

FASTER INTO THE PLANE

Boarding a plane always goes too slowly: for the passengers, because they're in a hurry - and for the airlines who are always keen to save on costs. It's a problem that has engineers, psychologists and astrophysicists working to find a solution.

by Hanna Klimpe

It sounds a bit esoteric: "The way people behave when boarding a plane has something in common with the way the universe works," says Eitan Bachmat. "Both formulas have a connection with the theory of relativity." The Israeli computer science professor has been researching a question that has troubled airlines for years: how to get passengers quickly and smoothly from the airline gate to their seat in the plane?

What might seem like a trivial issue has been keeping busy an army of computer scientists, engineers, physicists and psychologists. Bachmat's research results have been confirmed by the calculations of astrophysicist Jason Steffen who has posited that the most orderly way to board passenger planes is by allowing passengers to board randomly. Ironically, human nature is more sensible and effective because some people push and jostle to board before their seats are called, while others wait until the last five minutes before take-off then rush on to the plane.

Examples of boarding strategies

Such complicated calculations are based on the somewhat banal problem that passengers stand around when they board instead of going in a disciplined fashion directly from the gate to their seat. You know how it goes: one person squashes three suitcases and bags in an already overfull luggage compartment, another awkwardly fumbles around with the arm rest, because the seat is too narrow for his stomach. In the meantime, behind them forms a long line of irritated people who would like to take their own place, but must wait until the aisle is free.

"The back-to-front strategy would be optimal if people were as thin as playing cards," says Bachmat. The back-to-front boarding principle works like this: those in the back rows board first, and those in the front last. It might sound sensible, but it works only in theory, as everyone knows. As Bachmat found through his computer projections - the best mathematical solution is for passengers to board in a random fashion.

Such considerations are not just the preoccupation of eccentric hobby scientists. For the airline industry, it is a major cost factor. Boarding delays lead to flight delays - and in Europe alone these cost almost €1 billion per year, according to a study by the air safety organisation Eurocontrol.

From the late 90s, therefore, airlines began to initiate studies into boarding strategies. Thus, in 2002, the engineer Menkes van den Briel and his team developed a number of boarding models: these included "rotating zone-boarding" (alternating passengers between front and back rows) and "block-boarding" (from outside to inside in separate sections), "outside-in boarding," in which all the window passengers board first, then all of those in the middle seats and then finally those in the aisle seats. Another model was "reverse-pyramid boarding" - a hybrid of outside-in and the classic back-to-front.

Relativity and chaos theory

Why such models might work well in practice but are not necessarily used in real life can be seen in the example of America West. In 2003 the airline changed its boarding strategy to the "outside-in" model, immediately reducing delays by 20 percent. However, the airline grew and was taken over by U.S. Airways last year, and changed to a more individualistic strategy, Priority Boarding: where those who paid most were first allowed to board. Obviously the priority was the potential revenue raised by this strategy.

In this country we have always been sceptical about clever boarding strategies. "Try explaining to a family with small children that they should enter separately into the aircraft," says Lufthansa spokesman, Jan Bärwalde. Five years ago, the biggest German airline tested different boarding strategies on 450 different flights. The result: "In practice, back-to-front still works best."

Albert Steiner of the Zurich University of Applied Sciences also sees the problem pragmatically: "The seat strategy does influence the boarding time, but passengers have to understand the process and that they need a certain order." That is why large airlines prefer back-to-front boarding rather than using the random boarding model of low cost airlines - such as EasyJet or GermanWings.

"Even if random boarding is often the faster solution, the stress factor for the passenger is higher," says Steiner. With open seating boarding the passenger arrives earlier, even though it is actually faster to get on - another example of relativity theory. The spokesman for another major airline calls boarding strategies into question as a whole: "As soon as people come into the terminal, they seem to completely lose their mind. They push their way into the plane, no matter what the ground personnel say. It is difficult to work against this kind of herd instinct." As such, is there any chance of boarding a plane quickly and without having to push?

Perhaps the engineer Rob Wallace with his recently patented "Flying Carpet" has found the solution to the problem. His invention uses a kind of carpet on which the seating plan of the aircraft is shown. It functions like a board game: passengers look for their seats on the Flying Carpet and stand with their hand luggage on the appropriate field. When about 30 people have found their place, they will be the first group into the plane. Because the carpet fields are relatively small, no two people can stand directly next to each other on the carpet - if space 8A is occupied by someone, the owner of space 8B must wait a moment until his neighbour has gone aboard, the next group on the carpet can take their place. Thus chaos theory is considered, taking into account the order of the people and the fact that they are not thin like cards. And while the Flying Carpet is still waiting for its first commission, maybe soon we will find an expert to solve another pressing issue of civil aviation: how to avoid annoying queues out of the plane after landing.