

'Indoor GPS' could stop you getting lost – or going hungry – ever again

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Credit: ROMAN ODINTSOV from Pexels

Gatwick Airport is hoping you'll never get lost on the way to catch a flight again. The London airport has [recently installed](#) a wayfinding system that works like a kind of indoor GPS to direct customers around

the building using their smartphones. We could soon see this "blue dot" technology being used in more and more large commercial buildings, such as shopping malls and conference centres, to help us find the quickest route to a destination – but also to steer us into spending more money.

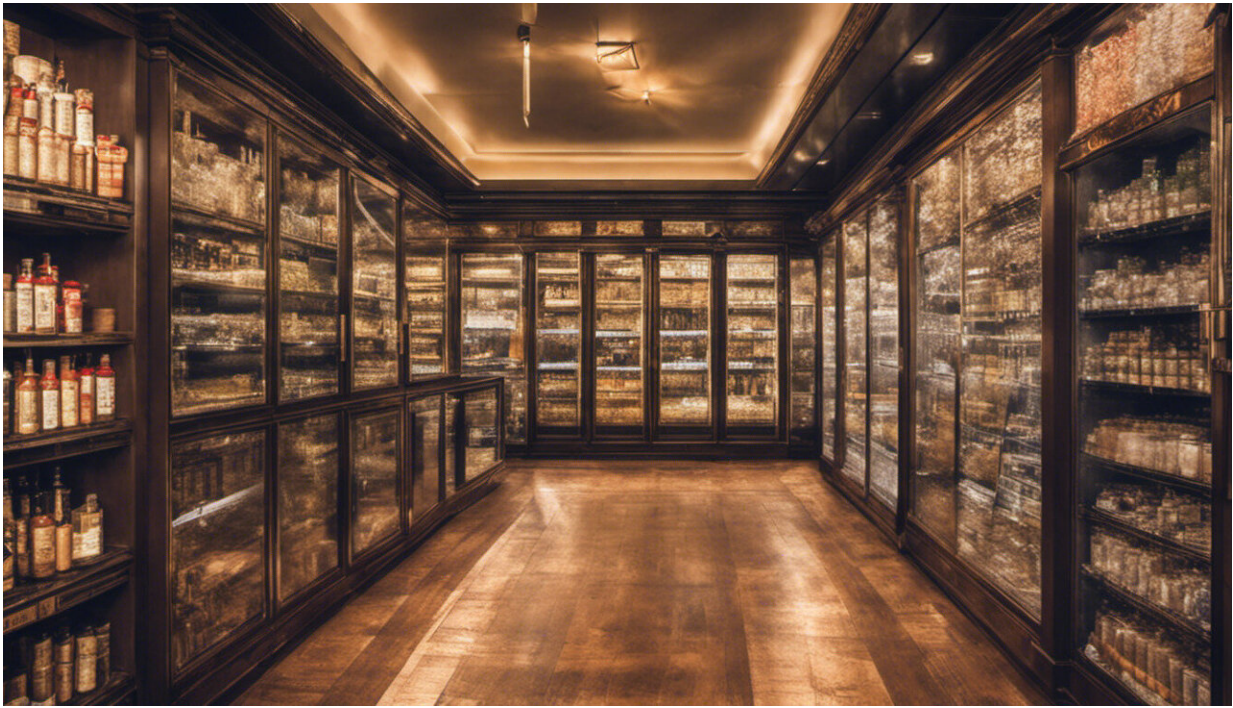
Most smartphone users are now so used to GPS that it can be frustrating to find there's no similar way to navigate once inside a large building. Roofs and walls often interfere with the satellite signals, making the positioning system [notoriously inaccurate indoors](#), if not impossible.

The best solution developed so far to map large indoor spaces is to place a series of beacons inside the building that send out signals to devices such as smartphones to tell them where they are. The device can then place a blue dot (or equivalent) on the on-screen map to pinpoint the user's location, or even use [augmented reality](#) technology to display virtual signposts telling the user where to go.

These beacons are relatively small, about the size of an adult human hand. They are relatively cheap individually, costing anything [from £20 to several hundred pounds each](#). A large number of these devices is needed to map every corner of a big indoor location such as an airport – in the case of Gatwick Airport, [2000 such beacons](#) have been deployed. The technology allows for very accurate positioning, the beacons are able to locate to within a 3 metre range, versus a range of [up to five metres for GPS](#) (outside).

Once installed, the beacons transmit location signals via Bluetooth to smartphones that can use the information in different ways. For example, users at Gatwick Airport can use their camera to view augmented reality arrows to direct them to a specific departure gate or shop. It could also be possible for airlines to locate missing or late passengers and guide them to their gate.

But the technology can do more than simply guiding users from A to B as quickly as possible. Instead it can send users through more pleasant routes – or more commercially viable ones that pass more shops. Some [shopping malls](#) have already started to use the technology to direct customers to certain coffee shops in the morning and to food outlets at lunchtime.



Credit: AI-generated image ([disclaimer](#))

The technology could also one day help with security and crowd control. Measuring the number of signals going from each beacon to nearby devices could help building security staff better understand the flow and numbers of people in indoor areas.

Of course, virtual wayfinding can't completely replace physical signs

because there is always the chance the system could go down or the users' phone batteries could run out. And some people, for example those with certain disabilities, [find it hard](#) to use smartphone apps to navigate.

Other solutions

The other downside is the cost of installing enough beacons to make the system work across buildings that are large enough for people to need navigation in, such as the 2,000 needed for Gatwick Airport. But beacons aren't the only solution. Existing [Wi-Fi hotspots](#), for example, can be used as a signal for indoor positioning. The downside is they are less accurate, locating the user within a range of [five metres to 15 metres](#) – and the signals can be weak and sometimes disappear altogether. This makes beacons a better technology, given their greater reliability and accuracy indoors.

Another idea is to generate a magnetic field that isn't as easily disrupted as the radio signals used by other technologies and use that for positioning. NASA is [developing a system](#) known as POINTER (Precision Outdoor and Indoor Navigation and Tracking for Emergency Responders) that could track firefighters as they navigate burning buildings. It only works over short distances and requires users to carry special equipment, but it could enable very accurate indoor positioning.

For now, only those venues with a budget the size of Gatwick's will likely be able to come up with the cost of installing the number of beacons needed for indoor mapping. In the longer term, widespread indoor wayfinding is only likely to become cost effective once ways are found to enable GPS signals to be used reliably in indoor spaces and that does not appear likely in the near future. Until then, we'll have to rely on a mix of [beacons](#) and an old-fashioned sense of direction.

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