**Crowd-GPS-Sec: Leveraging Crowdsourcing to Detect and Localize GPS Spoofing Attacks**

**Summary**

Crowd-GPS-Sec is a novel technique to detect spoofing attacks on GPS signals using position advertisements in a periodic format from a crowd-sourced air traffic monitoring sensor network. This technique relies on the OpenSky network, a crowdsourcing initiative made available to make air traffic communication open to the public. It consists of three modules - 1. **MLAT module** is used to estimate the location of the aircraft that sent the advertisement. 2. Based on the received advertisements, the **spoofing detection module** checks for inconsistencies between multilateral positions and GPS-derived positions. 3. The **spoofer location module** is then used to identify the spoofer location using the distance differences between the spoofed positions and then backtrace these deviations to a location of the spoofing device.

**Strengths**

* No change to existing GPS infrastructure is necessary and thereby making the option extremely scalable and easy to implement.
* The accuracy of the GPS is very high because the OpenSky network provides highly accurate data about the position and velocity of the aircraft.
* Along with the detection of spoofing attacks, it is also possible to localize the spoofer up to an accuracy of 150m and necessary legal action may be taken to prevent future attacks.
* Systems used for this technique need not be present on the receiver and can work remotely making it very attractive and no changes to existing receiver design.

**Weakness**

* Crowd-Sec-GPS may not be very effective in areas where there isn't a lot of air traffic because it relies on air traffic advertisements from aircrafts to the OpenSky network.
* The entire technique is based on Opensky networks' reliability and accuracy and if the OpenSky network is down or if it's having any other issues in their systems, this approach obviously won't work.
* Authors in the paper assume availability of ADS-B data, but this data may not be available in all aircrafts and all regions of the world.
* Authors also assume that the data provided by the OpenSky network is accurate at all times, which may not be completely true. There must be an independent validation to check the accuracy and validate the results of the paper.