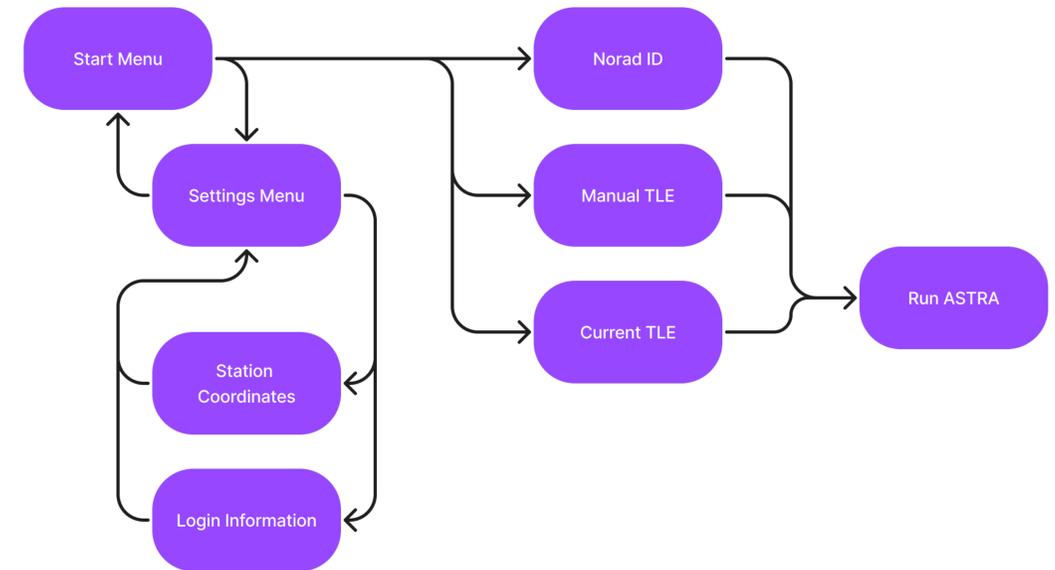


# ASTRA

## Project

- Satellite communications is inherently difficult, especially for amateur radio users and small satellite teams. Commercial tracking software used for satellite communication is often too expensive while cheaper solutions can be confusing for amateurs. ASTRA(Active Satellite Radio Tracking Antenna) is a new open-source software for tracking satellites. It's designed to be easy to use, cheap to implement, and open for anyone to modify or improve.
- Amateur radio users and small satellite teams now have opportunity to have a cheap, user friendly, and accurate satellite tracking software. This tracking software, implemented with a Raspberry Pi 4, can be integrated with most ground stations.

## System



## Methods

- The solution to an accurate tracking software is to perform all the necessary orbital calculations, while accounting for orbital perturbation. ASTRA takes a given TLE, from the user or the Space-Track.org API, that will give an initial position of a satellite. From the TLE, ASTRA calculates the corresponding azimuth and elevation angles for the ground station. ASTRA will repeat these calculation to predict the satellites position to constantly update and display the azimuth and elevation angles.

## Conclusion

- ASTRA is an easy-to-use software for amateur satellite and radio enthusiasts to use for tracking satellites. ASTRA is easy to install using our user guide and our surveys show that using ASTRA is user friendly as well. Using ASTRA is also inexpensive for amateurs implement, requiring only a raspberry pi to run. ASTRA has its limitations and is not perfect in its accuracy but ASTRA fits the needs of many newcomers to the amateur radio satellite space by providing an accurate and simple solution the problem that is tracking a satellite in real time.

