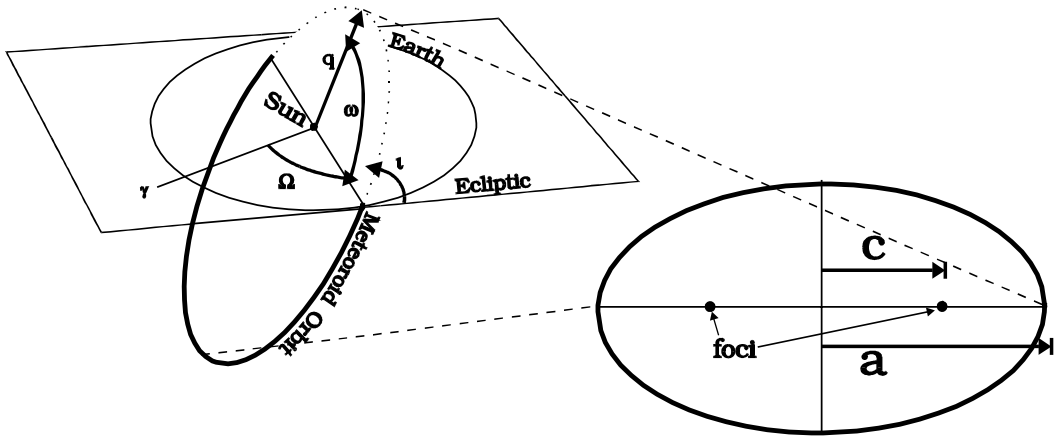
Appendix A : Orbital Element definitions and the Orbital elements of 55P/Tempel-Tuttle and 109P/Swift-Tuttle

To completely define the shape and orientation of an orbit in space, it is necessary to specify five elements. Fig A.1 describes the elliptic orbit in space and defines these quantities.



e=eccentricity of orbital ellipse (c/a)
i=inclination (angle between ecliptic and plane of orbit)
q=perihelion distance
ω=argument of perihelion (angle in orbit between ascending node and point of perihelion)
Ω=longitude of ascending node (angle from vernal equinox to point orbit crosses from under to above ecliptic plane)

Fig A.1 General elements of an orbit. Five elements are needed to specify the orientation of an orbit in the solar system and one additional element to specify the precise position of the meteoroid.

Table A1: Osculating orbital elements for 55P/Tempel-Tuttle and 109P/Swift-Tuttle during their most recent periehlion passages. a is the semi-major axis of the orbit in Astronomical Units, e is the eccentricity, i is the inclination of the orbit from the ecliptic plane in degrees, Ω is the longitude of the ascneding node in degrees, ω is the argument of perihelion in degrees, q is the perihelion distance in A.U., rnode is the radius of the decending node in A.U. and T is the time of the most recent perihelion. Fig A1 describes the meaning of these orbital elements in more detail. All angular measures are referenced to J2000.0.

Comet	a	e	i	Ω	ω	q	rnode	T
55P/Tempel-Tuttle	10.33	.9055	162.5	235.26	172.5	0.976598	0.9806	02/28/98
109P/Swift-Tuttle	26.32	.9636	113.4	139.44	153.0	0.95822	1.031	12/12/92