



The value of this method of quality control is limited, however, since the rate of change of the variables can legitimately vary over a large range depending on the vessel's design and sea conditions. Hence, a wide range of variation must be permitted. Similarly, individual anomalous values are useful only in detecting obvious hardware malfunctions. What is required is an alternative means of verifying a sensor's performance by comparing its data with data from another source. The following paragraphs describe how GeoNav does this.

2. Quality Control on Satellite Position Fixes

Digital data received from the orbiting satellites are independent of the velocity and azimuth measurement subsystems comprising the dead reckoning system. Since the vessel's velocity and azimuth do affect the doppler count, fixes derived from the decoded data and associated doppler counts are not independent of the dead reckoning system. The following describes the quality control that verifies incoming satellite data, quality assurance during computation, and interpretation of results, all of which permits use of satellite fixes as independent references.

All data received from a satellite observation are preserved in the computer's memory. At the end of a satellite pass, the software performs a validation sequence verifying the quality of incoming data. Since the same data is received several times during one pass of the satellite, one validity test is to see whether repeated data bits actually appear identical in the computer. This bit majority voting is performed on like bits of like parameters over the entire range of redundant satellite messages stored in memory. In the event the bit error rate is excessive, the entire satellite observation is invalidated and the operator informed of the excessive error rate. When