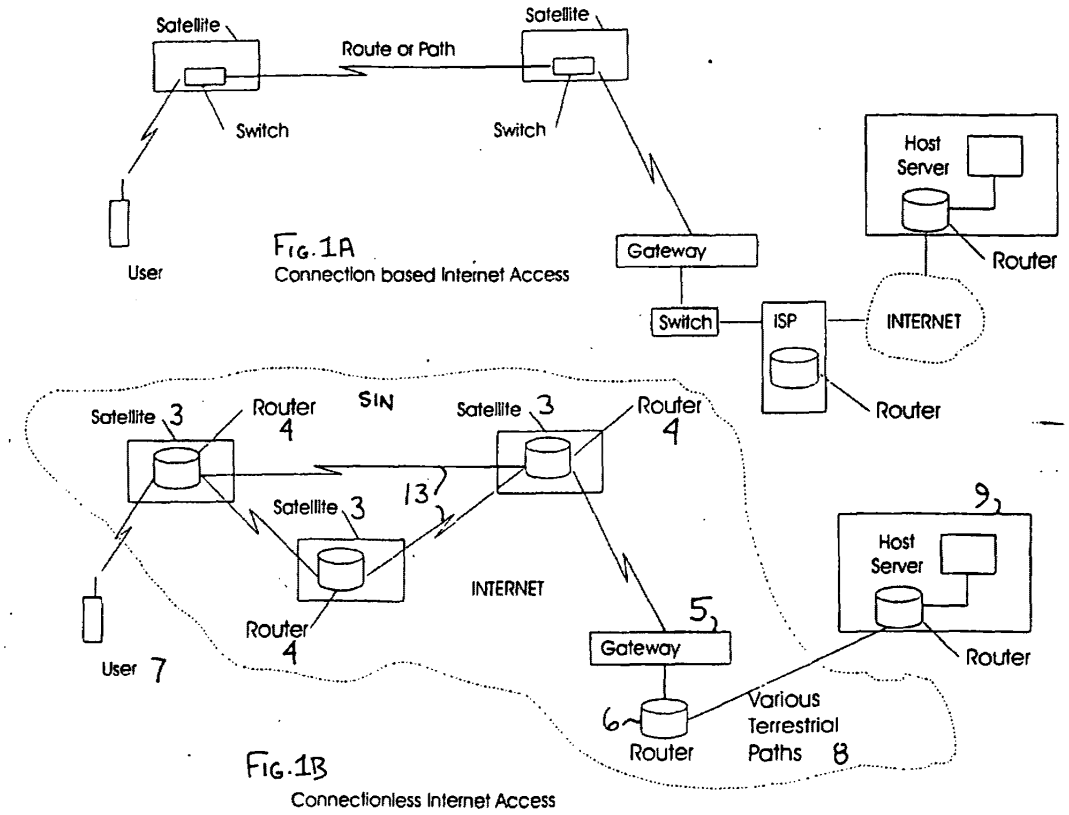

FIG. 1A
Connection based Internet Access

FIG. 1B
Connectionless Internet Access

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Figure 2
The Internet a collection of Networks

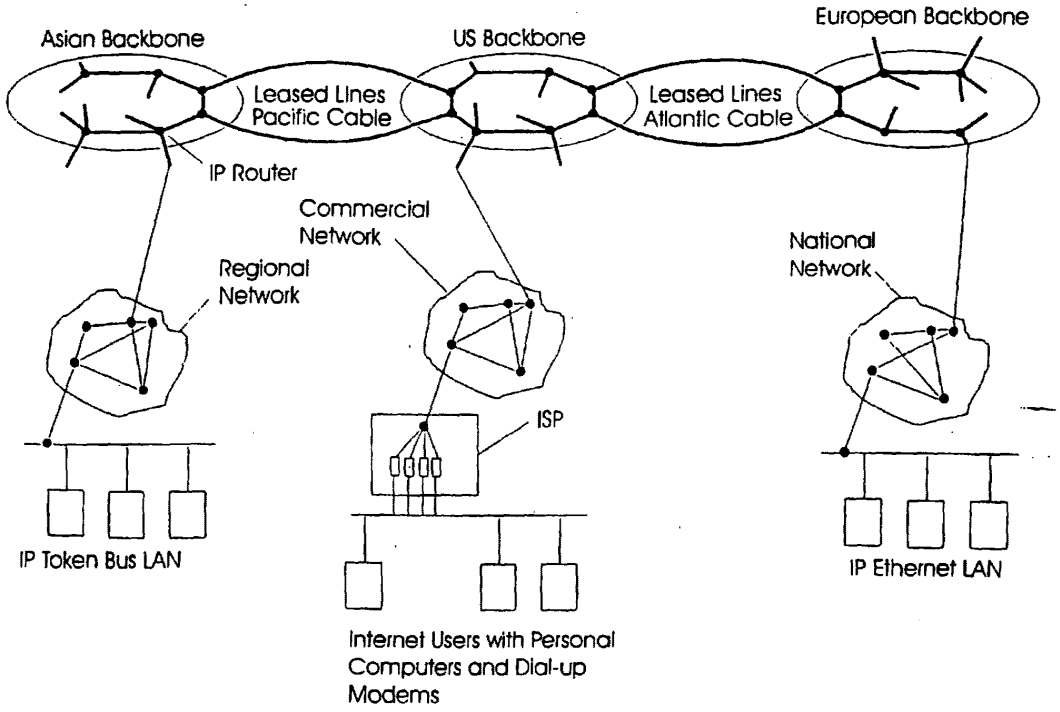

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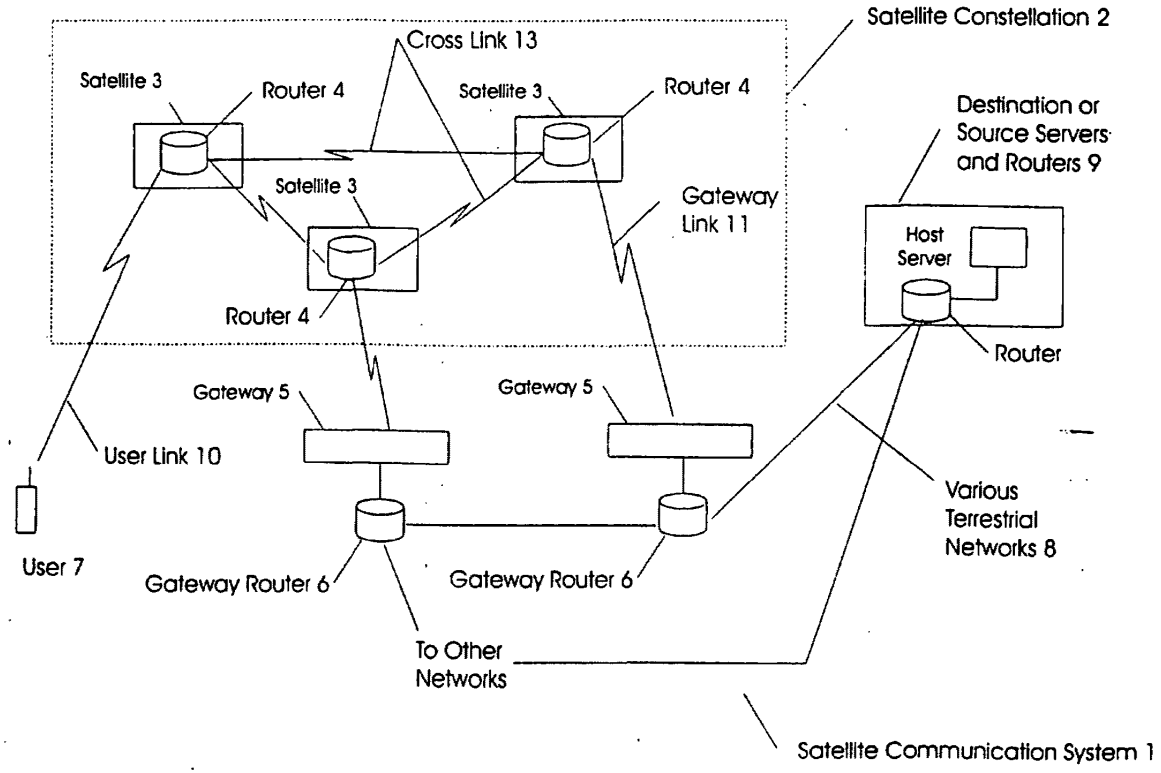
Figure 3
Connection Less Satellite Internet Access System



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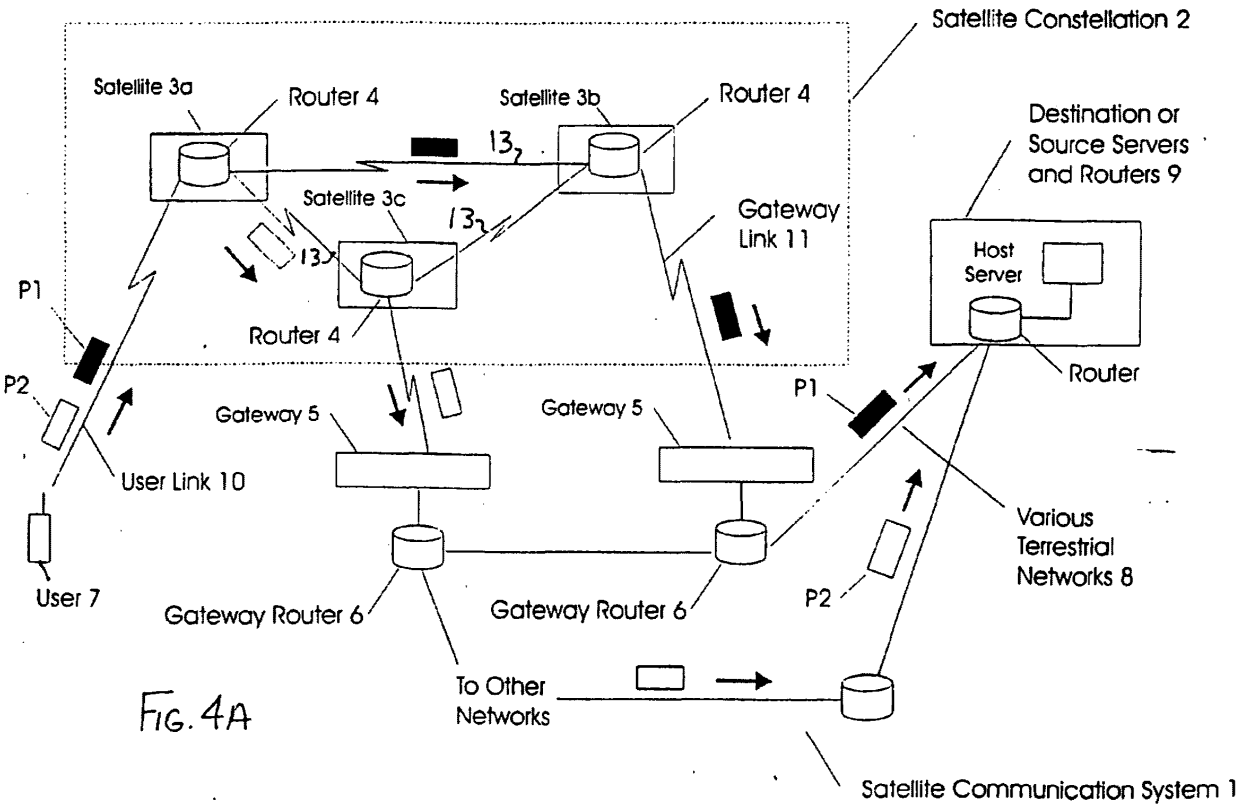

FIG. 4A

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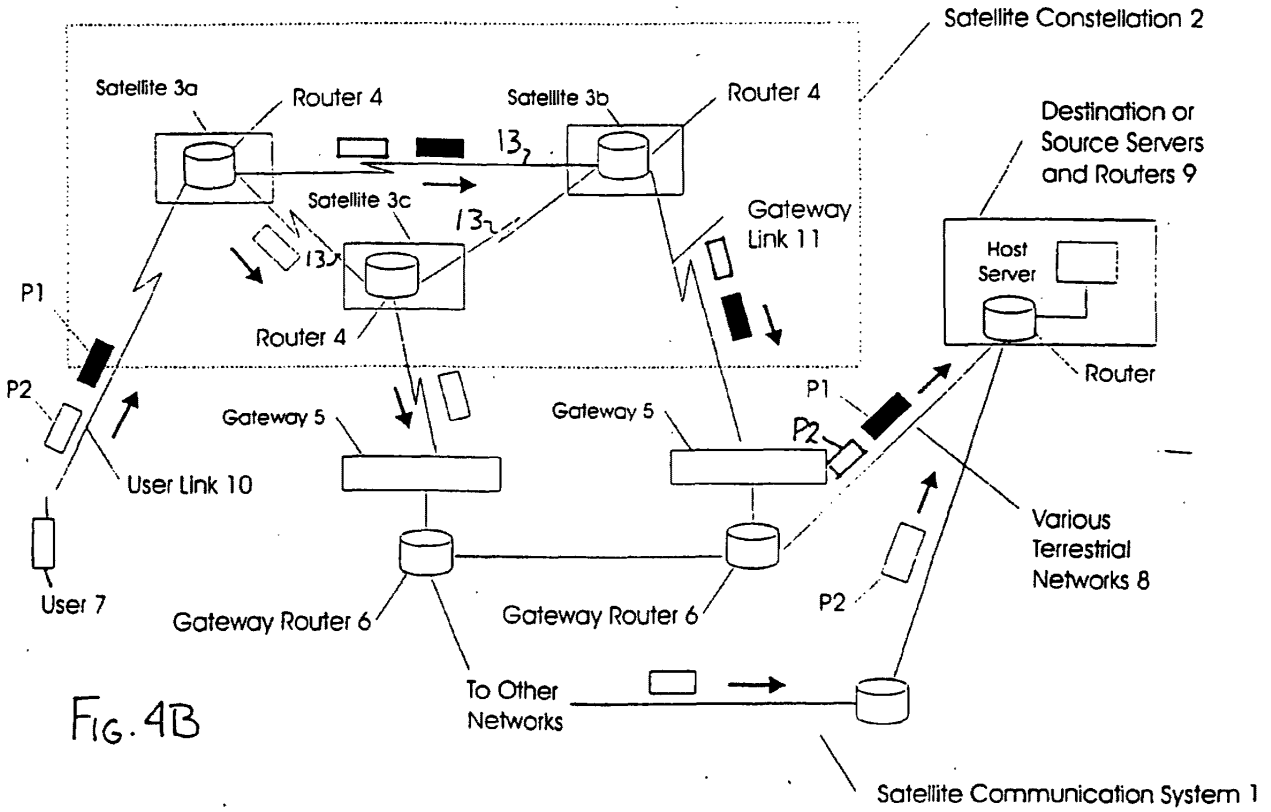
Satellite Constellation 2
Satellite 3a
Router 4
Satellite 3b
Router 4
Destination or Source Servers and Routers 9
Satellite 3c
Gateway Link 11
Host Server
Router 4
Router
P1
P2
Gateway 5
Gateway 5
P1
P2
User Link 10
Various Terrestrial Networks 8
User 7
Gateway Router 6
Gateway Router 6
P2
To Other Networks
Satellite Communication System 1

FIG. 4B

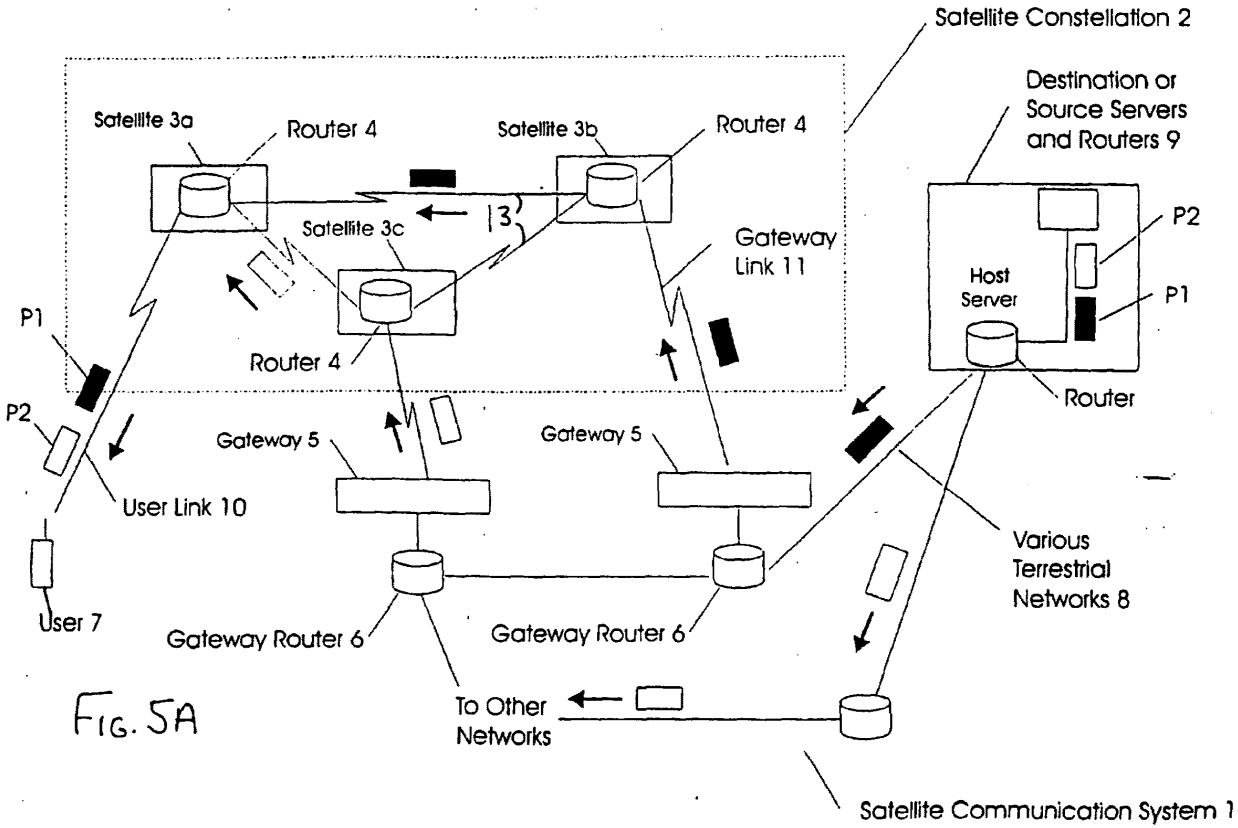

FIG. 5A

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IPR2025-00782

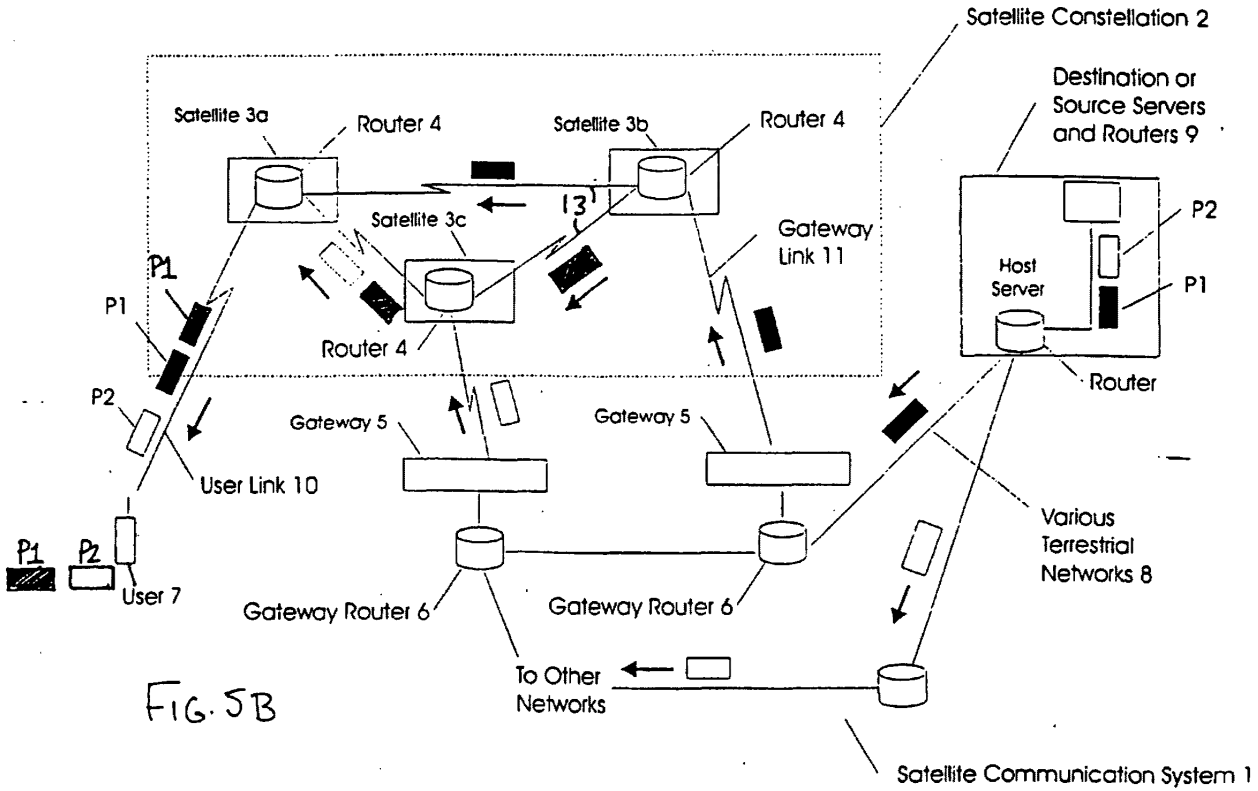

FIG. 5B

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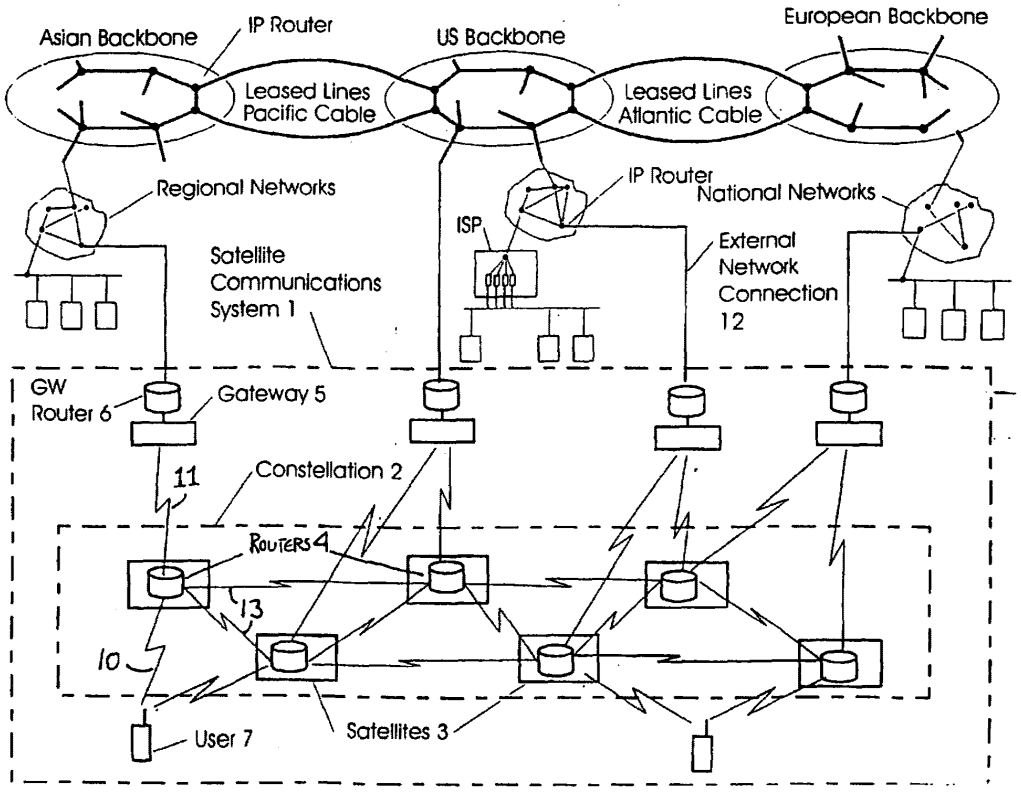
Figure 6
The Connection Less Satellite Internet Access System
Integrated with the Internets



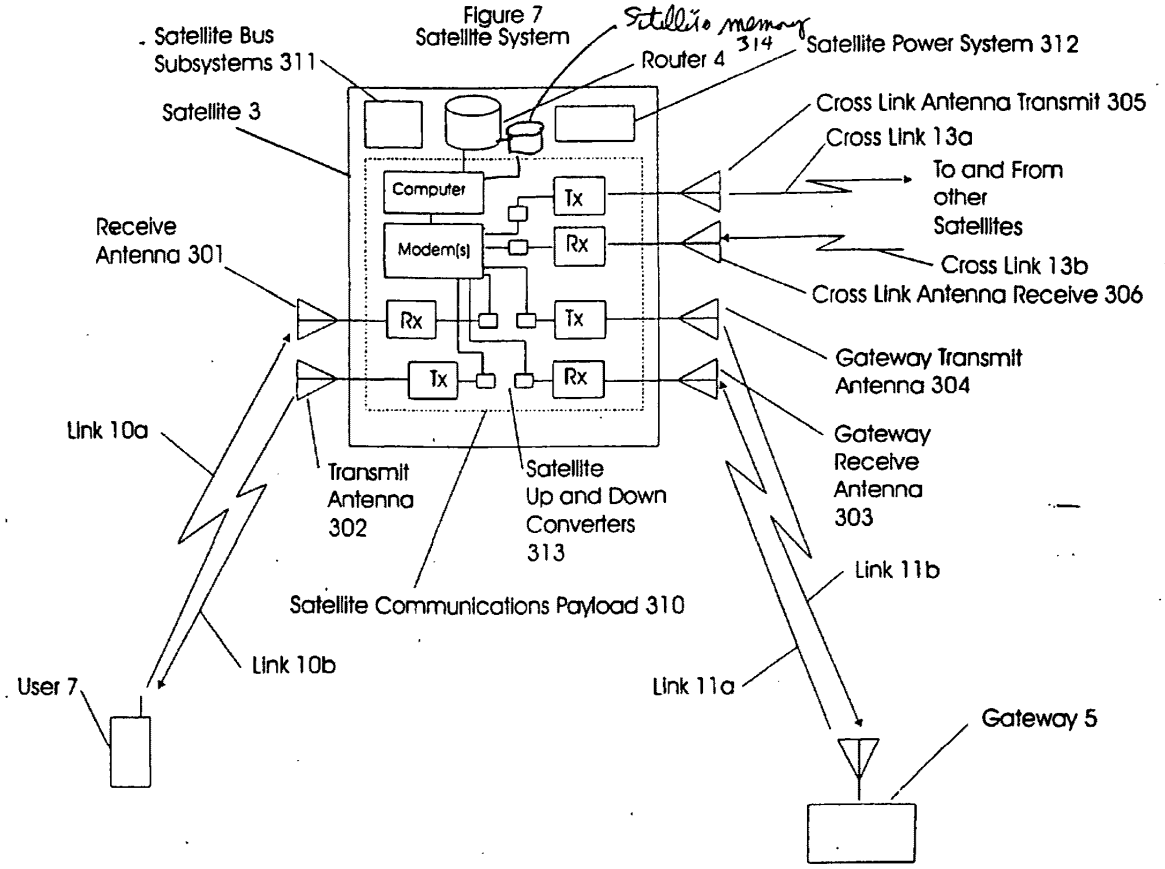


Figure 7
Satellite System

Figure 8
Satellite Mobile Internet Access User Terminal

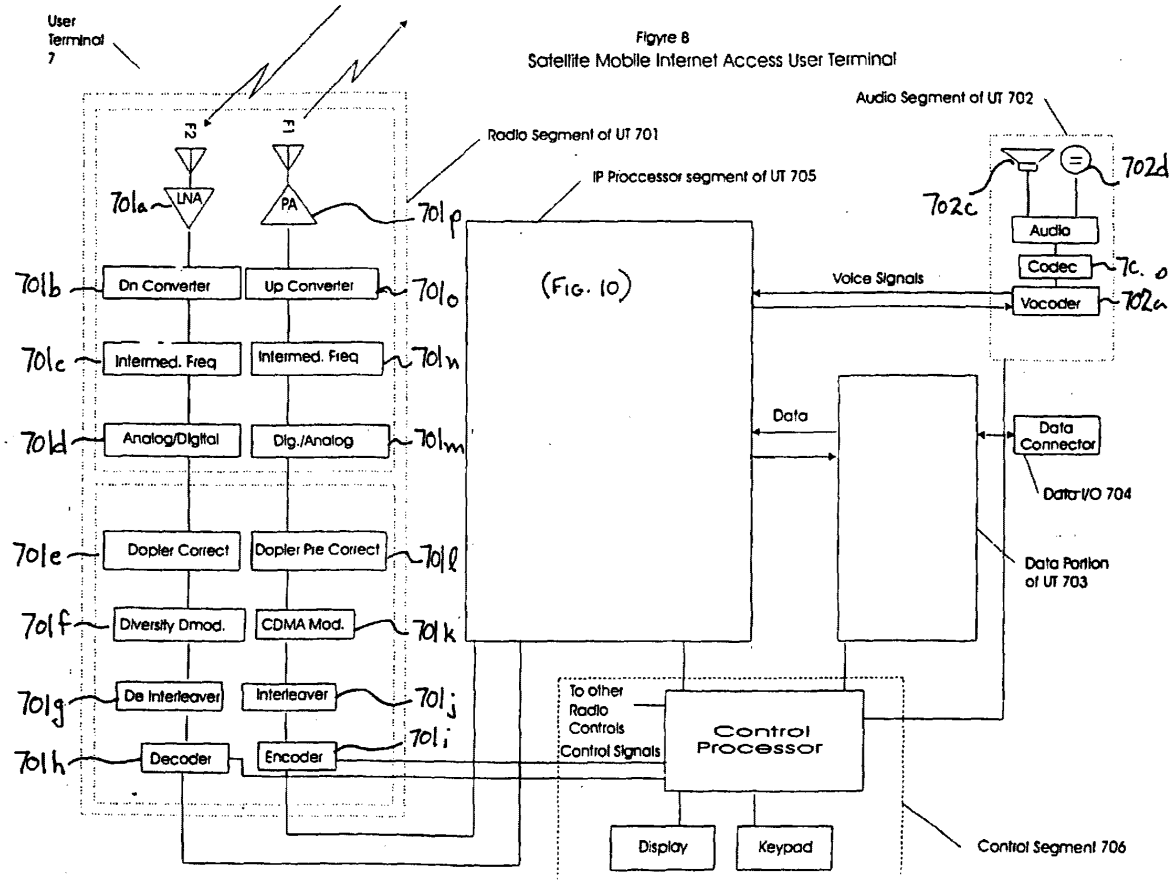


Figure 9
TCP/IP Packet structure illustration

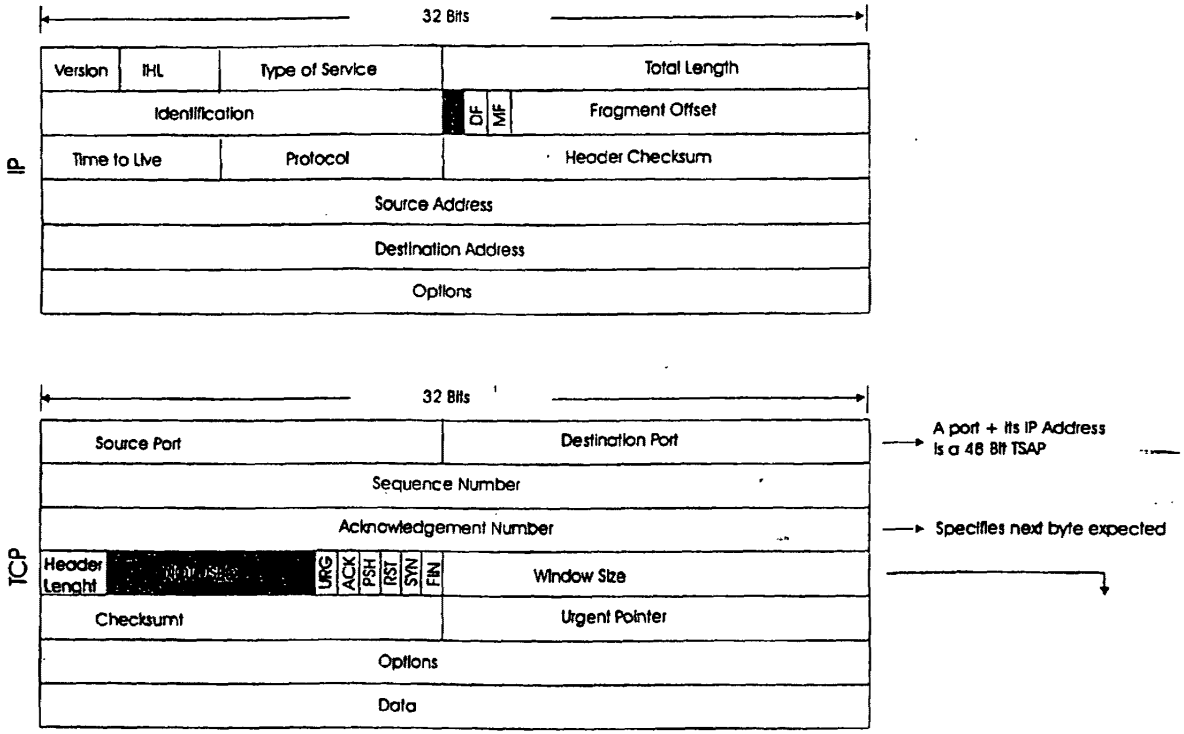


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Figure 10
IP Processor Segment of the UT 7

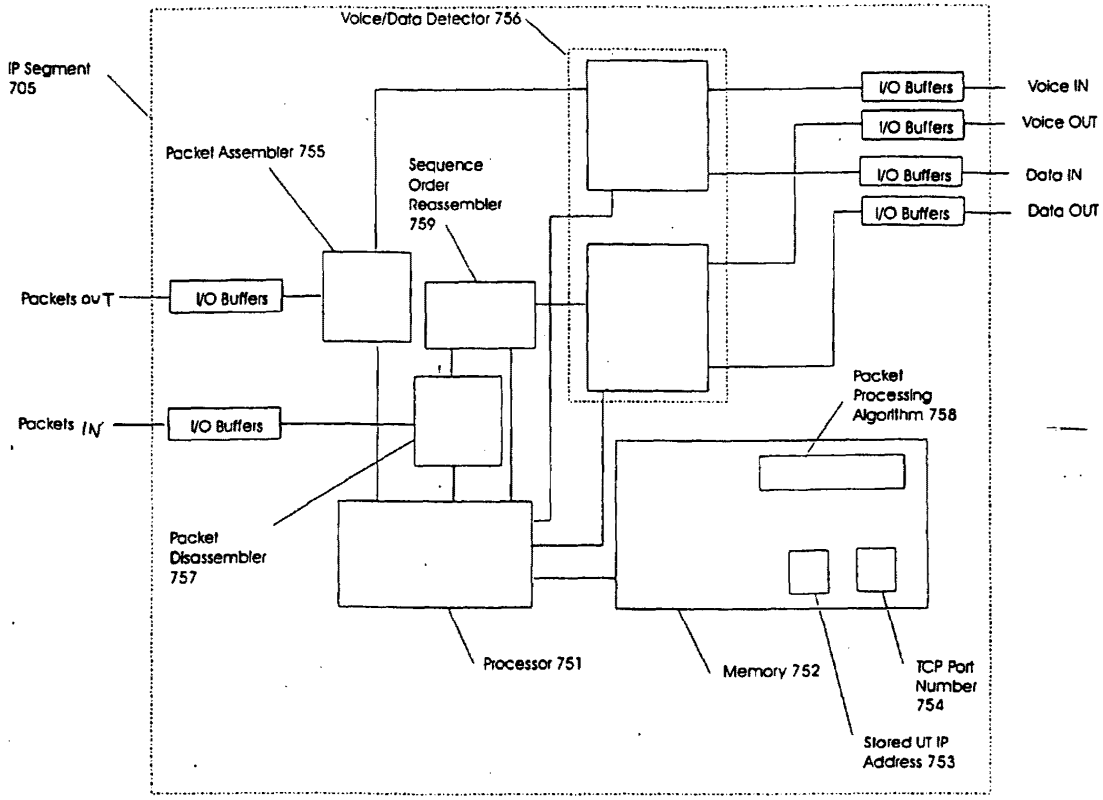

Figure 11
Outbound UT to Constellation Links

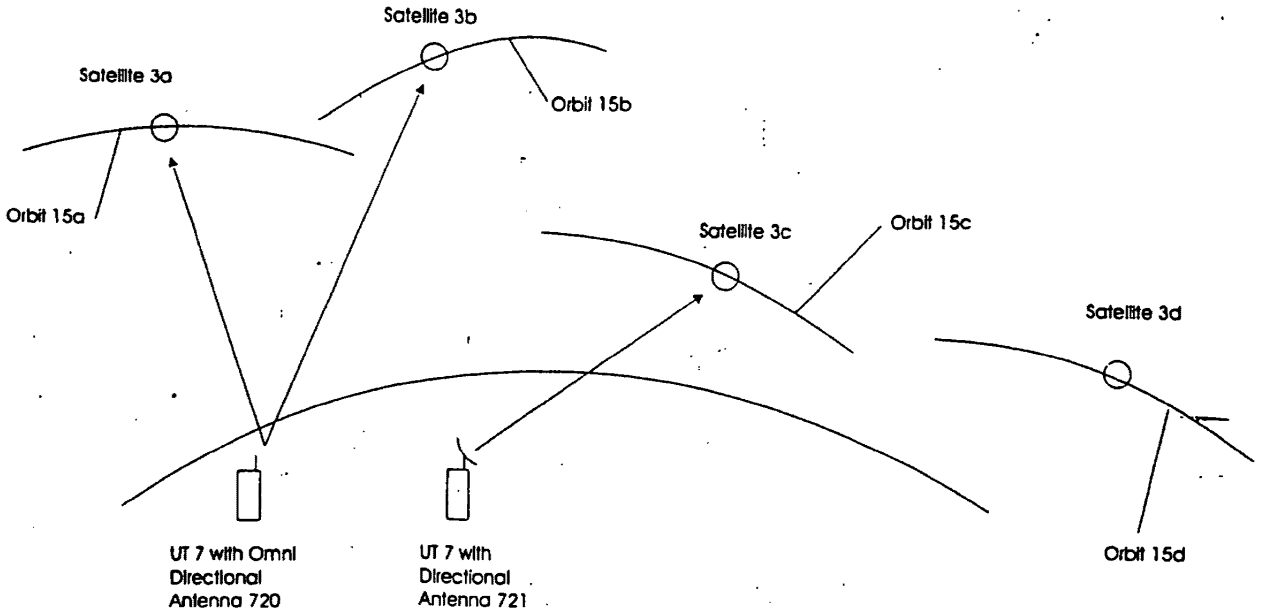

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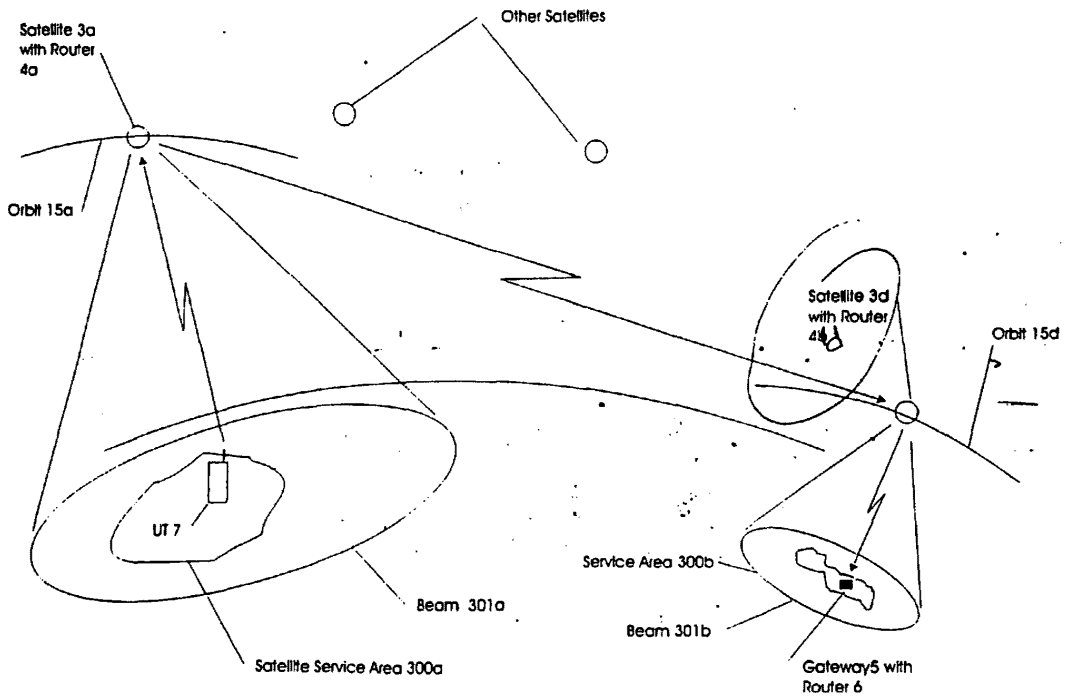
Figure 12
Outbound UT to Constellation Links



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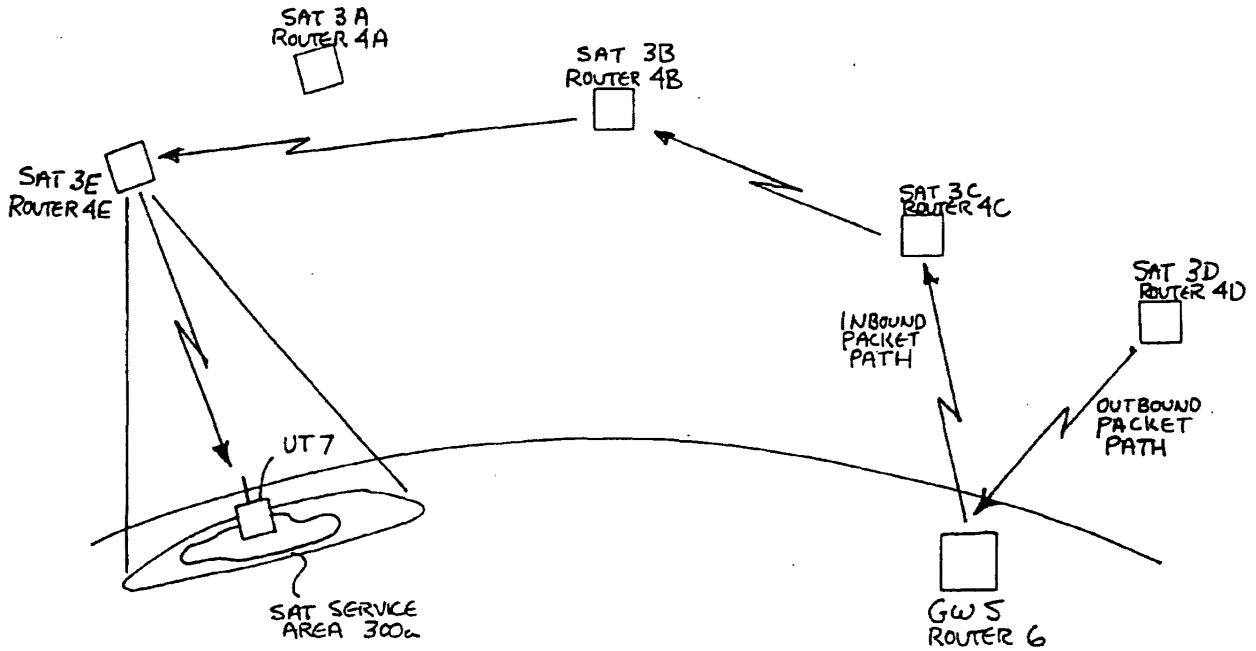

FIG. 13.

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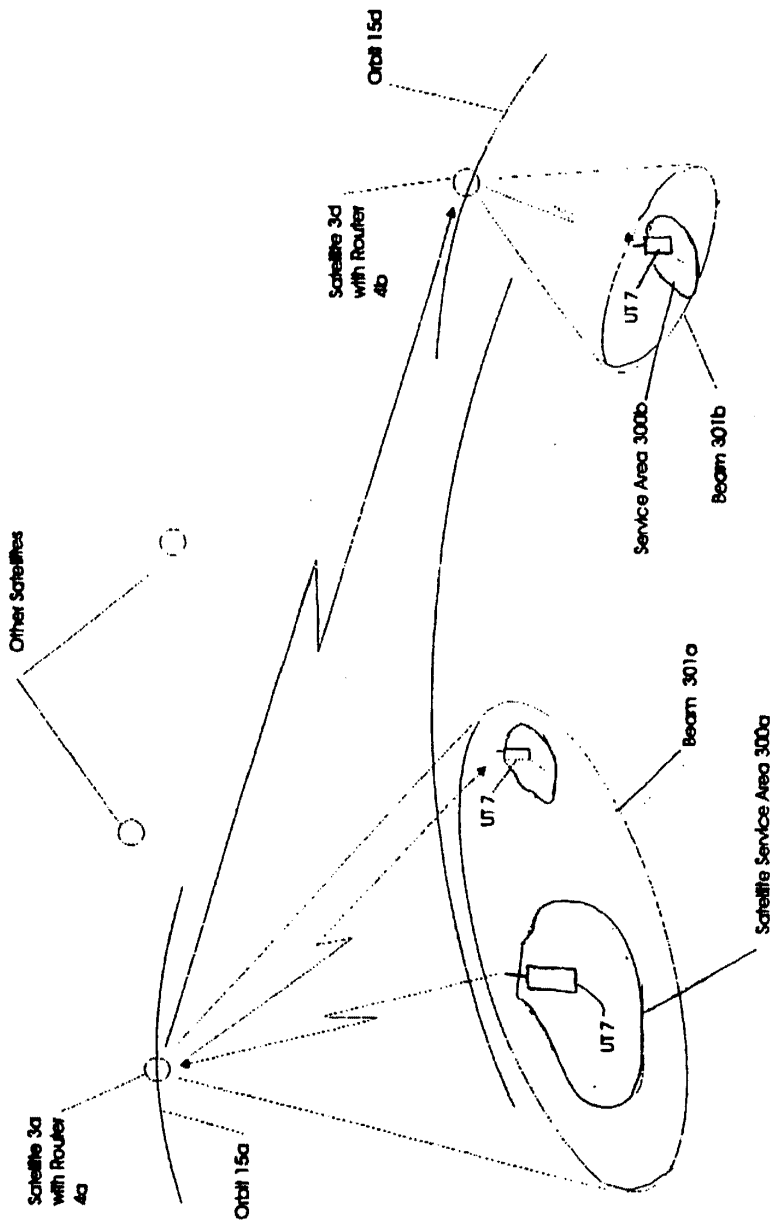

Figure 14
UT to UT commcommunications

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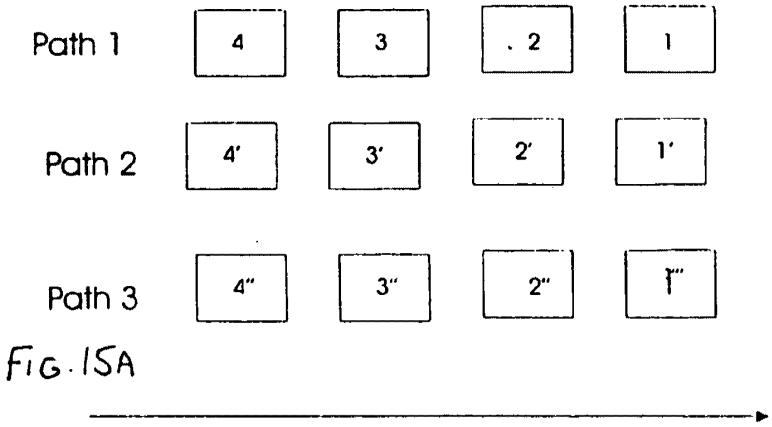

FIG. 15A

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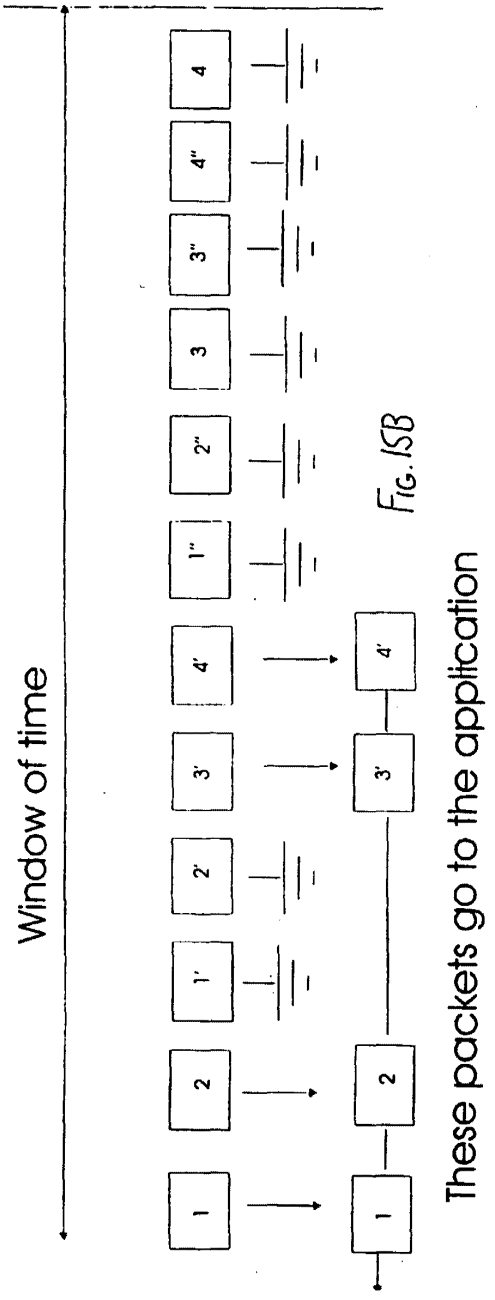

FIG. 15B

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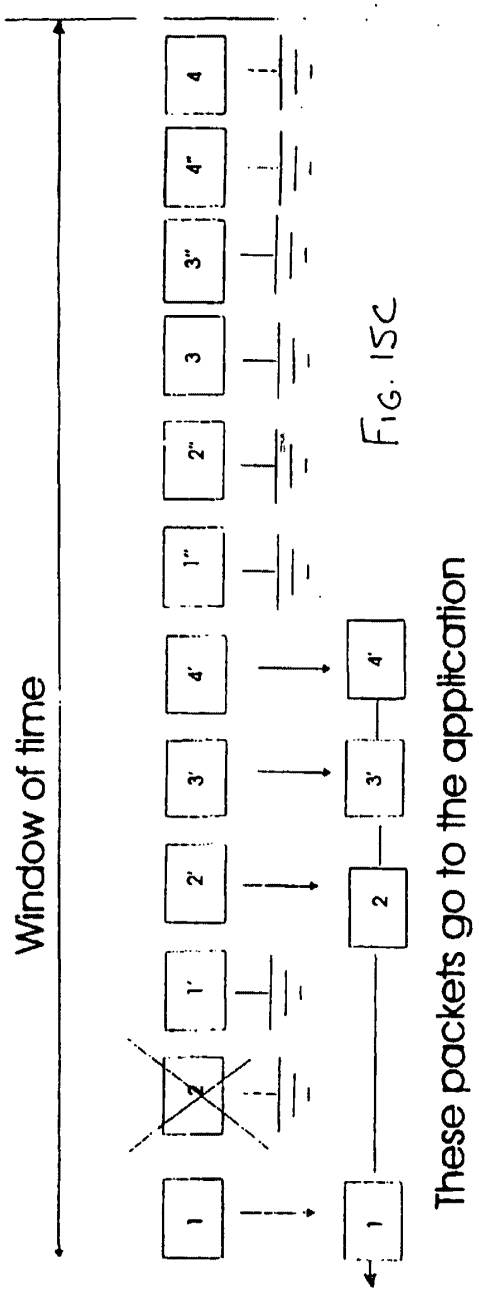

FIG. 15C

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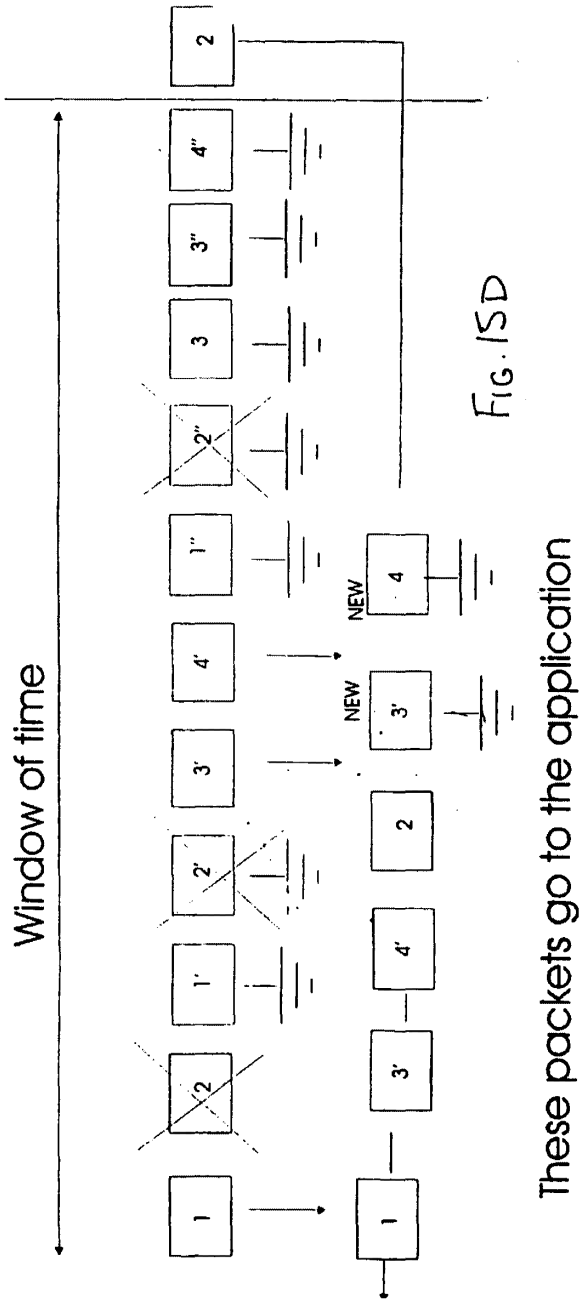

FIG. 15D

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IPR2025-00782

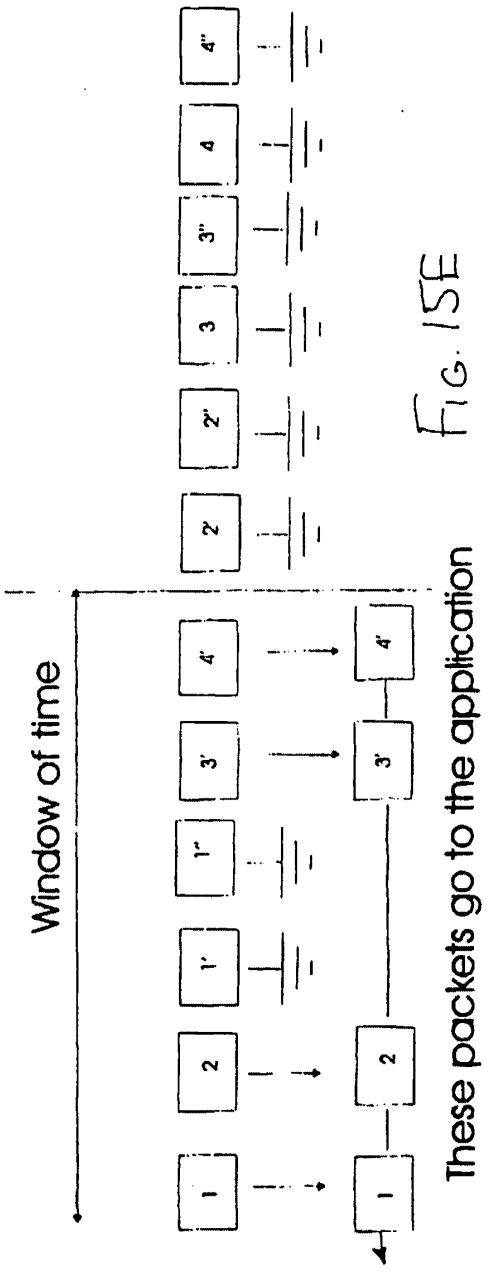

FIG. 15E

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IPR2025-00782

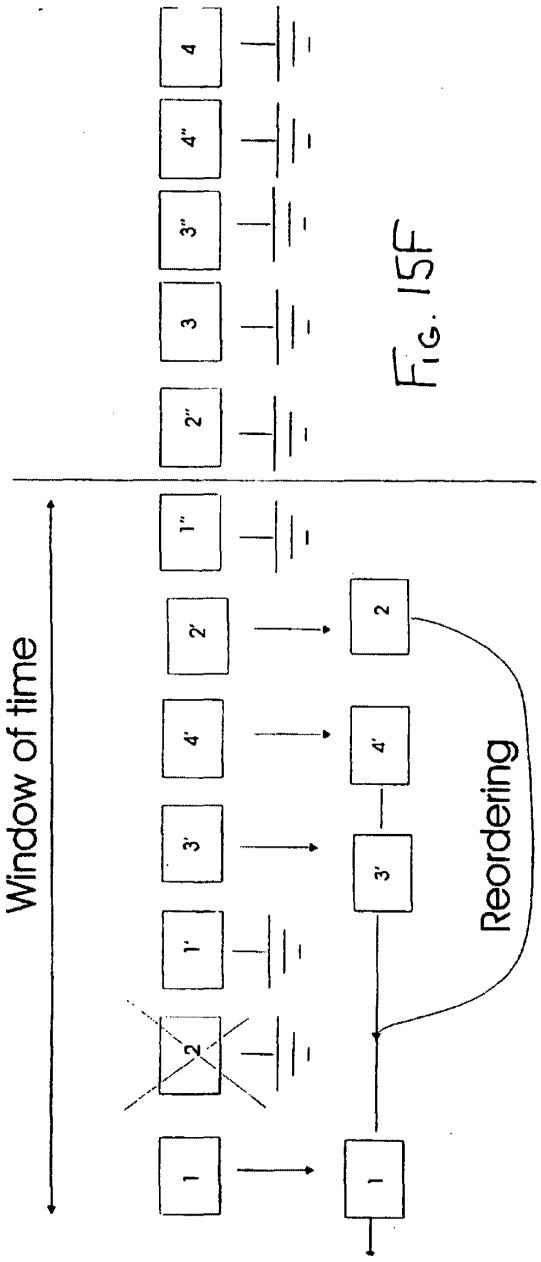

FIG. 15F

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/950,860	09/27/2004	W. David Wilson	SYS05-GN001	7056

30074 7590 06/15/2007
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EXAMINER	
TRAN, CONGVAN	
ART UNIT	PAPER NUMBER
2617	
MAIL DATE	DELIVERY MODE
06/15/2007	PAPER

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.

PTOL-90A (Rev. 04/07)

Office Action Summary	Application No.	Applicant(s)	
	10/950,860	WILSON, W. DAVID	
	Examiner	Art Unit	
	CongVan Tran	2617	

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

Period for Reply

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

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

Status

1)☒ Responsive to communication(s) filed on *27 September 2004*.

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

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

Disposition of Claims

4)☒ Claim(s) *1-46* is/are pending in the application.

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

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-46* is/are rejected.

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

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

Application Papers

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

10)☒ The drawing(s) filed on *27 September 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

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

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

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

Priority under 35 U.S.C. § 119

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

a)☐ All b)☐ Some * c)☐ None of:

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

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

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

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

Attachment(s)

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

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DETAILED ACTION

Claim Rejections - 35 USC § 102

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

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, and 35 are rejected under 35 U.S.C. 102(e) as being anticipated by Agarwal et al. (6,894,990).

Regarding claims 1, 35, Agarwal discloses an IP multicasting in MESH TDMA satellite networks comprising the steps of: providing a satellite dish communicating with the Internet via data link with a satellite (see fig.1, elements 12, 14, and its description) ; and providing at least one router operatively coupled to the satellite dish see fig.1, elements 14, 50 and its description); installing the satellite dish and router in a rural location, which experiences a relatively high volume of transient traffic (see fig.1, elements 10, 20 and its description); allowing a user to access the Internet at the rural location by connecting a user's web-ready device to the Internet via the router and satellite dish (see fig.1, elements 10, 20, 68, 101-110, col.3, line 40 and its description).

Regarding claim 2, Agarwal further discloses the router includes at least one jack to which a web-ready device may be connected via a cable (see fig.1, 101-110, col.3, line 40 and its description).

Claim Rejections - 35 USC § 103

3. 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 negatived by the manner in which the invention was made.

4. Claims 2-34 and 36-46 rejected under 35 U.S.C. 103(a) as being unpatentable over Agarwal et al. (6,894,990).

Regarding claims 2-34 and 36-46, Agarwal disclose the use of Internet via satellite network, except the features described in claims 2-35 and 36-46. However, these features are well known in regular Internet network. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the these features system in Agarwal's invention to improve use of Internet via satellite network.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CongVan Tran whose telephone number is 571-272-7871. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Appiah can be reached on 571-272-7904. 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.

CONGVAN TRAN
PRIMARY EXAMINER

CongVan Tran
Primary Examiner
Art Unit 2617

Jun 08, 2007.

OIPE JC1
APR 0 6 2005
PATENT & TRADEMARK OFFICE

PTO/SB/08A (08-03)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 2

Complete if Known	
Application Number	10/950,860
Filing Date	09-27-2004
First Named Inventor	WILSON, W. DAVID
Art Unit	2661
Examiner Name	
Attorney Docket Number	SYS05-GN001

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/CT/		US- 5,081,703	01-14-1992	LEE	
		US- 5,678,172	10-14-1997	DINKINS	
		US- 6,035,178	03-07-2000	CHENNAKESHU ET AL.	
		US- 6,072,768	06-06-2000	WIEDEMAN ET AL.	
		US- 6,212,550 B1	04-03-2001	SEGUR	
		US- 6,243,450 B1	06-05-2001	JANSEN ET AL.	
		US- 6,414,635 B1	07-02-2002	STEWART ET AL.	
		US- 6,522,865 B1	02-18-2003	OTTEN	
		US- 6,556,828 B1	04-29-2003	CARLIN ET AL.	
		US- 6,584,083 B1	06-24-2003	TOPOREK ET AL.	
		US- 6,591,084 B1	07-08-2003	CHUPRUN ET AL.	
		US- 6,611,821 B2	08-26-2003	STAHL ET AL.,	
		US- 2001/0010047 A1	07-26-2001	SHEN ET AL.	
		US- 2001/0026537 A1	10-04-2001	MASSEY	
		US- 2002/0006116 A1	01-17-2002	BURKHART	
/CT/		US- 2003/0046242 A1	03-06-2003	HIMMEL ET AL.	
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FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]
/CT/		EP 1 024 610 A2	02-08-2000	GLOBALSTAR L.P.		

Examiner Signature	CongVan TRan	Date Considered	06/08/2007

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DN: cn=CongVan TRan, c=US, o=cell, ou=2617, email=CongVan.tran@uspto.gov
Date: 2007.06.08 10:01:03 -04'00'

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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 2 hours 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, 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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OIPE JC16
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 2 of 2

Complete if Known	
Application Number	10/950,860
Filing Date	09-27-2004
First Named Inventor	WILSON, W. DAVID
Art Unit	2661
Examiner Name	
Attorney Docket Number	SYS05-GN001

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
/CT/		UNKNOWN, VP1200/VP1210 Vivato Indoor & Outdoor Wi-Fi Base Stations, copyright 2004, Vivato, Inc., San Francisco, CA U.S.A.	

Examiner Signature	CongVan TRan	Digitally signed by CongVan TRan DN: cn=CongVan TRan, c=US, o=uspto, ou=2617, email=CongVan.tran@uspto.gov Date: 2007.06.08 16:01:22 -04'00'	Date Considered	06/08/2007

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1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 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 2 hours 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, 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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Notice of References Cited	Application/Control No. 10/950,860	Applicant(s)/Patent Under Reexamination WILSON, W. DAVID	
	Examiner CongVan Tran	Art Unit 2617	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2003/0181162 A1	09-2003	Matula, Michael	455/13.3
*	B	US-2007/0115942 A1	05-2007	Money et al.	370/352
*	C	US-2004/0255221 A1	12-2004	Shen et al.	714/752
*	D	US-6,894,990 B1	05-2005	Agarwal et al.	370/321
*	E	US-7,216,283 B2	05-2007	Shen et al.	714/752
*	F	US-2005/0135422 A1	06-2005	Yeh, Chih-Hao	370/474
*	G	US-2003/0149601 A1	08-2003	Cabral, Anthony J.	705/5
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*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.

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American Airlines, et. al. v. Intellectual Ventures, et.al.
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Search Notes

Application/Control No.	Applicant(s)/Patent under Reexamination
10/950,860	WILSON, W. DAVID
Examiner	**Art Unit**
CongVan Tran	2617

SEARCHED			
Class	Subclass	Date	Examiner
370	316 474 475 352 321 390 432	6/8/2007	CT
455	13.3 12.1	6/8/2007	CT
714	752 791	6/8/2007	CT
	794 800		

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR

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Index of Claims

Application/Control No.	Applicant(s)/Patent under Reexamination
10/950,860	WILSON, W. DAVID
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CongVan Tran	2617

√	Rejected	–	(Through numeral) Cancelled	N	Non-Elected	A	Appeal
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Claim		Date
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Applicant	:	W. David Wilson
Serial No.	:	10/950,860
Filed	:	September 27, 2004
Title	:	SATELLITE DISTRIBUTED HIGH SPEED INTERNET ACCESS
Docket No.	:	SYS05-GN001
Examiner	:	Tran, CongVan
Art Unit	:	2617

SEE ATTACHED AMENDMENT IN RESPONSE TO OFFICE ACTION OF 6/15/07, TO BE FILED IN THE ABOVE-REFERENCED APPLICATION.

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:

Applicant	:	W. David Wilson
Serial No.	:	10/950,860
Filed	:	September 27, 2004
Title	:	SATELLITE DISTRIBUTED HIGH SPEED INTERNET ACCESS
Docket No.	:	SYS05-GN001
Examiner	:	Tran, CongVan
Art Unit	:	2617

Hon. Commissioner for Patents
Alexandria, VA 22313-1450

AMENDMENT

This Amendment is filed in response to the Office action mailed on June 15, 2007 having a period of response extending through and including September 15, 2007. Reconsideration of the application is respectfully requested.

PAGE 2/24 * RCVD AT 9/17/2007 3:34:11 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-5/7 * DNIS:2738300 * CSID:513 381 0205 * DURATION (mm-ss):04-04

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IN THE CLAIMS:

1. (Currently Amended) A method for establishing and operating an Internet Hotspot comprising the steps of:

providing a satellite dish communicating with the Internet via data link with a satellite; ~~and~~

providing at least one router operatively coupled to the satellite dish;

providing a subscriber access unit operatively coupled between the satellite dish and the router;

installing the satellite dish, ~~and~~ router and subscriber access unit in a rural location, the rural location experiencing ~~which experiences~~ a relatively high volume of transient traffic;

connecting a web-ready device to the router;

creating by a user a subscription account, the subscription account being created on a remote server and enabling the user to access the Internet;

navigating a browser operating on the web-ready device to a subscriber access website, the subscriber access website being capable of verifying that the subscription account is valid;

verifying that the subscription account is valid via the subscriber access website to allow access to the Internet; and

allowing a user to access the Internet at the rural location. ~~by connecting a user's web-ready device to the Internet via the router and satellite dish.~~

2. (Currently Amended) The method of claim 1, wherein the router includes at least one jack to which a web-ready device may be connected via a ~~cable~~ wired connection.

3. (Canceled)

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4. (Currently Amended) The method of claim ~~3~~ 1, wherein the step of creating a subscription account includes creating ~~user opens a~~ the subscription account using a prepaid coupon via the remote server. ~~before the user is enabled to access other websites.~~

5. (Currently Amended) The method of claim ~~3~~ 1, wherein the step of creating a subscription account includes ~~user purchases~~ purchasing by the user a quantity of subscription-based access time using a credit card via the remote server. ~~before the user is enabled to access other websites.~~

6. (Original) The method of claim 5, wherein the subscription-based access time may be purchased in a definite quantity.

7. (Original) The method of claim 5, wherein the subscription-based access time may be purchased on a "continued until canceled" basis.

8. (Original) The method of claim 5, wherein the credit card billing is performed by an existing merchant service.

9. (Original) The method of claim 8, wherein the existing merchant service is reciprocal with other Internet subscription providers nationwide.

10. (Canceled)

11. (Currently Amended) The method of claim ~~10~~ 1, wherein the verifying step ~~authentication of the user's account~~ is performed by a subscriber merchant service.

12. (Currently Amended) The method of claim 1, wherein the connecting step includes connecting the ~~a step of communicating the user's~~ web-ready device to the router via a wireless connection.

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13. (Currently Amended) The method of claim 12, wherein a plurality of users can simultaneously connect web-ready devices to the router. ~~access the Internet by communicating wireless web-ready devices with the router.~~

14.-22. (Canceled)

23. (Original) The method of claim 12, further comprising the steps of operatively coupling at least one wireless transceiver extender unit between the satellite dish and the router to extend the range of Internet access at the rural location.

24. (Canceled)

25. (Canceled)

26. (Original) A method for providing satellite-distributed high-speed Internet access, comprising the steps of:

providing a router to which a web-ready device may be connected via at least one of a cable or a wireless data link;

assigning a dynamic IP address to the web-ready device that has been connected to the router;

forwarding by the router of the user's connection to a subscriber access unit;

retrieving from memory by the subscriber access unit of the static IP address of a remote server;

forwarding the user's connection to a satellite dish;

establishing communication by the satellite dish with a satellite, which is enabled to send and receive data over the Internet;

establishing a connection over the Internet with the remote server, whose interface is viewed by the user as a webpage on the web-ready device;

prompting by the remote server of the user for a username and password;

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accessing a database by the remote server to verify the username and password;

prompting the user to create a new account, if the username and password are invalid or the user's account has zero time remaining;

allowing the user to access other websites, until the user's account has zero time remaining or the user logs off the network; and

updating the user's account in the database by the remote server to subtract the amount of time used during the just-completed session, when the user logs off the network.

27. (Original) The method of claim 26, wherein the interface of the remote server is viewed by the user as a webpage on the web-ready device using Secure Socket Layer encryption.

28. (Original) The method of claim 26, wherein the user may create an account using a prepaid coupon.

29. (Original) The method of claim 26, further comprising, after the step of prompting the user to create a new account, if the username and password are invalid or the user's account has zero time remaining, the step of:

charging the user's credit card, if a new account is created.

30. (Original) The method of claim 29, wherein the user may purchase access time in a definite quantity when creating an account.

31. (Original) The method of claim 29, wherein the user may purchase access time on a "continue until canceled" basis when creating an account.

32. (Original) The method of claim 29, wherein the charging of the user's credit card is performed by an existing merchant service.

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33. (Original) The method of claim 32, wherein the existing merchant service is reciprocal with other Internet subscription providers nationwide.

34. (Original) The method of claim 29, further comprising the step of installing the router and the satellite dish in a rural location experiencing a relatively high volume of transient traffic.

35. (Currently Amended) An Internet Hotspot comprising:

a satellite dish ~~installed in a remote location experiencing a relatively high volume of transient traffic, and the satellite dish~~ communicating with the Internet via one or more data links with a satellite;

at least one router operatively coupled to the satellite dish ~~and installed in the remote location~~;

a subscriber access unit operatively coupled between the satellite dish and the at least one router, the subscriber access unit being capable of authenticating a subscription account associated with a user prior to allowing the user access to the Internet; and

a web-ready device operatively coupled to the at least one router, the web-ready device having a browser application operating thereon for accessing the Internet;

wherein the satellite dish, the at least one router and the subscriber access unit are located in a remote location experiencing a relatively high volume of transient traffic;

wherein a the user may authenticate the subscription account and access the Internet at the remote location by establishing a data connection between the web-ready device and ~~with~~ the router, ~~via a user's web-ready device.~~

36. (Currently Amended) The Internet Hotspot of claim 35, wherein the data connection is one of a wired data connection and a wireless data connection.

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37. (Original) The Internet Hotspot of claim 35, wherein a plurality of users may access the Internet simultaneously at the remote location by respectively establishing data connections with the router via their web-ready devices.

38. (Original) The Internet Hotspot of claim 37, wherein the data connections include wired data connections.

39. (Original) The Internet Hotspot of claim 37 ~~38~~, wherein the data connections include wireless data connections.

40. (Original) The Internet Hotspot of claim 39, further comprising an amplifier and antenna operatively coupled to the router.

41. (Currently Amended) The Internet Hotspot of claim ~~39~~ 40, wherein the router is a Vivato outdoor switch.

42.-44. (Canceled)

45. (Currently Amended) The Internet Hotspot of claim ~~43~~ 35, further comprising at least one wireless extender transceiver ~~wirelessly,~~ operatively coupled between the subscriber access unit and the router.

46. (Canceled)

47. (Newly Added) The method of claim 1, further comprising an amplifier and antenna operatively coupled to the router.

48. (Newly Added) The method of claim 12, wherein the wireless connection is one of an 802.11a wireless area network, an 802.11b wireless area network, an 802.11g wireless area network, and an 802.11n wireless area network.

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49. (Newly Added) The Internet Hotspot of claim 36, wherein the wireless connection is one of an 802.11a wireless area network, an 802.11b wireless area network, an 802.11g wireless area network, and an 802.11n wireless area network.

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Serial No.: 10/772,747
Attorney Docket No.: 2003-0660.02
Amendment

REMARKS

Claims 1-46 are currently pending in this Application. Claims 1, 2, 4, 5, 11, 12, 13, 35, 36, 41 and 45 are currently amended. Claims 3, 10, 14-22, 24, 25, 42-44, and 46 are now canceled. Claims 47-49 are newly added. Reconsideration of the Application is respectfully requested.

I. Rejections under 35 U.S.C. § 102(e) – Agarwal

Independent claims 1 and 35 stand rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by U.S. Patent App. No. 6,894,990 to Agarwal et al. ("Agarwal"). Independent claims 1 and 35 are currently amended and are now distinguished from Agarwal. Therefore, these claims and all claims depending from them are now in condition for allowance.

Claim 1, as amended, teaches a method for establishing and operating an Internet Hotspot including the steps of: providing a satellite dish communicating with the Internet via data link with a satellite, providing at least one router operatively coupled to the satellite dish, providing a subscriber access unit operatively coupled between the satellite dish and the router, installing the satellite dish, router and subscriber access unit in a rural location, the rural location experiencing a relatively high volume of transient traffic, connecting a web-ready device to the router; creating by a user a subscription account, the subscription account being created on a remote server and enabling the user to access the Internet; navigating a browser operating on the web-ready device to a subscriber access website, the subscriber access website being capable of verifying that the subscription account is valid; verifying that the subscription account is valid via the subscriber access website to allow access to the Internet; and allowing a user to access the Internet at the rural location. By adding these additional steps, claim 1 is now distinguished from Agarwal because Agarwal fails to teach providing a subscriber access unit coupled between the satellite dish and router, creating a subscription account for Internet access,

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navigating a browser application to a subscriber access website, and verifying on a subscriber access website that the subscription account is valid.

Claim 35, as amended, teaches an Internet Hotspot comprising a satellite dish communicating with the Internet via one or more data links with a satellite, at least one router operatively coupled to the satellite dish, a subscriber access unit operatively coupled between the satellite dish and the at least one router, the subscriber access unit being capable of authenticating a subscription account associated with a user prior to allowing the user access to the Internet; and a web-ready device operatively coupled to the at least one router, the web-ready device having a browser application operating thereon for accessing the Internet. The satellite dish, the at least one router and the subscriber access unit are located in a remote location experiencing a relatively high volume of transient traffic. The user may authenticate the subscription account and access the Internet at the remote location by establishing a data connection between the web-ready device and the router. By adding these additional steps, claim 35 is now distinguished from Agarwal because Agarwal fails to teach a subscriber access unit operatively coupled between the satellite dish and the at least one router, the subscriber access unit being capable of authenticating a subscription account associated with a user prior to allowing the user access to the Internet. Agarwal also fails to teach a web-ready device operatively coupled to the at least one router, the web-ready device having a browser application operating thereon for accessing the Internet after being authenticated.

For at least the foregoing reasons, independent claims 1 and 35 are now distinguished from Agarwal. Therefore, it is respectfully submitted that the current rejections be withdrawn.

II. Rejections under 35 U.S.C. § 103(a) – Agarwal

Claims 2-34 and 36-46 stand rejected under 35 U.S.C. § 103(a) as allegedly being obvious over Agarwal. Claims 3, 10, 14-22, 24, 25, 42-44, and 46 are now canceled and therefore the current rejections are moot as to those claims. Claims 2 (as amended), 4 (as

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amended), 5 (as amended), 6, 7, 8, 9, 11 (as amended), 12 (as amended), 13 (as amended) and 23 depend from independent claim 1 and are in allowance for at least the same reasons as discussed above. Claims 36 (as amended), 37, 38, 39, 40, 41 (as amended) and 45 (as amended) depend from independent claim 35 and are in allowance for at least the same reasons as discussed above.

The Examiner based these § 103(a) rejections on Agarwal and "official notice" that the features disclosed in claims 2-34 and 36-46 are well known in "regular Internet network." The Examiner does not provide documentary evidence, as required by the MPEP, to support such official notice. Therefore, without such documentary evidence, it is respectfully submitted that claims 2-34 and 36-46 are now in condition for allowance. Consequently, the Applicant respectfully traverses the rejections of claims 2-34 and 36-46 based on this official notice as discussed in detail below.

According to MPEP 2144.03(A), "[o]fficial notice without documentary evidence to support an examiner's conclusion is permissible only in some circumstances." Further, *"[o]fficial notice unsupported by documentary evidence should only be taken by the examiner where the facts asserted to be well-known, or to be common knowledge in the art are capable of instant and unquestionable demonstration as being well-known."*

Furthermore, pursuant to MPEP 2144.03(B), "there must be some form of evidence in the record to support an assertion of common knowledge." "If such notice is taken, the basis for such reasoning must be set forth explicitly. The examiner must provide specific factual findings predicated on sound technical and scientific reasoning to support his or her conclusion of common knowledge." "The applicant should be presented with the explicit basis on which the examiner regards the matter as subject to official notice and be allowed to challenge the assertion in the next reply after the Office action in which the common knowledge statement was made." MPEP 2144.03(B).

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MPEP 2144.03(C) explicitly discusses the necessary requirements in traversing an Examiner's official notice. Specifically, "[t]o adequately traverse such a finding, an applicant must specifically point out the supposed errors in the examiner's action, which would include stating why the noticed fact is not considered to be common knowledge or well-known in the art." Further, "[i]f applicant adequately traverses the examiner's assertion of official notice, the examiner must provide documentary evidence in the next Office action if the rejection is to be maintained."

Claim 2, as amended, is directed to the method of claim 1, wherein the router includes at least one jack to which a web-ready device may be connected via a wired connection. The Examiner generally states that this feature was well known in regular Internet networks. Furthermore, the Examiner states that this "well known" feature, in combination with Agarwal would deem this claim obvious. Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

Claim 4, as amended, is directed to the method of claim 1, wherein the step of creating a subscription account includes creating the subscription account using a prepaid coupon via the remote server. The Examiner generally states that this feature was well known in regular Internet networks. Furthermore, the Examiner states that this "well known" feature, in combination with Agarwal would deem this claim obvious. Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

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Claim 5, as amended, is directed to the method of claim 1, wherein the step of creating a subscription account includes purchasing by the user a quantity of subscription-based access time using a credit card via the remote server. The Examiner generally states that this feature was well known in regular Internet networks. Furthermore, the Examiner states that this "well known" feature, in combination with Agarwal would deem this claim obvious. Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

Claim 6 is directed to the method of claim 5, wherein the subscription-based access time may be purchased in a definite quantity. The Examiner generally states that this feature was well known in regular Internet networks. Furthermore, the Examiner states that this "well known" feature, in combination with Agarwal would deem this claim obvious. Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

Claim 7 is directed to the method of claim 5, wherein the subscription-based access time may be purchased on a "continued until canceled" basis. The Examiner generally states that this feature was well known in regular Internet networks. Furthermore, the Examiner states that this "well known" feature, in combination with Agarwal would deem this claim obvious. Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official notice is respectfully

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traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

Claim 8 is directed to the method of claim 5, wherein the credit card billing is performed by an existing merchant service. The Examiner generally states that this feature was well known in regular Internet networks. Furthermore, the Examiner states that this "well known" feature, in combination with Agarwal would deem this claim obvious. Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

Claim 9 is directed to the method of claim 8, wherein the existing merchant service is reciprocal with other Internet subscription providers nationwide. The Examiner generally states that this feature was well known in regular Internet networks. Furthermore, the Examiner states that this "well known" feature, in combination with Agarwal would deem this claim obvious. Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

Claim 11, as amended, is directed to the method of claim 1, wherein the verifying step is performed by a subscriber merchant service. The Examiner generally states that this feature was well known in regular Internet networks. Furthermore, the Examiner states that this "well known" feature, in combination with Agarwal would deem this claim obvious. Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature

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is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

Claim 12, as amended, is directed to the method of claim 1, wherein the connecting step includes connecting the web-ready device to the router via a wireless connection. The Examiner generally states that this feature was well known in regular Internet networks. Furthermore, the Examiner states that this "well known" feature, in combination with Agarwal would deem this claim obvious. Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

Claim 13, as amended, is directed to the method of claim 12, wherein a plurality of users can simultaneously connect web-ready devices to the router. The Examiner generally states that this feature was well known in regular Internet networks. Furthermore, the Examiner states that this "well known" feature, in combination with Agarwal would deem this claim obvious. Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

Claim 23 is directed to the method of claim 12, further comprising the steps of operatively coupling at least one wireless transceiver extender unit between the satellite dish and the router to extend the range of Internet access at the rural location. The Examiner generally states that this feature was well known in regular Internet networks.

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Furthermore, the Examiner states that this "well known" feature, in combination with Agarwal would deem this claim obvious. Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

Independent claim 26 is directed to a method for providing satellite-distributed high-speed Internet access, comprising the steps of: providing a router to which a web-ready device may be connected via at least one of a cable or a wireless data link; assigning a dynamic IP address to the web-ready device that has been connected to the router; forwarding by the router of the user's connection to a subscriber access unit; retrieving from memory by the subscriber access unit of the static IP address of a remote server; forwarding the user's connection to a satellite dish; establishing communication by the satellite dish with a satellite, which is enabled to send and receive data over the Internet; establishing a connection over the Internet with the remote server, whose interface is viewed by the user as a webpage on the web-ready device; prompting by the remote server of the user for a username and password; accessing a database by the remote server to verify the username and password; prompting the user to create a new account, if the username and password are invalid or the user's account has zero time remaining; allowing the user to access other websites, until the user's account has zero time remaining or the user logs off the network; and updating the user's account in the database by the remote server to subtract the amount of time used during the just-completed session, when the user logs off the network. The Examiner generally states that these features and steps were well known in regular Internet networks. Furthermore, the Examiner states that these "well known" features, in combination with Agarwal would deem this claim obvious. Applicant contends that these features and steps were not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because these features and steps are not *capable of instant and*

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unquestionable demonstration as being well-known. Therefore, this official notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to these features and steps in the next Office action.

Claim 27 is directed to the method of claim 26, wherein the interface of the remote server is viewed by the user as a webpage on the web-ready device using Secure Socket Layer encryption. The Examiner generally states that this feature was well known in regular Internet networks. Furthermore, the Examiner states that this "well known" feature, in combination with Agarwal would deem this claim obvious. Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

Claim 28 is directed to the method of claim 26, wherein the user may create an account using a prepaid coupon. The Examiner generally states that this feature was well known in regular Internet networks. Furthermore, the Examiner states that this "well known" feature, in combination with Agarwal would deem this claim obvious. Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

Claim 29 is directed to the method of claim 26, further comprising, after the step of prompting the user to create a new account, if the username and password are invalid or the user's account has zero time remaining, the step of: charging the user's credit card, if a new account is created. The Examiner generally states that this feature was well known in regular Internet networks. Furthermore, the Examiner states that this "well

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known" feature, in combination with Agarwal would deem this claim obvious. Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

Claim 30 is directed to the method of claim 29, wherein the user may purchase access time in a definite quantity when creating an account. The Examiner generally states that this feature was well known in regular Internet networks. Furthermore, the Examiner states that this "well known" feature, in combination with Agarwal would deem this claim obvious. Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

Claim 31 is directed to the method of claim 29, wherein the user may purchase access time on a "continue until canceled" basis when creating an account. The Examiner generally states that this feature was well known in regular Internet networks. Furthermore, the Examiner states that this "well known" feature, in combination with Agarwal would deem this claim obvious. Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

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Claim 32 is directed to the method of claim 29, wherein the charging of the user's credit card is performed by an existing merchant service. The Examiner generally states that this feature was well known in regular Internet networks. Furthermore, the Examiner states that this "well known" feature, in combination with Agarwal would deem this claim obvious. Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

Claim 33 is directed to the method of claim 32, wherein the existing merchant service is reciprocal with other Internet subscription providers nationwide. The Examiner generally states that this feature was well known in regular Internet networks. Furthermore, the Examiner states that this "well known" feature, in combination with Agarwal would deem this claim obvious. Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

Claim 34 is directed to the method of claim 29, further comprising the step of installing the router and the satellite dish in a rural location experiencing a relatively high volume of transient traffic. The Examiner generally states that this feature was well known in regular Internet networks. Furthermore, the Examiner states that this "well known" feature, in combination with Agarwal would deem this claim obvious. Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official

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notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

Claim 36, as amended, is directed to the Internet Hotspot of claim 35, wherein the data connection is one of a wired data connection and a wireless data connection. The Examiner generally states that this feature was well known in regular Internet networks. Furthermore, the Examiner states that this "well known" feature, in combination with Agarwal would deem this claim obvious. Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

Claim 37 is directed to the Internet Hotspot of claim 35, wherein a plurality of users may access the Internet simultaneously at the remote location by respectively establishing data connections with the router via their web-ready devices. The Examiner generally states that this feature was well known in regular Internet networks. Furthermore, the Examiner states that this "well known" feature, in combination with Agarwal would deem this claim obvious. Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

Claim 38 is directed to the Internet Hotspot of claim 37, wherein the data connections include wired data connections. The Examiner generally states that this feature was well known in regular Internet networks. Furthermore, the Examiner states that this "well known" feature, in combination with Agarwal would deem this claim

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obvious. Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

Claim 39 is directed to the Internet Hotspot of claim 37, wherein the data connections include wireless data connections. The Examiner generally states that this feature was well known in regular Internet networks. Furthermore, the Examiner states that this "well known" feature, in combination with Agarwal would deem this claim obvious. Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

Claim 40 is directed to the Internet Hotspot of claim 39, further comprising an amplifier and antenna operatively coupled to the router. The Examiner generally states that this feature was well known in regular Internet networks. Furthermore, the Examiner states that this "well known" feature, in combination with Agarwal would deem this claim obvious. Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

Claim 41, as amended, is directed to the Internet Hotspot of claim 40, wherein the router is a Vivato outdoor switch. The Examiner generally states that this feature was well known in regular Internet networks. Furthermore, the Examiner states that this "well known" feature, in combination with Agarwal would deem this claim obvious.

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Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

Claim 45, as amended, is directed to the Internet Hotspot of claim 35, further comprising at least one wireless extender transceiver operatively coupled between the subscriber access unit and the router. The Examiner generally states that this feature was well known in regular Internet networks. Furthermore, the Examiner states that this "well known" feature, in combination with Agarwal would deem this claim obvious. Applicant contends that this feature was not well known in the art at the time. It is respectfully submitted that this official notice is erroneous because this feature is not *capable of instant and unquestionable demonstration as being well-known.* Therefore, this official notice is respectfully traversed. The Applicant requests that the Examiner provide documentary evidence specific to this feature in the next Office action.

For the foregoing reasons, the Applicant respectfully traverses the Examiner's assertions of official notice. Therefore, for at least these reasons, claims 2-34 and 36-46 are now in condition for allowance.

III. Newly Added Claims

Claims 47, 48 and 49 are newly added. Consideration of these claims is respectfully requested.

V. Conclusion

In light of the foregoing, it is respectfully submitted that claims 1-2, 4-9, 11-13, 23, 26-41, 45, and 47-49, now pending, are distinguishable from the references cited, and in condition for allowance. Reconsideration and withdrawal of the rejections of record is respectfully requested.

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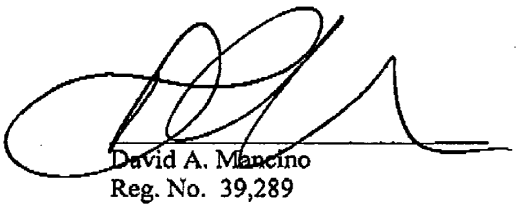
Serial No.: 10/772,747
Attorney Docket No.: 2003-0660.02
Amendment

If the Examiner wishes to discuss any aspect of this response, please contact the undersigned at the telephone number provided below.

Respectfully submitted,



David A. Mancino
Reg. No. 39,289

30074
Taft, Stettinius & Hollister LLP
425 Walnut Street; Suite 1800
Cincinnati, Ohio 45202-3957
mancino@taftlaw.com
(513) 357-9331

PAGE 24/24 * RCVD AT 9/17/2007 3:34:11 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-5/7 * DNIS:2738300 * CSID:513 381 0205 * DURATION (mm-ss):04-04

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American Airlines, et. al. v. Intellectual Ventures, et.al.
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...ATION FEE DETERMINATION RECORD
Effective October 1, 2003

10950860

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS		
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	minus 20=	*
INDEPENDENT CLAIMS	minus 3 =	*
MULTIPLE DEPENDENT CLAIM PRESENT		☐

* If the difference in column 1 is less than zero, enter "0" in column 2

SMALL ENTITY TYPE ☐		OR	OTHER THAN SMALL ENTITY	
RATE	FEE		RATE	FEE
BASIC FEE	385.00	OR	BASIC FEE	770.00
X$ 9=		OR	X$18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL		OR	TOTAL	

CLAIMS AS AMENDED - PART II

AMENDMENT A	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

9/17/07

AMENDMENT B	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	* 32	Minus	** 46	= 26
Independent	* 3	Minus	*** 3	= 0
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

		OR		
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT C	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

		OR		
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

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American Airlines, et. al. v. Intellectual Ventures, et.al.
IPR2025-00782

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

NOTICE OF ALLOWANCE AND FEE(S) DUE

30074 7590 10/25/2007

TAFT, STETTINIUS & HOLLISTER LLP
SUITE 1800
425 WALNUT STREET
CINCINNATI, OH 45202-3957

EXAMINER	
TRAN, CONGVAN	
ART UNIT	PAPER NUMBER
2617	

DATE MAILED: 10/25/2007

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/950,860	09/27/2004	W. David Wilson	SYS05-GN001	7056

TITLE OF INVENTION: SATELLITE DISTRIBUTED HIGH SPEED INTERNET ACCESS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$720	$300	$0	$1020	01/25/2008

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

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

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

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

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

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

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

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

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

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

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

PTOL-85 (Rev. 08/07) Approved for use through 08/31/2010.

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American Airlines, et. al. v. Intellectual Ventures, et.al.
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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)

30074 7590 10/25/2007

TAFT, STETTINIUS & HOLLISTER LLP
SUITE 1800
425 WALNUT STREET
CINCINNATI, OH 45202-3957

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.
10/950,860	09/27/2004	W. David Wilson	SYS05-GN001	7056

TITLE OF INVENTION: SATELLITE DISTRIBUTED HIGH SPEED INTERNET ACCESS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$720	$300	$0	$1020	01/25/2008

EXAMINER	ART UNIT	CLASS-SUBCLASS
TRAN, CONGVAN	2617	370-316000

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

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

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

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____

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

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

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

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

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

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

☐ Issue Fee

☐ Publication Fee (No small entity discount permitted)

☐ Advance Order - # of Copies _____

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

☐ A check is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

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

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

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

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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.

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IPR2025-00782

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/950,860	09/27/2004	W. David Wilson	SYS05-GN001	7056

30074 7590 10/25/2007

TAFT, STETTINIUS & HOLLISTER LLP
SUITE 1800
425 WALNUT STREET
CINCINNATI, OH 45202-3957

EXAMINER	
TRAN, CONGVAN	
ART UNIT	PAPER NUMBER
2617	

DATE MAILED: 10/25/2007.

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 563 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 563 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.

PTOL-85 (Rev. 08/07) Approved for use through 08/31/2010.

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American Airlines, et. al. v. Intellectual Ventures, et.al.
IPR2025-00782

Notice of Allowability	Application No.	Applicant(s)	
	10/950,860	WILSON, W. DAVID	
	Examiner	Art Unit	
	CongVan Tran	2617	

-- 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 *9/7/07*.

2. ☒ The allowed claim(s) is/are *1,2,4-9, 11-13, 23, 26-41, 45, 47-49 have been renumbered to 1-12, 15-31, 13-14, and 32 respectively*.

3. ☐ 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 the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

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

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ 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. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

CONGVAN TRAN
PRIMARY EXAMINER
/Cong Van Tran/
Primary Examiner
Art Unit: 2617

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American Airlines, et. al. v. Intellectual Ventures, et.al.
IPR2025-00782

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Bib Data Sheet

CONFIRMATION NO. 7056

SERIAL NUMBER	FILING OR 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
10/950,860	09/27/2004 RULE	370	2617	SYS05-GN001

APPLICANTS

W. David Wilson, Cincinnati, OH;

**** CONTINUING DATA ************************

This appln claims benefit of 60/507,022 09/29/2003 and claims benefit of 60/517,044 11/04/2003 and claims benefit of 60/523,061 11/18/2003

**** FOREIGN APPLICATIONS ********************

IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** SMALL ENTITY **
** 11/10/2004

Foreign Priority claimed	STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS
☐ yes ☑ no	OH	4	46	3

35 USC 119 (a-d) conditions met: ☐ yes ☑ no ☐ Met after Allowance

Verified and Acknowledged: _____ (Examiner's Signature) _____ (Initials)

ADDRESS
30074

TITLE

Satellite distributed high speed internet access

FILING FEE RECEIVED		
684	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

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IPR2025-00782

Issue Classification	Application/Control No.	Applicant(s)/Patent under Reexamination	
	10/950,860	WILSON, W. DAVID	
	Examiner	Art Unit	
	CongVan Tran	2617	

ISSUE CLASSIFICATION

ORIGINAL		CROSS REFERENCE(S)							
CLASS	SUBCLASS	CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)						
370	316	370	351	352					
INTERNATIONAL CLASSIFICATION		455	428						
H 0 4 B	7/185								
	/								
	/								
	/								
	/								

(Assistant Examiner) (Date)

(Legal Instruments Examiner) (Date)

CONGVAN TRAN
PRIMARY EXAMINER
CongVan Tran, September 21, 2007.
(Primary Examiner) (Date)

Total Claims Allowed: 32

O.G. Print Claim(s)	O.G. Print Fig.
1	1

☐ 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
1	1	20	31		61		91		121		151		181
2	2	21	32		62		92		122		152		182
	3	22	33		63		93		123		153		183
3	4	23	34		64		94		124		154		184
4	5	24	35		65		95		125		155		185
5	6	25	36		66		96		126		156		186
6	7	26	37		67		97		127		157		187
7	8	27	38		68		98		128		158		188
8	9	28	39		69		99		129		159		189
	10	29	40		70		100		130		160		190
9	11	30	41		71		101		131		161		191
10	12		42		72		102		132		162		192
11	13		43		73		103		133		163		193
	14		44		74		104		134		164		194
	15	31	45		75		105		135		165		195
	16		46		76		106		136		166		196
	17	13	47		77		107		137		167		197
	18	14	48		78		108		138		168		198
	19	32	49		79		109		139		169		199
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15	26		56		86		116		146		176		206
16	27		57		87		117		147		177		207
17	28		58		88		118		148		178		208
18	29		59		89		119		149		179		209
19	30		60		90		120		150		180		210

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Index of Claims

Application/Control No.	Applicant(s)/Patent under Reexamination
10/950,860	WILSON, W. DAVID
Examiner	**Art Unit**
CongVan Tran	2617

√	Rejected	–	(Through numeral) Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

Claim		Date
Final	Original	9/21/07
	1	=
	2	=
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Claim		Date
Final	Original	
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Claim		Date
Final	Original	
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AA/SWA Ex. 1004, p.127 of 147
American Airlines, et. al. v. Intellectual Ventures, et.al.
IPR2025-00782

Search Notes

Application/Control No.	Applicant(s)/Patent under Reexamination
10/950,860	WILSON, W. DAVID
Examiner	**Art Unit**
CongVan Tran	2617

SEARCHED			
Class	Subclass	Date	Examiner
370	316 351 352 355 356	9/21/2007	CT
455	13.3 428	9/21/2007	CT
	445		

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner
370	**351 352**	9/21/2007	**CT**

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
Search Updated	9/21/2007	CT

AA/SWA Ex. 1004, p.128 of 147
American Airlines, et. al. v. Intellectual Ventures, et.al.
IPR2025-00782

PART B - FEE(S) TRANSMITTAL

OIPE DEC 03 2007 U.S. PATENT AND TRADEMARK OFFICE

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)

30074 7590 10/25/2007

TAFT, STETTINIUS & HOLLISTER LLP
SUITE 1800
425 WALNUT STREET
CINCINNATI, OH 45202-3957

12/03/2007 HDEMESS2 00000101 10950860

01 FC:2501 720.00 OP
02 FC:1504 300.00 OP
03 FC:8001 0.00 OP

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.

SHARON A. SHELTON, PARALEGAL	(Depositor's name)
Sharon A. Shelton	(Signature)
NOVEMBER 28, 2007	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/950,860	09/27/2004	W. David Wilson	SYS05-GN001	7056

TITLE OF INVENTION: SATELLITE DISTRIBUTED HIGH SPEED INTERNET ACCESS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$720	$300	$0	$1020	01/25/2008

EXAMINER	ART UNIT	CLASS-SUBCLASS
TRAN, CONGVAN	2617	370-316000

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 Taft Stettinius &
Hollister LLP
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: SYSTEM SERVICES, INC.

(B) RESIDENCE: (CITY and STATE OR COUNTRY): BATAVIA, OHIO

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 3

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 50-3072 (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

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

Authorized Signature _____ Date 11-28-2007

Typed or printed name David A. Mancino Registration No. 39,289

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.

AA/SWA Ex. 1004, p.129 of 147
American Airlines, et. al. v. Intellectual Ventures, et.al.
IPR2025-00782

OIPE IAP12 DEC 03 2007 PATENT & TRADEMARK OFFICE

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)

30074 7590 10/25/2007

TAFT, STETTINIUS & HOLLISTER LLP
SUITE 1800
425 WALNUT STREET
CINCINNATI, OH 45202-3957

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.

SHARON A. SHELTON, PARALEGAL	(Depositor's name)
Sharon A. Shelton	(Signature)
NOVEMBER 28, 2007	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/950,860	09/27/2004	W. David Wilson	SYS05-GN001	7056

TITLE OF INVENTION: SATELLITE DISTRIBUTED HIGH SPEED INTERNET ACCESS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$720	$300	$0	$1020	01/25/2008

EXAMINER	ART UNIT	CLASS-SUBCLASS
TRAN, CONGVAN	2617	370-316000

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 Taft Stettinius & Hollister LLP
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: SYSTEM SERVICES, INC.

(B) RESIDENCE: (CITY and STATE OR COUNTRY): BATAVIA, OHIO

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 3

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 50-3072 (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

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

Authorized Signature _____ Date 11-28-2007

Typed or printed name David A. Mancino Registration No. 39,289

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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American Airlines, et. al. v. Intellectual Ventures, et.al.
IPR2025-00782

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.
10/950,860	01/29/2008	7324469	SYS05-GN001	7056

30074 7590 01/09/2008

TAFT, STETTINIUS & HOLLISTER LLP
SUITE 1800
425 WALNUT STREET
CINCINNATI, OH 45202-3957

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 563 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 Customer Service Center of the Office of Patent Publication at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

W. David Wilson, Cincinnati, OH;

APPENDIX

Issued Patents

	Application/Patent Number	Title	Filed/Issue Date	Recordation Information
1.	11/155,292	Satellite Distributed High Speed Internet Access	06/17/2005	Reel/Frame: 016299/0095 Assignors: Wilson, W. David Assignee: System Services, Inc. Reel/Frame: 022368/0877 Assignors: System Services, Inc. Assignee: Distalma Management LLC
2.	7,324,469	Satellite Distributed High Speed Internet Access	01/29/2008	Reel/Frame: 016299/0095 Assignors: Wilson, W. David Assignee: System Services, Inc. Reel/Frame: 022368/0877 Assignors: System Services, Inc. Assignee: Distalma Management LLC

PTO/SB/80 (01-06)
Approved for use through 12/31/2008. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

☒ Practitioners associated with the Customer Number: 20306

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

☒ The address associated with Customer Number: 20306

OR

☐ Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Email	

Assignee Name and Address:
Distalma Management LLC
160 Greentree Drive, Suite 101
Dover, DE 19904

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record
The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	1/16/09
Name	Jeremiah Miller	Telephone	
Title	Authorized Person for Distalma Management LLC		

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

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

American LegalNet, Inc.
www.USCourtForms.com

Electronic Acknowledgement Receipt	
EFS ID:	5003413
Application Number:	10950860
International Application Number:	
Confirmation Number:	7056
Title of Invention:	SATELLITE DISTRIBUTED HIGH SPEED INTERNET ACCESS
First Named Inventor/Applicant Name:	W. David Wilson
Customer Number:	30074
Filer:	Robert Johnson Irvine
Filer Authorized By:	
Attorney Docket Number:	SYS05-GN001
Receipt Date:	24-MAR-2009
Filing Date:	27-SEP-2004
Time Stamp:	12:10:45
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		08_1673_US.pdf	369065 eaa3d32fdea9d32c1c0a002593f64a100bbb2842	yes	3

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Assignee showing of ownership per 37 CFR 3.73(b).	1	1
	Miscellaneous Incoming Letter	2	2
	Power of Attorney	3	3
Warnings:			
Information:			
	Total Files Size (in bytes):	369065	

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.

PTO/SB/96 (01-08)
Approved for use through 04/30/2008. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: DISTALMA MANAGEMENT LLC

Application No./Patent No.: 7,324,469 Filed/Issue Date: 01/29/2008

Entitled: Satellite Distributed High Speed Internet Access

DISTALMA MANAGEMENT LLC, a corporation
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:
1. ☒ the assignee of the entire right, title, and interest; or

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

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

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

OR

B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

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

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

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

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

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

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

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

/Robert J. Irvine III/	March 20, 2009
Signature	Date
Robert J. Irvine III	312-913-0001
Printed or Typed Name	Telephone Number
Attorney of Record	
Title	

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

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

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/950,860	09/27/2004	W. David Wilson	SYS05-GN001

CONFIRMATION NO. 7056

20306
MCDONNELL BOEHNEN HULBERT & BERGHOFF LLP
300 S. WACKER DRIVE
32ND FLOOR
CHICAGO, IL 60606

POA ACCEPTANCE LETTER

OC000000035231616

Date Mailed: 03/30/2009

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 03/24/2009.

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

/jtfitzhugh sr/

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

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10/950,860	09/27/2004	W. David Wilson	SYS05-GN001

CONFIRMATION NO. 7056

POWER OF ATTORNEY NOTICE

30074
TAFT, STETTINIUS & HOLLISTER LLP
SUITE 1800
425 WALNUT STREET
CINCINNATI, OH 45202-3957

OC000000035231615

Date Mailed: 03/30/2009

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 03/24/2009.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/jtfitzhugh sr/

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

PTO/SB/80 (01-08)
Approved for use through 12/31/2008. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

[X] Practitioners associated with the Customer Number: **23524**

OR

[ ] Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

[X] The address associated with Customer Number: **23524**

OR

[ ] Firm or Individual Name

Address					
City		State		Zip	
Country		Telephone		Email	

Assignee Name and Address:

Distalma Management LLC
160 Greentree Drive
Suite 101
Dover DE 19904

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature	Osra Morris	Date	11/21/2011
Name	Osra Morris	Telephone	
Title	Authorized Person for Distalma Management LLC		

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4821-8347-2141.1

DECLARATION REGARDING AUTHORITY TO SIGN ON BEHALF OF A LEGAL ENTITY
(37 C.F.R. 3.73(b)(2)(i))

I, Dana Morris (whose title is supplied below), hereby declare that I am authorized to sign on behalf of Distalma Management LLC.

Dana Morris
Authorized Person for Distalma Management LLC

11/21/2011
[date]

4813-1112-0445.1

Electronic Acknowledgement Receipt	
EFS ID:	11677465
Application Number:	10950860
International Application Number:	
Confirmation Number:	7056
Title of Invention:	SATELLITE DISTRIBUTED HIGH SPEED INTERNET ACCESS
First Named Inventor/Applicant Name:	W. David Wilson
Customer Number:	20306
Filer:	Paul S. Hunter/Ann Laabs
Filer Authorized By:	Paul S. Hunter
Attorney Docket Number:	08-1673-US
Receipt Date:	21-DEC-2011
Filing Date:	27-SEP-2004
Time Stamp:	14:52:06
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		5328_373b_Poa.pdf	461647 424f94baad214a08806ebdf1aa50874f7b91409e	yes	3

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Assignee showing of ownership per 37 CFR 3.73(b).	1	1
	Power of Attorney	2	3
Warnings:			
Information:			
	Total Files Size (in bytes):	461647	

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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.

AA/SWA Ex. 1004, p.143 of 147
American Airlines, et. al. v. Intellectual Ventures, et.al.
IPR2025-00782

PTO/SB/96 (06-04)
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STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner:	WILSON, W. DAVID		
Application No.:	10/950860	Filed:	09/27/2004
Patent No.:	7324469	Issue Date:	01/29/2008
Docket Number:	098688-5328		
Entitled:	SATELLITE DISTRIBUTED HIGH SPEED INTERNET ACCESS		

DISTALMA MANAGEMENT LLC (Name of Assignee)

LIMITED LIABILITY COMPANY (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

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

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

A. [ ] An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel/Frame or for which a copy thereof is attached.

OR

B. [X] A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as shown below:

1. From: WILSON, W. DAVID To: SYSTEM SERVICES, INC.
The document was recorded in the United States Patent and Trademark Office at Reel 016299, Frame 0085, or for which a copy thereof is attached.

2. From: SYSTEM SERVICES, INC. To: DISTALMA MANAGEMENT LLC
The document was recorded in the United States Patent and Trademark Office at Reel 022368, Frame 0977, or for which a copy thereof is attached.

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

[ ] Copies of assignments or other documents in the chain of title are attached.

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

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

Signature	Date
Paul S. Hunter (Reg. No. 44,787)	(608) 256-4282
Printed or Typed Name	Telephone Number
Attorney for Applicant	
Title	

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. 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 NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/950,860	09/27/2004	W. David Wilson	098888-5328

CONFIRMATION NO. 7056

23524
FOLEY & LARDNER LLP
150 EAST GILMAN STREET
P.O. BOX 1497
MADISON, WI 53701-1497

POA ACCEPTANCE LETTER

OC000000051659859

Date Mailed: 12/28/2011

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 12/21/2011.

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

/sibrahim/

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

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/950,860	09/27/2004	W. David Wilson	08-1673-US

CONFIRMATION NO. 7056

POWER OF ATTORNEY NOTICE

20306
MCDONNELL BOEHNEN HULBERT & BERGHOFF LLP
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32ND FLOOR
CHICAGO, IL 60606

OC000000051659836

Date Mailed: 12/28/2011

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 12/21/2011.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/sibrahim/

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In the following listed application(s) for which the Issue Fee has been paid for patent(s).

PATENT NUMBER (If known)	APPLICATION NUMBER
7324469	10/950860
7821984	11/155292

Completed by (check one)

☐ Applicant/Inventor

Signature

☒ Attorney or Agent of record — 63,272 — Nicholas M. Lagerwall
Reg. No. — Typed or Printed Name

☐ Assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96)

(608) 257-5035
Requester's telephone number

☐ Assignee recorded at Reel ___ Frame

January 6, 2012
Date

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

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Sender's Direct Dial :	608.258.4466
Date :	January 6, 2012
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4848-9349-5566.1
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