In this technique, the 1PPS output of the DG16 triggers a camera shutter. The camera shutter generates a signal that is fed to the DG16 for accurate time tagging, better than one microsecond.

The delay between the camera receiving the pulse and triggering the photogrammetry port should be calculated. This may then be applied so as to advance the 1PPS from the DG16 so that the shutter time exactly matches the GPS time for the epoch. No interpolation between the shutter time and the GPS position time will be needed.

Timing Pulse and Measurement Strobe (Optional)

When the timing pulse option [L] is installed, the DG16 can output a timing pulse synchronized with GPS time to an accuracy of ±1 microsecond. The timing pulse is a TTL-level square wave signal output on pin 18 of the J301 connector and is fed into a 75-ohm impedance. The pulse is generated by default once every second (1PPS, or 1 pulse-per-second) with no offset from GPS time and with the rising edge of the pulse synchronized to GPS time. Using the **$PASHS,PPS** command, the period of the pulse can be changed from 0.05 of a second up to 99.95 seconds, depending upon the receiver update rate, which, in turn, is dependent upon the installed position update rate and raw data update rate options.The timing pulse may be offset from GPS time within a range of -999.9999 to +999.9999 milliseconds. GPS time can be synchronized to the rising or falling edge of the square wave pulse.

DEFAULT SETTING		
PPS	**Period**	**1 second**
	Offset	**0.0000 milliseconds**
	Synchroniza-tion	**GPS time synchronized to the rising edge of the pulse**

Figure 3.3 shows timing pulse characteristics under default conditions. The pulse occurs when the signal goes high (i.e., goes from zero to five volts). The pulse is generated within ±1 microsecond of the GPS second and remains high for 1-2 milliseconds. The precision of the epoch between pulses is ±200 nanoseconds in stand-alone mode with SA off and ±50 nanoseconds when the DG16 is receiving differential corrections. The DG16 must be computing positions and tracking a minimum of four satellites in order for the one microsecond accuracy and 50/200 nanosecond precision to be valid.

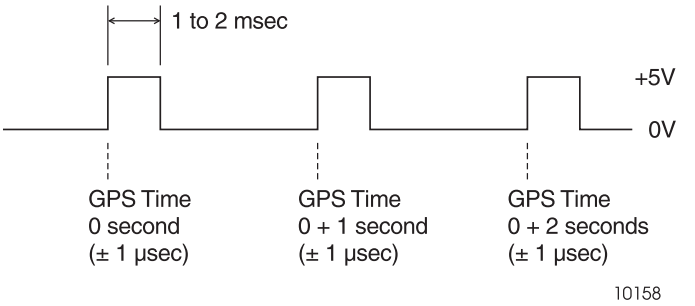

Figure 3.3. Timing Pulse Characteristics

In order to provide notification to peripheral equipment and software with respect to time tagging the occurrence of the timing pulse, it is necessary to set the output of PBN raw data message to match the period of the timing pulse. The GPS time value contained in the PBN message plus one second is the time that the next pulse will occur when the default settings are in effect (Figure 3.4). PBN time is already internally rounded to GPS time, so it is the actual time to which the navigation 1PPS pulse generation which preceded it (unless that pulse has been intentionally advanced or retarded). The latency of PBN message output is normally about 40 milliseconds after the timing pulse event.

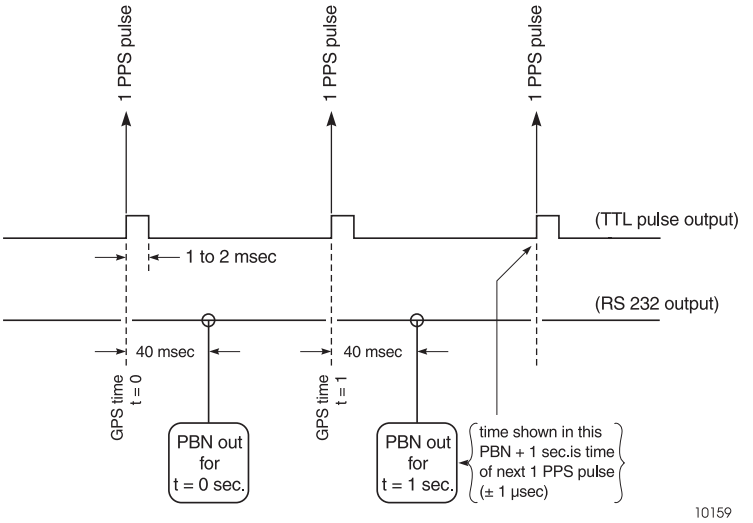

Figure 3.4. Relationship of GPS Time in PRN Record to Output of 1PPS Pulse