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to the reference base station. This may be accomplished by issuing an appropriate query to a calibration terminal receiving signals from the base station and the reference base station, or to a location server that maintains such information, using a standard messaging channel. The query includes an identification of the requesting base station and an identification of the reference base station to which synchronization is to be established. The base station then determines **1110** an expected TDOA at the known location. This may be obtained through a query to the calibration terminal or location server, if such information is calculated or maintained at these network elements. Alternatively, the base station may calculate the expected TDOA using its location, the location of the reference base station, and the location of the calibration terminal. This information may be determined from a database maintained at the base station, or may be determined through queries to a network device or devices that maintain this information, such as calibration terminals or location servers.

The base station then determines **1120** the synchronization error, which may be treated as being equal to the difference between the measured TDOA and expected TDOA. The timing of the base station may then be adjusted **1130** by the amount of the synchronization error to bring the PN offset of the base station into alignment with the PN offset of the reference base station.

In the alternative, the base station may simply obtain the correction factor for the appropriate base station pair and use this as the amount of the synchronization error, if sufficient data to enable its calculation is available within the network. Such information may be provided, for example, by a calibration terminal or a location server. The process in the base station would therefore proceed as illustrated in FIG. **12**.

It is noted that it is preferable in accordance with the fifth configuration to provide network location servers such that all information required by the base station may be acquired from a location server using the fixed connection between the base station and the network. While the base station may be provided such that queries for information are directed to calibration terminals, such base stations would not be preferred because conventional base stations do not typically decode the messages transmitted and received over the network signalling channels that they support, and so the additional monitoring necessary for such an embodiment would involve additional equipment and expense, and may therefore be undesirable for some applications.

The configurations described above represent network configurations that are preferred in accordance with various exemplary network specifications. However, those having ordinary skill in the art will recognize from the present disclosure that other network configurations may be implemented in accordance with alternative network specifications. For example, it will be appreciated that in the configurations described above, the amount of processing done in the mobile is generally minimized by delegating tasks such as correction factor determination to other network elements. However, based on the disclosure provided herein, it will also be recognized that mobiles may be configured to perform location determination or correction factor determination. The information needed for such processes may be obtained from other network elements, and the configurations of the other network elements will therefore be determined in part by the information needs of the mobile. Also, while the embodiments specifically addressed herein utilize TDOA measurements for base station signals made at mobiles, the principles, methods and devices disclosed

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herein may be equally applied to systems utilizing TDOA measurements for mobile stations made by base station pairs.

While the description provided above is intended to disclose the invention and its presently preferred embodiments, those having ordinary skill in the art will recognize further alternative embodiments which may be derived from the above disclosure. Accordingly, the scope of the invention is not limited by the above disclosure, but is intended to encompass the subject matter defined by the appended claims and equivalents thereof.

What is claimed is:

1. A process in a mobile communication network, comprising:

determining an expected time difference of arrival (TDOA) at a known location for signals of at least three base station pairs of the network;

determining a measured TDOA for each of said base station pairs at said known location;

determining an average measured TDOA for each of the base station pairs at said known location for a period of time;

determining a correction factor for each base station pair constituting the difference between the expected and average measured TDOAs;

determining a measured TDOA at a location of a mobile for each of said base station pairs;

for each of said base station pairs, if a TDOA at the location of the mobile differs from a corresponding TDOA at the known location by less than a predetermined amount, applying a corresponding correction factor to said measured TDOA to yield a corrected TDOA; and

determining a location using said corrected TDOAs.

2. A mobile communication network, comprising:

means for determining an expected time difference of arrival (TDOA) at a known location for signals of at least three base station pairs of the network;

means for determining a measured TDOA for each of said base station pairs at said known location;

means for determining an average measured TDOA for each of the base station pairs at said known location for a period of time;

means for determining a correction factor for each base station pair constituting the difference between the expected and average measured TDOAs;

means for determining a measured TDOA at a location of a mobile for each of said base station pairs;

means for individually applying a corresponding correction factor to each measured TDOA to yield a corrected TDOA if a corresponding TDOA at the location of the mobile differs from a corresponding TDOA at the known location by less than a predetermined amount; and

means for determining a location using said corrected TDOAs.

3. A process in a mobile communication network for synchronizing a base station and a reference base station, comprising:

determining a measured time difference of arrival (TDOA) at a known location of a signal from a base station with respect to a signal from a reference base station;

determining an expected TDOA for the base station with respect to the reference base station;