Heat assisted magnetic recording (HAMR) is one of the most promising techniques to extend the recording density in hard disk drives beyond 1Tb/inch². In heat assisted magnetic recording systems, a laser beam is integrated into the write head in order to heat the magnetic media above its Curie temperature. The local heating of the magnetic material reduces its coercivity momentarily and permits the recording of information on the disk. This allows the use of magnetic media with high coercivity, thereby overcoming the superparamagnetic limit. Although the diameter of the spot on the disk that is heated by the laser beam is very small, on the order of nanometers, high local temperatures on the disk and the heat dissipated in the slider during the light delivery process can cause thermal deformations of both the disk and the slider, thereby affecting the flying characteristics at the head/disk interface. In this talk, a finite element model that incorporates a heat assisted magnetic recording optical system into a thermal flying height control (TFC) slider was developed. The effect of heat dissipation along the laser path on the thermal deformation and flying characteristics of a HAMR-TFC slider was investigated. The design parameters of a slider with two thermal flying height control heaters, the so-called “dual TFC slider” were optimized in order to achieve low flying height, high thermal efficiency, and minimize the dependence of the head/disk interface spacing on laser induced thermal effects.