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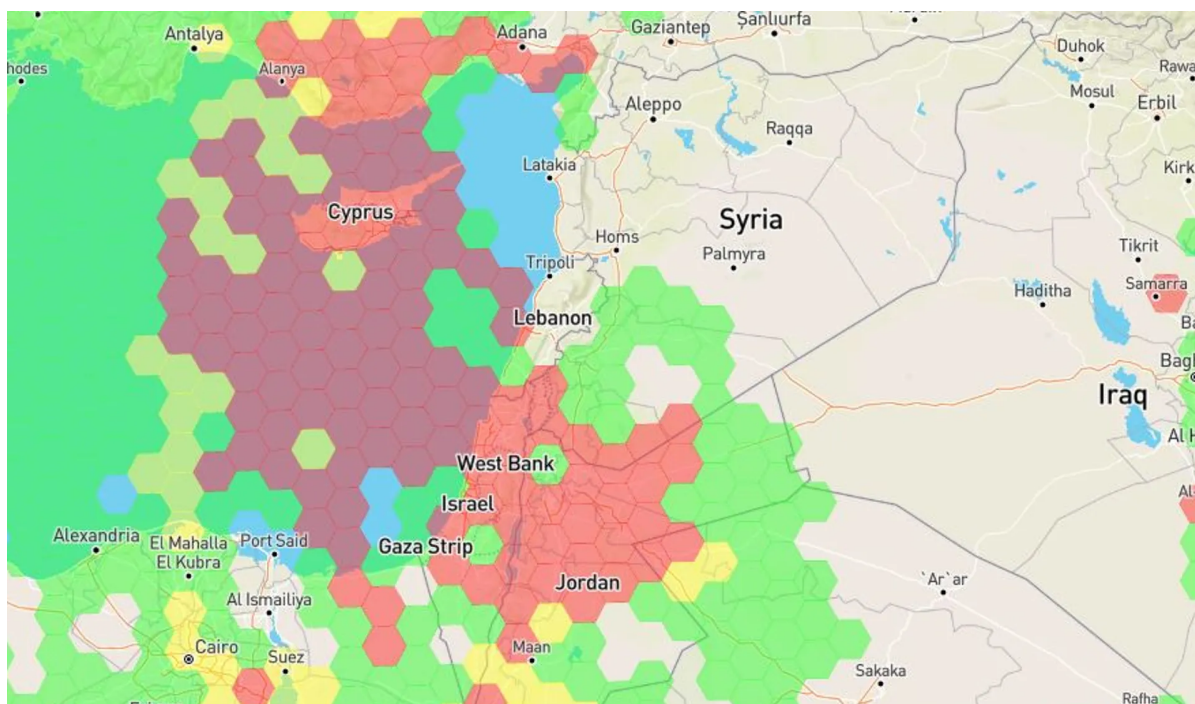
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Israel Ramps Up GPS Jamming to Thwart Hezbollah, Hamas Drone Attacks

However, the Israeli jamming can also mess up the IDF's rocket warning app ■ U.S. researchers recently geolocated a powerful GPS jammer at base in northern Israel

Avi Scharf and Yaniv Kubovich Oct 16, 2023 11:47 am IDT



GPS jamming in Israel and surrounding areas this week, as observed by gpsjam.org



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Israeli defense forces have increased GPS jamming in the region to try to thwart drone attacks by Hamas and Hezbollah.

Hamas's surprise attack a week ago Saturday included extensive use of drones to observe and attack Israel Defense Forces communications and firing positions along the border fence with Gaza and to fire at soldiers from the air at bases adjacent to the fence. Hezbollah has a much more advanced unmanned aircraft force, and in the week or so since Hamas' deadly assault, a number of warnings have been issued alerting the public along the Lebanese border of possible aerial infiltrations into Israeli territory.

The IDF has confirmed that Israel is disrupting satellite navigation systems "in a proactive manner for various operational needs. Citizens should be aware that the disruption can cause various and temporary effects on location-based applications."

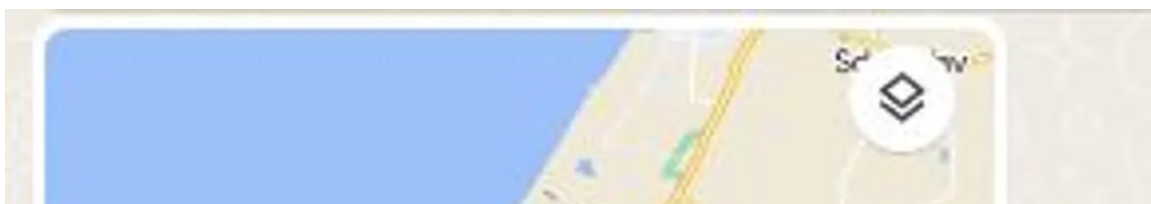
The wide scale jamming affects GPS services in two ways. Sometimes reception of GPS signals can be completely blocked, while in other cases, the GPS signal is spoofed - meaning that it transmits a false location to the device. On Sunday morning, residents of the Haifa Bay area reported that their Waze road navigation system erroneously informed them that they were approaching Israel's northern border. Others in the West Bank reported their phone informed them they were near the Gaza border.

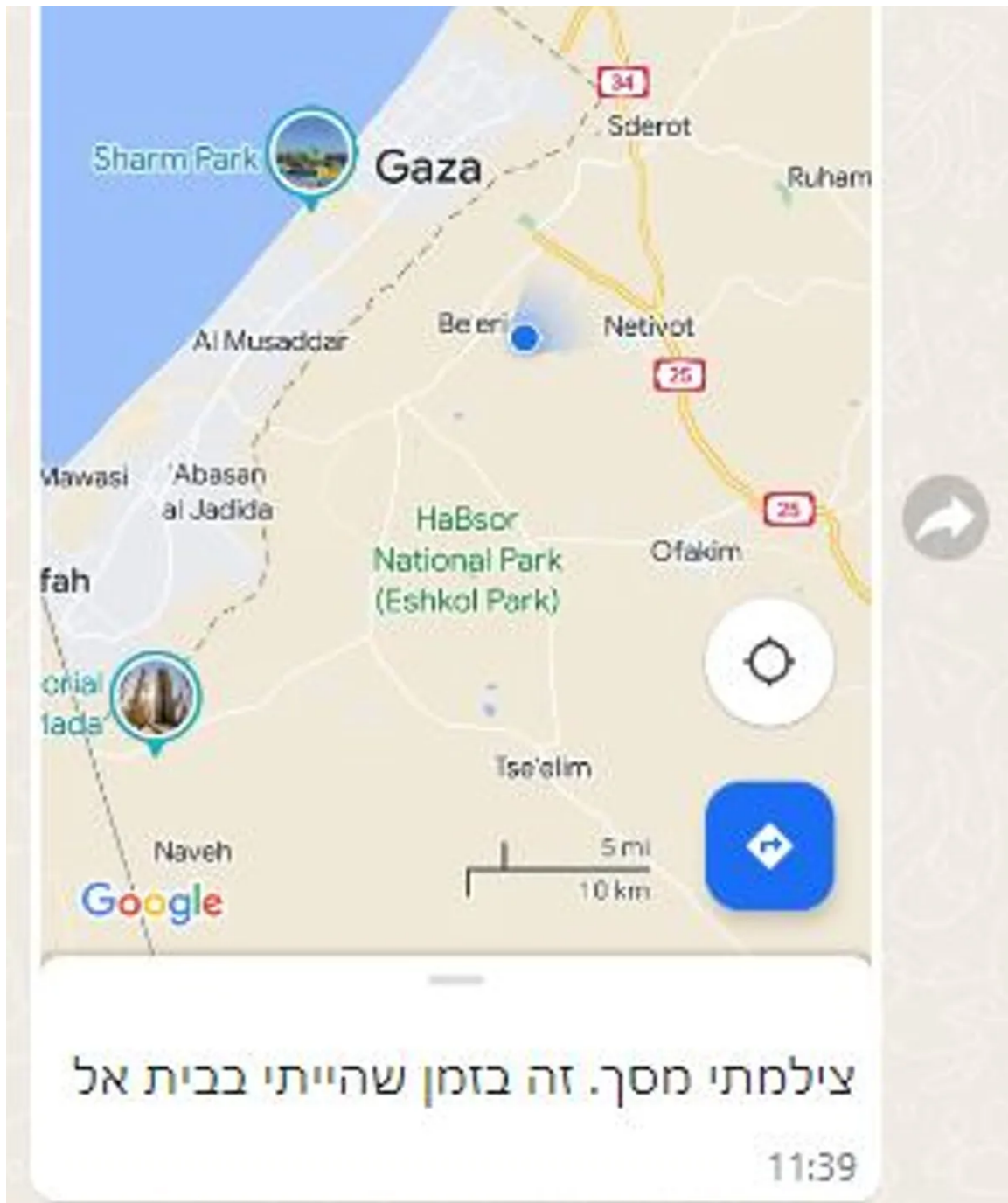
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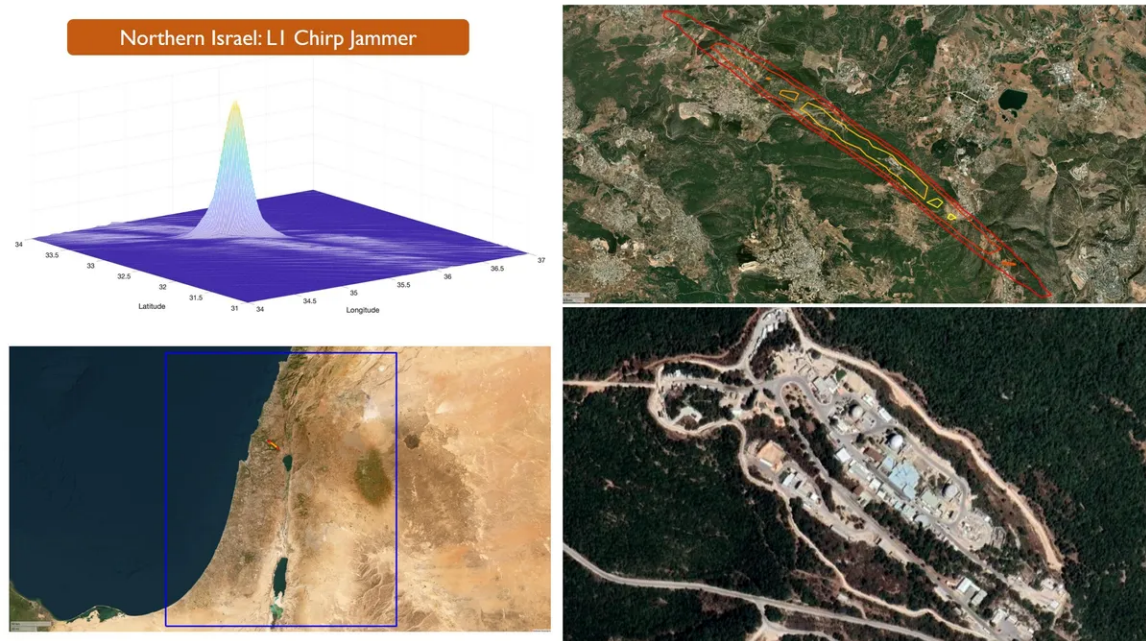
The phone of an Israeli near Jerusalem, erroneously reporting it is near Gaza, this weekend

This GPS jamming poses a potential security risk for Israelis using the IDF Home Front Command app, which provides warnings of incoming missiles based on the user's phone location. If, for example, a Haifa resident's phone erroneously reads its location to be the northern border area, the app might send a false warning based on a real missile attack on the Lebanese border. On the other hand, if the phone erroneously places the user at a location other than Haifa, the app could fail

to warn of a missile that is actually being fired at the Haifa area. The IDF said in response that it advises users to manually configure their town of residence in the app, so they receive real time warnings, regardless of their phone's location services which may not work due to the jamming.

Increased flight risks

In the past year, there has been a steady increase in satellite navigation system disruptions in Israel and throughout the eastern Mediterranean. [An analysis](#) by researchers from the University of Texas recently found that Israel has been using a powerful GPS jammer, located at an Israeli Air Force base at Mount Meron in Israel's north, that has affected civil aviation throughout the region. Their study was presented at an international conference in California.



U.S. researchers recently geolocated a powerful GPS jammer at Air Force Base in northern Israel Credit: Radionavigation Laboratory, The University of Texas at Austin

As Haaretz reported extensively last year, the skies of the eastern Mediterranean are a global GPS jamming hub. The impact on satellite navigation systems is felt along the southern Turkish coast, as well as in Syria, Israel, Lebanon and Cyprus.

This past year, the disruptions have increased, mainly affecting landing and departing passenger aircraft at Ben Gurion International Airport near Tel Aviv as well as the at Beirut airport and Cyprus' Larnaca airport.

According to Eurcontrol, The European Organisation for the Safety of Air Navigation, the rise in GPS jamming “reduces the efficiency of the overall aviation system, places a higher workload on pilots and air traffic controllers, and requires complementary communication, navigation and surveillance services to be maintained to more demanding requirements, posing a serious potential risk to safety”. Eurocontrol claims the GPS disruptions are likely the result of systems used to prevent drone attacks.

Israel has previously claimed that Russian military systems in Syria were causing the interference, and the Israel Airports Authority recently reported “unknown actors, apparently outside of Israel,” were responsible for GPS interference.

Last year, however, Haaretz reported on Israeli defensive measures that could be contributing to the disruptions. Then-Defense Minister Benny Gantz acknowledged that Israel and its neighbors had established a regional air defense system that had successfully thwarted “Iran’s attempts to target the countries of the region with rockets, cruise missiles and drones.” When Haaretz asked whether Israel was using various means to disrupt GPS to prevent Iranian drone attacks, the IDF said last year: “The IDF operates in a range of ways in every sector. There are many other players working in the region in a variety of ways to protect themselves, alongside Israel.”

Blocking and spoofing

The GPS receiver on a cellphone, airplane, ship or vehicle receives signals from several satellites at the same time and uses them to calculate its own exact location and altitude. Similar receivers are also found on cruise missiles and drones and are used to guide them to their target. A military organization interested in disrupting such an attack can powerfully transmit on the relevant frequency range to prevent the GPS receiver from receiving any satellite signal, thereby totally disrupting its functionality.

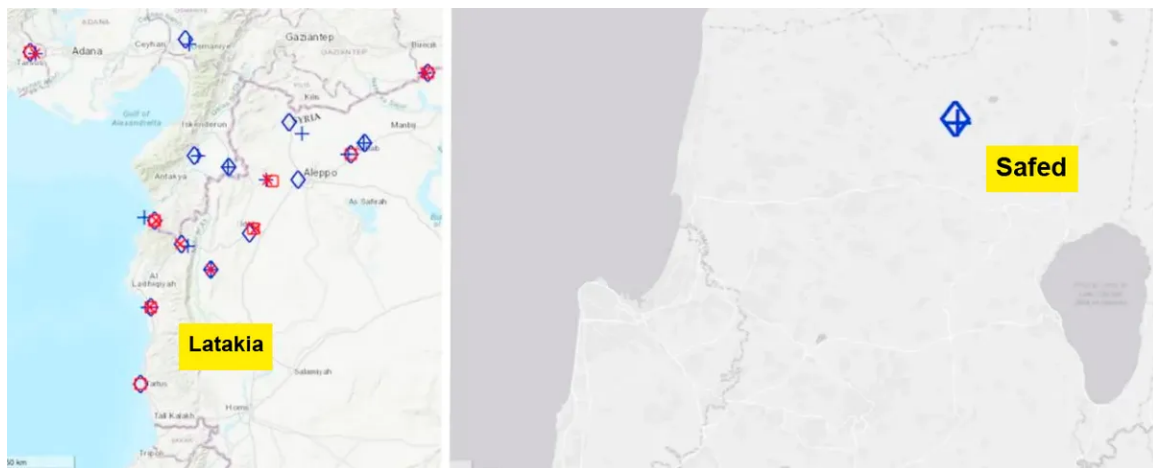
Another tactic is spoofing. By transmitting a signal that simulates the authentic satellite signal, the GPS receiver can be “hijacked”. Once the receiver locks on to the fake signal, the disrupter “feeds” the GPS receiver with fake data, causing it to calculate and display a completely incorrect position and altitude – up to dozens, and even hundreds of kilometers off its true location. That is what many Israelis experienced over the last week, apparently as a result of an attempt to prevent Hezbollah’s GPS-guided drones from crossing deep into Israel.

Even before this month’s Hamas attack, a commercial pilot told Haaretz that there had recently been a significant increase in GPS jamming, with almost daily warnings from Israeli aviation authorities about satellite navigation disruption. He said one of the main consequences was the elimination of the “RNP approach” for landing at Ben Gurion Airport – a GPS-based guidance procedure that allows the aircraft to accurately navigate to the runway based on pre-set navigational points. As a result, Ben Gurion airport is currently using only ILS (Instrument Landing System) approaches, creating a greater workload for air traffic controllers – which must verbally direct every plane until it intercepts the radio signal guiding it to the runway.

The pilot said the GPS disruptions also cause false altitude readings, which then trip alarms warning pilots that they are dangerously close to the ground. When that happens at night or in cloudy conditions, pilots have to “go around” – halt their descent (sometimes at an advanced stage of landing), pull back up, circle the airport and make a second landing approach.

Tracking jamming from space

The University of Texas researchers geolocated the Israeli GPS jammer through Spire Global, which operates 120 satellites, of which 60 are in low-earth orbit. They are used for GNSS Radio Occultation – a remote sensing technique that uses GPS measurements to profile the atmosphere and ionosphere, to study weather forecasting, atmospheric processes, climate monitoring and more. The researchers found that data collected by the satellites could be used to accurately pinpoint the location of powerful earth-based transmitters that are being used to disrupt satellite navigation systems.



GPS jammers in Israel and Syria, geolocated by U.S. researchers Credit: Radionavigation Laboratory, The University of Texas at Austin

The study that revealed the Israeli disrupter also confirmed the previously reported activity of a Russian GPS jammer at the Latakia air force base in Syria, and identified several other disruptors in southern Turkey and on the Syrian border.

It's reasonable to assume that the Israel Air Force is constantly disrupting GPS systems in the region to thwart Hezbollah and Iranian drone and cruise missile attacks against strategic sites. Last year, the IDF intercepted a [Hezbollah drone attack against the Karish offshore natural gas rig](#). Israel has also warned of the deployment of Iranian drones and cruise missiles in Yemen, Iraq and Syria - capable of reaching Israel. In 2021, Israeli fighter jets shot down Iranian drones over an unnamed Middle Eastern country.

In response to the detection of a powerful Israel Air Force GPS jammer that increases the risk to civil aviation, the IDF said: "Several elements in the northern theater of operations operate different systems that affect and are affected by the spectral dimension. The IDF acts in a variety of dimensions against the various threats to protect the security of the State of Israel, while minimizing the harm to the civilian fabric of life to the extent possible."



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The Israel Airports Authority said in response: “Similar to airports around the world, Ben Gurion airport also uses a variety of navigation aid systems for landing and takeoff routes. GPS disruptions have existed for more than seven years and do not cause disruptions in landings and departures from Ben Gurion airport, which are proceeding normally.”

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