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A CUBESAT PLATFORM FOR MONITORING SPACE WEATHER

Abstract

NanoSats, more specifically CubeSats, are cost-effective small satellites. Once a CubeSat is launched into orbit, it only has so long to live. Over time a CubeSat will experience orbital decay. Orbital Decay occurs after a mission lifetime is over. The CubeSat then goes into a post-mission disposable orbit with a high chance that it will work. A 1U CubeSat has dimensions of 10cm³ with a maximum mass of 1.3 kilograms. The cause of orbital decay is atmospheric drag at an orbital altitude which is caused by collisions of gas molecules, radiation, and light into a satellite. This is the main cause of orbital decay for satellites in low earth orbit. It ends in the satellite slowing down and eventually burning up on reentry.

The technology we have today to prevent CubeSats from orbital decay is effective although there are some downfalls. Some of these downfalls include problems deploying on some occasions and problems controlling the motion of the CubeSat. Another major problem with the solar sail is when the solar sail tries to utilize the sun's emissions as propulsion while traveling towards the sun, it becomes a nuisance and slows the CubeSat down. The sun is constantly releasing low energy ions and electrons. If we utilize today's technologies such as particle detectors, aerogel, an accelerometer, and altimeters, we can find measurements of these various photons. Particle detectors utilize silicone to create components that create electricity. These charged particles pass through the silicon and collide into the particle detector. They can be tracked and measured. There are other means of measuring the rate photons collide into an object. A similar alternative to silicon detectors is aerogel. Aerogel consists of about 90