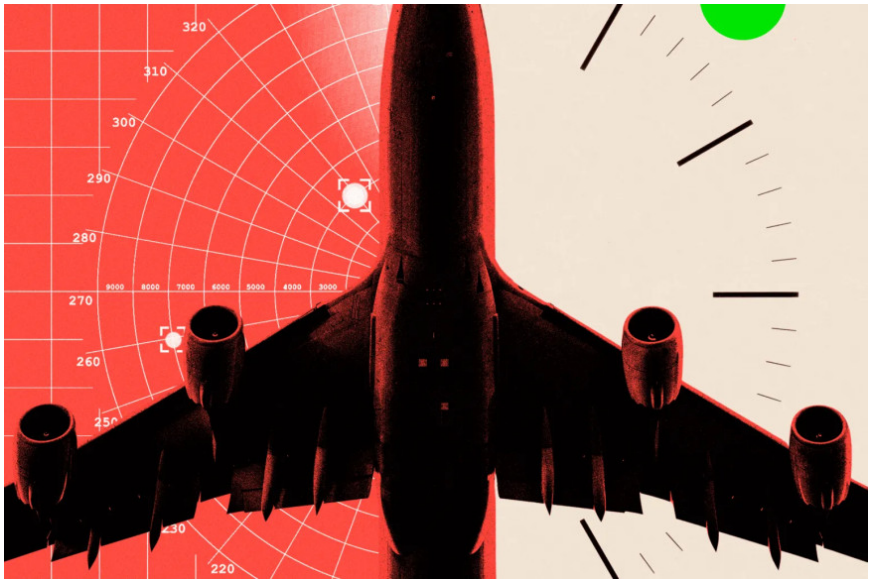
Planes are having their GPS hacked. Could new clocks keep them safe?



As a Ryanair flight from London approached Vilnius, Lithuania, on 17 January, its descent was suddenly aborted. Just minutes from touching down, the aircraft's essential Global Positioning System (GPS) suffered an unexplained interference, triggering an emergency diversion.

The Boeing 737 MAX 8-200 had already descended to around 850ft (259m) when the disruption occurred. Instead of landing, the plane was forced to climb back into the sky and divert nearly 400km (250 miles) south to Warsaw, Poland. Lithuanian air authorities later confirmed the aircraft had been affected by "GPS signal interference".

This was not an isolated incident. Over the last three months of 2024, more than 800 cases of GPS interference were recorded in Lithuanian airspace. Estonia and Finland have also raised concerns, accusing Russia of deploying technology to jam satellite navigation signals near Nato's eastern flank – though the country has denied that. Last March the then Defence Secretary, Grant Shapps, was on a plane that had its GPS signal jammed while flying close to Russian territory.

The treat of GPS jamming To pinpoint our exact location, we need to know the exact time. GPS works by users receiving signals from multiple satellites. The length of time it takes each signal to reach a device is used to determine exactly where on Earth we are.Very large atomic clocks communicate directly with the satellites, allowing them to know the time to within 100 billionths of a second, and this precision timing is key to a variety of economic activities around the world, including communication systems, electrical power grids, and financial networks.recent months, the UK government has set up research initiatives to tackle the threat of GPS jamming. But turning prototypes into robust devices that could one day be incorporated into our phones is an enormous undertaking – and the need for the new technology is getting ever more urgent.1967, the world's timekeepers, an intergovernmental body called the General Conference on Weights and Measures, agreed to define time using atomic clocks, rather than by the Earth's rotation.

The switch transformed our world just as radically as Harrison's clock, laying the foundation for GPS and similar space-based systems. These provided precise timekeeping from atomic clocks on satellites, which allowed rapid and huge volumes of communications, computation, and transactions to be carried out everywhere in the world near instantaneously, as well as more precise navigation.