

ROLE OF GRAVITY IN GEODETIC MODEL:

Newton's law of universal gravitation states that all particles in the universe are mutually attracted by all other particles. Gravitational attraction and centrifugal force (rotation of earth) combine to form gravity.

- **Gravity vector at each location determines:**
 1. **Direction of "up"**
 2. **What is "level"**
- **Any instrument using an optical plummet and/or striding level is influenced (measurements are affected) by gravity:**
 1. **Levels**
 2. **Theodolites**
- **What is the definition of horizontal distance?**
 1. **Model makes a difference**
 - **plane surveying**
 - **geodetic surveying**
 2. **Is horizontal distance elevation dependent?**
- **GPS vectors (except for the antenna height distance) are determined independently of gravity.**
- **3-D positions in the photogrammetric mapping stereo model are formed by the intersection of light rays in space. Are the intersection positions affected by gravity?**
- **Are EDM measurements affected by gravity?**
- **The impact of gravity in spatial data (surveying) considerations is:**
 1. **Related to geoid heights and shape of the geoid.**
 2. **The deflection-of-Vertical which is the difference between the**
 - **Direction of the plumb line and the**
 - **Direction of the ellipsoid normal.**
 2. **Small in most cases, larger in mountainous terrain.**
 - **Can accumulate in traversing if corrections not applied.**
 - **Controlled by tying into precise GPS 3-D points.**