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**Wang et al.**

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(54) **NAVIGATION SIGNAL RECEIVER  
TRAJECTORY DETERMINATION**

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(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 38 days.

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(51) **Int. Cl.**  
**G01S 3/14**            (2006.01)

(52) **U.S. Cl.**            **342/357.02; 342/357.13**

(58) **Field of Classification Search**            **342/357.02, 342/357.06, 357.13**

See application file for complete search history.

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*Primary Examiner*—Thomas H. Tarcza

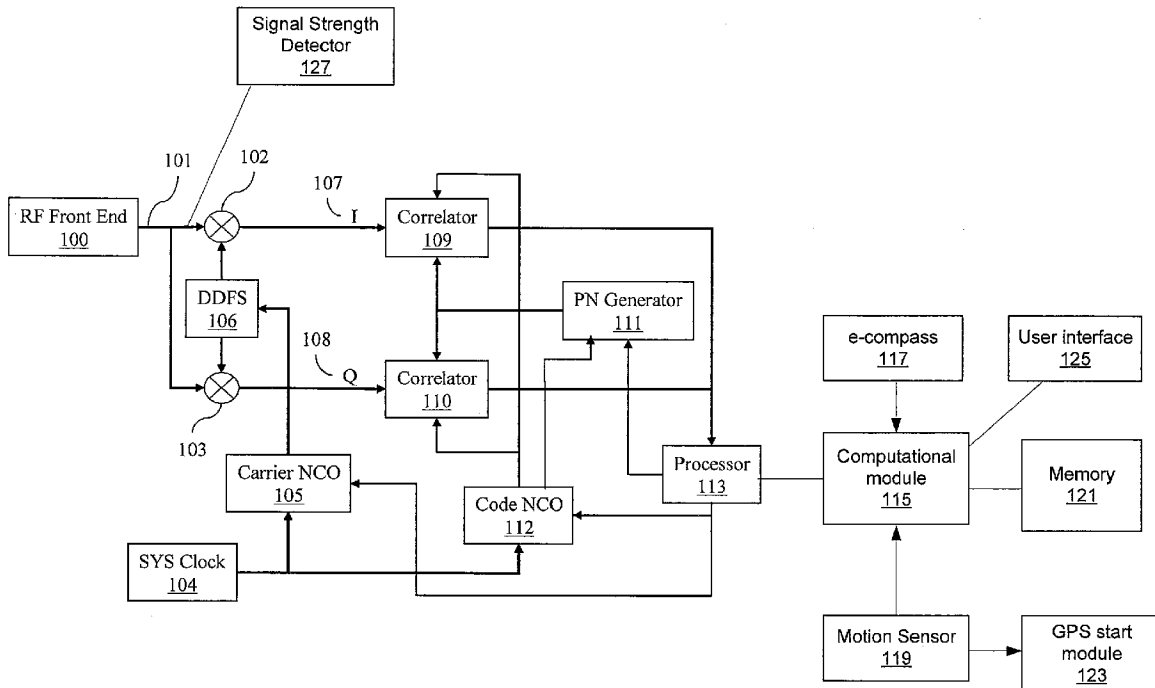
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(57)            **ABSTRACT**

The present invention provides methods and systems that enable a mobile navigation receiver to accurately determine its trajectory with non-current ephemeris in stand-alone mode. In an embodiment, the receiver computes the position for the same location using non-current ephemeris and current ephemeris at different time instances. The receiver then determines a position correction by finding the difference between these two computed positions, and applies this correction to the trajectory generated with non-current ephemeris to obtain a more accurate trajectory. In another embodiment, the receiver computes an initial position of the receiver using non-current ephemeris and finds the difference between the computed initial position and an accurate approximation of the initial position. The receiver then shifts the subsequent receiver trajectory computed using non-current ephemeris by the difference to obtain a more accurate trajectory.

**18 Claims, 5 Drawing Sheets**



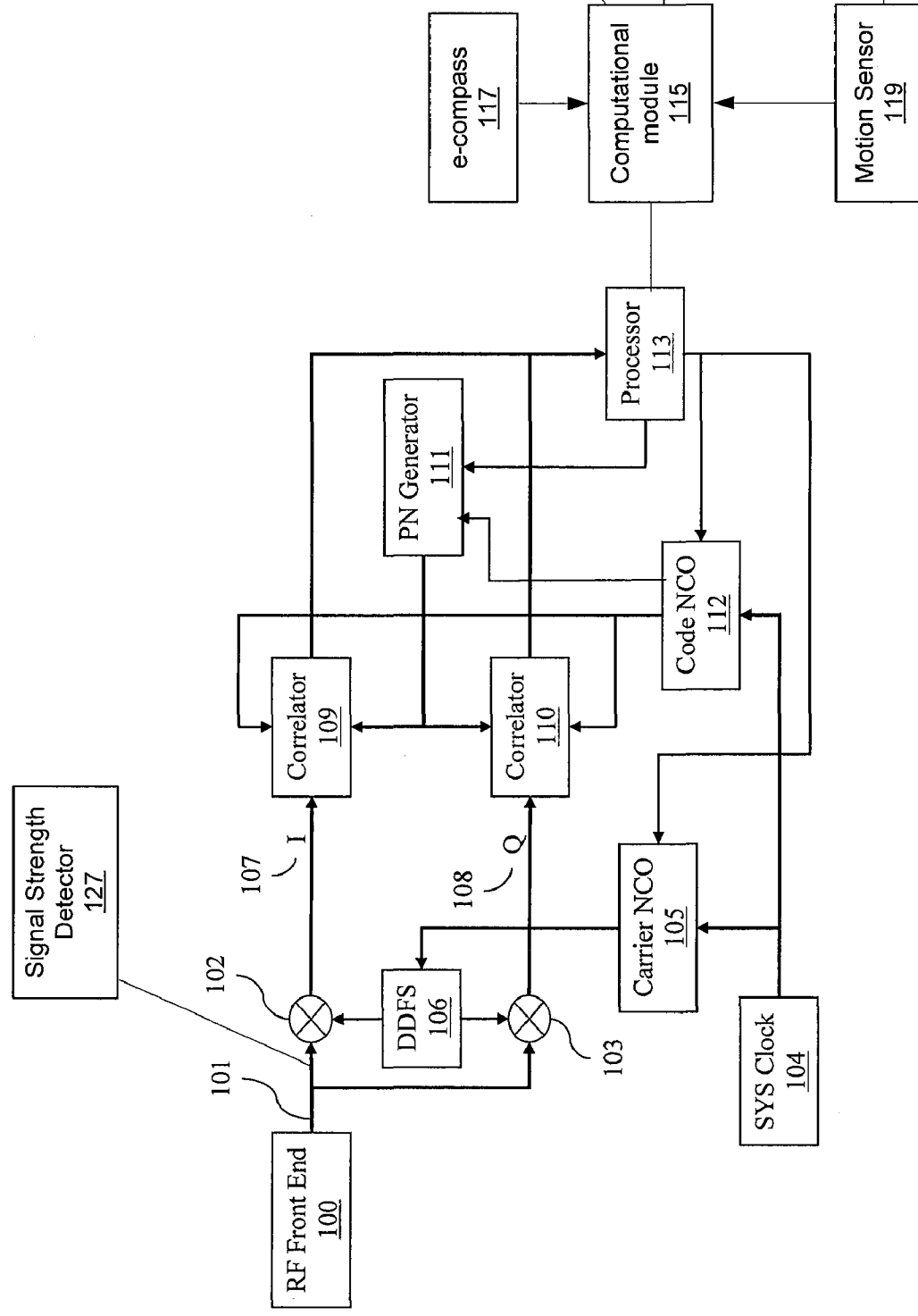


FIG. 1A GPS Receiver

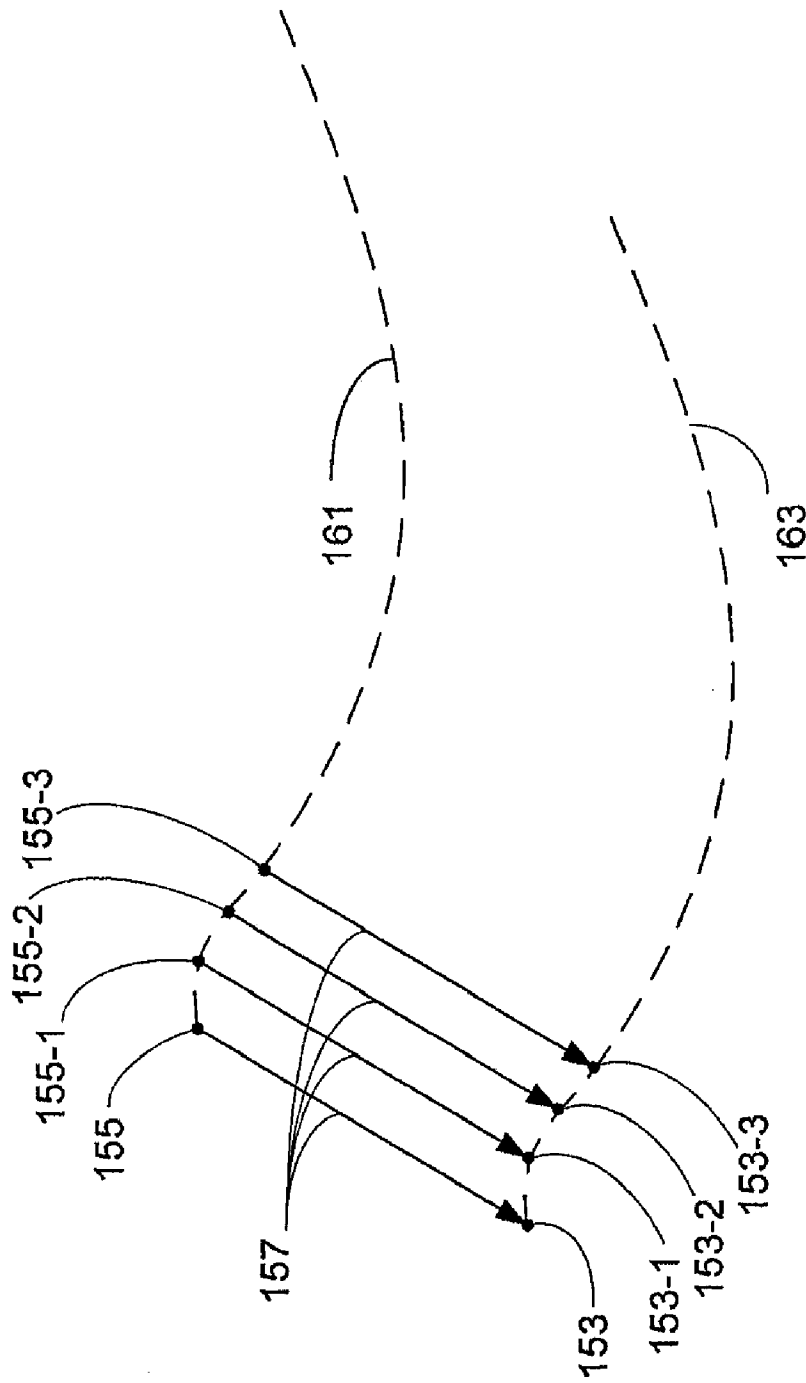


FIG. 1B

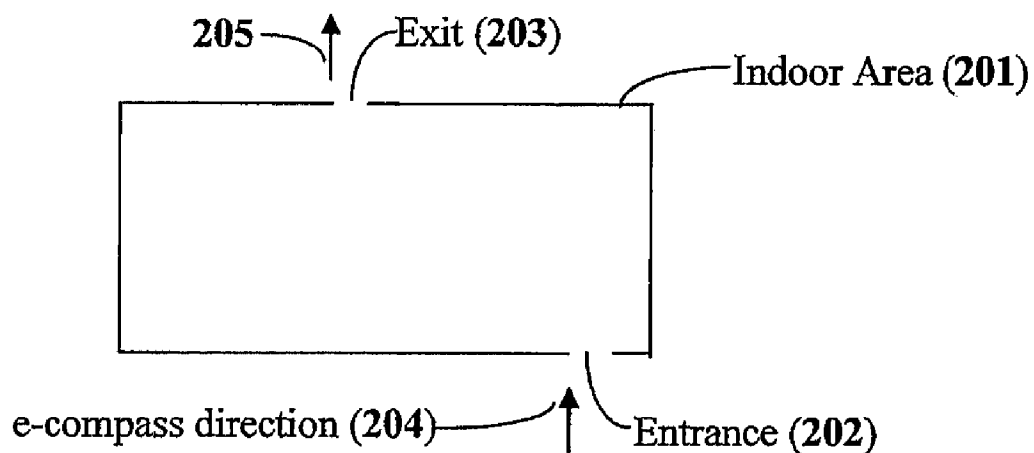


FIG. 2 USE OF E-COMPASS IN LARGE INDOOR AREA

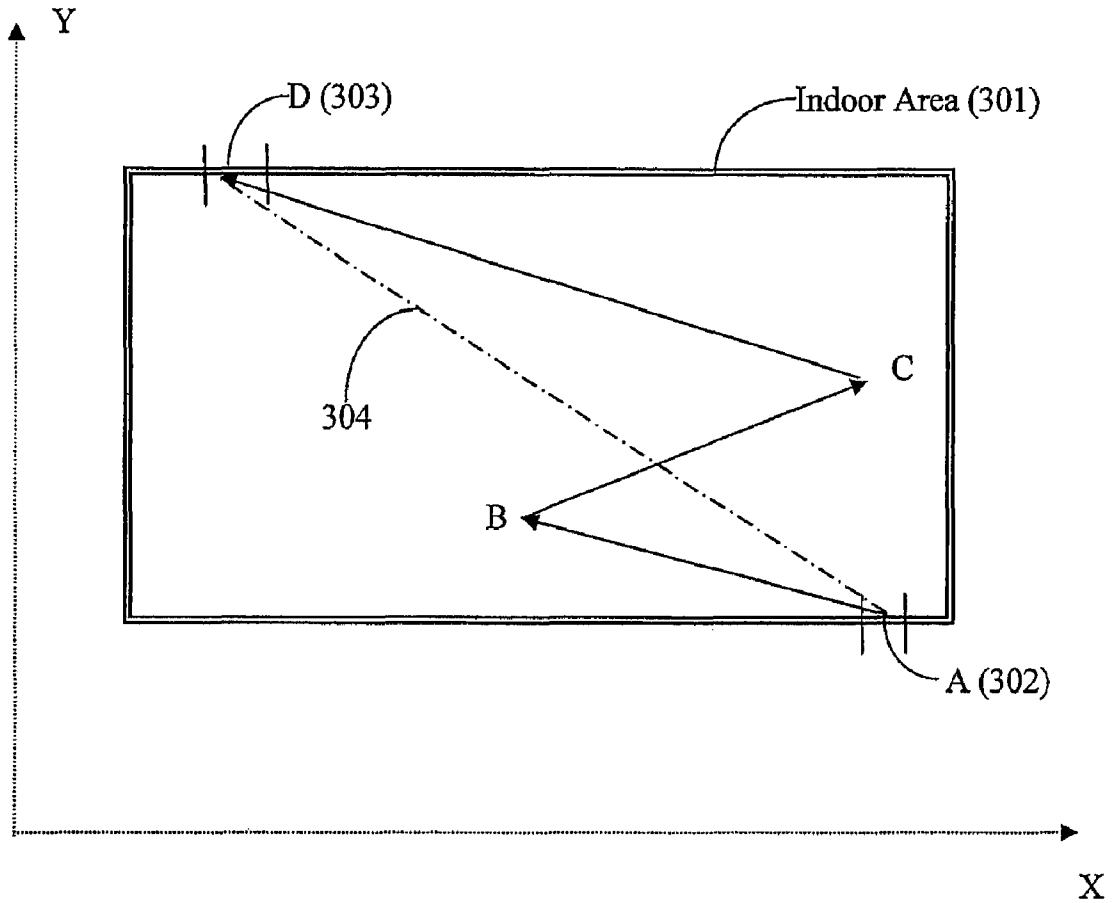


FIG 3 USE OF MOTION SENSORS FOR INITIAL POSITION

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