Aviation Safety Information Leaflet (ASIL)
AIRSPACE INFRINGEMENTS
Analysis of the pilot questionnaires - Edition 2018-2019
Update of the Belgian Airspace Infringement Reduction Plan (B/AIRP)

ASIL nr. 01/2020
The Belgian Civil Aviation Authority (BCAA), skeyes and the Belgian Air Force, have joined forces, in order to reduce the number of Airspace Infringements in Belgian airspace. The approach to this problem is one of documenting the occurrences, drawing conclusions, implementing improvements and stimulating awareness and training on the matter rather than blaming and punishing.

In the frame of this approach, pilots are reminded that they should report these kind of occurrences to the BCAA in accordance with Regulation (EU) 376/2014 on the reporting, analysis and follow-up of occurrences in civil aviation. The reporting of these occurrences can be done via the European reporting portal (http://www.aviationreporting.eu/).

To get more details on the infringements occurring in the Belgian FIR, the BCAA sends a questionnaire to each aircraft owner or pilot involved in an infringement. The answers are grouped and analyzed to get a better understanding of the causes and contributing factors of Airspace Infringements in Belgium. To raise the awareness and to demonstrate the usefulness of good reporting, this summary of the results is made public and shared with all stakeholders.

In the following pages you can find the graphs resulting from the analysis of the occurrence reports and the answers provided by pilots, instructors, examiners, ... via the questionnaires. For this analysis, available data from January 2018 to December 2019 was used. For this period 135 pilot replies have been received and analyzed. About 48% of the pilots of identified aircraft completed the airspace infringement questionnaire during the period 2018/2019. The BCAA would like to emphasize that the sole aim of this analysis is the prevention of future accidents and incidents, and not the determination of violations or responsibilities. This information shall not be used for purposes other than maintaining or improving aviation safety.

Following analysis results can be found in this document:

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Interpretation:
The chart here below displays the cumulative number of reported airspace infringements in the period 2015-2019 in which ATC was not directly involved. During the course of 2018, especially as of May 2018, there was a noticeable decrease in the number of airspace infringements. This decrease is most probably correlated with the broad BCAA and EASA safety promotion campaign on the prevention of airspace infringements that year. Unfortunately, in 2019, no momentum of that improvement was observed. On the contrary, 2019 ended up with the second highest number of airspace infringements in one year.

Cum. number of infringements - ECCAIRS

High level figures

<table>
<thead>
<tr>
<th>Year</th>
<th>Total airspace infringements</th>
<th>Comparison with previous year</th>
<th>Completed questionnaires received</th>
<th>Pilot’s response rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>151</td>
<td>N/A</td>
<td>80</td>
<td>47%</td>
</tr>
<tr>
<td>2016</td>
<td>145</td>
<td>-4%</td>
<td>63</td>
<td>50%</td>
</tr>
<tr>
<td>2017</td>
<td>169</td>
<td>+17%</td>
<td>72</td>
<td>47%</td>
</tr>
<tr>
<td>2018</td>
<td>127</td>
<td>-25%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td>154</td>
<td>+21%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Interpretation:
A large number of infringements are conducted in the airspace surrounding Brussels, Kleine Brogel and Ostend. The complex airspace around Brussels is definitely a hotspot that deserves extra attention from both pilots and authorities. The large amount of infringements in Kleine Brogel are most probably due to amount of recreational airfield and complexity of airspace in the vicinity of that military air base. Also a relatively large number of infringements are conducted in the airspace of Charleroi and Liège. There is also a relatively high number of airspace infringements (~16%) in the other military airspaces (Florennes, Beauvechain, Koksijde).

One out of three departure aerodromes is located in a neighbouring country. The same comment is valid for destination aerodromes. This important contribution to the number of infringements caused by aircraft departing from or arriving at foreign aerodromes was already observed in the past. Although the percentage of infringements caused by aircraft departing from or arriving at French aerodromes decreased significantly compared to the 2017 results.

2018 & 2019 - Location of the infringement (airspace)
*“Other” combines aerodromes with less than 2,50% each.
Interpretation:
The distribution of airspace infringements over the year reflects the higher rate during the beginning of the summer. Periods with nice weather can clearly be distinguished. These graphs show the importance of a good flight preparation at the beginning of the ‘summer’ season.
Interpretation:
This matrix shows the relation between the causes as indicated by the pilots. In the questionnaire, the pilot is free to indicate as many factors as wanted.

For example: a pilot could indicate ‘distraction’ & ‘navigation error’. But he can also indicate a combination of ‘distraction’ and ‘navigation error’.

Numbers with a very low statistical significance are not displayed.

Remark: several pilots trust on Brussels/Belga information to warn them of the airspace ahead, or think Brussels/Belga will coordinate with ATC. Pilots must be aware that the ATS-service they may expect depends on the combination of the classification of the airspace they are operating in, the VFR/IFR status of the flight and thus the type of service (ToS) provided by ATS. Pilots must be aware of the ToS they are provided with and what the associated responsibilities are.

aircraft receiving a joining clearance from EBBR APP to join the TMA at a certain altitude and forgetting that, to join the EBBR TMA, this aircraft will have to cross first another airspace (e.g. mil TMA) and not asking clearance for that.
5. EXPERIENCE OF THE PILOTS INVOLVED

Interpretation:
The plots on this page show the distribution of experience of the pilots involved in airspace infringements. The total flying experience is shown against the average flying hours per year, as reported by the pilot.
For practical reasons the graphs don’t show the pilots with experience above 5000h nor more than 500 flight hours per year. Most airspace infringements are caused by pilots with a low number of total flight hours and with a limited average of annual flight time, although infringements are committed by pilots over the complete range of experience.

Note: «Total cumulative percentage» is the percentage of outcomes inside a rectangle formed by total flight hours and average flight time (see corresponding colour) in comparison with the total number of outcomes.

<table>
<thead>
<tr>
<th>Total flight hours</th>
<th>Avg. Flight time/year</th>
<th>TOTAL CUM. PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours</td>
<td>Cum. Percentage</td>
<td>Hours</td>
</tr>
<tr>
<td>&lt;3000</td>
<td>71,85%</td>
<td>&lt;200</td>
</tr>
<tr>
<td>&lt;2000</td>
<td>67,41%</td>
<td>&lt;150</td>
</tr>
<tr>
<td>&lt;1000</td>
<td>54,07%</td>
<td>&lt;100</td>
</tr>
<tr>
<td>&lt;500</td>
<td>35,56%</td>
<td>&lt;50</td>
</tr>
</tbody>
</table>

Graph only shows Total hours up to 5000h
Graph only shows Total hours up to 1500h.

Zoom on:
Experience of the pilots involved

Graph is limited to 150h/year.
Interpretation:
These graphs show the pilot experience in relation to the causes of the infringement. Only the most frequent causes are displayed. The vertical line indicates the average experience of all the pilots that were involved in an infringement regardless of the cause, while the rows show the average for all pilots that indicated that specific cause. Less experienced pilots commit infringements due to their unfamiliarity of the airspace and the insufficient preparation of the flight. This latter raises concerns as one may expect a thorough flight preparation given their relatively low level of experience. More experienced pilots encounter navigation errors and distractions, usually due to heavy workload in the cockpit. Meteorology (deteriorating weather, reduced visibility, etc.) is a contributing factor for all pilots.

2018 & 2019 - Avg. total flight hours of pilot involved vs Infringement cause

- Insufficient preparation of the flight
- Meteorology (deteriorating weather, reduced visibility, etc.)
- Unfamiliarity with the airspace/area/country
- Wrong interpretation of the airspace / map / environment
- Navigation error by pilot / navigator
- Distraction, work load in the cockpit, late observation of the airspace

avg. total flight hours for all infringements: 3292

2018 & 2019 - Avg. flight hours / year of pilot involved vs Infringement cause

- Insufficient preparation of the flight
- Meteorology (deteriorating weather, reduced visibility, etc.)
- Unfamiliarity with the airspace/area/country
- Wrong interpretation of the airspace / map / environment
- Navigation error by pilot / navigator
- Distraction, work load in the cockpit, late observation of the airspace

avg. flight hours/year for all infringements: 146
7. RELATION BETWEEN PILOT LICENSE AND CAUSE/CONTRIBUTING FACTOR

Interpretation:
The top row shows the distribution of the (highest) license of the pilot involved in the infringement. Around 48% of the pilots involved have a PPL license. 32% have a commercial pilot or ATPL license. Around 10% of the infringements can be attributed to pilots having an ULM license. Lastly, 4% of the infringements are committed by trainees.
The other rows show the distribution for all infringements where the pilot indicated that specific cause. It can be seen that PPL pilots are relatively more represented when it comes to unfamiliarity with the airspace, an insufficient flight preparation, and a wrong interpretation of the airspace. On the other hand, when it comes to distraction and navigation errors, we notice that these occurrences are relatively more reported by CPL pilots or higher.
Note: Total distribution equals 94%. For the remaining 6%, the type of license is unknown and therefore not displayed on the chart.

2018 & 2019 - Distribution of type of license
Interpretation:
This page shows the usage of different navigational equipment at the time of an infringement. As can be seen in the first graph, over 30% of the pilots state they were using GPS as their main navigation tool, 34% used a map for this purpose. Tablet/smartphone applications, also known as Electronical Flight Bag (EFB), were also used in 21% of the infringements.

The second image illustrates the portion of pilots that were using these tools, but still made navigation errors. 56% were using a low level map as primary means of navigation. Notice that more than 46% of the pilots were using GPS but still made navigation errors. Pilots should be aware that if they use these tools, they should know how to use them and make sure to use the latest updates of charts and maps! Also, especially when using static charts: do not rely on the maps only. A good flight preparation remains key and includes i.a. the study of NOTAMs and the knowledge of activation times of certain airspace volumes!
9. CONCLUSION

- A large number of infringements are conducted in the airspace surrounding Brussels, Ostend and Charleroi. There are also a large number of infringements in military airspace mainly in the airspace of Kleine Brogel.

- An important contribution to the number of airspace infringements (one third) can be seen by aircraft departing from or arriving at foreign airports (mainly French and Dutch airports).

- Unfamiliarity with the airspace, insufficient preparation of the flight and distraction are key factors in making airspace infringements. Followed by the wrong interpretation of the airspace and meteorology.

- Almost 50% of the pilots were using a GPS but still made navigation errors. Pilots should be aware that if they want to use these navigation tools, they should know how to use them and that a good flight preparation remains aviation safety key!
10. MORE INFORMATION ON HOW TO AVOID AIRSPACE INFRINGEMENTS

BCAA website:
https://mobilit.belgium.be/fr/transport_aerien/programme_belge_de_securite/violations_de_lespace_aerien

https://mobilit.belgium.be/nl/luchtvaart/belgisch_veiligheidsprogramma/schendingen_van_het_luchtruim


EASA website:
https://www.easa.europa.eu/airspace-infringement

These websites provide links to the videos of EASA, Belgium and other European countries. These videos suggest useful tips that will help to reduce the risk of airspace infringement and mid-air collisions. It is recommended to start with those videos corresponding to the countries where the pilot wants to fly or cross. BCAAs website also contains all other materials on avoiding infringements (leaflet, infographic, banner...) developed by EASA as a part of a Europe-wide safety promotion campaign on the prevention of airspace infringement.

EASA and BCAA encourage to use these videos and documents in the briefing rooms of the flight clubs, flying schools, etc... to help others.

EUROCONTROL Top ten tips for GA pilots:
https://www.skybrary.aero/bookshelf/books/133.pdf