One of the major considerations when using GPS for navigation onboard commercial aircraft is that of integrity monitoring. Although this encompasses many aspects, one of the major components is in the detection of faults in the navigation ephemeris data itself, i.e. the information broadcast by satellites which gives the user critical information such as satellites positions. Algorithms exist which can be implemented autonomously onboard aircraft during flight which can mitigate this threat when there is only one satellite in view which is in error but which fail for higher numbers. Another significant integrity aspect is the effect of the ionosphere on satellite signals which cannot be mitigated autonomously using single frequency GPS. These threats and others have led to the development of Satellite Based Augmentation Systems (SBAS) which involve both a ground and space segment to continually monitor and report faults in the GPS system to aircraft in flight. In the next ten years, however, it is expected that there will be at least 3 Global Navigation Satellite Systems (GNSS) that will include a dual frequency broadcast which can be used to cancel first order ionospheric effects. With such a development, it becomes attractive to move away from the large infrastructure associated with SBAS and back towards autonomous monitoring. Here we explore the concept of generating independent ephemerides to be used for error detection during flight and as a means of expanding the existing airborne algorithms to include the ability of detecting multiple satellites in error for this new GNSS landscape.