Orbital Elements

Foci. Every orbit is an ellipse and has two foci. For most orbits, the first focus corresponds to orbited body’s center of mass, and the second focus is usually empty.

Apoapsis. The point at which an orbit is farthest away from the planetary focus

Periapsis. The point at which an orbit is closest to the planetary focus

Minor Axis. The shorter diameter/axis of the ellipse

Major Axis. The longer diameter/axis of the ellipse

Equatorial Plane. The plane of the equator of the object

Orbital Plane. The plane of the object’s orbit

Ascending Node. The point at which an orbital plane intersects the equatorial plane in the ascending direction

Descending Node. The point at which an orbital plane intersects the equatorial plane in the descending direction.

Semi Major Axis (a). Size. Half of the length (in meters) of the major axis.

Eccentricity (e). Shape. Depends on the radius of the periapsis, radius of apoapsis, and length of major axis (a)

Inclination (i). Tilt. The inclination in degrees from the equatorial plane to the orbital plane.

Longitude of the Ascending Node (uppercase Omega). Swivel. The angle between the vernal equinox and the ascending node.

Argument of Periapsis (lowercase Omega). Location of periapsis. The angle in degrees from the ascending node to the periapsis, measured counter-clockwise from the north pole of the central body

True Anomaly (Mu). Position. The angle in degrees from the orbit’s periapsis to the orbiting body.

Special Cases:

Circular Orbit. An orbit whose ellipse is a perfect circle. Lacks an argument of periapsis.

Equatorial Orbit. An orbit in which the orbital plane coincides with the equatorial plane.