

(12) **United States Patent**  
**Levanon et al.**

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(54) **OPTIMIZED IMAGE DELIVERY OVER LIMITED BANDWIDTH COMMUNICATION CHANNELS**

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(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.  
  
This patent is subject to a terminal disclaimer.

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**Related U.S. Application Data**

(63) Continuation of application No. 13/027,929, filed on Feb. 15, 2011, now Pat. No. 8,924,506, which is a continuation-in-part of application No. 12/619,643, filed on Nov. 16, 2009, now Pat. No. 7,908,343, which

(Continued)

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**G06F 15/16** (2006.01)

**H04L 29/06** (2006.01)

(Continued)

(52) **U.S. Cl.**

CPC ..... **H04L 65/602** (2013.01); **G06F 3/1454** (2013.01); **G06T 3/4092** (2013.01); **H04L 67/42** (2013.01); **G09G 2340/02** (2013.01); **G09G 2350/00** (2013.01)

(58) **Field of Classification Search**

CPC ..... G06T 3/4092; G09G 2340/02; G06F 3/14  
USPC ..... 709/202, 203, 217, 230, 246, 247;  
345/625; 382/232, 305

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,682,869 A \* 7/1987 Itoh et al. .... 358/426.12  
4,972,319 A 11/1990 Delorme

(Continued)

FOREIGN PATENT DOCUMENTS

EP 1070290 B1 1/2001  
WO 99/41675 8/1999

OTHER PUBLICATIONS

Potmesil Maps Alive with dArnaud Declaration (all pages).

(Continued)

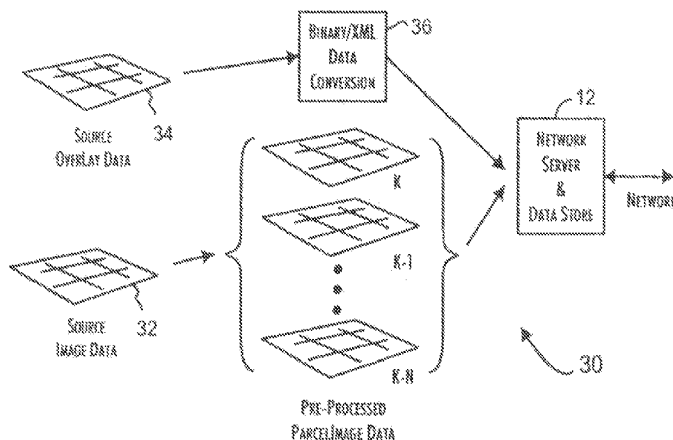
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(57) **ABSTRACT**

Large-scale images are retrieved over network communications channels for display on a client device by selecting an update image parcel relative to an operator controlled image viewpoint to display via the client device. A request is prepared for the update image parcel and associated with a request queue for subsequent issuance over a communications channel. The update image parcel is received from the communications channel and displayed as a discrete portion of the predetermined image. The update image parcel optimally has a fixed pixel array size, is received in a single and or plurality of network data packets, and were the fixed pixel array may be constrained to a resolution less than or equal to the resolution of the client device display.

**25 Claims, 5 Drawing Sheets**



**Related U.S. Application Data**

is a continuation of application No. 10/035,987, filed on Dec. 24, 2001, now Pat. No. 7,644,131.

- (60) Provisional application No. 60/258,465, filed on Dec. 27, 2000, provisional application No. 60/258,466, filed on Dec. 27, 2000, provisional application No. 60/258,467, filed on Dec. 27, 2000, provisional application No. 60/258,468, filed on Dec. 27, 2000, provisional application No. 60/258,488, filed on Dec. 27, 2000, provisional application No. 60/258,489, filed on Dec. 27, 2000.
- (51) **Int. Cl.**  
**G06F 3/14** (2006.01)  
**G06T 3/40** (2006.01)

- (56) **References Cited**

## U.S. PATENT DOCUMENTS

5,179,638	A	1/1993	Dawson et al.	
5,263,136	A	11/1993	DeAguiar et al.	
5,321,520	A	6/1994	Inga et al.	
5,559,936	A *	9/1996	Poulter et al. ....	345/428
5,613,051	A *	3/1997	Iodice et al. ....	345/428
5,682,441	A	10/1997	Ligtenberg et al.	
5,760,783	A	6/1998	Migdal	
5,798,770	A	8/1998	Baldwin	
5,940,117	A	8/1999	Hassan et al.	
5,987,256	A	11/1999	Wu et al.	
5,995,903	A *	11/1999	Smith et al. ....	701/470
6,118,456	A	9/2000	Cooper	
6,167,442	A *	12/2000	Sutherland et al. ....	709/217
6,182,114	B1	1/2001	Yap et al.	
6,212,301	B1 *	4/2001	Warner et al. ....	382/232
6,246,797	B1 *	6/2001	Castor et al. ....	382/232
6,285,317	B1 *	9/2001	Ong ..... 342/357.57	
6,314,452	B1 *	11/2001	Dekel et al. ....	709/203
6,326,965	B1 *	12/2001	Castelli et al. ....	345/420
6,345,279	B1 *	2/2002	Li et al.	
6,346,938	B1 *	2/2002	Chan et al. ....	345/419
6,397,259	B1 *	5/2002	Lincke et al. ....	709/236
6,449,639	B1 *	9/2002	Blumberg ..... 709/217	
6,496,189	B1 *	12/2002	Yaron et al. ....	345/428
6,525,732	B1 *	2/2003	Gadh et al. ....	345/428
6,608,628	B1 *	8/2003	Ross et al. ....	345/619
6,608,933	B1 *	8/2003	Dowell et al. ....	382/232
6,625,309	B1 *	9/2003	Li et al. ....	382/173
6,650,998	B1	11/2003	Rutledge et al.	
6,704,024	B2 *	3/2004	Robotham et al. ....	345/581
6,704,791	B1 *	3/2004	Harris ..... 709/231	
6,711,297	B1 *	3/2004	Chang et al. ....	382/240
6,754,365	B1 *	6/2004	Wen et al. ....	382/100
6,801,665	B1 *	10/2004	Atsumi et al. ....	382/239
6,882,755	B2 *	4/2005	Silverstein et al. ....	382/282
6,898,311	B2 *	5/2005	Whitehead ..... 382/166	
6,970,604	B1 *	11/2005	Chai ..... 382/240	
7,908,343	B2 *	3/2011	Levanon et al. ....	709/217
8,924,506	B2 *	12/2014	Levanon et al. ....	709/217

## OTHER PUBLICATIONS

Michalson Declaration Appendices P-EE (all pages).  
 Michalson Declaration with Appendices A-O (all pages).  
 Michael Potmesil, "Maps Alive: Viewing Geospatial Information on the WWW", Computer Networks and ISDN Systems vol. 29, issues 8-13, pp. 1327-1342.  
 Peter Lindstrom, David Koller, William Ribarsky, Larry F. Hodges, Augusto OP den Bosch, Nick Faust, "An Integrated Global GIS and

Visual Simulation System" by P. Lindstrom et al., Tech. Rep. GIT-GVU-97-07, Mar. 1997 (all pages).

Curriculum Vitae of William R. Michalson (all pages).

Hanan Samet, The Design and Analysis of Spatial Data Structures, University of Maryland (1989) (all pages).

B. Fuller and I. Richer, The Magic Project: From Vision to Reality, IEEE Network May/June 1996, pp. 15-25.

International Telegraph and Telephone Consultative Committee ("CCITT") Recommendation T.81, Sep. 1992 (all pages).

Ken Cabeen & Peter Gent, Image Compression and the Discrete Cosine Transform (all pages).

M. Antonini, Image Coding Using Wavelet Transform, IEEE Transactions on Image Processing, vol. 1, No. 2, Apr. 1992 (all pages).

Lance Williams, Pyramidal Parametrics, Computer Graphics, vol. 17, No. 3, Jul. 1983, (all pages).

OpenGL Standard Version 1.1, Mar. 1997, available: <https://www.opengl.org/documentation/specs/version1.1/glspec1.1/node84.html#SECTION00681100000000000000>, (all pages).

H. Hoppe, Progressive Meshes, SIGGRAPH '96: Proceedings of the 23rd annual conference on computer graphics and interactive techniques, pp. 99-108.

Boris Rabinovich and Craig Gotsman, Visualization of Large Terrains in Resource-Limited Computing Environments (1997) (all pages).

User Datagram Protocol (UDP) (Windows CE 5.0, Microsoft, Available: <https://msdn.microsoft.com/enus/library/ms885773.aspx> [Accessed Apr. 28, 2015]) (all pages).

OpenGL Standard Version 1.2.1, Apr. 1999, available: <https://www.opengl.org/documentation/specs/version1.2/opengl1.2.1.pdf>, (all pages).

George H. Forman and John Zahorjan, "The challenges of mobile computing," Computer vol. 27, No. 4, pp. 38, 47 (Apr. 1994).

K. Brown and S. Singh, A Network Architecture for Mobile Computing, INFOCOM '96, Fifteenth Annual Joint Conference of the IEEE Computer Societies, Networking the Next Generation, Proceedings IEEE vol. 3, pp. 1388-1399.

B. Kreller et al "UMTS: a middleware architecture and mobile API approach," Personal Communications, IEEE, vol. 5, No. 2, pp. 32-38 (Apr. 1998).

J. Hansen et al, "Real-time synthetic vision cockpit display for general aviation," AeroSense '99, International Society for Optics and Photonics, 1999, (all pages).

Theresa-Marie Rhyne, A Commentary on GeoVRML: A Tool for 3D Representation of GeoReferenced Data on the Web, International Journal of Geographic Information Sciences, issue 4 of vol. 13, 1999, (all pages).

Declaration of Prof. William R. Michalson (all pages).

Provisional Applications to which the 506 Patent claims priority (all pages).

Numbering of Claim Elements of Challenged Claims of the 506 Patent, (all pages).

Claim chart illustrating teachings of Potmesil (Ex. 1002) and Hornbacker (Ex. 1003) pertinent to elements of Challenged Claims (all pages).

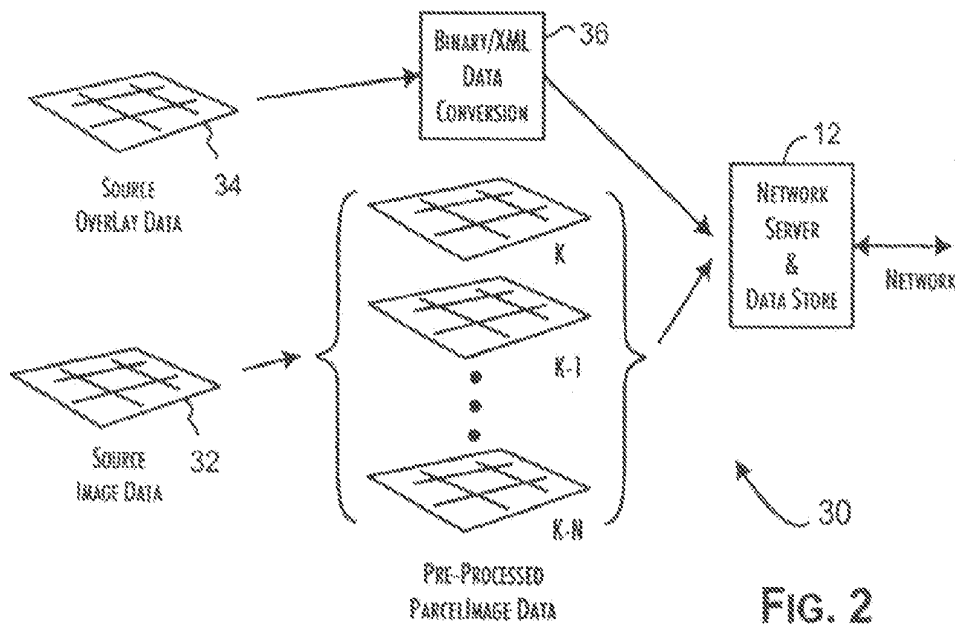
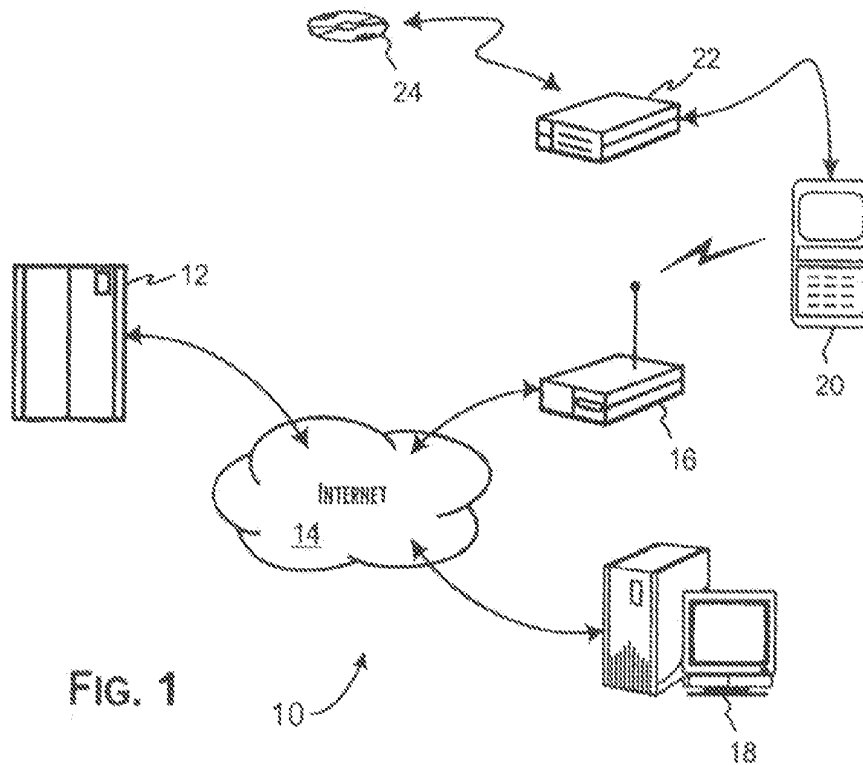
Claim chart illustrating teachings of Rutledge (Ex. 1006), Ligtenberg (Ex. 1005), and Cooper (Ex. 1007) pertinent to elements of Challenged Claims (all pages).

Claim chart illustrating teachings of Rutledge (Ex. 1006), Ligtenberg (Ex. 1005), Cooper (Ex. 1007), and Hassan (Ex. 1008) pertinent to elements of Challenged Claims (all pages).

Claim chart illustrating teachings of Fuller (App. E) and Hornbacker (Ex. 1003) pertinent to elements of Challenged Claims (all pages).

Claim chart illustrating teachings of Yap (App. J) and Rabinovich (App. R) pertinent to elements of Challenged Claims (all pages).

\* cited by examiner



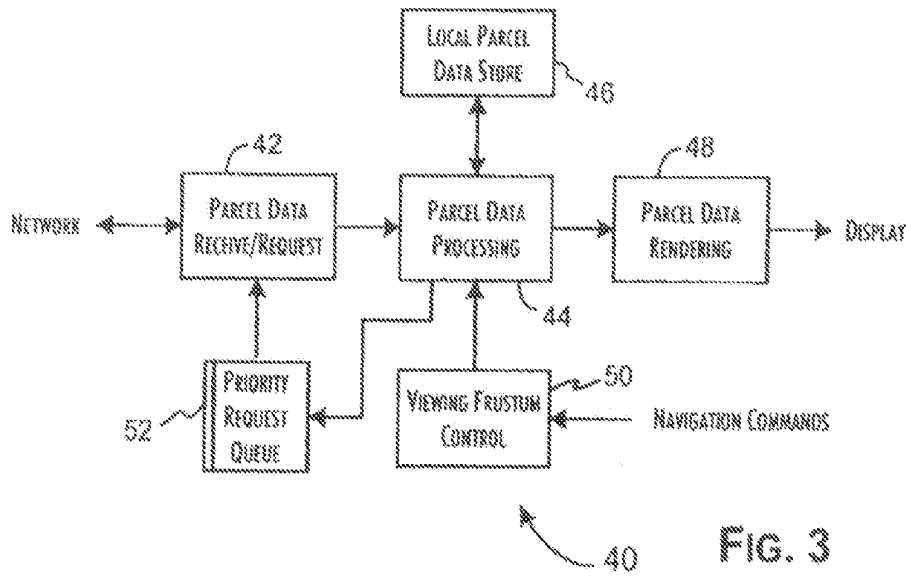


FIG. 3

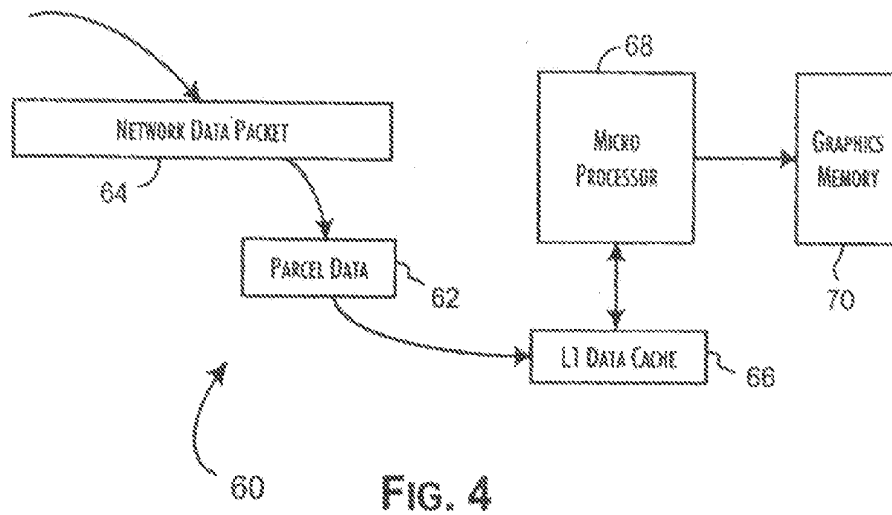
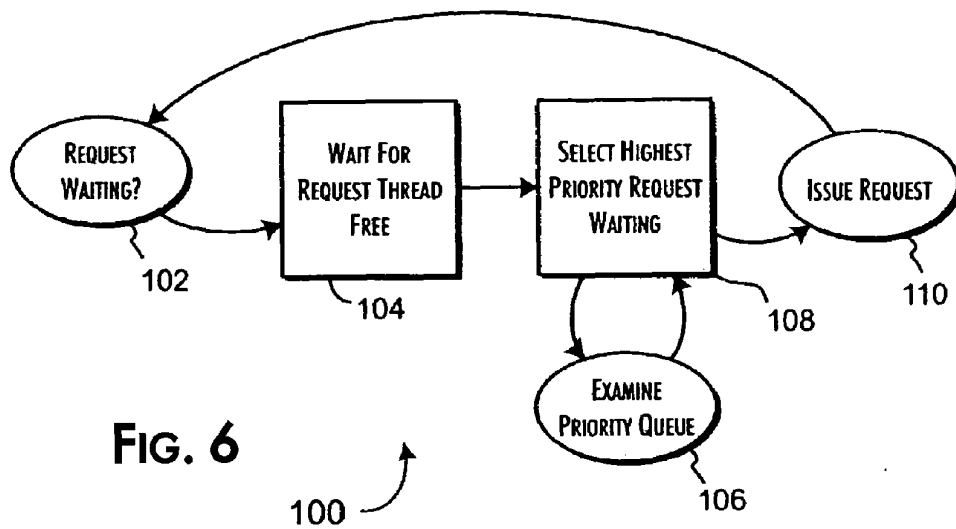
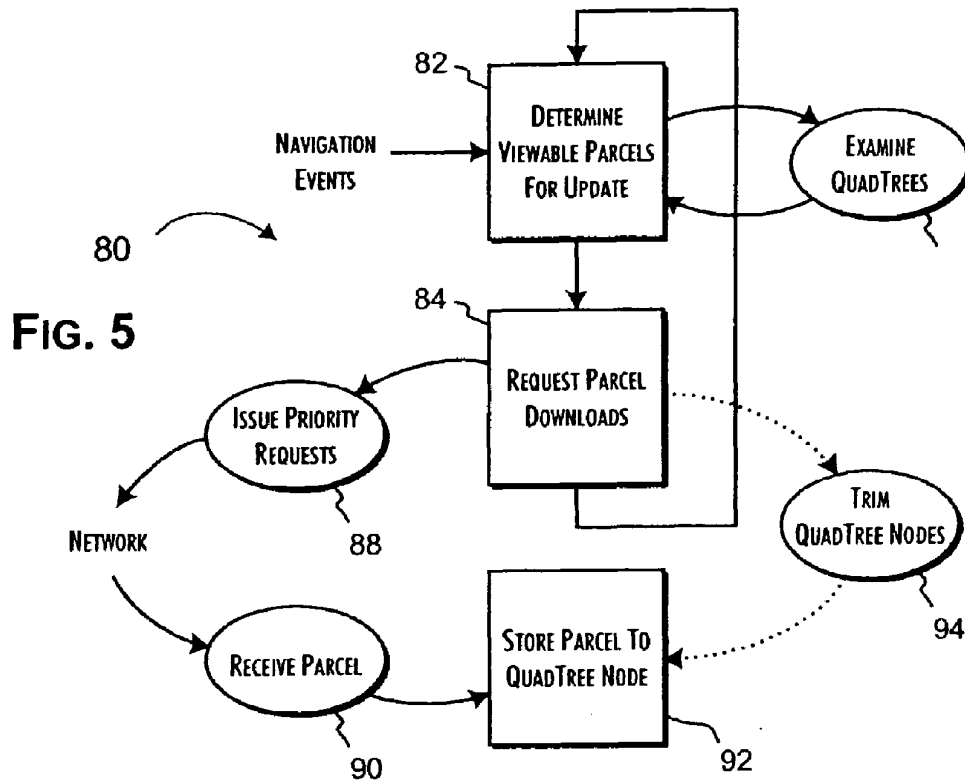


FIG. 4



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