

Aviation Safety Information Leaflet (ASIL) AIRSPACE INFRINGEMENTS Analysis of the pilot questionnaires V.1.3



Update of the Belgian Airspace Infringement Reduction Plan (B/AIRP)

Introduction

The Belgian CAA, Belgocontrol and the Belgian Air Force, have joined forces, in order to reduce the number of Airspace Infringements. The approach to this problem is one of documenting the incidents, drawing conclusions, implementing improvements and stimulating awareness and training on the matter instead of blaming and punishing.

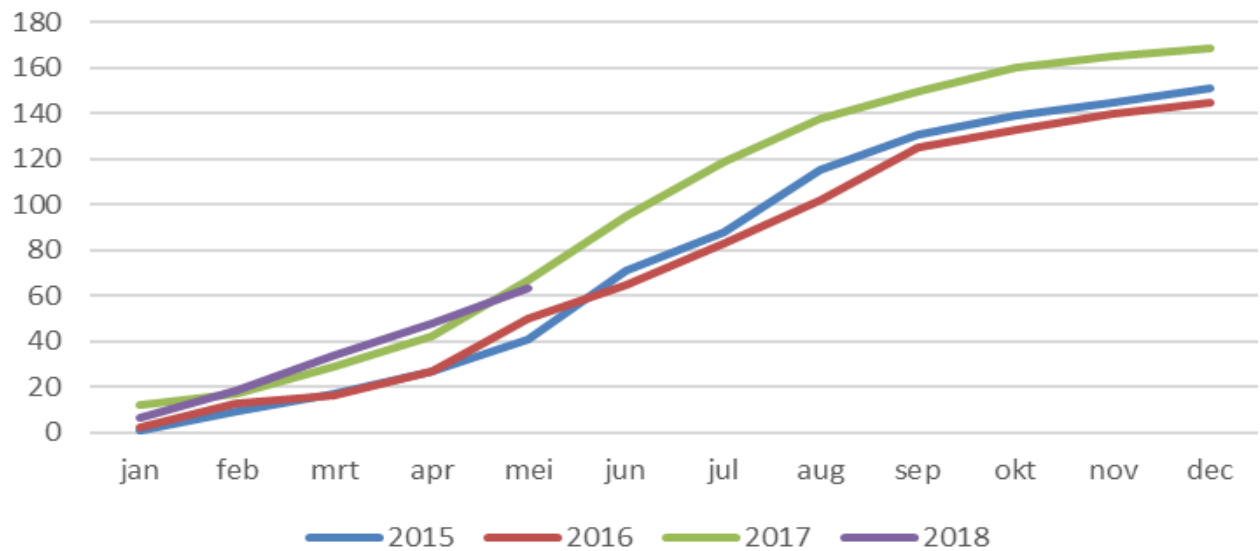
To get more details on the infringements occurring in the Belgian FIR, a questionnaire has been sent to each aircraft owner or pilot involved in an infringement. The answers from the pilots are grouped and analyzed to get a better understanding of the causes and contributing factors of Airspace Infringements 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,... in the questionnaire. For this analysis, available data from January 2017 to December 2017 was used. For this period 75 pilot replies have been received and analyzed. About 55% of the pilots of identified aircraft has filled out the airspace infringement questionnaire. The Belgian CAA would like to emphasize that the sole aim of this analysis is the prevention of future accident and incidents, and not the determination of violations or responsibilities. The information shall not be used for purposes other than maintaining or improving aviation safety.

The following results can be found back in this document:

1. Evolution of infringement reports Page 2
2. Location (CTR, TMA) of the infringement, departure and destination airport of the aircraft involved Page 3
3. Distribution over time of the infringements (where information available): month of the year, day of the week, hour of the day Page 4
4. Causes and the relation between causes/contributing factors, as indicated by the pilot Page 5
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8. Usage of navigation tools during infringements and during infringements involving a navigation error Page 9
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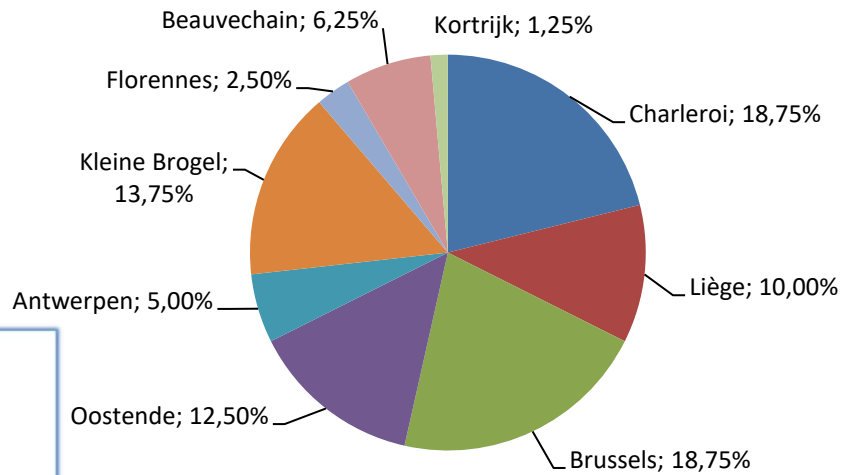
Cum. number of infringements - ECCAIRS



Interpretation:

The number of infringements and evolution was constant the last years. However, there was a small increase in the number of infringements for 2017 despite the publication and communication of Belgian CAA safety promotion material like aviation safety information leaflets on the prevention of airspace infringements.

2017 - Location of the infringement (airspace)

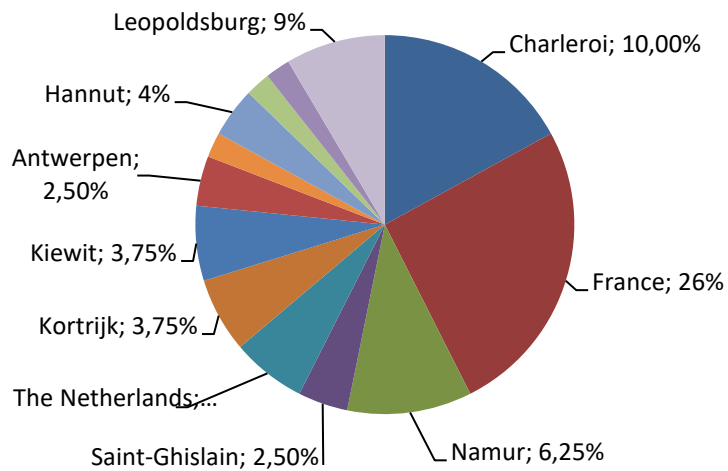


Interpretation:

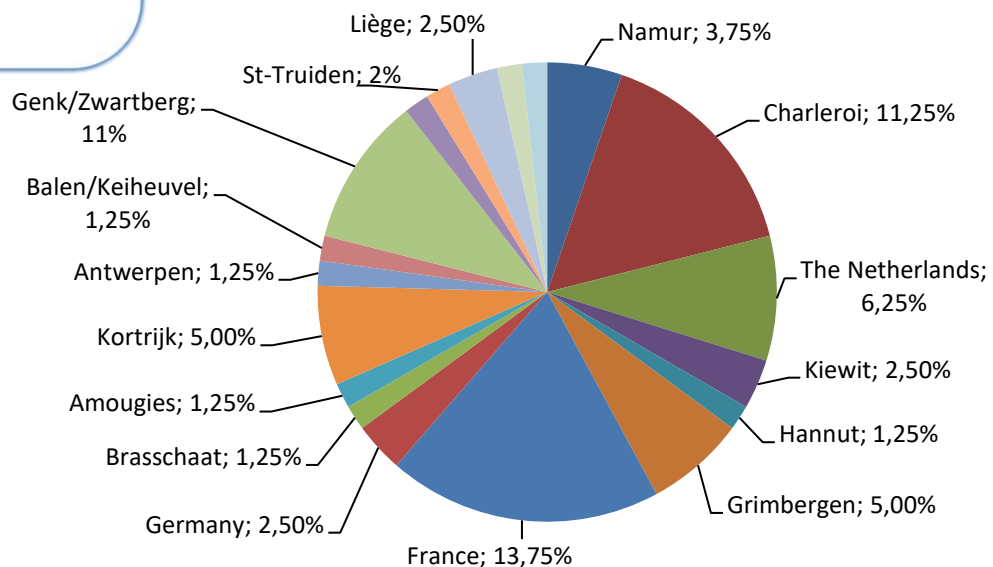
A large number of infringements are conducted in the airspace surrounding Charleroi and Brussels. The complex airspace around these airports is definitely a hotspot that deserves extra attention from both pilots and authorities. Also a relatively large number of infringements are conducted in the airspace of Ostend. There are also a relatively large number of infringements in military airspace (Kleine Brogel, Beauvechain...).

The higher number of departures from Charleroi and Namur remains consistent with the observation of relatively more incidents in the respective airspaces. However, a clear increased contribution to the number of infringements can be seen by aircraft departing from or arriving at foreign airports, mainly French airports and to a lesser extent Dutch airports.

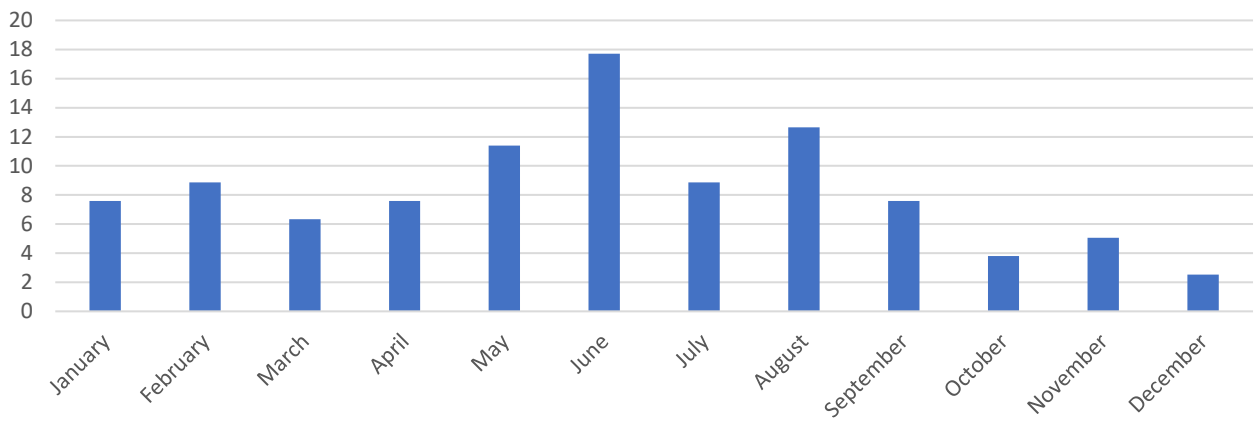
2017 - Departure airport



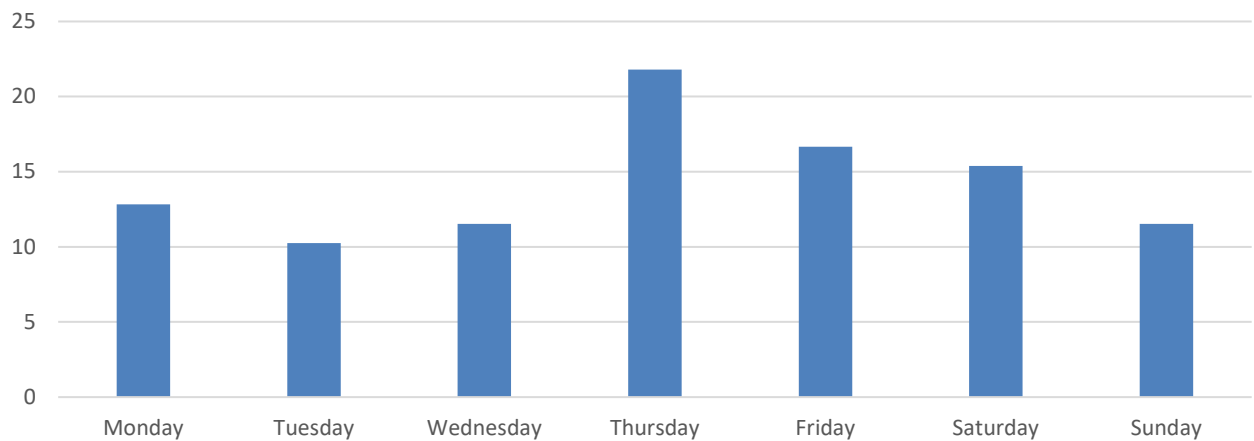
2017 - Destination airport



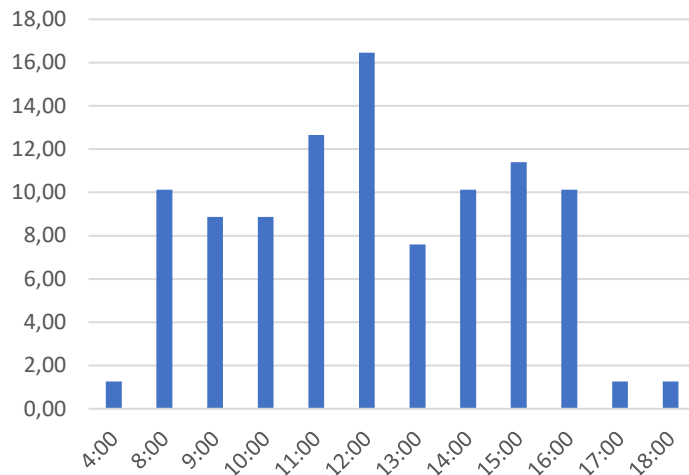
2017 - Distribution months of the year in %



2017 - Distribution days of the week in %



2017 - Distribution time of the day in %



Interpretation:

The distribution over the year clearly reflects the higher rate during the beginning of the summer. While infringements happen on all days of the week, 27% of all infringements take place during the weekend. Periods with nice weather can clearly be distinguished.

These graphs show the importance to keep reminding the aviation community of the Belgian airspace, good flight preparation and recent flying experience in the beginning of the 'summer' season.

Causes and the relation between causes/contributing factors, as indicated by the pilot - 2017

This cross-table shows the relation between the different causes for one infringement.
- The top row, shows the total number of times each cause was mentioned in the infringements.
- The matrix below shows the prevalence of every cause in respect to the cause on top.

EXAMPLE: in case of a "navigation error", in 63.16% of the cases, also "distraction" was mentioned as one of the causes.
But in 42.86% of the case with "distraction", this resulted in a "navigation error."

| | Insufficient preparation of the flight | Technical failure of the navigation aids used | Navigation error by pilot / navigator | Wrong interpretation of the airspace / map / environment | Wrong interpretation/ use of GPS | Distraction, work load in the cockpit, late observation of the airspace | Meteorology (deteriorating weather, reduced visibility, etc.) | Unfamiliarity with the airspace/area/country | Unobserved changes in airspace | Use of wrong frequencies (COMM/NAV) | Loss, or reduction of skill, due to long period between this flight and the previous | Other: due to ATCO | |
|--|---|---|---------------------------------------|--|----------------------------------|---|---|--|--------------------------------|---------------------------------------|--|--------------------|---|
| Total number of infringements with this cause | 11 | 6 | 19 | 16 | 7 | 28 | 9 | 16 | 4 | 17 | 1 | 14 | Numbers with a very low statistical significance are greyed out |
| Percentage of infringements with this cause in respect to total number of infringements | 13,75% | 7,50% | 23,75% | 20,00% | 8,75% | 35,00% | 11,25% | 20,00% | 5,00% | 21,25% | 1,25% | 17,50% | |
| | Percentage of infringements with combination of both causes / the cause in this column | | | | | | | | | | | | |
| Insufficient preparation of the flight | | 16,67% | 15,79% | 12,50% | 14,29% | 14,29% | | 25,00% | 0,00% | 5,88% | 0,00% | | |
| Technical failure of the navigation aids used | 9,09% | | 5,26% | | | 3,57% | | 6,25% | 0,00% | 5,88% | 0,00% | | |
| Navigation error by pilot / navigator | 27,27% | 16,67% | | 12,50% | 28,57% | 42,86% | 22,22% | 12,50% | 0,00% | 11,76% | 0,00% | 14,29% | |
| Wrong interpretation of the airspace / map / environment | 18,18% | | 10,53% | | 42,86% | 21,43% | 33,33% | 37,50% | 25,00% | 11,76% | 0,00% | 7,14% | |
| Wrong interpretation/ use of GPS | 9,09% | | 10,53% | 18,75% | | 3,57% | 11,11% | 12,50% | 25,00% | 11,76% | 0,00% | 7,14% | |
| Distraction, work load in the cockpit, late observation of the airspace | 36,36% | 16,67% | 63,16% | 37,50% | 14,29% | | 33,33% | 37,50% | 25,00% | 11,76% | 0,00% | 28,57% | |
| Meteorology (deteriorating weather, reduced visibility, etc.) | | | 10,53% | 18,75% | 14,29% | 10,71% | | | 0,00% | 5,88% | 100,00% | 14,29% | |
| Unfamiliarity with the airspace/area/country | 36,36% | 16,67% | 10,53% | 37,50% | 28,57% | 21,43% | | | 25,00% | 17,65% | 0,00% | | |
| Unobserved changes in airspace | | | | 6,25% | 14,29% | 3,57% | | 6,25% | | 11,76% | 0,00% | | |
| Use of wrong frequencies (COMM/NAV) | 9,09% | 16,67% | 10,53% | 12,50% | 28,57% | 7,14% | 11,11% | 18,75% | 50,00% | | 0,00% | 14,29% | |
| Loss, or reduction of skill, due to long period between this flight and the previous | | | | | | | 11,11% | | 0,00% | | | | |
| Other: due to ATCO | | | 10,53% | 6,25% | 14,29% | 14,29% | 22,22% | | 0,00% | 11,76% | 0,00% | | |

Interpretation:
 This matrix shows the correlation 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 'use of wrong frequencies'.

The top row of the matrix shows the prevalence for every cause over all replies. The rows below indicate how many times the combination of causes was chosen.

Distraction, navigation errors and the use of wrong frequencies are key factors in making airspace infringements. Followed by the wrong interpretation of the airspace and the unfamiliarity with the airspace.

Interesting correlations are: insufficient preparation resulting in navigation errors and high work load; wrong interpretation of the airspace and unfamiliar airspace resulting in a high work load; deteriorating weather leading to navigation errors...

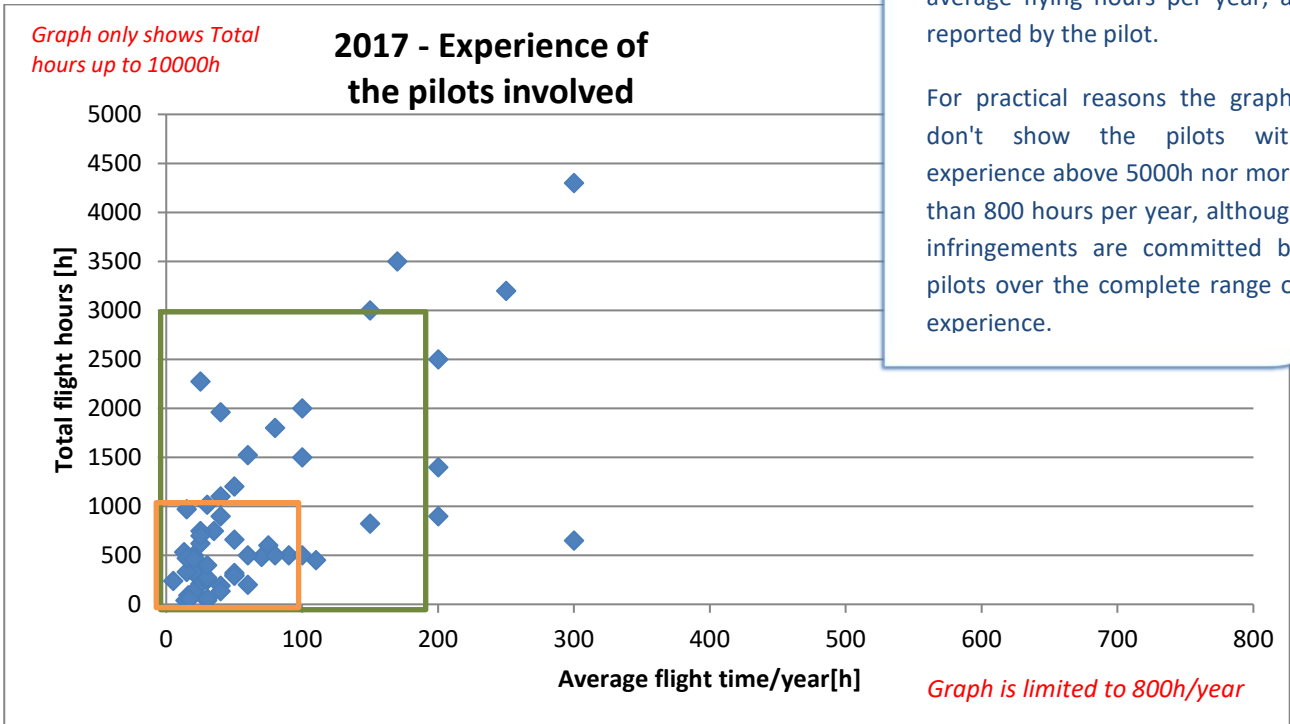
Remark: several pilots trust on Brussels/Belga information to warn them for airspace ahead or think Brussels/Belga will coordinate with ATC.

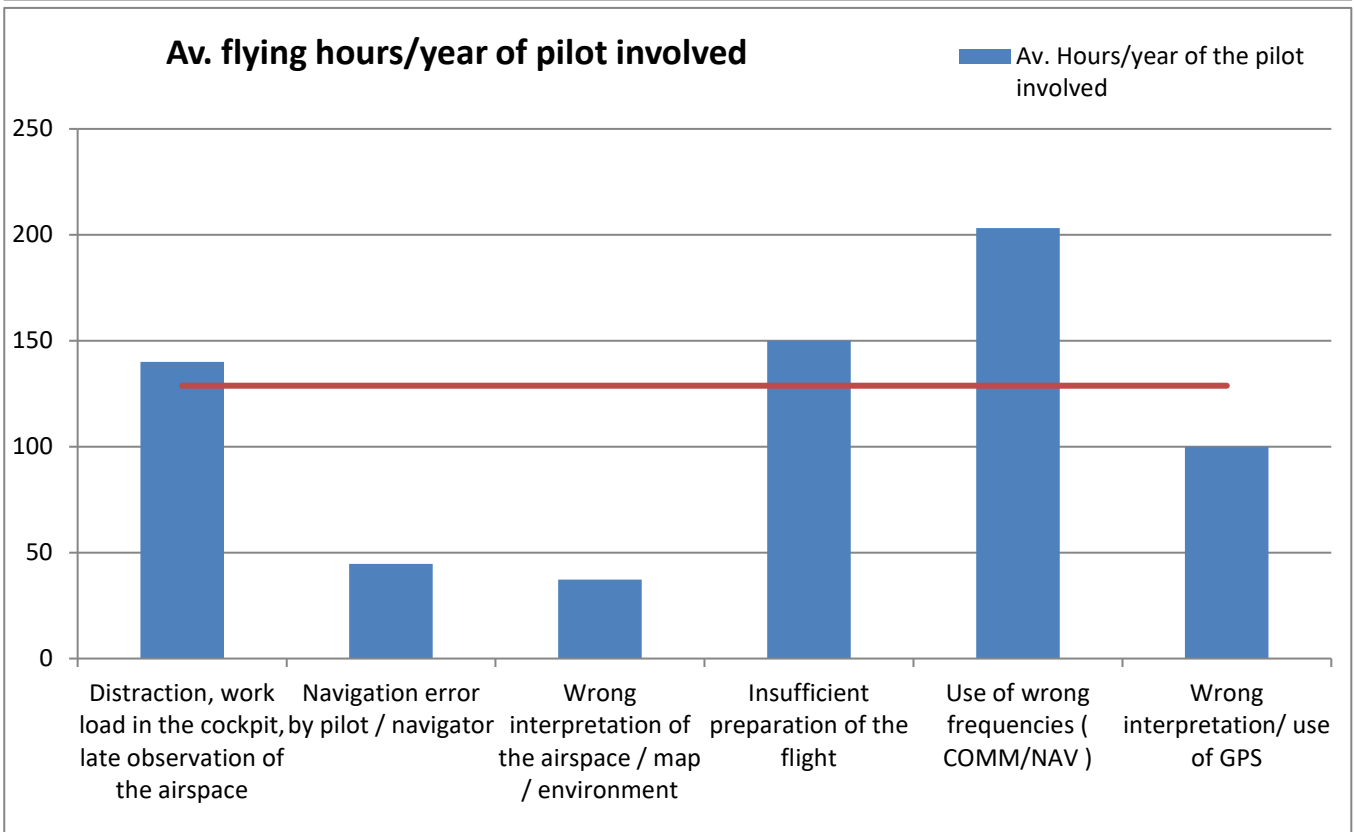
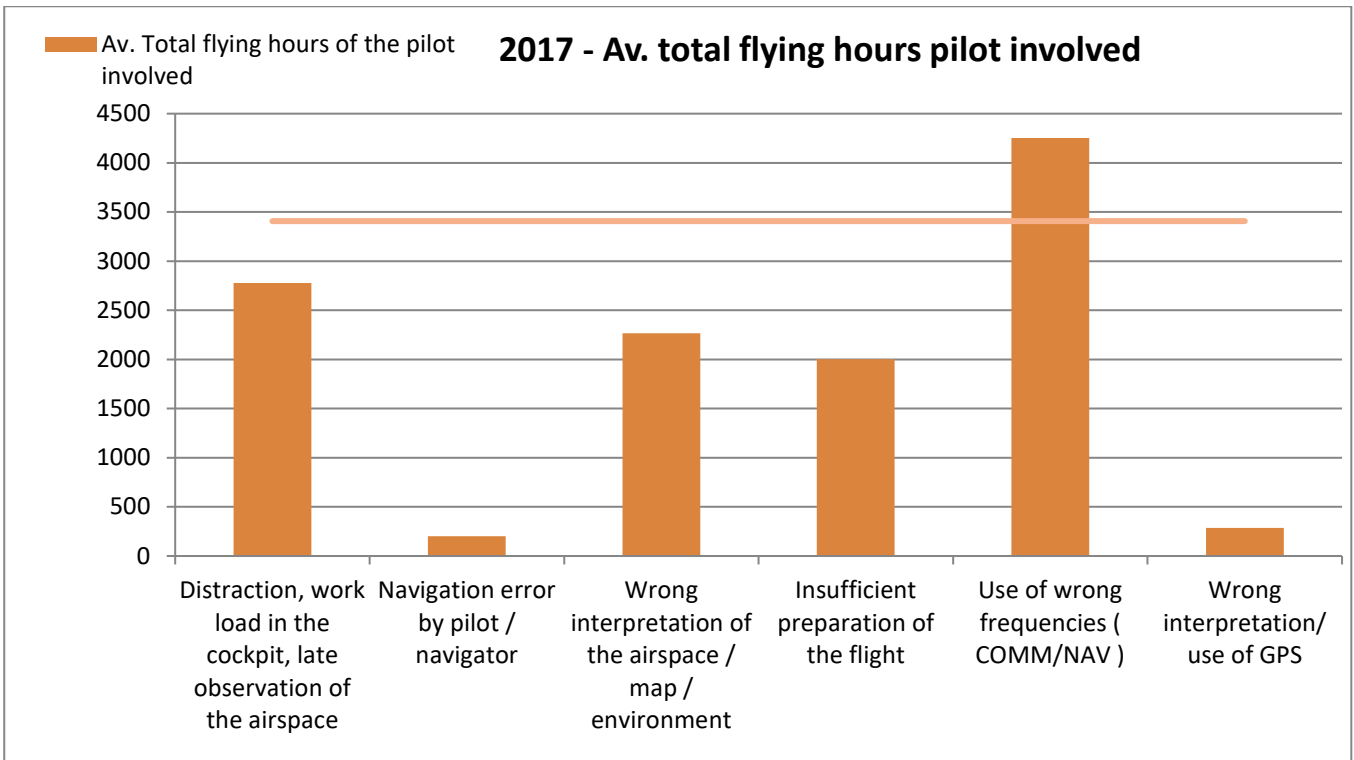
| Total flight hours | | Avg. Flight time/year | | TOTAL CUM. |
|---------------------------|-----------------|------------------------------|-----------------|-------------------|
| Hours | Cum. Percentage | Hours | Cum. Percentage | PERCENTAGE |
| <3000 | 70,00% | <200 | 70,00% | 63,75% |
| <2000 | 66,25% | <150 | 66,25% | 60,00% |
| <1000 | 56,25% | <100 | 60,00% | 48,75% |
| <500 | 35,00% | <50 | 41,25% | 26,25% |

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.

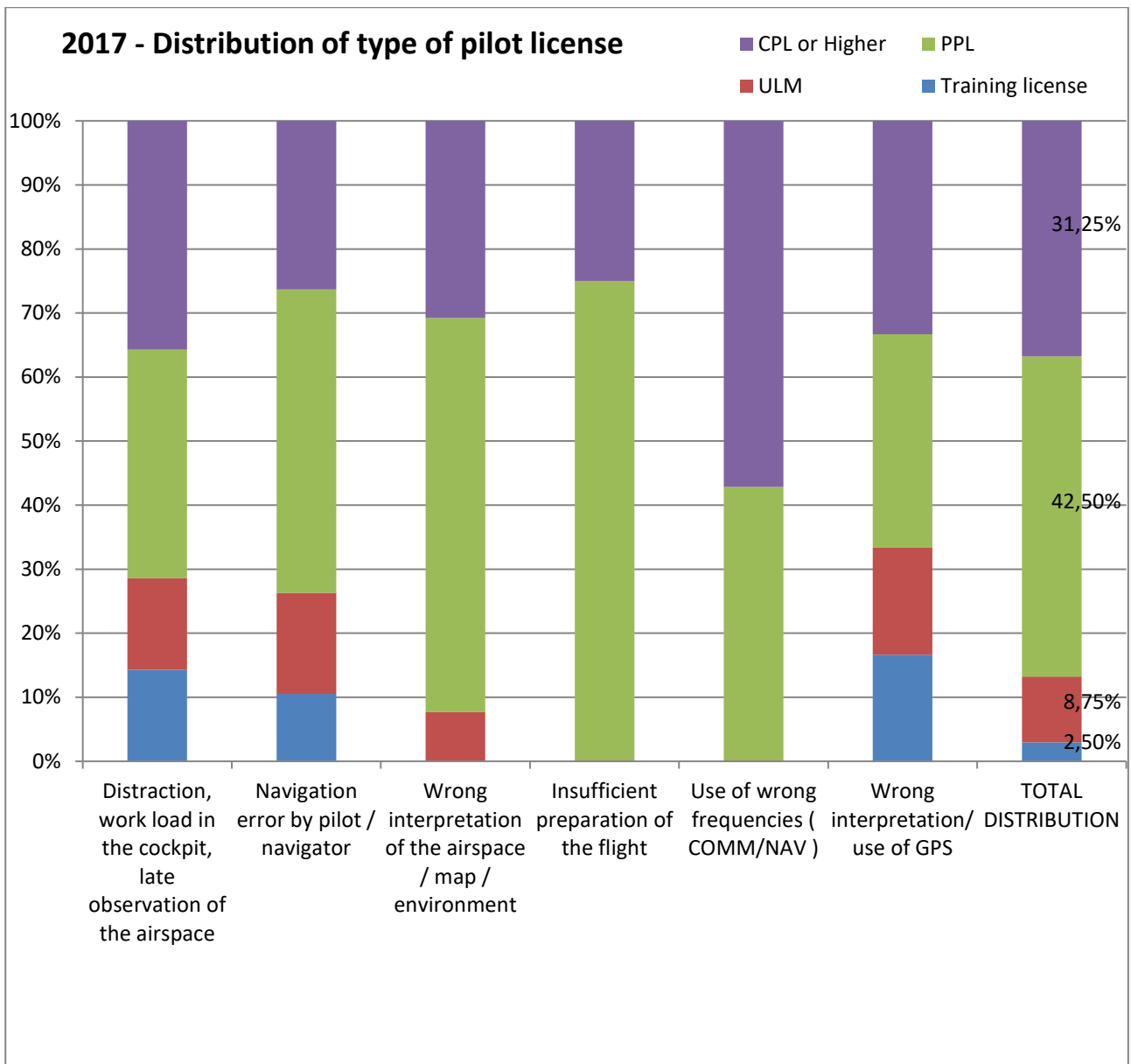
For practical reasons the graphs don't show the pilots with experience above 5000h nor more than 800 hours per year, although infringements are committed by pilots over the complete range of experience.





Interpretation:

These graphs show the pilot experience in relation to the causes of the infringement. The horizontal line indicates the average experience of all the pilots that were involved in an infringement, while the columns show the average for all pilots that indicated that specific cause. Less experienced pilots encounter more navigation errors and a wrong interpretation or use of the GPS. More experienced pilots commit infringements by using wrong frequencies or by wrong interpreting the airspace/map/environment. Distraction due to other tasks is a contributing factor for all pilots.

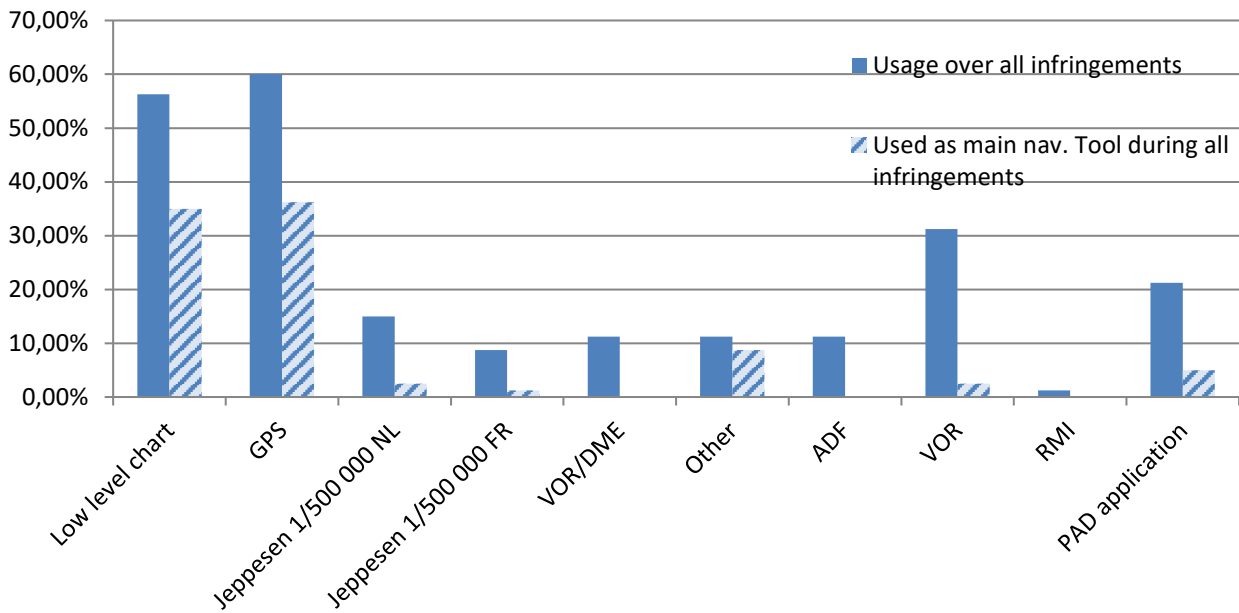


Interpretation:

The most right column shows the distribution of the (highest) license of the pilot involved in the infringement. Around 43% of the pilots involved have a PPL license. 31% has a commercial pilot or ATPL license. Around 9% of the infringements can be attributed to pilots having an ULM license.

The other columns show the distribution for all infringements were the pilot indicated that specific cause. It can be seen that PPL pilots are relatively more represented when it comes to an insufficient flight preparation and a wrong interpretation of the airspace. On the other hand, when it comes to the usage of wrong frequencies, we notice that these are relatively more reported by CPL pilots or higher.

2017 - Usage of navigation tool over all infringements

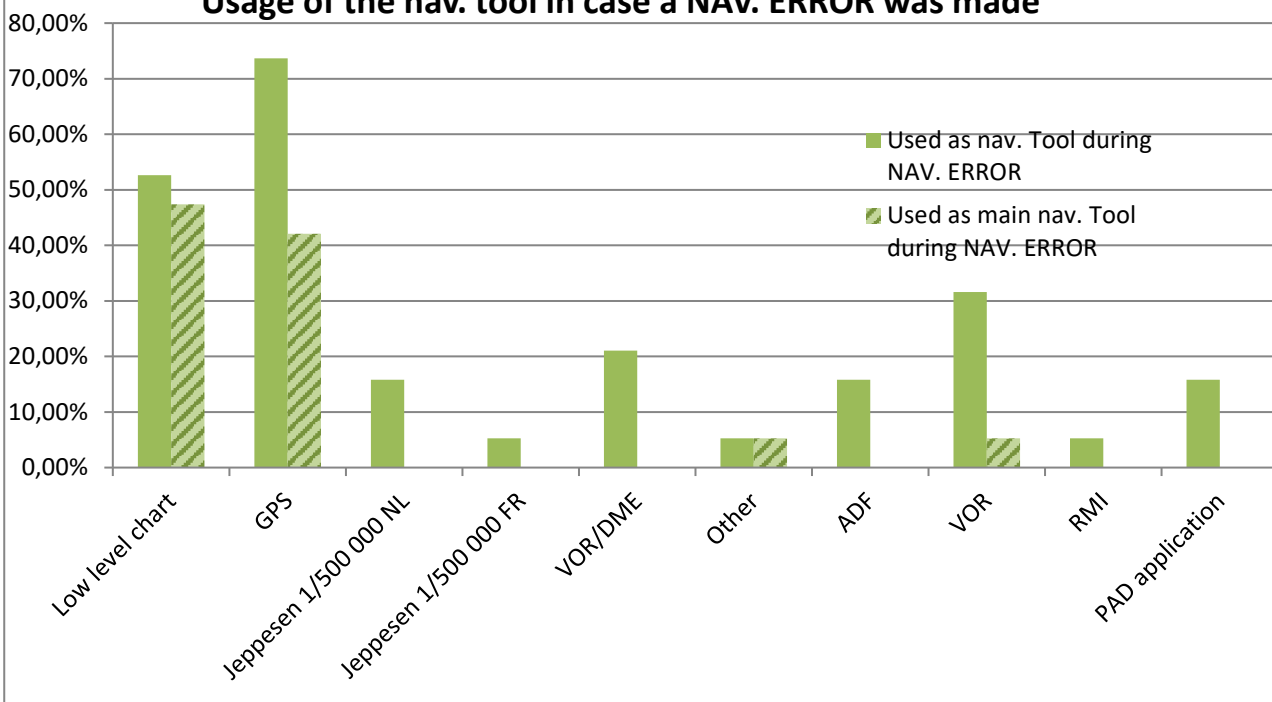


Interpretation:

This page shows the usage of different navigation equipment at the time of an infringement. As can be seen in the first graph, over 36% of the pilots state they were using GPS as their main nav. tool, 35% used a map for this purpose. Tablet/smartphone applications were also used in 21% of the infringements, but the graph clearly shows that this is a supporting tool and not a primary means of navigation.

The second image illustrates the portion of pilots that were using these tools, but still made a navigation error. 53% were using a low level map as primary means. Notice that more than 73% of the pilots were using a GPS but still made navigation errors! Pilots should be aware that if they want to use these tools, they should know how to use them and that a good flight preparation remains key!

Usage of the nav. tool in case a NAV. ERROR was made



Conclusions

- *A large number of infringements are conducted in the airspace surrounding Charleroi, Brussels and Ostend. There are also a relatively large number of infringements in military airspace.*
- *A clear increased contribution to the number of airspace infringements can be seen by aircraft departing from or arriving at foreign airports (mainly French airports and to a lesser extent Dutch airports).*
- *Distraction, navigation errors and the use of wrong frequencies are key factors in making airspace infringements. Followed by the wrong interpretation of the airspace and the unfamiliarity with the airspace.*
- *More than 73% of the pilots were using a GPS but still made navigation errors. Pilots should be aware that if they want to use these tools, they should know how to use them and that a good flight preparation remains key!*

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

https://mobilit.belgium.be/en/aviation/airspace_infringements

EASA website:

<https://www.easa.europa.eu/airspace-infringement>

The BCAA's website provides links to the Belgian video on the prevention of airspace infringement and to other entertaining yet informative video's from EASA and other European countries. These video's suggest useful tips that will help to reduce the risk of airspace infringement and mid-air collisions. It is recommended to start with those video's corresponding to the countries where the pilot wants to fly or cross. The BCAA's 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 the BCAA encourage to use these video's and documents in the club briefing rooms to help others.

Questions? Suggestions?
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