

ECE 514E - SATELLITE COMMUNICATION
LABORATORY SESSION: SATELLITE TRACKING
Wednesday, November 19, 2025

1.0 Objective

To make the learners understand:

- i) the trajectories of satellites in space
- ii) Space parameters of GEO, LEO, MEO Satellites
- iii) Space parameters of Military, Weather and Communication Satellites
- iv) Understand the importance of satellite international codes and their composition.
- v) Various computations of the satellite tracking software and link them to theory.

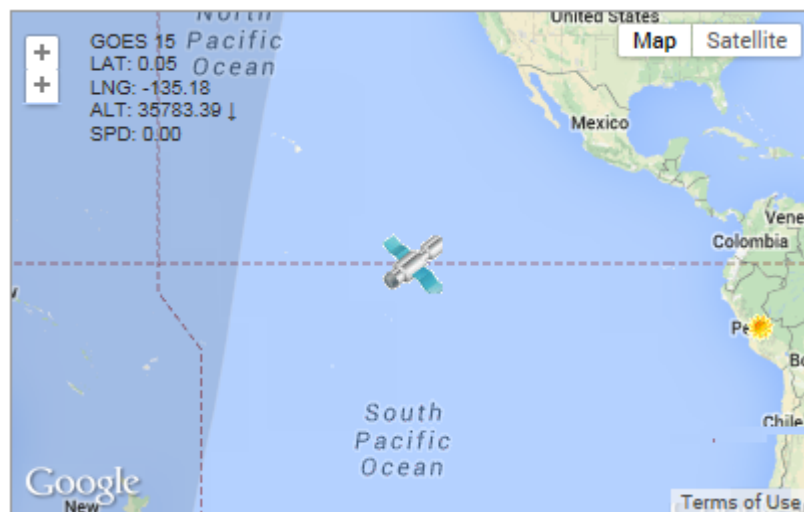


Figure 1 Satellite Tracking (image)

2.0 Laboratory Equipment Required

Computer workstation running Windows 10 or later version with connection to the Internet.

3.0 Methodology

1. Open website: <http://www.n2yo.com>
2. Track the satellites shown below.
3. Repeat for each satellite by using the <https://orbtrack.org>

SATELLITE PARAMETERS

Enter the parameters and fill the table below.

Satellite	Parameters
STARLINK-35100	1. Type 2. International Code..... 3. Launch Date 4. Perigee 5. Apogee 6. Period 7. Speed 8. Azimuth..... 9. Elevation Projected End of Life
KUIPER-00088	1. Type 2. International Code..... 3. Launch Date 4. Perigee 5. Apogee 6. Period 7. Speed 8. Azimuth..... 9. Elevation 10. Projected End of Life
USA 248	1. Type 2. International Code..... 3. Launch Date 4. Perigee 5. Apogee 6. Period 7. Speed 8. Azimuth..... 9. Elevation 10. Projected End of Life

Satellite	Parameters
GSAT-14	1. Type 2. International Code..... 3. Launch Date 4. Perigee 5. Apogee 6. Period 7. Speed 8. Azimuth..... 9. Elevation 10. Projected End of Life
NAVSTAR 65 (USA 213)	1. Type 2. International Code..... 3. Launch Date 4. Perigee 5. Apogee 6. Period 7. Speed 8. Azimuth..... 9. Elevation 10. Projected End of Life
GOES-16	1. Type 2. International Code..... 3. Launch Date 4. Perigee 5. Apogee 6. Period 7. Speed 8. Azimuth..... 9. Elevation 10. Projected End of Life

Satellite	Parameters
IRIDIUM 107	1. Type 2. International Code..... 3. Launch Date 4. Perigee 5. Apogee 6. Period 7. Speed 8. Azimuth..... 9. Elevation 10. Projected End of Life
INTELSAT 35E	1. Type 2. International Code..... 3. Launch Date 4. Perigee 5. Apogee 6. Period 7. Speed 8. Azimuth..... 9. Elevation 10. Projected End of Life
ONEWEB-0188	1. Type 2. International Code..... 3. Launch Date 4. Perigee 5. Apogee 6. Period 7. Speed 8. Azimuth..... 9. Elevation 10. Projected End of Life

QUESTIONS

- 1.** What do the following terms mean and who assigns them (Use google)?
 - (a) NORAD ID
 - (b) International Satellite Code
- 2. (a)** Derive value of the velocity of a satellite (V_s) and use the equation to compute the speed of the following satellites:
 - (i) GOES 16
 - (ii) Iridium 107

Assume $G = 6.67 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$ and $M = 5.98 \times 10^{34} \text{ Kg}$.

- (b)** How does your computation compare with the value displayed by the satellite tracking program?
- 3.** Computation of various azimuth and elevation is dependent on the geographic location (latitude and longitude). Explain how the software takes this into account.
- 4.** By taking your location to be a city in the centre of the country, estimate the number of satellites over-flying the country.
- 5.** How many Iridium satellites are parked. Why is satellite parking necessary?
- 6.** Locate and list parked geostationary satellites. Why is it necessary to park geostationary satellites?