

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

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(54) **NAVIGATING NETWORK-BASED ELECTRONIC INFORMATION USING SPOKEN INPUT WITH MULTIMODAL ERROR FEEDBACK**

WO WO 00/11869 3/2000

**OTHER PUBLICATIONS**

<http://www.ai.sri.com/~lesaf/commandtalk.html>: "CommandTalk: A Spoken-Language Interface for Battlefield Simulations", 1997, by Robert Moore, John Dowding, Harry Bratt, J. Mark Gawron, Yonael Gorfu and Adam Cheyer, in "Proceedings of the Fifth Conference on Applied Natural Language Processing", Washington, DC, pp. 1-7, Association for Computational Linguistics.  
 "The CommandTalk Spoken Dialogue System", 1999, by Amanda Stent, John Dowding, Jean Mark Gawron, Elizabeth Owen Bratt and Robert Moore, in "Proceedings of the Thirty-Seventh Annual Meeting of the ACL", pp. 183-190, University of Maryland, College Park, MD, Association for Computational Linguistics.  
 Stent, Amanda et al., "The CommandTalk Spoken Dialogue System", SRI International.  
 Moore, Robert et al., "CommandTalk: A Spoken-Language Interface for Battlefield Simulations", Oct. 23, 1997, SRI International.  
 Dowding, John et al., "Interpreting Language in Context in CommandTalk", Feb. 5, 1999, SRI International.  
<http://www.ai.sri.com/~oaa/infowiz.html>, InfoWiz: An Animated Voice Interactive Information System, May 8, 2000.

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**Related U.S. Application Data**

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(51) **Int. Cl.<sup>7</sup>** ..... G06F 15/16

(52) **U.S. Cl.** ..... 709/218; 707/5; 707/4; 707/102

(58) **Field of Search** ..... 709/218; 707/5, 707/4, 102; 704/257, 231

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

5,197,005 A 3/1993 Schwartz et al. .... 364/419  
 5,386,556 A 1/1995 Hedin et al. .... 395/600

(List continued on next page.)

**FOREIGN PATENT DOCUMENTS**

EP 0 803 826 A2 10/1997

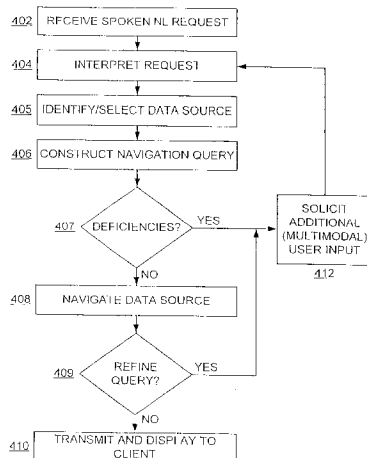
**132 Claims, 7 Drawing Sheets**

(List continued on next page.)

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(57) **ABSTRACT**

A system, method, and article of manufacture are provided for navigating an electronic data source by means of spoken language. When a spoken input request is received from a user, it is interpreted. Additional input is solicited from the user in a modality different than the original request and used to refine the navigation query. The resulting interpretation of the request is thereupon used to automatically construct an operational navigation query to retrieve the desired information from one or more electronic network data sources.



## U.S. PATENT DOCUMENTS

5,434,777	A	7/1995	Luciw .....	364/419
5,519,608	A	5/1996	Kupiec .....	364/419.08
5,608,624	A	3/1997	Luciw .....	395/794
5,721,938	A	2/1998	Stuckey .....	395/754
5,729,659	A	3/1998	Potter .....	395/2.79
5,748,974	A	5/1998	Johnson .....	395/759
5,774,859	A	6/1998	Houser et al. ....	704/275
5,794,050	A	8/1998	Dahlgren et al. ....	395/708
5,802,526	A	9/1998	Fawcett et al. ....	707/104
5,805,775	A	9/1998	Eberman et al. ....	395/12
5,855,002	A	12/1998	Armstrong .....	704/270
5,890,123	A	3/1999	Brown et al. ....	704/275
5,963,940	A	10/1999	Liddy et al. ....	707/5
6,003,072	A	12/1999	Gerritsen et al. ....	709/218
6,012,030	A	1/2000	French- St. George et al. ....	704/275
6,021,427	A	1/2000	Spagna et al.	
6,026,388	A	2/2000	Liddy et al. ....	707/1
6,080,202	A	6/2000	Strickland et al.	
6,144,989	A	11/2000	Hodjat et al.	
6,173,279	B1 *	1/2001	Levin et al. ....	707/5
6,192,338	B1 *	2/2001	Zasto et al. ....	704/257
6,226,666	B1	5/2001	Chang et al.	
6,338,081	B1	1/2002	Furusawa et al.	

## OTHER PUBLICATIONS

Dowding, John, "Interleaving Syntax and Semantics in an Efficient Bottom-up Parser", SRI International.  
 Moore, Robert et al., "Combining Linguistic and Statistical Knowledge Sources in Natural-Language Processing for ATIS", SRI International.

Dowding, John et al., "Gemini: A Natural Language System For Spoken-Language Understanding", SRI International.  
 Moran, Douglas B. et al., "Intelligent Agent-based User Interfaces", Article Intelligence center, SRI International.  
 Martin, David L. et al., "Building Distributed Software Systems with the Open Agent Architecture".  
 Julia, Luc. et al., "Cooperative Agents and Recognition System (CARS) for Drivers and Passengers"; SRI International.  
 Moran, Douglas et al., "Multimodal User Interfaces in the Open Agent Architecture".  
 Cheyer, Adam et al., "Multimodal Maps: An Agent-based Approach", SRI International.  
 Cutkosky, Mark R. et al., "An Experiment in Integrating Concurrent Engineering Systems".  
 Martin, David et al., "Development Tools for the Open Agent Architecture", The Practical Application of Intelligent Agents and Multi-Agent Technology (PAAM96), London, Apr. 1996.  
 Cheyer, Adam et al., "The Open Agent Architecture<sub>mi</sub>", SRI International, AI center.  
 Dejima, Inc., <http://www.dejima.com/>.  
 Cohen, Philip et al., "An Open Agent Architecture", AAAI Spring Symposium, pp. 1-8, Mar. 1994.  
 Martin, David et al., "Information Brokering in an Agent Architecture", Proceeding of the 2<sup>nd</sup> Int'l Conference on Practical Application of Intelligent Agents & Multi-Agent Technology, London, Apr. 1997.

\* cited by examiner

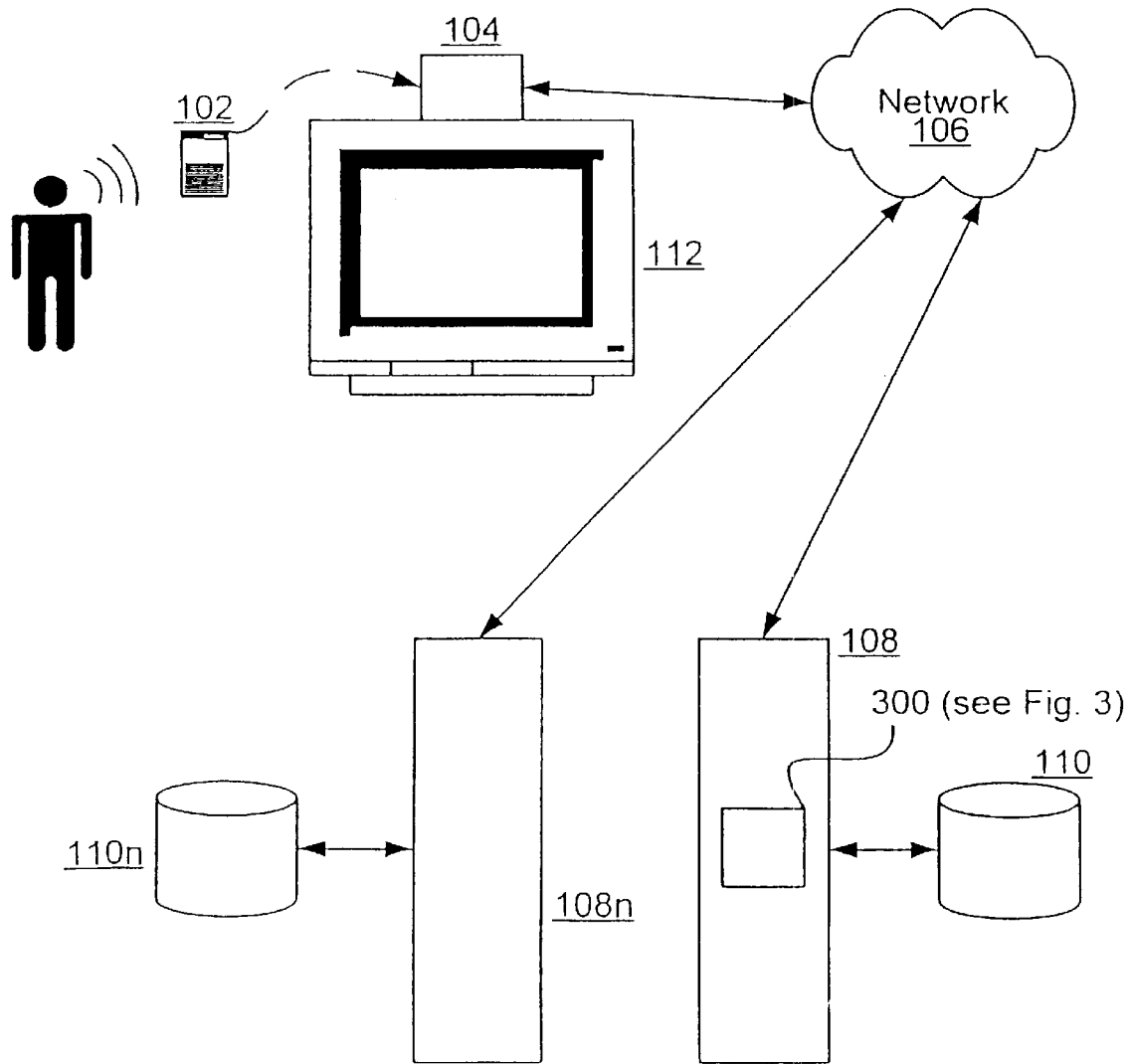


Fig. 1a

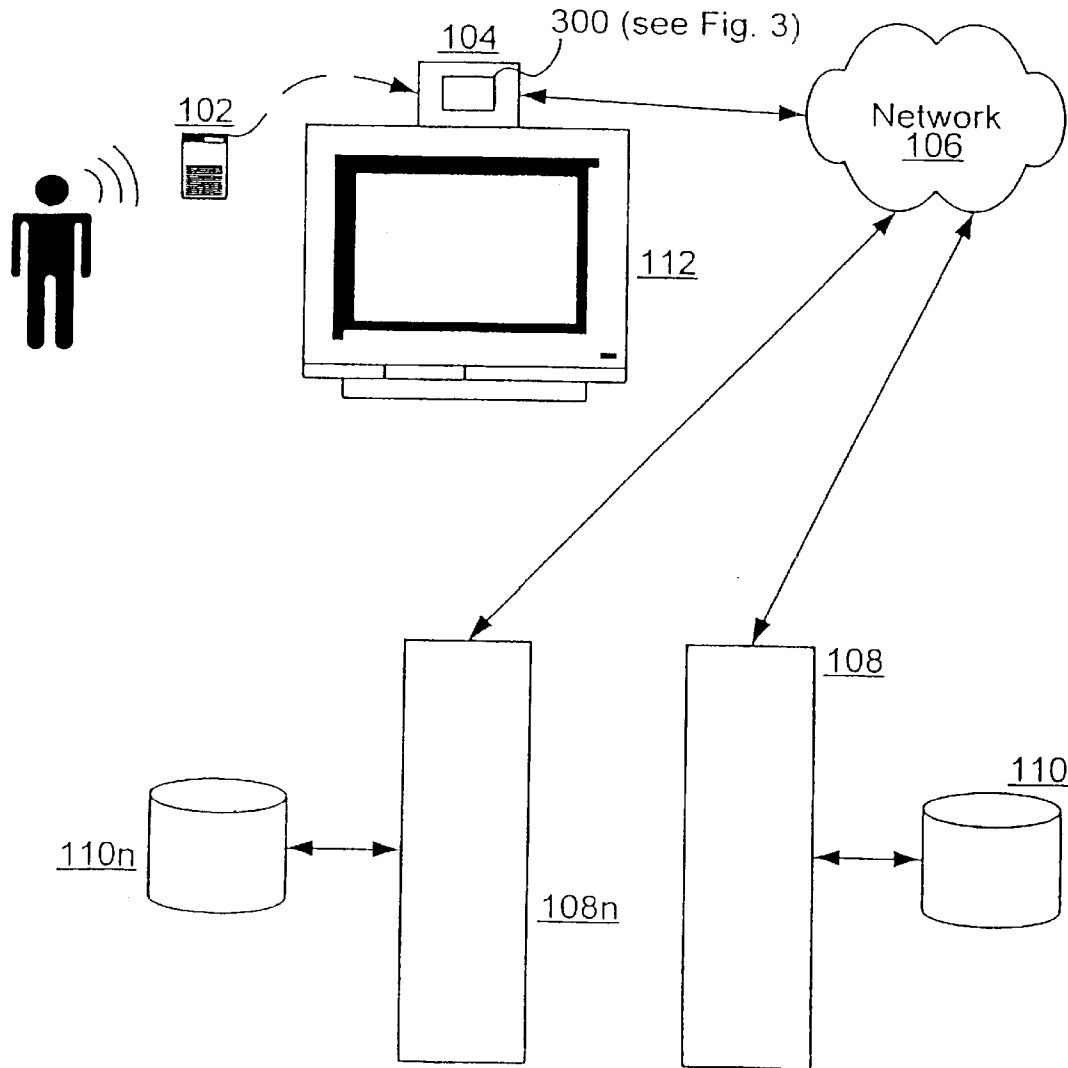


Fig. 1b

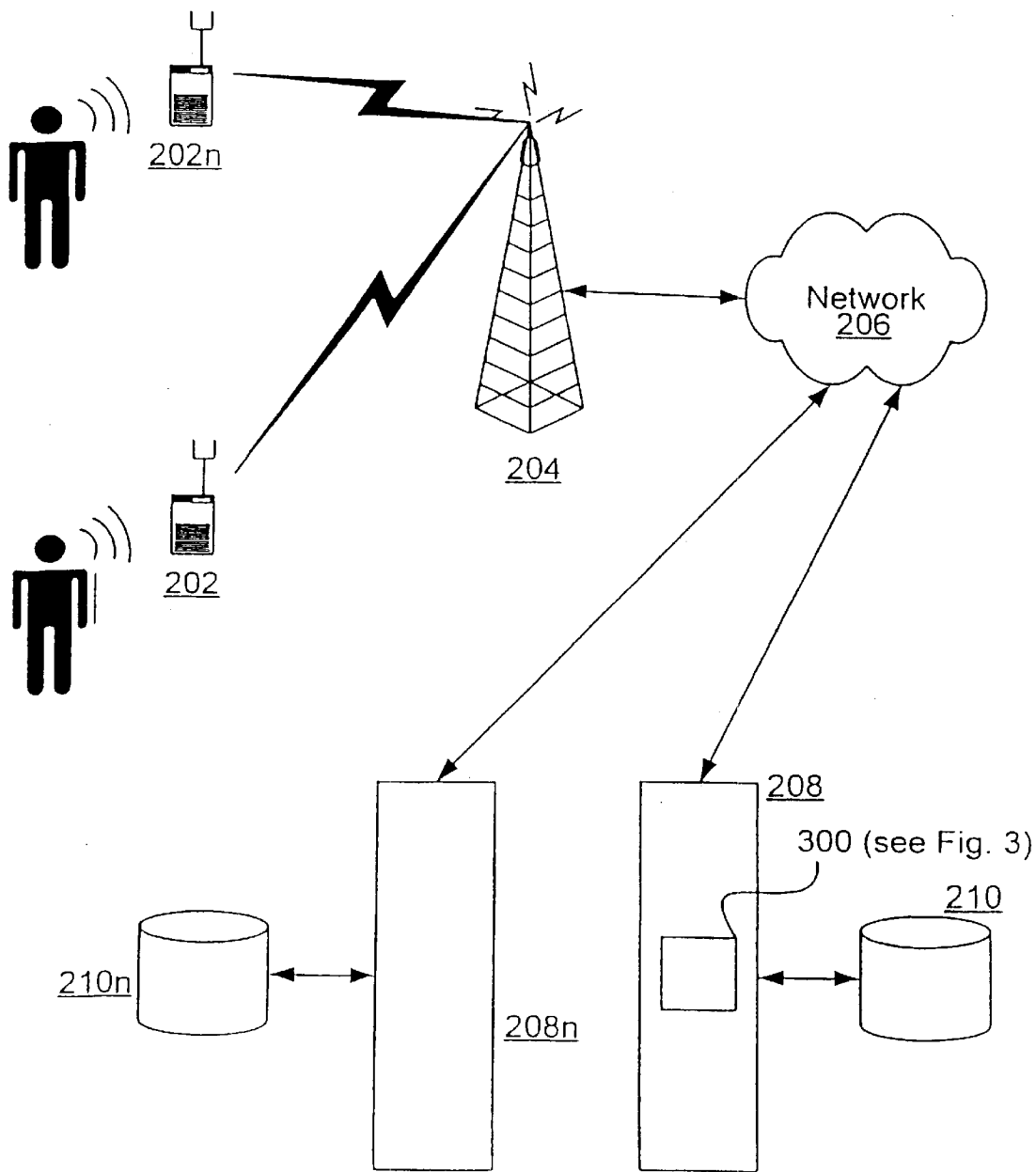


Fig. 2

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