Q/A

The method outlined previously is able to estimate the latitude of the EPIRB. However, it produces two solutions for the longitude which are mirror images across the estimated latitude point. This ambiguity is addressed in the second generation of the 406 MHz beacons, which use an internal (or external) navigation device for encoding the position data in the transmitted distress signal, resulting in successful ambiguity resolution 95% of the time and using only one pass [2].

The improved oscillator accuracy in the 406 MHz beacons, coupled with the encoded position data in the transmitted distress signals, allow the SARSAT system to determine the location of the beacon within a 5 km radius [2] [3].

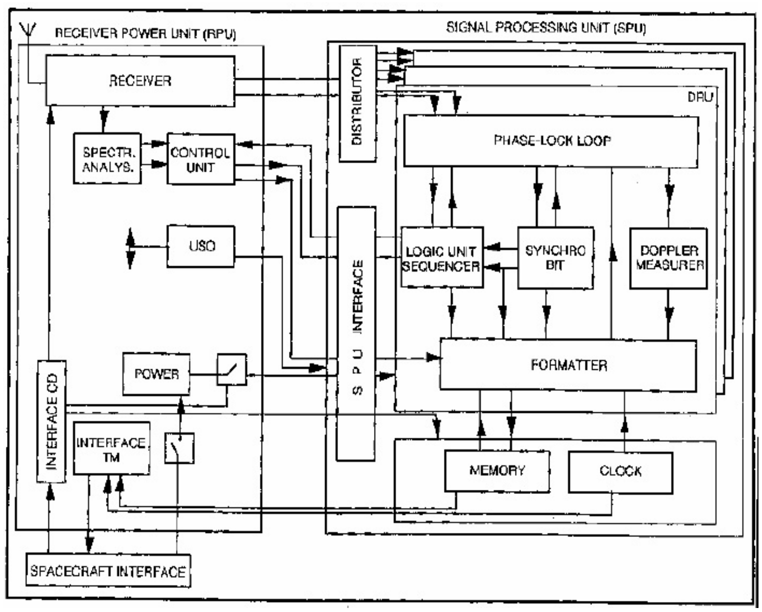

Figure 1: Block Diagram of the Search and Rescue Processor (SARP) [2].

The Search and Rescue Processor (SARP), shown in Fig. 1, provides the control, signal processing and communication functionality within the SARSAT spacecraft [2]. The SARP receiver analyzes the spectrum of the received signal in order to accurately estimate it's frequency and therefore, ensure accurate estimation of the time at which the received frequency equals the carrier frequency. Several algorithms exist for instantaneous frequency estimation, such as the Short time Fourier Transform (STFT), however, in the case of the SARSAT system, the criterion for choosing the algorithm is the optimality. Therefore, we suggest using the Cross Wigner-Ville (XWVD) peak algorithm, which is proven to give the best frequency estimate of Doppler-shifted signals [4].

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