



\*162162\*



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## **ABSTRACT**

### **Methods and Apparatus for Estimating Time of Arrival of a Pulse in a Train of Pulses in a Ranging System**

A method of estimating time of arrival of a pulse in a train of pulses in a ranging system comprises estimating a first value for the time of arrival of a second pulse based on discrete time sampling data obtained from a first pulse over a predetermined number of time sampling periods; the sampling stage being controlled by a sampling clock. An observation window time period is then defined around the estimated first value for the time of arrival, the observation window having a duration greater than or equal to the time sampling period. An integrator stage is activated at the start time of the observation window and integrates a current to provide an output voltage as a function of time of integration. The integrator stage is deactivated to cease integration on detection of the arrival of the pulse whose time of arrival is to be estimated. A revised time of arrival of the pulse is determined using a time value obtained from the output voltage of the integrator and the estimated first value of the time of arrival. There is also disclosed an apparatus for estimating time of arrival of a pulse.

**[FIG 3]**