Air traffic in Germany
Mobility Report 2017
## The year in figures

### The year 2017

Air traffic in German airspace

<table>
<thead>
<tr>
<th>Size of German airspace</th>
<th>IFR flights</th>
<th>IFR take-offs and landings</th>
<th>Peak day</th>
</tr>
</thead>
<tbody>
<tr>
<td>390,000 square kilometres</td>
<td>3.212 million</td>
<td>2.209 million</td>
<td>10,667 IFR flights</td>
</tr>
</tbody>
</table>

### Safety

**Infringements of separation (en-route)** Per 1 million flight hours (RAT ABC)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>15.23</td>
<td>18.6</td>
</tr>
</tbody>
</table>

**Infringements of separation (terminal)** Also includes runway incursions per 100,000 aircraft movements (RAT ABC)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.37</td>
<td>0.71</td>
<td>0.31</td>
</tr>
</tbody>
</table>

### Punctuality

**ATFM delay en-route** Delay per flight in minutes (ATC-related)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.27</td>
<td>0.22</td>
<td>0.5</td>
</tr>
</tbody>
</table>

**ATFM delay arrival** Delay per flight in minutes (ATC-related)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.09</td>
<td>0.008</td>
<td>0.003</td>
</tr>
</tbody>
</table>

### Environment

**Horizontal flight efficiency** Deviation from the direct route

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.6%</td>
<td>1.18%*</td>
<td></td>
</tr>
</tbody>
</table>

*ca. 3.9 km
2017 – A record year

Every year, the German air navigation service provider DFS and its 5,400 staff ensure that millions of passengers reach their destinations safely and on time. The year 2017 was a record year in German airspace as regards the number of flights. The metrics we use to judge the quality of our services show that it was also a good year for passengers and airlines despite the record volume of traffic we had to manage. The DFS Mobility Report provides you with information on important developments and trends in aviation from Germany, Europe and around the world.
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New record for air traffic in Germany

The year 2017 was the busiest year in German airspace, with more than 3.2 million controlled flights.

In 2017, the number of flights under instrument flight rules (IFR) controlled in German airspace was exactly 3,211,771. This broke the record set in 2008. In 2017, growth accelerated compared with the previous year, with traffic volumes in Germany rising by around 3.3 percent (2016: 2.6 percent). This annual increase was again slightly lower than the EU country average of 3.8 percent for the year. We can see that the record achieved in German airspace was primarily due to the rise in air traffic in neighbouring countries. According to EUROCONTROL data, around 9.6 million flights were controlled in the EU Member States in 2017. About a third of these flights came under the responsibility of DFS and its air traffic controllers. The fact that the traffic growth in Europe was higher than the growth in Germany is reflected in the growing share of overflights. At 38.6 percent, these overflights make up the largest share of the flights controlled in Germany. Entries to and exits from German airspace each made up 25.7 percent of IFR flights. The share of purely domestic traffic declined again. Only 10 percent of the flights took off from and landed on German territory in 2017 (2016: 10.5 percent). In 2017, the number of take-offs and landings at the designated international airports in Germany increased by 1.6 percent. Leipzig Halle Airport had a particularly good year in 2017. The second-largest cargo airport in the country benefitted from the rise in freight traffic. In 2017, 7.3 percent more flights took off from and landed in Leipzig. Nürnberg Airport also experienced a significant rise in flight movements (+7.2 percent).

At the regional airports, the trend reversed a little, following the slump seen in the previous year (2016: -8.4 percent).
With around 310,000 controlled flights, July was the busiest month of 2017. On 23 June, 10,667 IFR flights were recorded in German airspace – more than on any other day of the year.
At the turn of the millennium, overflights made up less than a third of the air traffic volume in German airspace. By 2017, their share had risen to 38.6 percent. During the same period, the percentage of domestic flights almost halved.

According to the German Federal Statistical Office, just under 24 million passengers travelled on domestic flights within Germany in 2017. Berlin – Munich, Berlin – Frankfurt and Hamburg – Munich were the most popular routes.
Air transport sector
At Germany’s designated international airports, 1.6 percent more flights were conducted in 2017. Traffic at the regional airports – which had been declining – rebounded, with the number of take-offs and landings rising by 2.8 percent. This table is based on all take-offs and landings under instrument flight rules (IFR). Domestic flights count as two aircraft movements – one take-off and one landing.

* Altenburg and Zweibrücken are no longer classified as regional airports (since 2015).

** Until further notice, flight operations at Magdeburg Cochstedt Airport have been discontinued (since September 2016).
These airports experienced around 2.8 percent more take-offs and landings over the previous year. While the busiest regional airport (Frankfurt Hahn) basically stagnated (+0.1 percent), Dortmund Airport, the second busiest regional airport, recorded above-average growth. Higher frequencies on some routes and new connections to Eastern Europe and North Africa led to a rise in traffic of 5.0 percent in Dortmund. The growth at Memmingen Airport was especially high. This airport in the far south of Germany saw traffic advance by 10.8 percent. Ryanair stationed a new aircraft there in 2017, which opened up new destinations.

Summer time is holiday time and holiday time is travel time – this truth remained unchanged in 2017. With around 310,000 controlled flights, July was the busiest month of the year. The busiest day also fell in a typical holiday month. On 23 June, exactly 10,677 flights were controlled. This number only includes IFR flights.

According to EUROCONTROL forecasts, the rise in traffic will continue in 2018. EUROCONTROL expects 2.7 percent more flight movements in Germany, totalling 3.4 million controlled flights. It expects growth to slacken off in the subsequent years, forecasting an average growth rate of 1.9 percent per year until 2024. This would put Germany slightly below the average for the EU States, which are forecast to see a rise of 2.1 percent.

Eurocontrol recalculates its air traffic forecast twice a year with three scenarios. These include a conservative, an optimistic and a third scenario somewhere between the two extremes. This middle scenario is shown in the visual. In this scenario, the number of flights in German airspace will rise by around half a million until 2024.
After the terror: How the travel behaviour of German tourists has changed.

Egypt is recovering from the collapse in numbers seen in 2016, while Turkey continues to lose visitors and Spain keeps its top ranking as the favourite holiday destination of the Germans.

The year 2016 saw a change in travel behaviour as tourists reacted to terror threats by avoiding Egypt and Turkey. The number of flights to both countries from Germany declined. This decline has been arrested for Egypt. In 2017, passenger numbers there rose by almost two thirds. Flights to Turkey, however, continued their downward trend, experiencing a decrease of 4.7 percent. This decrease slackened off considerably compared with the decline seen the year before, when the number of flights sank by a fifth. Turkey remains in fifth place in the ranking of top destinations, while Egypt has re-entered the top 20.

Greece (+17.7 percent) and Portugal (+14.6 percent) experienced significant increases. These countries are considered as alternatives to Spain, which itself remains the clear favourite as the top holiday destination of the Germans. More than 14 million passengers boarded flights from Germany to either the Spanish mainland, the Balearic Islands or the Canary Islands in 2017. This represents a further increase of 3.6 percent over the previous year. Italy, which ranks second, saw only half as many passengers. The United Kingdom and the United States follow close behind.

Top 20 destinations

While the number of travellers to Turkey declined, other countries, particularly Spain, benefitted. In 2017, around 14.4 million people flew to the Spanish mainland, the Balearic Islands or the Canary Islands. Greece recorded even higher growth.
The changes in travel flows are reflected in the traffic seen in other EU States. According to EUROCONTROL, traffic to Mediterranean countries rose at above-average rates in 2017: Cyprus (+11.6 percent), Portugal (+9.5 percent), Croatia (+8.7 percent) and Greece (+6.5 percent). Eastern Europe also recorded a higher volume of traffic. Slovenia (+9.3 percent), Latvia (+8.9 percent), Romania (+8.5 percent) and Estonia (+7.5 percent) saw significantly more take-offs and landings in 2017 over 2016.
Europe’s busiest airports are located in and around London. The airports of Heathrow, Gatwick, Stansted, Luton and City see an annual average of just under 1,600 take-offs per day. These figures only consider flights under instrument flight rules. The statistics include airports located up to 50 kilometres from the city centre with at least one aircraft movement per day.
Passengers and freight

Statistically speaking, half of the global population travelled by aeroplane in 2017. The International Air Transport Association (IATA) reported that the number of airline passengers rose to around 4.1 billion, breaking the record high of 2016 (3.8 billion passengers). The number of passenger kilometres went up correspondingly (number of passengers multiplied by kilometres flown). This figure rose by 7.6 percent over the previous year according to IATA.

A new record high in passenger numbers was also seen in Germany. According to the German Federal Statistical Office, around 213 million passengers used German airports in 2017, a rise of 5.7 percent over 2016. As in previous years, the rise in the number of passengers was stronger than the rise in the number of flights. This underlines that airlines are keeping a close eye on the profitability of their routes and are trying to use their capacity as efficiently as possible. Load factors went up correspondingly. They reached a record level according to the German Federal Statistical Office, rising to 77.6 percent in 2017. This is 0.9 percentage points more than in the record year of 2015.

This growth in traffic means that the busy skies above Europe’s metropolitan areas continued to get busier. The London metropolitan area has the busiest airspace. The airports serving London have an average 1,597 departures per day,
putting them in first place in Europe. Then come the Paris airports with an average of 1,053. Third place is taken by the two Istanbul airports (911 departures per day). Frankfurt Airport remains behind Amsterdam in fifth place.

**Load factor**

The extent to which seats are filled in the aircraft departing from and arriving at German airports has continued to increase. In 2017, 77.6 percent of all seats were occupied according to the German Federal Statistical Office.

**Destinations with the best load factor**

Flights to the tourist centres in Egypt, on the Canary Islands and Rome recorded the highest load factors in 2017. Overall, the load factor for flights abroad rose to 79.2 percent. These figures reflect flight destinations with over 1,000 flights per year.
Economic boom above the clouds: Air freight

Growth rates for freight more than doubled last year – a positive sign for the economy.

Around 60 million tonnes of freight were transported through the skies worldwide in 2017. According to IATA, nine percent more freight tonne kilometres were registered worldwide in 2017 compared with the previous year. The rise in freight was twice as high as in 2016 (+3.8 percent). This was the strongest growth in freight traffic since 2010.

In Europe, freight tonne kilometres rose by 11.8 percent. This shows that there was a recovery from the below-average growth seen in the region in 2016. Growth in the two largest freight markets, North America (+7.8 percent) and Asia Pacific (+7.9 percent), remained slightly below average. The largest percentage growth (more than 25 percent) was recorded in Africa.

In 2017, 4.9 million tonnes of freight and post were handled at airports in Germany according to the German Federal Statistical Office. This is 6.2 percent more than in the previous year.

The volume of air freight in 2017 increased significantly in a year-on-year comparison. With a rise of nine percent, freight tonne kilometres – the volume of freight transported multiplied by the kilometres flown – grew more than twice as strong as in the previous year. Passenger volumes continued to grow at above-average rates, as was the case in the year before, with an increase of 7.6 percent.
More than 475,000 flights, just under 65 million passengers and 2.23 million tonnes of freight were handled at Frankfurt Airport, the largest airport where the DFS Group operates. Through its British subsidiary, the DFS Group is responsible for providing air traffic control at London Gatwick. Edinburgh Airport in Scotland followed in 2018.
Many people have an irrational relationship with flying. Only every third person feels at ease on board an aeroplane according to surveys. Two thirds feel a greater or lesser sense of unease. This feeling is completely misplaced. The figures from 2017 released by IATA again show that flying is an especially safe form of travel.

According to IATA, just under 42 million flights were conducted worldwide in 2017 – carrying more than four billion people. This corresponds to more than half the world's population. Around the world, IATA registered 45 air accidents with 19 deaths. The relationship between the numbers makes one thing clear: the probability of such an accident is minimal.

Safe and sound around the world: Air traffic safety statistics

Whoever boards an aeroplane can lean back and relax. According to IATA, the high level of aviation safety improved again.
This is also demonstrated by the global accident rate released by IATA each year. This figure shows how many major accidents occur for every one million flights. According to IATA, a major accident means that the aircraft was damaged so badly that it is not worth repairing. For jet aircraft, the average accident rate worldwide declined to 0.11 in 2017. This is equivalent to only one major accident for every nine million flights. Compared with the five-year rate, this was a clear improvement. Between 2012 and 2016, this average accident rate was 0.33 according to IATA.

Nevertheless, the same level of safety is not encountered all over the world. The lowest accident rates are for airlines from Asia, Europe and North America according to IATA. Based on the five-year rate, the highest rates are experienced in Africa.
Keeping your distance in the air: Safety in German airspace

The safety level in German airspace remained as high as ever, even as the volume of traffic reached a record high. This is not only due to the hard work of air traffic control, the airlines and airports also play a vital part.

DFS has one special core task to perform to guarantee the safety of air traffic. It has to ensure sufficient distance, or separation, between aircraft in the air, and on the ground. Due to the high speeds flown, for safety reasons these distances are intentionally set high. In the air, the vertical separation is at least 1,000 feet (300 m) and the horizontal separation is three to five nautical miles (5.9 to 9.3 km) depending on the size of aircraft and phase of flight.

Any deviation from the prescribed separation minima is registered as an infringement of separation and is investigated. All infringements of separation are analysed and evaluated by the company’s safety management division. There are four categories depending on the severity. They act as a type of early warning system for DFS. By thoroughly examining each individual deviation, potential risks become visible before they can have a negative impact on the safety of air traffic and DFS can take countermeasures.

168 TIMES
This is the number of infringements of separation in 2017 where DFS played a contributing role. Of these, only 31 were safety-related.
An infringement of separation occurs when the distance between two aircraft is less than prescribed. In 2017, 215 infringements of separation were documented in German airspace – DFS was involved in 168 of these. The Risk Analysis Tool (RAT) showed that the majority were not safety-related.

In its publications, DFS uses a method to evaluate infringements of separation that is applied uniformly across Europe. It is called the Risk Analysis Tool (RAT). This tool was introduced to harmonise safety classifications so that the safety levels of countries across Europe could be more accurately compared with each other. While DFS used to have a three-level system of severity, the RAT tool uses a four-level system. It differentiates between the categories: serious, major, significant and no safety effect. DFS has been using this new classification system since 2015. This means that the values prior to this new system are not comparable.

In 2017, 215 infringements of separation were recorded in German airspace for 3.2 million aircraft movements (2016: 174). DFS was a contributing factor in 168 of these (2016: 137). However, only a small percentage of these had an appreciable effect on safety. Of these 168 cases, 137 had no influence on safety at all. Twenty-five occurrences were classified as significant; four were categorised as major and two as serious. The number of infringements of separation in the top three severity levels remained more or less unchanged compared with the previous year (2016: two serious, eight major, twenty-one significant). This is an excellent level of performance given the continued rise in traffic volume.
Keeping your distance on the ground: Safety at airports

DFS not only ensures safety in the skies above Germany. At the 16 international airports in Germany, DFS air traffic controllers also monitor all aircraft under their control while taxiing, taking off and landing.

Aircraft on the ground also need to keep their distance from each other to be safe. For this purpose, tower controllers monitor compliance with minimum distances that apply on the ground. Similar to infringements of separation in the air, it is the controllers’ job to make sure these distances are maintained at all times.

Whenever an aircraft takes off or lands, a protected area is activated in which no other aircraft, vehicle or person is allowed to enter. If this does happen, this is called a runway incursion.

80 PERCENT of all runway incursions involved the cockpit crew as a contributing factor.
As with infringements of separation, DFS records and analyses all runway incursions thoroughly regardless of whether the runway incursion actually posed a threat to safety or not. The new Risk Analysis Tool (RAT) in use across Europe is also used for this purpose. In 2017, 101 runway incursions were recorded out of around two million take-offs and landings at Germany’s designated international airports (2016: 115).

In more than 70 of these cases, the cockpit crew contributed to the runway incursion. Air traffic control was a contributing factor in only eight cases. Four of these were classified as safety-related. One was classified as significant and three as major. Not even one incident was categorised as serious. This means that safety on the ground improved compared with the previous year. Not only did the number of runway incursions overall decline. The number of incidents in the top three severity categories also went down compared with 2016.

Runway Incursions

On the ground, too, minimum distances need to be maintained: In the protected area of a surface designated for the take-off and landing of aircraft, the presence of other aircraft, vehicles or people is not allowed. If this does happen, this is called a runway incursion. Every runway incursion is recorded and analysed.

Of the 101 runway incursions that occurred at German airports in 2017, only eight involved DFS. The Risk Analysis Tool determined that three of these had to be categorised in the second highest severity category. There were no incidents in the highest category in 2017.
Rivals in the air: More safety for drone flights

More and more drones are filling the skies above Germany. These unmanned aerial vehicles are opening up new avenues of business across the whole economy – but they are posing a challenge for the safety of air traffic.

The exact number of drones in Germany is unknown. After all, there is no mandatory registration. Based on current sales volumes and industry reports, the number will soon reach the one-million mark. In 2017 alone, DFS estimates that between 350,000 and 400,000 new drones entered circulation.

Every new drone increases the risk of collision between these small aircraft and manned aircraft. Last year, DFS recorded 88 cases
when civil air traffic was impeded by drones. This is about a third more than in the previous year (2016: 64 reports). This rise is, however, considerably lower than the rates of growth experienced in the past.

In 2017, DFS, together with the Belgian software company Unifly, developed an app to safely integrate these new airspace users into the skies above Germany. The app, which was launched in July 2017, shows amateur drone pilots where and when they are allowed to fly. It also informs users of the new regulations that were introduced in spring 2017 that need to be complied with by drone pilots in Germany. The app can be downloaded to smartphones from the Apple App Store and the Google Play Store.

DFS has been working with partners since 2016 to locate and monitor drones using the mobile phone network. Unmanned aerial vehicles could then be operated beyond the remote pilot’s line of sight. In addition, together with the German Federal Ministry of Transport, DFS has put together a comprehensive package of information for drone pilots on its website.

www.safe-droneflight.de
(This site is also available in English.)

**Civil aircraft impeded by drones**

![Graph showing reported cases of civil aircraft impeded by drones from January to December 2017.](image)

An increasing number of drones goes hand in hand with an increasing number of cases in which unmanned aircraft systems come too close to regular air traffic. In 2017, DFS registered 88 such cases, which represents a clear levelling off of the rise seen in previous years.
The aviation system is complex – a complicated machine with many cogs that need to fit smoothly together. It only takes a late connecting flight, a shortage of gates or a thunderstorm to cause the system to snag. No other mode of transport is so dependent on the weather, for instance. Given all these factors, it is almost surprising that such a large number of flights reach their destinations on time. In 2017, around 80 percent of all flights in Europe arrived at their destinations without any major delay. A third of flights actually arrived ahead of time. Only one in six flights was more than 15 minutes late. It is mostly the knock-on effects of prior delays that are the problem. These delays are often caused by the wait for passengers, baggage or new crew. An evaluation by the Central Office for Delay Analysis (CODA), a EUROCONTROL division, came to the conclusion that this reason lay behind half of all delays. CODA based this analysis on pilot reports. Their results show that every second delay is attributable to the airlines.
The average delay time caused by air traffic flow management (ATFM) was nearly 53 seconds per flight in German airspace. Only about half a minute of the delay was caused by air traffic control in 2017. The figure shows the punctuality in Europe’s ten countries with the highest traffic volumes.

The percentage of delayed flights in German airspace is very small. In 2017, only 5.8 percent of flights were affected by air traffic flow management (ATFM) measures, for example due to bad weather, capacity bottlenecks at airports or high traffic volumes.
Punctuality declined slightly in European airspace compared with the previous year. The average arrival delay in 2017 was 11.6 minutes (2016: 11 minutes). Bad weather and industrial action were the prime causes according to CODA. In addition, the aviation system is so tightly scheduled that it can be almost impossible to make up for delays once they sneak into the system. These then have a snowball effect on later flights.

The percentage of flights that were subject to air traffic flow management (ATFM) – due to factors such as capacity bottlenecks – increased as well. The average ATFM delay in German airspace in 2017 stood at just under 53 seconds. This is a very small proportion of the overall delay.

**Punctuality in Europe**

<table>
<thead>
<tr>
<th>Share in %</th>
<th>Departures</th>
<th>Arrivals</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than 15 minutes ahead of schedule</td>
<td>46</td>
<td>40</td>
</tr>
<tr>
<td>5 to 15 minutes ahead of schedule</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>On time</td>
<td>35</td>
<td>30</td>
</tr>
<tr>
<td>5 to 15 minutes late</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>More than 15 minutes late</td>
<td>9</td>
<td>5</td>
</tr>
</tbody>
</table>

Every sixth aircraft in Europe takes off with more than 15 minutes of delay, for example due to ground handling delays or bad weather. By contrast, every third aircraft actually arrives earlier than scheduled.
Causes of delays – departures

Europe
- Airlines: 46%
- Airports: 20%
- Weather: 9%
- Security: 14%
- Other: 5%

Germany (international)
- Airlines: 46%
- Airports: 16%
- Weather: 7%
- Security: 7%
- Other: 15%

Germany (domestic)
- Airlines: 50%
- Airports: 15%
- Weather: 7%
- Security: 9%
- Other: 11%

Source: EUROCONTROL/ECAC

<table>
<thead>
<tr>
<th>Airport</th>
<th>Airlines</th>
<th>Airports</th>
<th>Weather</th>
<th>Air navigation service providers</th>
<th>Security</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paris Charles-de-Gaulle</td>
<td>62%</td>
<td>11%</td>
<td>3%</td>
<td>9%</td>
<td>12%</td>
<td>3%</td>
</tr>
<tr>
<td>Madrid Barajas</td>
<td>47%</td>
<td>22%</td>
<td>6%</td>
<td>14%</td>
<td>8%</td>
<td>4%</td>
</tr>
<tr>
<td>London Heathrow</td>
<td>63%</td>
<td>18%</td>
<td>6%</td>
<td>5%</td>
<td>5%</td>
<td>4%</td>
</tr>
<tr>
<td>Amsterdam</td>
<td>44%</td>
<td>33%</td>
<td>6%</td>
<td>11%</td>
<td>2%</td>
<td>5%</td>
</tr>
<tr>
<td>Frankfurt</td>
<td>40%</td>
<td>24%</td>
<td>11%</td>
<td>9%</td>
<td>9%</td>
<td>7%</td>
</tr>
<tr>
<td>Munich</td>
<td>54%</td>
<td>8%</td>
<td>12%</td>
<td>9%</td>
<td>10%</td>
<td>7%</td>
</tr>
</tbody>
</table>
DFS air traffic controllers guide the aircraft under their control to their destinations safely and punctually. They select the most direct route feasible to be as environmentally friendly as possible. This poses a difficult challenge in an airspace as busy as the one above Germany. With more than three million flight movements per year and up to 10,000 flights per day, it is simply impossible for every flight to reach its destination without deviating slightly from the shortest route. Evaluations, however, show that DFS comes very close to providing the optimum flight path. The average route flown by aircraft in German airspace in 2017 was just 1.18 percent longer than the most direct route. This corresponds to a deviation of only 3.9 kilometres per flight. The immediate vicinity of airports has been left out of this assessment as, due to noise abatement, the shortest possible route can often not be used there.
DFS developed arrival profiles that are optimised vertically as a further measure to benefit the environment. In a joint effort with European partners and airlines, more than 30 approach procedures have been improved in this way at numerous airports. These include Basel, Berlin Tegel, Frankfurt, Geneva, Munich, Stuttgart, Strasbourg, Vienna and Zurich. By using improved procedures, aircraft remain at higher altitudes for longer. Optimal descent profiles have been designed for each aircraft type, allowing these aircraft to approach the airport with the lowest possible level of engine power.

There are other ways to reduce the noise level. DFS has introduced continuous descent operations (CDO) at all large airports where it operates. In contrast to conventional approach procedures, which contain phases in which the aircraft levels off, an aircraft using CDO glides at the same rate of descent until it lands. This uses less engine power, which reduces noise and lowers fuel consumption. CDO can only be used if certain conditions are met, however. The traffic volume has to be low, for instance.

DFS is always on the lookout for new ways to lessen the noise impact of flight operations for local residents. For example, a ground-based augmentation system (GBAS) has been installed at Frankfurt Airport. This enables satellite-based approaches at a steeper angle, reducing the noise for people who live below the approach paths. Aircraft, however, need to be equipped to use GBAS. Unfortunately, this is only the case for a small number of aircraft so far.

DFS is also putting its support behind a new website from the German Aviation Association (BDL). Online for only a few months, this website provides information on the strategies and measures in place to reduce emissions in aviation. Numerous projects at DFS can also be found, illustrated with up-to-date data and graphics.

En-route flight efficiency

The air traffic controllers at DFS guide the aircraft under their control to their destinations safely, punctually and by selecting the most direct route possible. The deviation between the route assigned and the most direct route amounted to only 1.18 percent in 2017, which corresponds to a detour of less than four kilometres.