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(54) **Title**: NETWORK-CENTRIC DETERMINATION OF NODE PROCESSING DELAY

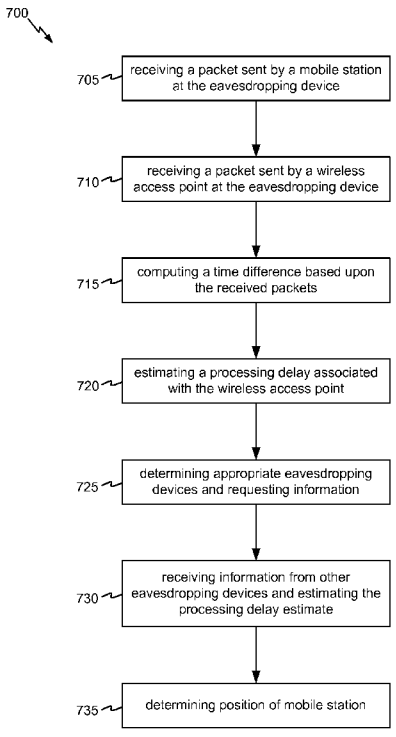

FIG. 7

(57) **Abstract**: Apparatus and methods are directed to calibrating a delay within a wireless access point for determining a position of a mobile station. One method includes receiving an initial packet at an eavesdropping device, receiving a response packet, sent by another entity, at the eavesdropping device, computing a time difference based upon the packet arrival times, and providing the time difference to a position determination entity. Another method includes providing a request to appropriate eavesdropping devices to send information, receiving, from each appropriate eavesdropping device, a time difference which represents a difference in a time of arrival of a packet transmitted by the wireless access point and a time of arrival of a packet transmitted by the mobile station, determining a processing delay estimate based upon the time differences, and determining a position of the mobile station based upon the processing delay estimate and the received time differences.

WO 2010/059936 A3

TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

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ADD.

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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G01S

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, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	XINRONG LI ET AL: "Comparison of indoor geolocation methods in DSSS and OFDM wireless LAN systems" VEHICULAR TECHNOLOGY CONFERENCE, 2000. IEEE VTS FALL VTC 2000. 52ND SEPT. 24-28, 2000, PISCATAWAY, NJ, USA,IEEE, vol. 6, 24 September 2000 (2000-09-24), pages 3015-3020, XP010525129 ISBN: 978-0-7803-6507-0 abstract page 3017, right-hand column	1,8,17, 24,33, 35,42,44
A	US 2007/184864 A1 (LEITCH ADAM S [GB] ET AL) 9 August 2007 (2007-08-09) abstract paragraphs [0035] - [0037], [0041]	1,8,17, 24,33, 35,42,44

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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Name and mailing address of the ISA/	Authorized officer
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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 2003/174048 A1 (MCCORKLE JOHN W [US]) 18 September 2003 (2003-09-18) abstract paragraphs [0118] - [0126]	1,8,17, 24,33, 35,42,44
A	ISRAEL MARTIN-ESCALONA ET AL: "Impact of geometry on the accuracy of the passive-TDOA algorithm" PERSONAL, INDOOR AND MOBILE RADIO COMMUNICATIONS, 2008. PIMRC 2008. IEEE 19TH INTERNATIONAL SYMPOSIUM ON, IEEE, PISCATAWAY, NJ, USA, 15 September 2008 (2008-09-15), pages 1-6, XP031371602 ISBN: 978-1-4244-2643-0 abstract II. Passive-TDOA Positioning Algorithm	1,8,17, 24,33, 35,42,44

INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2007184864 A1	09-08-2007	CN 101023632 A	22-08-2007
		EP 1728362 A1	06-12-2006
		WO 2005091573 A1	29-09-2005
		JP 2007529943 T	25-10-2007
US 2003174048 A1	18-09-2003	NONE	