

PushToSky - En

Phone-based Astronomical Telescope Control, Simply

Push to Sky is a low-cost control system for astronomical telescopes that uses mobile phone sensors.

Connect to the world of stars – look up at the sky and control smartly!

Key Features

Phone-based manual control The current direction of the telescope can be determined and tracked in real-time using the mobile phone's sensors (gyroscope, accelerometer, compass).

Compatible with azimuthal telescopes Specifically designed for alt-azimuth mechanical systems, making it easy to use with Dobsonians, refractors, or beginner non-motorized systems.

Sensor data processing with Kalman filter Filters and smooths noisy mobile sensor data, providing a more reliable position estimate of the telescope's direction.

Star calibration and correction Through one-star or multi-point teaching, the system can correct sensor errors – ensuring even more precise targeting.

Client-server connection Phone data is sent to the PC via Wi-Fi, where the system displays the current direction, suggests movements, and allows orientation using a virtual sky.

User Manual

Installation Kit:

Phone:

- TelescopeMotionSender for Push_to_Sky.apk (Sends orientation data to the Push_to_Sky system)

- GPS Sender for Push_to_Sky.apk (Sends GPS data to the Push_to_Sky system)

Laptop/Desktop:

- Push_to_Sky

- config.ini file

How to use:

Mount the phone on the telescope.

Install TelescopeMotionSender for Push_to_Sky.apk and GPS Sender for Push_to_Sky.apk on your phone.

Place the Push_to_Sky and config.ini files in the same folder on your laptop.

Start the Push_to_Sky application, then GPS Sender for Push_to_Sky.apk from your phone. This will provide your exact location to the Push_to_Sky application (Remember to provide your laptop's exact IP address).

Restart the Push_to_Sky application.

Now, start the TelescopeMotionSender for Push_to_Sky.apk (Sends orientation data to the Push_to_Sky system) application on your phone (Remember to provide your laptop's exact IP address).

Point the telescope, for example, at Antares and mark it in the one-star teaching.

Now, in the Tracking tab, you can select an object you like (Deep sky objects/M3), where the system will navigate using the control system.

Phone sensors are not very accurate, so manual correction may be needed occasionally.

Explanation

*Settings

** Azimuth Correction by Elevation: A common error with phone sensors is that the azimuth value drifts when measuring elevation from 0 to 90 degrees. This function is designed to correct that drift between 0–90, 90–180, 180–270 and 270–360 degrees.

** Direction Indicator Sensitivity (Degrees): The sensitivity of the direction indicator system located under the “Tracking” tab can be adjusted between 0.3–1 degrees.

** Orientation Data (UDP): Orientation data received from the phone's sensors (in degrees).

*Tracking

** Target Selection: Contains a search field and a list of celestial objects from which you can select the object you wish to observe (Bright Stars, Deep Sky Objects, Solar System).

** Calculated Celestial Body Position: The position of the celestial object selected in the “Target Selection” section.

** Direction Indicator: Here you can choose whether to use raw or filtered (Kalman filter) data. The latter can assist during telescope movement. Arrows assist in moving the telescope, and a green dot indicates target acquisition.

** Multi-point Alignment: You can mark multiple objects for calibration purposes from the “Target Selection” section. Point the telescope at a selected object, then mark it with the “Mark for Calibration” button. Repeat as desired with additional objects. After marking 1, 2, 3, or even 4 objects, click the “Perform Calibration” button. During the day, the PushToSky system can even be calibrated using a single mark on the Moon.

** Current Position and Offset: Indicates the current direction of the telescope and provides the option for manual correction and offsetting.

** Virtual Sky: After pressing the button, a virtual sky view opens up, which can help with orientation in the night sky.

*One-Star Alignment

Point the telescope at a star, for example, Polaris. Select Polaris from the list, then press the “Current Position and Offset” button. After this, under the “Tracking” tab in the “Target Selection” section, you can choose a target object.