In this work a numerical investigation has been carried out to study the effect of g-jitter on zero gravity and partial gravity opposed flow spreading flame over thin solid fuels. G-jitter is emulated by gravity modulation of sinusoidal gravity perturbation of a particular frequency and amplitude over a selected base gravity level. The response of flames at near zero base gravity and at base gravity levels of Moon and Mars was different to the imposed gravity perturbation. While the mean and the amplitude of the oscillatory flame spread rate magnified with lowering of perturbation frequency gravity perturbation, interestingly for the partial gravity maximum deviation occurs at certain perturbation frequency whose value increase with increase in base gravity level. Further, at very high perturbation frequency the flame spread rate (FSR) at partial gravity levels were lower than the steady state FSR at the base gravity. The amplitude of oscillatory flame spread is larger for lower base gravity levels and increased with increase in perturbation amplitude. Both the gas phase and fuel pyrolysis (or fuel response) follow perturbation signal with a lag but fuel pyrolysis is more sluggish and lags behind gas phase. The phase lag between fuel pyrolysis and gas increases at higher frequencies and tends to enhance the effect of external perturbation whereas lower frequencies this phase lag inhibits the effect of external perturbation.