1.2 System Overview

The DIAS consists of four distinct functional segments which provide navigation support. These functional segments are: 1) GNSS satellites providing positioning signals; 2) the DIAS airborne subsystem; 3) the DIAS ground subsystem; and 4) the DIAS data link.

The GNSS satellites provide the airborne and ground DIAS subsystems with positioning information. The ground subsystem produces ground-monitored differential correction, integrity and (optionally) Final Approach Segment (FAS) path construction data which is transmitted as messages on the DGNSS data link to the airborne subsystem for validation and processing. The airborne subsystem then corrects its pseudorange measurements to each satellite with the differential correction data received from the ground subsystem to support more accurate determination of position, velocity, and heading. The differentially-corrected aircraft position is then used, in conjunction with FAS path construction data obtained from the airborne navigation data base and/or the DGNSS data link, to supply navigation guidance signals to drive appropriate aircraft systems such as displays, autopilots, and/or flight directors. A Total System Error (TSE) containment warning algorithm is executed in the airborne subsystem to provide additional system integrity.

1.2.2 Airborne Equipment

The DIAS airborne subsystem consists of a GNSS Receiver Function, a Navigation Processing Function, a Navigation Data Base (optional) , and a DGNSS Data Link Function. Several equipment configurations are feasible and may be used to implement the navigation processing and navigation data base functions. The functional descriptions are not intended in any way to imply packaging.

1.2.2.2 Airborne Navigation Processing Function

The Navigation Processing Function receives the measurement of the pseudoranges to each GNSS satellite from the GNSS Receiver Function and applies the differential corrections received from the DIAS ground subsystem. (In implementations of the airborne subsystems, this portion of the Navigation Processing Function may reside in the GNSS Receiver). As long as the Total System Error of the aircraft's position is within acceptable limits, the differential corrected aircraft position is subsequently processed, using FAS path construction data from uplinked messages or from an airborne Navigation Data Base, into a signal to drive appropriate aircraft systems (e.g., displays, autopilot, and/or flight director). While not required to do so by this MASPS, the Navigation Processing Function may also use the differentially corrected aircraft position and further waypoint data from the Navigation Data Base to drive appropriate