

Low-Cost GPS Spoofing Detector

VTIP 20-070: “A Low-cost GPS Spoofing Detector and Spoofer Localizer”

THE CHALLENGE

There are 31 satellites currently in orbit that are part of the Global Positioning System. These satellites are used to calculate the longitude, latitude, and altitude of users. However, the GPS system is vulnerable to spoofing attacks that can migrate the user from the actual signal to the spoofing signal. These attacks can disrupt operations of many critical applications such as vehicle, vessel, or aircraft navigation systems, stock exchanges, and inventory tracking systems, and have been used frequently in cyber warfare. Similar to antibiotic resistance, anti-spoofing methods need to be improved as spoofing attacks outsmart previous methods.

OUR SOLUTION

Researchers at Virginia Tech have designed a new GPS-spoofing detection technique that is impossible for a spoofer to evade. This new design will work with any commercially available GPS receiver, and requires no modification of the current GPS chips. By analyzing the output signals of the GPS receiver during motion, the technique not only can accurately and rapidly detect more advanced GPS spoofing attacks, but also quickly pinpoint the spoofer's location.

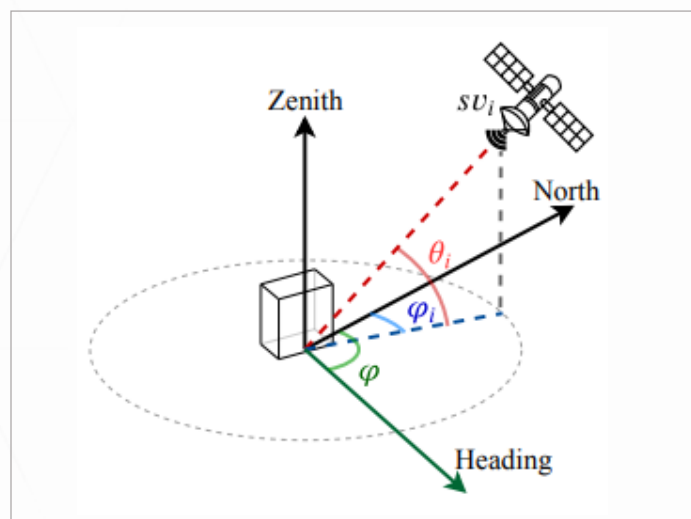
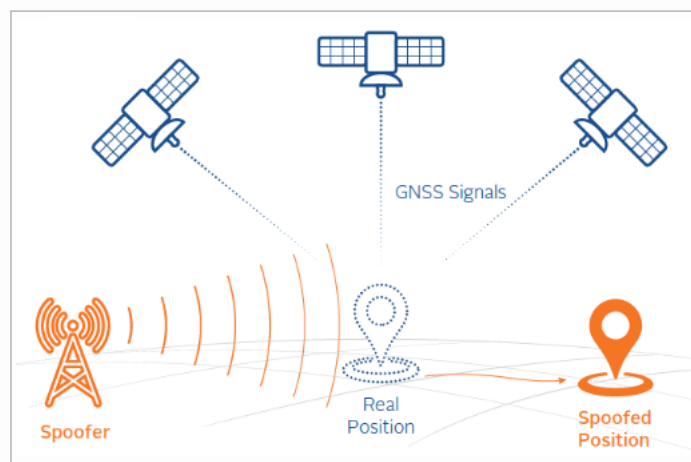


Illustration of angle of arrival of GPS signal.



Visualization of how GPS spoofing displaces the user's position. (Obtained from Orolia)



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