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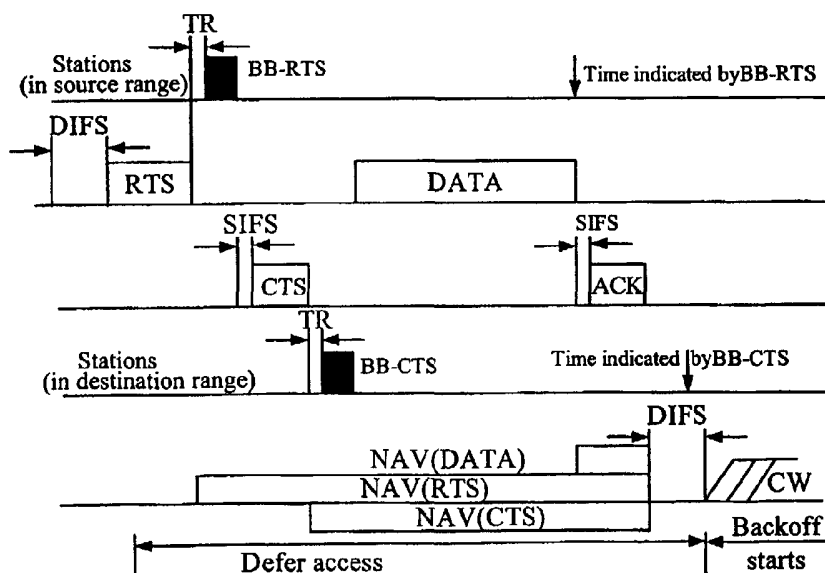
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[Continued on next page]

(54) Title: ENHANCING FAIRNESS AND PERFORMANCE IN A MULTIHOP AD HOC NETWORK



(57) Abstract: A method for enhancing the fairness and performance in a multihop ad hoc network, the method usually including providing contention synchronization information regarding a transmission between nodes of the network, wherein the information is routinely provided to nodes in a range of two hops from the nodes participating at the transmission. The method also typically includes setting, after successfully finishing the transmission, a waiting time for the nodes participating at the transmission, in which these nodes backoff from accessing a transmission medium.

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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB2004/001720

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC 7 H04L12/28 H04L12/56

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
 IPC 7 H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CA 2 412 038 A (AT & T CORP) 19 May 2003 (2003-05-19) page 1, line 5 - page 2, line 15 page 8, line 11 - page 10, line 12 page 11, line 5 - page 12, line 4 figures 4a, 4b, 6a, 6b	1, 9, 21
A	-----	2, 10
Y	US 2002/027894 A1 (LEPPA ARI ET AL) 7 March 2002 (2002-03-07) paragraph '0001! - paragraph '0016! paragraph '0098! - paragraph '0110! paragraph '0170!	1, 9, 21
A	-----	2, 10
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Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

° Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
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- \*&\* document member of the same patent family

Date of the actual completion of the international search

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## INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB2004/001720

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 02/28020 A (UNIV CALIFORNIA) 4 April 2002 (2002-04-04) page 1, line 20 - page 4, line 24 page 6, line 8 - page 8, line 11 page 10, line 13 - page 11, line 15 claim 7	1,9,21
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A	EP 0 680 177 A (NIPPON ELECTRIC CO) 2 November 1995 (1995-11-02) abstract column 1, line 1 - column 4, line 13	1,9,21
A	US 2003/095504 A1 (OGIER RICHARD G) 22 May 2003 (2003-05-22) paragraph '0001! - paragraph '0009! paragraph '0077! - paragraph '0079!	1,9,21
A	ANON: "Wireless LANs - MAC layer" CS 117, 4 February 2003 (2003-02-04), pages 1-34, XP002298252 INTERNET the whole document	1,2,9, 10,17,21
A	US 2002/172186 A1 (LARSSON PETER) 21 November 2002 (2002-11-21) the whole document claim 7	1,9,17, 21
A	WO 03/026221 A (COMMPRIZE VENTURES LTD ; ALTMAN BARUCH (IL)) 27 March 2003 (2003-03-27) the whole document	1,9,21
A	WO 03/026218 A (KHUN-JUSH JAMSHID ; PAULI MATHIAS (DE); SCHRAMM PETER (DE); ZIMMERMANN) 27 March 2003 (2003-03-27) page 1, line 6 - page 2, line 23 page 4, line 31 - page 6, line 14 page 28, line 6 - page 29, line 8	17
A	US 5 721 725 A (GOLDSTEIN RICHARD J ET AL) 24 February 1998 (1998-02-24) column 1, line 15 - column 4, line 6	17
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## INTERNATIONAL SEARCH REPORT

International Application No

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2002/191573 A1 (WHITE ERIC D ET AL) 19 December 2002 (2002-12-19) paragraph '0002! - paragraph '0019! paragraph '0066! -----	17
A	DANIEL ROWLAND: "Performance Improvement Schemes for Wireless Data Links" ECPE 6504 - SPRING, 2000, 24 April 2000 (2000-04-24), pages 1-20, XP002312627 page 5 - page 6 -----	17
A	RAHUL MANGHARAM: "Delay Constrained MAC Protocols for Wireless LANs" ANON, 5 December 2000 (2000-12-05), pages 1-17, XP002312628 page 15 -----	17

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-16,21

Method and system for enhancing fairness and performance in a multihop ad hoc network, where contention information is provided between a set of nodes, where nodes back off after accessing a transmission medium, and where the contention information is provided to a second set of nodes two hops away from the first set

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2. claims: 17-20

A wireless local area network node, where backing off is performed, and where black burst signals are generated according to a mapping scheme.

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# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/IB2004/001720

## Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
  
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1.  As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3.  As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4.  No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

### Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No  
PCT/IB2004/001720

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