

(12) **United States Patent**
Wortham

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(54) **SYSTEM AND METHOD FOR LOCATING A MOBILE UNIT WITHIN THE SERVICE AREA OF A MOBILE COMMUNICATIONS NETWORK**

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Related U.S. Application Data

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(51) **Int. Cl.⁷** **H04Q 7/34**

(52) **U.S. Cl.** **455/456.6; 455/456.1; 455/456.2; 342/357.1; 342/450**

(58) **Field of Search** 455/456, 457, 455/414, 422, 426, 517, 434, 440, 575, 515, 456.1, 456.2, 456.6; 342/357.1, 450, 451, 457, 463, 464, 389

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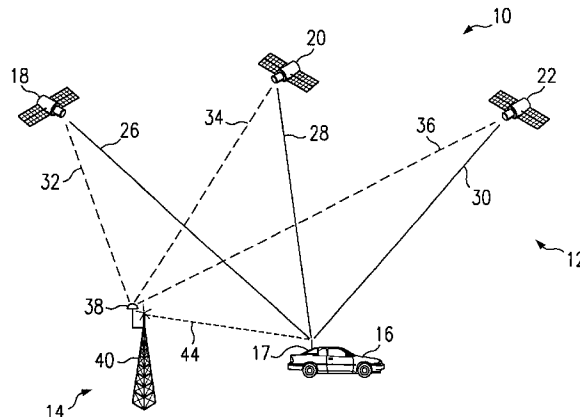
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(57) **ABSTRACT**

A differential positioning system (10) includes components of a satellite-based or land-based positioning system (12) and components of a mobile communications network (14). The differential positioning system (10) provides accurate and immediate position information to a mobile unit (17). A transmitter site (40) of a mobile communications network (14) is associated with a reference positioning receiver (38). The reference positioning receiver (38) generates correction data for transmission to the mobile unit (17). The mobile unit (17) includes a mobile communications device (42) for receiving the correction data generated by the reference positioning receiver (38) and a mobile positioning receiver (24) for generating a position fix. The mobile unit (17) refines the position fix generated by the mobile positioning receiver (24) using correction data received by the mobile communications device (42).

16 Claims, 3 Drawing Sheets



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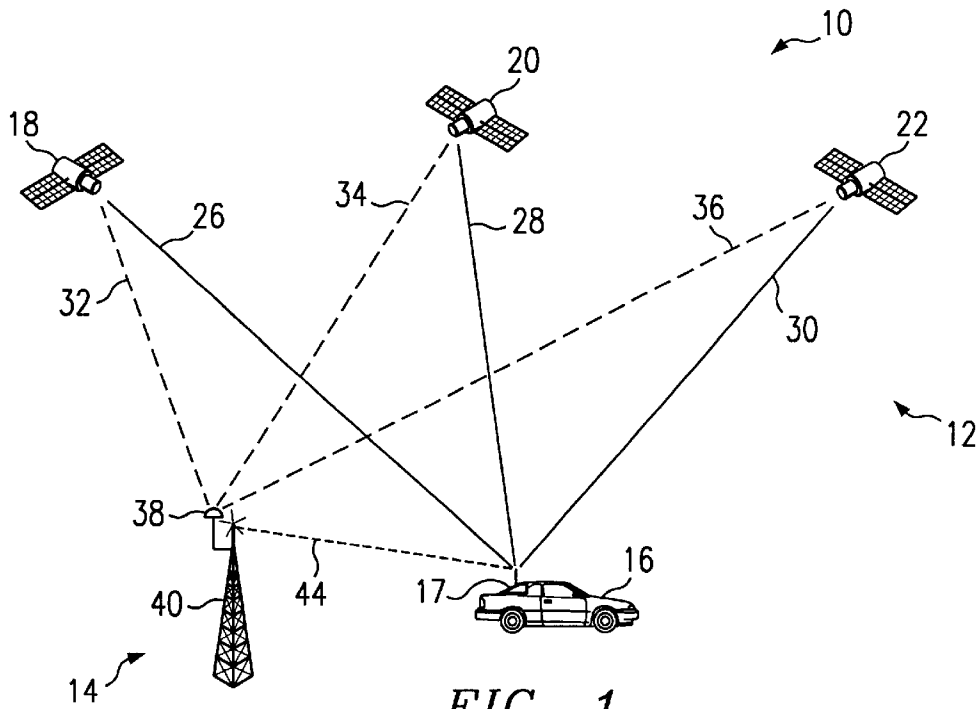


FIG. 1

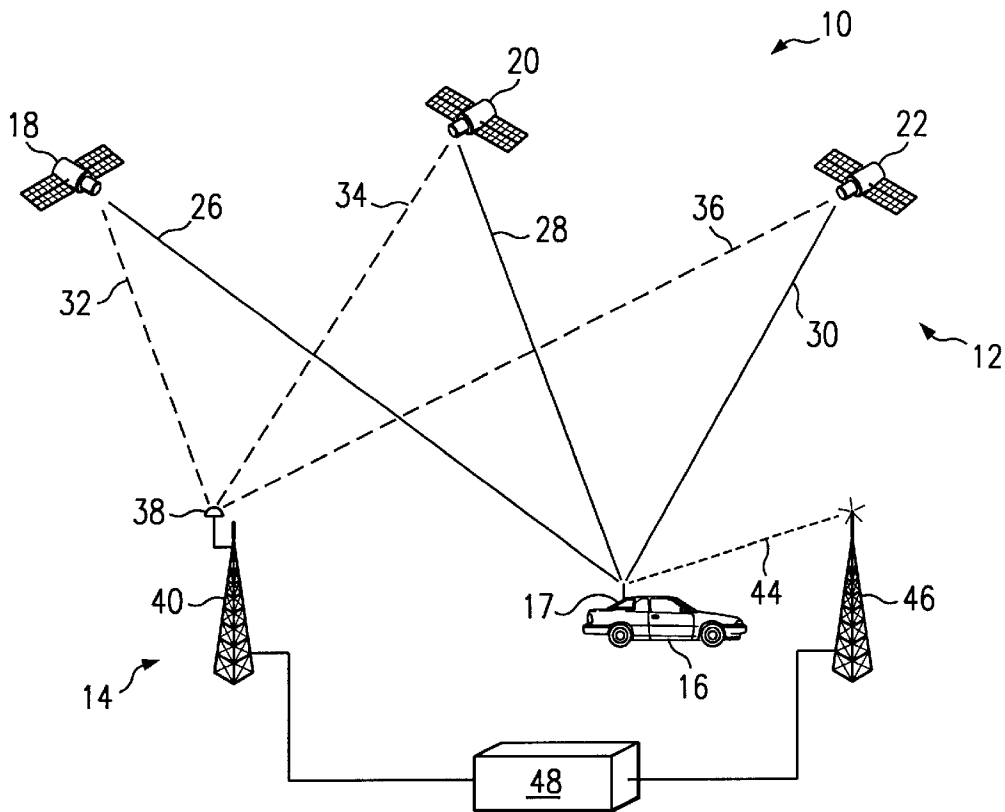


FIG. 2

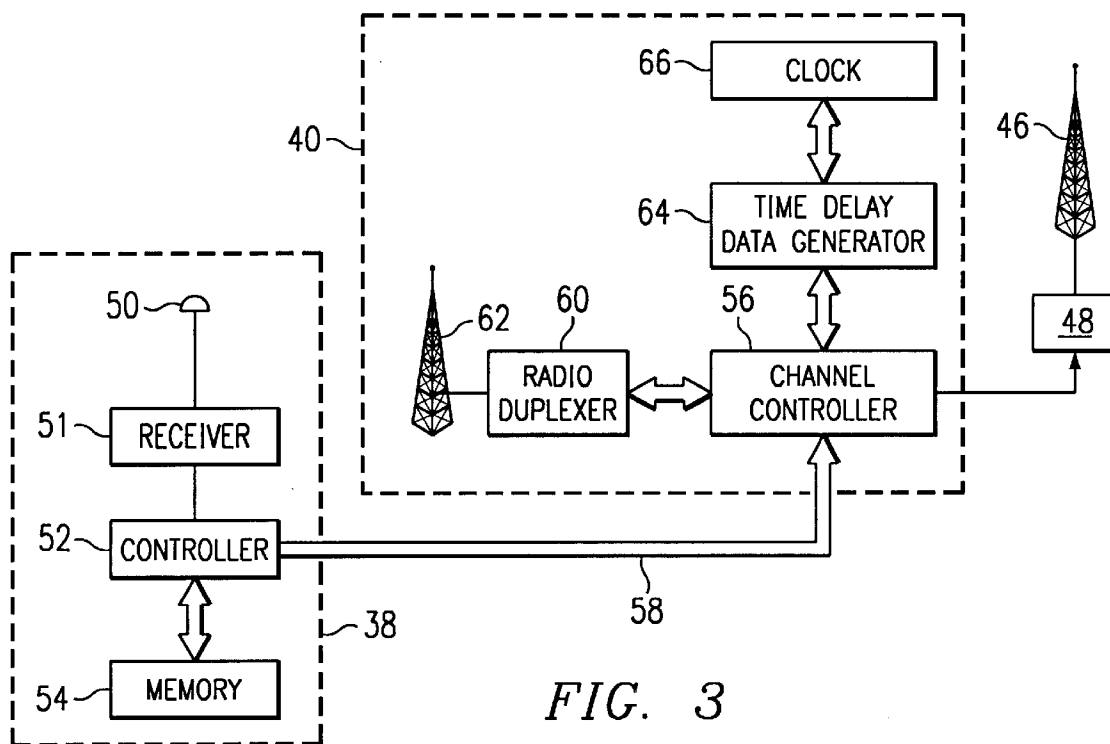


FIG. 3

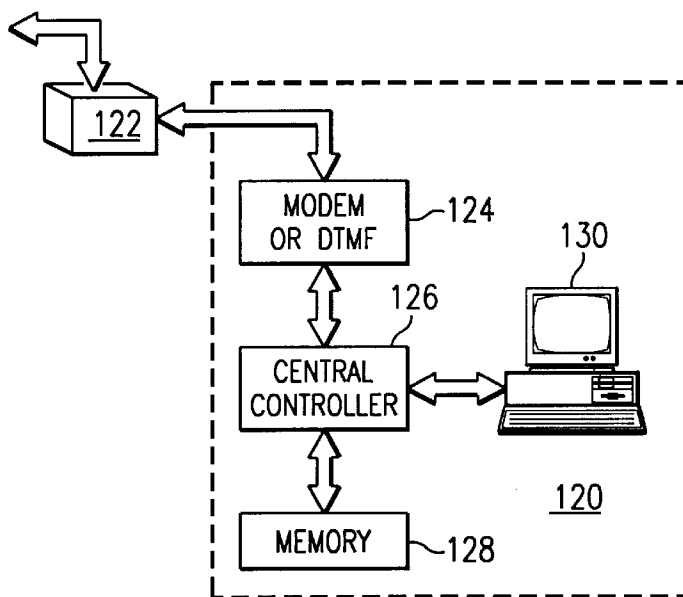
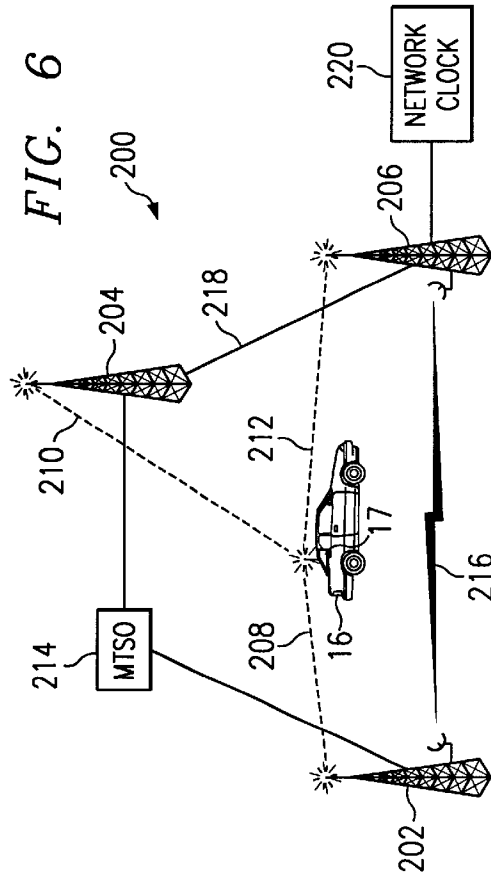
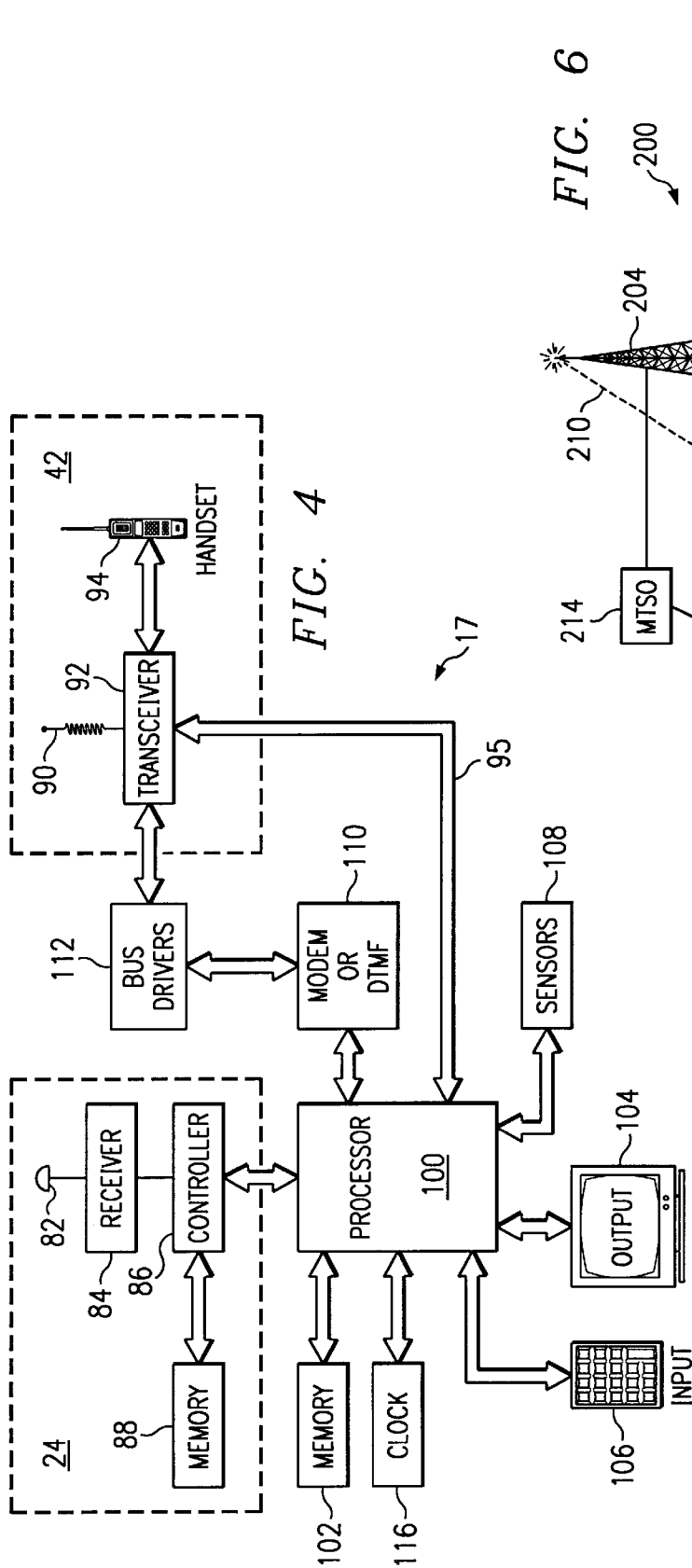


FIG. 5



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