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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:

DUPRAY et al.

Serial No.: 09/194,367

Filed: November 24, 1998

Attorney File No.: 1003-PUS

For: "LOCATION OF A MOBILE STATION"

Group Art Unit: 3662

Examiner: Dao Phan

**RESPONSE TO OFFICE ACTION DATED DECEMBER 8, 2000**

CERTIFICATE OF MAILING

I HEREBY CERTIFY THAT THIS CORRESPONDENCE IS BEING DEPOSITED WITH THE UNITED STATES POSTAL SERVICE AS FIRST CLASS MAIL IN AN ENVELOPE ADDRESSED TO ASSISTANT COMMISSIONER FOR PATENTS, WASHINGTON, D.C. 20231 ON April 9, 2001.

By: Chasity C. Rossum
Chasity C. Rossum



Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

In response to the Office Action having a mailing date December 8, 2000, please enter the present Amendment and Response for the above identified patent application. It is respectfully requested that the present application be reconsidered, and that this Amendment and Response be promptly acted upon so that the application may proceed to issuance as a patent in that it is believed all claims are now in condition for allowance. Note that the fee for a one month extension of time as per $55 is enclosed.

It is believed that no fees are due for the new claims provided herein. The Applicants have paid a total of $2,385 for 33 independent claims and 129 dependent claims in the present application. However, with the entry of the present Amendment and Response, the currently pending claims (including the new claims provided herein), there are 27 independent claims and 111 dependent claims) for a total amount for claims of: 138.

It is further believed that no further fees are outstanding or due with the present Amendment and Response. However, if additional fees are due, it is respectfully requested that the undersigned Applicant, Dennis J. Dupray, be contacted by phone as soon as possible at (303) 863-2975, and alternatively at (303) 273-0167.

Additionally, it believed that all additional formalities (such as the entry of satisfactory formal drawings) have been fully and appropriately addressed so that with the allowance of the claims as provided herein, the present application can proceed to issuance.

Moreover, in the event that a telephone conversation would further prosecution and/or expedite allowance, the Examiner is invited to contact the undersigned Applicant at the phone numbers provided above.

**IN THE CLAIMS:**

Please cancel Claims 139, 189, 246 and 250 without prejudice or disclaimer.

Please amend claim 85 as follows:

85. (Thrice Amended) A method for locating a terrestrial mobile station, MS, when there is an occurrence of at least one of (A) and (B) following: (A) said terrestrial mobile station MS being tracked, and (B) a request for locating said terrestrial mobile station MS; wherein said method uses wireless signal measurements obtained from transmissions between said terrestrial mobile station MS and a plurality of terrestrial communication stations, each capable of at least one of: wirelessly detecting said terrestrial mobile station MS, and wirelessly being detected by said terrestrial mobile station MS, comprising:

providing access to first and second mobile station location estimators, wherein said location estimators provide likely geographical ranges of an unknown location of said mobile station MS when said location estimators are supplied with corresponding input data obtained using wireless signal measurements obtained by transmissions between said mobile station MS and the communication stations;

wherein said first location estimator performs one or more of the following techniques (a) through (d) when supplied with said corresponding input data:

(a) an angulation technique for determining, for at least one of the communication stations, CS, at least one of (i) and (ii) following: (i) a distance between the communication station CS and the mobile station MS, said distance dependent upon signal time delay derived information, and (ii) a wireless signal angle of arrival between the mobile station MS and the communication station CS, wherein said at least one communication station CS is stationary;

(b) a learning technique, wherein said learning technique uses a learned association for associating (b1) and (b2) following:

(b1) information obtained from at least one of signal strength and signal time delay measurements of wireless signal communicated between the mobile station MS and the communication stations, and

(b2) data identifying a likely geographical range for a location for the mobile station MS,

wherein said association is learned by a training process using a plurality of data pairs, each said data pair including: first information identifying a known location of some mobile station, and second information from wireless signal measurements communicated between said some mobile station and one or more of the communication stations when said some mobile station is at the known location;

(c) a stochastic technique, wherein said stochastic technique uses a statistical correlation for correlating (c1) and (c2) following:

(c1) information obtained from at least one of signal strength and signal time delay measurements of wireless signal between the mobile station MS and the communication stations, and

(c2) data identifying a likely geographical range for a location for the mobile station MS,

wherein said correlation is used for determining a probability that the mobile station MS is within the likely geographical range of (c2);

(d) a multipath resolution technique for determining a likely geographical range L for a location of the mobile station MS, wherein for determining L, (d1) - (d3) following hold:

(d1) the multipath resolution technique is dependent upon multipath data, wherein the multipath data is obtained from wireless signal multipath information communicated between the mobile station MS and the communication stations,

(d2) the multipath resolution technique is dependent upon (i) and (ii) following: (i) a representation of each of a plurality of geographical locations and (ii) for each of the geographical locations, corresponding multipath information previously obtained using transmissions between some mobile station and the communication stations, when the some mobile station transmitted from approximately the geographical location,

(d3) the multipath resolution technique selects one or more of the geographical location representations that are likely to be approximate to the unknown location;



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first receiving, from said first location estimator, in response to said first location estimator obtaining a first instance of its said corresponding input data for said at least one occurrence, first location related information having at least a first likely geographical range for a location of the mobile station MS;

second receiving, from said second location estimator, in response to said second location estimator obtaining a second instance of its said corresponding input data for said at least one occurrence, second location related information having at least a second likely geographical range for the location of the mobile station MS;

wherein each of said first and second likely geographical ranges is determined in a manner that is substantially unaffected by the likely geographical range of the other of said first and second location estimators;

determining a resulting location estimate of the mobile station MS that is dependent upon at least one of: (a) and (b) following: (a) a first value obtained from said first location related information, and (b) a second value obtained from said second location related information.

Please amend claim 86 as follows:

2 ~~86~~ (Twice Amended) The method as claimed in Claim ~~85~~ 1, further including:

first supplying said first location estimator with said first instance; and

second supplying said second location estimator with said second instance;

wherein for at least one of said four steps of first and second supplying, and, first and second receiving uses a transmission on the Internet.

3 ~~87~~. The method as claimed in Claim ~~85~~ 1, further including a step of receiving said wireless signal measurements during a wireless communication between said mobile station MS and said plurality of communication stations for contacting an emergency response center.

4 ~~88~~. The method as claimed in Claim ~~85~~ 1, wherein said step of providing access includes transmitting, through a telecommunications network, said first location estimator from a source site to an activation site for generating said first likely geographical range.

5 ~~89~~. The method as claimed in Claim ~~88~~ 4, wherein said step of transmitting includes sending an encoding of said first location estimator via the Internet.

Please amend claim 90 as follows:

90. (Twice Amended) The method as claimed in Claim 85, further including a step of retrieving at least one of (d) and (e) following:

(d) first historical location data including (i) and (ii) following:

(i) a first set of likely geographical ranges for one or more mobile station locations, said geographical ranges of said first set are generated by a location estimator $LE_1$ providing a plurality of first outputs wherein each of said first outputs includes at least one geographic value that is substantially effectively equivalent to a value of a corresponding output of said first location estimator, wherein $LE_1$ uses first data obtained from wireless signal measurements of transmissions between (1) and (2) following: (1) one or more of a plurality of mobile stations, at a first plurality of locations, and (2) said plurality of communication stations;

wherein said first set is selected by determining that a distance related value between at least one of said likely geographical ranges of said first set, and said first likely geographical range for the location of the mobile station MS has a predetermined relationship; and

(ii)data identifying said locations of said first plurality of locations; and

(e) second historical location data including (iii) and (iv) following:

(iii) a second set of likely geographical ranges for one or more mobile station locations, said geographical ranges of said second set are generated by a location estimator $LE_2$ providing a plurality of second outputs wherein each of said second outputs includes at least one geographical value that is substantially effectively equivalent to a value of a corresponding output of said second location estimator, wherein $LE_2$ uses second data obtained from wireless signal measurements of transmissions between (3) and (4) following: (3) one or more mobile stations, at a second plurality of locations, and (4) said plurality of communication stations;

wherein said second set is selected by determining that a distance related value between at least one of said previous likely geographical ranges for one or more mobile station locations of said second set, and said

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