



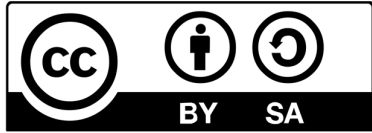
**Navigraph**

FlightSim Community  
Survey 2020

**Final Report**

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## Preamble

For the third consecutive year I am happy to present the annual flightsim community survey. This report is the result of a collaborative effort between survey partners - developers, companies, organizations and media outlets in the flightsim community. Navigraph's role is to organize, design and compile the survey and make the results freely available for the common good of the flightsim community to guide future projects and ultimately to attract new pilots.

This flightsim community survey is the largest and most comprehensive of its kind. 2020 an amazing 23,500 respondents participated in the survey! This is a 32% increase from last year when 17,800 respondents participated! Moreover, the reach has also increased this year. Last year 40% of the survey respondents had not taken the survey before. This year 60% of the respondents were newcomers! The survey is growing!

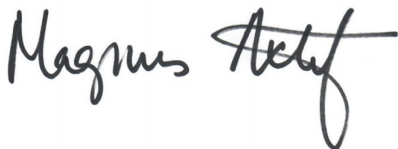
In last year's meta analysis of the survey we could see that respondents were comfortable with the amount of questions, and that many pilots quite enjoyed the tour of the community, so we decided to extend the survey from 93 to 119 questions this year. Some questions were of course removed, and we also implemented more conditional questions to keep the survey relevant to each respondent. What did the new questions cover? Well, as usual we try to cover current events and the trends of the past year.

This year's survey is a particularly interesting one because it reflects an important year which has been in many parts eventful yet paradoxically also exceptionally uneventful.

It was eventful in the sense that Laminar Research released X-Plane 11.50; Lockheed Martin released Prepar3D v5; and Microsoft launched Flight Simulator. Just like previous years the survey contains a question measuring the most popular simulator platform, but also includes questions to track movements between platforms in the past year. Did the Microsoft Flight Simulator platform become as popular as anticipated? Where did the new users from? Those are some of the questions you'll be able to answer by reading this survey.

The year was also uneventful in the sense that many parts of the world was under a lockdown due to Covid-19. Therefore we ask some questions whether respondents' flight simulation habits have changed because of Covid-19. We also ask if respondents employment situation has changed, assuming this will affect the amount of time and money pilots will be able to spend on their hobby.

The survey also includes a quite deep dive into Virtual Reality, graphics cards, gaming, consoles, and much more. We are surprised how many pilots wear polarized sunglasses while flying their simulator – in doors. By “we” I mean the survey team here at Navigraph - Andreas Goodholm, Malin Söderlund, Stephen O'Connell, and myself - who have been working on organizing, designing, and compiling this survey. It's been hard work, but also fun and interesting. We hope you enjoy reading it!



Magnus Axholt  
CEO & Co-Founder

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# 1. Introduction

## 1.1. Partners

The FlightSim Community Survey 2020 is a collaborative effort conducted by the developers, organizations and companies alphabetically presented in the list of partners below.

- Aerosoft
- AviTab
- Carenado
- Cruiselevel
- Drzewiecki Design
- Frooglesim
- FSElite
- Flight Sim Labs
- Flight1
- FlightGear
- FlightSim.com
- FlightSimExpo
- Gaya Simulations
- GeoFS
- HeliSimmer.com
- Honeycomb
- Infinite Flight
- IVAO
- JonFly
- Laminar Research
- Lockheed Martin
- Microsoft
- MilViz
- Navigraph
- ORBX
- PMDG
- REX
- SimBrief
- SimFlight
- VATSIM

Navigraph was responsible for coordinating, designing, compiling and funding the survey, as well as authoring this document.



## 1.2. Purpose and Target Audience

The primary purpose of the survey is to provide the participating partners with information about the flight simulation community so that they are better able to:

- recruit new pilots to the flight simulation community
- develop products and services in response to pilots' needs and requests

The secondary purpose of the survey is to provide all members of the flight simulation community with information so that they are better able to:

- find resources to develop their flight simulation interest
- maintain and develop the community

## 1.3. Data Protection

The data was collected from the respondents anonymously without storing any personally identifiable information. The results are presented in aggregated form, never individually. The data was collected in the legitimate interest pursued by Navigraph and the partners. To the best of our judgement, the survey was conducted in a fashion compliant with the General Data Protection Regulation (EU) 2016/679. For any questions regarding user privacy, please contact [info@navigraph.com](mailto:info@navigraph.com).

## 1.4. Previous Work

VATSIM conducted a survey in 2006<sup>1</sup>. It had 6,691 respondents.

AVSIM has previously published a demographic survey for the flight simulation community. The most recent one was made in 2013<sup>2</sup>. It had approximately 2,800 respondents.

Laminar Research has collected usage data from its X-Plane simulator and published two reports<sup>3</sup> in November 2017, and June 2018.

Navigraph has previously conducted customer surveys. In 2017<sup>4</sup> it had 3,187 respondents. In 2016 2,200 participated. While these surveys had significant portions aimed at product feedback specific for Navigraph, it also had demographics questions included from the AVSIM survey.

Navigraph has also, with the help of partners, conducted a previous flight community survey in 2018<sup>5</sup> which has 15,000 respondents, and in 2019<sup>6</sup> which had 17,800 respondents.

It is our impression that there have been additional small surveys completed in the past. Either they have been published by various developers with the intent of obtaining specific product feedback; or they have been published by interest organizations with the intent of obtaining feedback of the particular operations of that organization.

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<sup>1</sup> <https://www.flightsim.com/vbfs/content.php?7782-VATSIM-User-Survey-Results>

<sup>2</sup> <https://www.avsim.com/forums/topic/430855-results-of-the-2013-avsim-community-demographics-survey/>

<sup>3</sup> <https://developer.x-plane.com/category/x-plane-usage-data/>

<sup>4</sup> <http://blog.navigraph.com/post/167492052421/survey-results-prepar3d-x-plane-up-fsx-down>

<sup>5</sup> <https://blog.navigraph.com/post/181243982766/2018-survey-results>

<sup>6</sup> <https://blog.navigraph.com/post/190623949491/flightsim-community-survey-2019-results>

The flightsim community surveys 2018, 2019 and 2020 are different in that they have:

- a larger sample size, i.e. many more respondents compared to any previous flight simulation community survey to date
- a sample which represents multiple user groups, i.e. users from various developers and members from various organizations

## 2. Method

Navigraph began by posting an official invite on social media and in the Navigraph newsletter for partners to collaborate on the survey. Partners who participated to the survey earlier years were contacted directly via email. To get a representative sample of the community partners were chosen from as many different parts of the flightsim community as possible.

Partners were asked to submit questions of particular interest to them. Navigraph edited, consolidated, and designed the questions. The questions were then remitted to the partners for review before the survey was published.

All partners were asked to publish an individual survey link at a specific date and time. The partners were free to choose how to distribute the link, but many chose to publish on social media, forums, websites, and in newsletters. The individual links permitted tracking of how successful each partner was at gathering respondents to the survey,

The respondents were not compensated for their contribution. The incentive for the respondents to contribute to the survey is the possibility to guide development in the flightsim community. The incentive for the partners to contribute to the survey is the possibility to include questions and reach a wider audience compared to publishing an individual survey themselves.

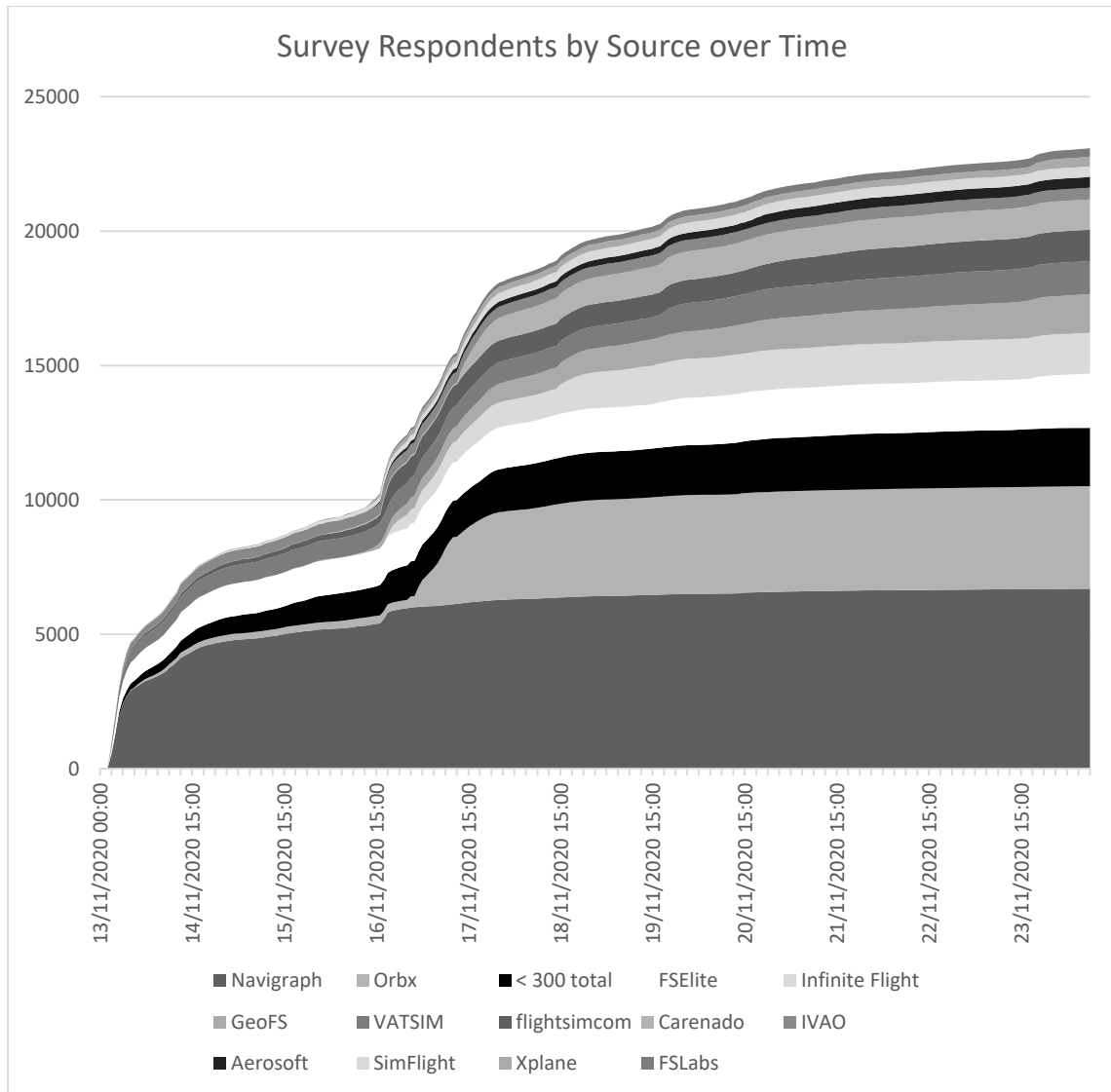
The information presented in this survey report is only diagrams over aggregated data. No other analysis as to statistical significance, power, or confidence interval has been done.

### 3. Analysis

#### 3.1. Respondents

The survey had 23,476 (17,800) respondents out of which 62% (69%) completed the 119 (93) questions in the survey and spent on average 22 (20) minutes. (Last year’s values within parentheses.)

The diagram below illustrates the number of respondents clicking a link published by a survey partner over time starting from November 13 when the link to survey was first published, until the evening of November 2 when the survey closed. Navigraph, illustrated at the bottom of the diagram contributed with the most respondents followed by Orbx, FSElite, and Infinite Flight. All partners who contributed with less than 300 respondents are aggregated into the black graph.

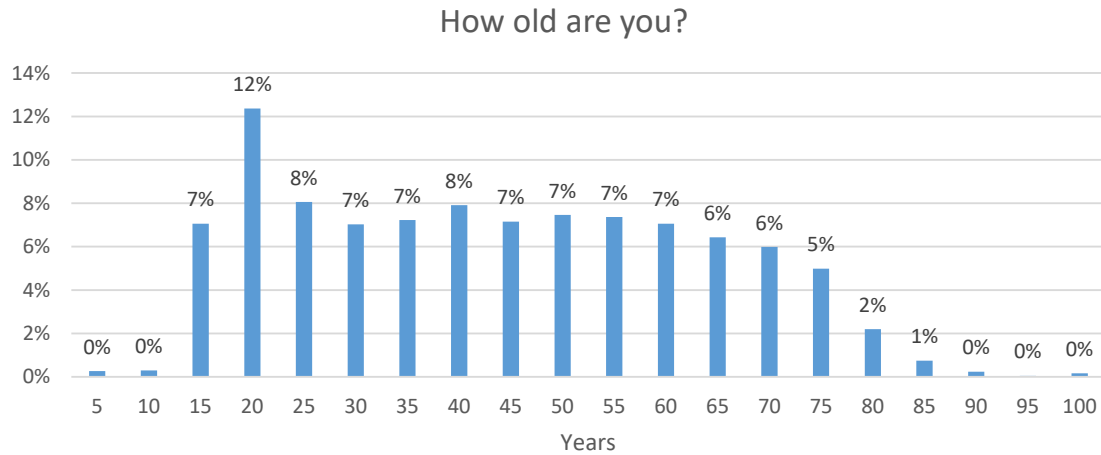


## 3.2. Demographics

### 3.2.1. Age

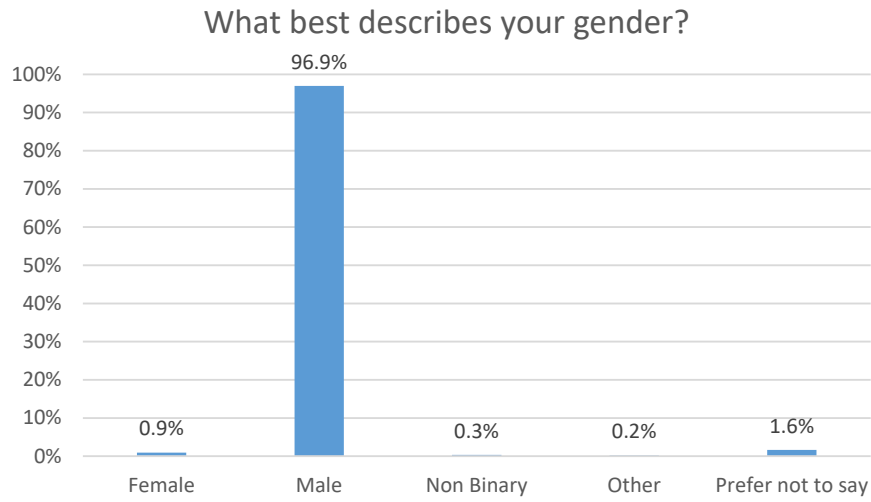
The rather even distribution shows that flight simulation is interesting to people of all ages. While the bulk of the users are in the range of 15-85 years, we notice a peak around 20 and an impressive tail towards 85.

The age distribution this year is very similar to those of the two previous surveys, in terms of range but also with the distinct peak around 20.



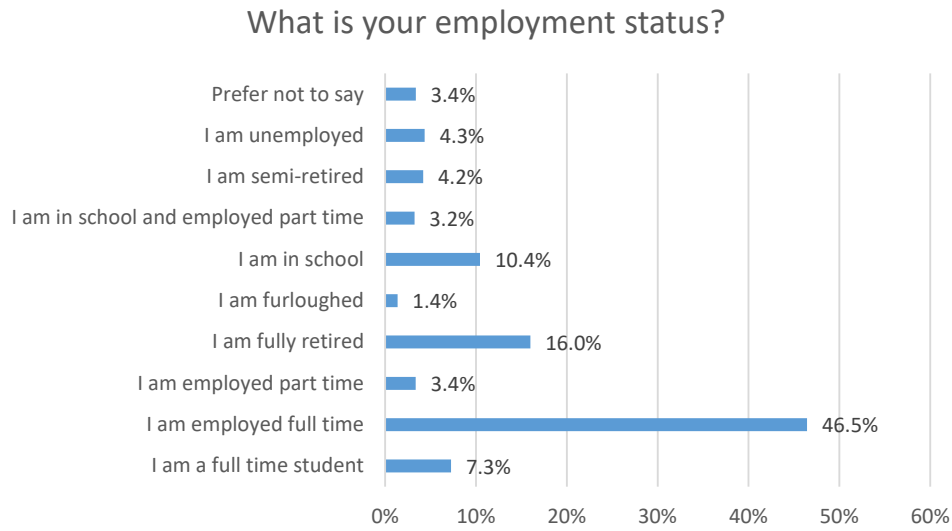
### 3.2.2. Gender

Flight simulation continues to be a predominantly male activity. The results are the same as the previous two years.



### 3.2.3. Employment Status

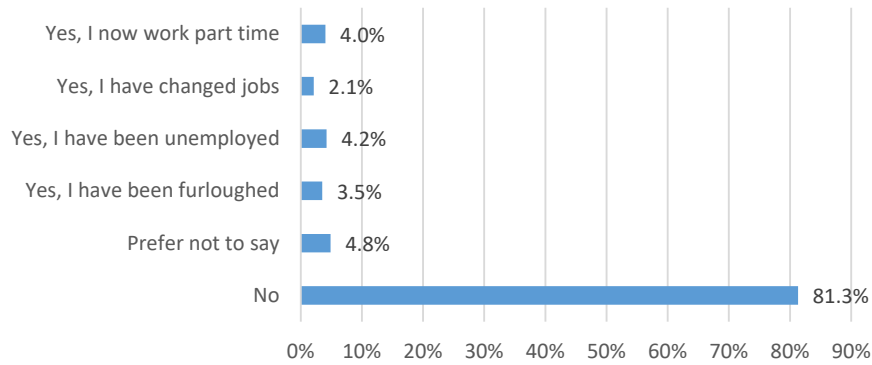
Most flight simulator pilots are either employed full time or fully retired. This result is consistent with previous years.



### 3.2.4. Covid-19 Employment Effect

This question was introduced in this year's survey to investigate if respondents' employment situation has changed due to the effects of Covid-19.

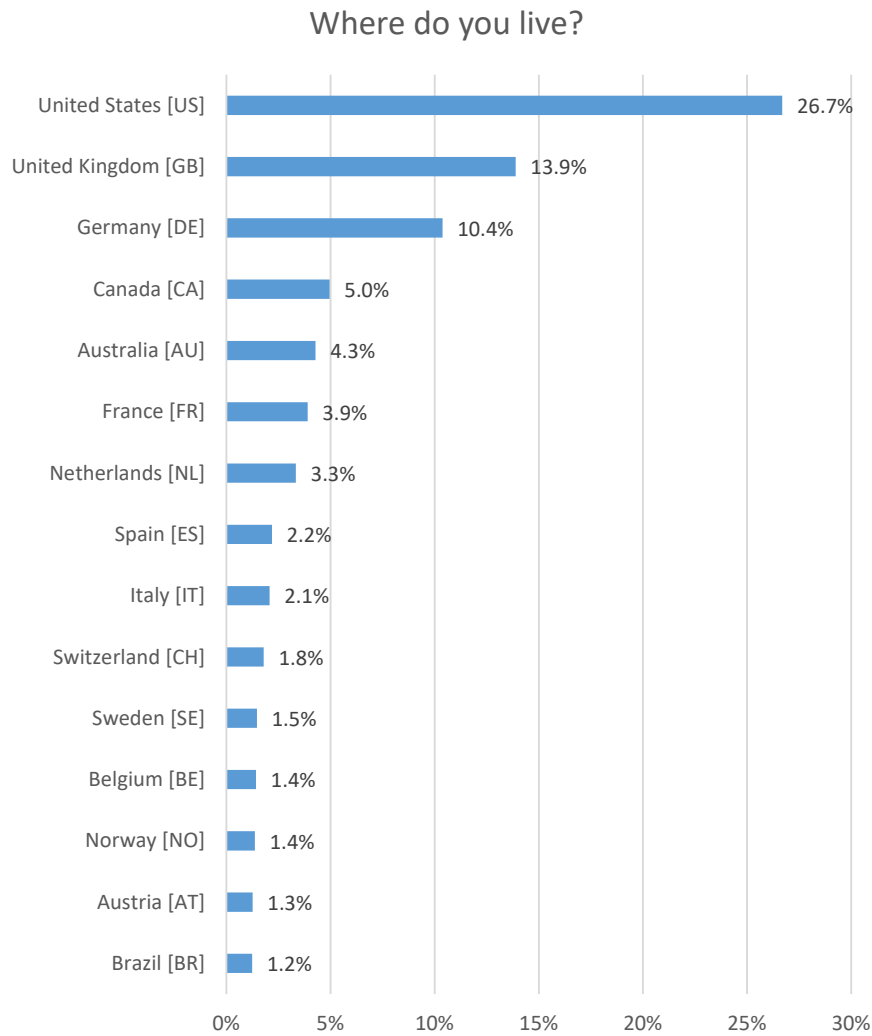
#### Has your employment situation changed due to Covid-19?





### 3.2.5. Country

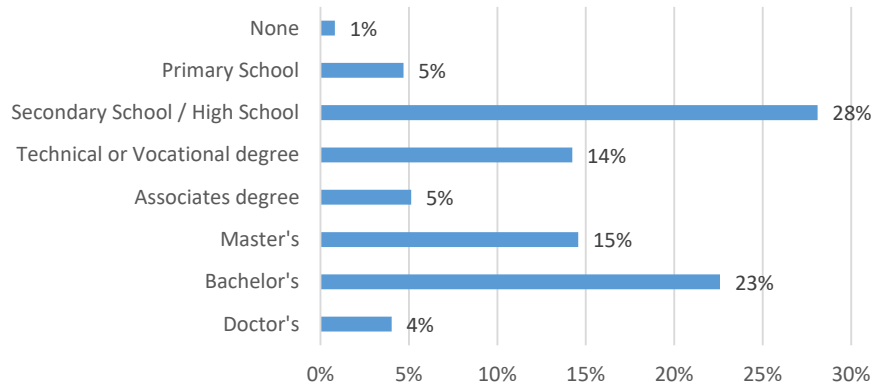
The top five countries are the same this year as the two previous years. France, the Netherlands, Spain, Italy and Switzerland follow next, just like previous years, but in varying order.



### 3.2.6. Education

This year Secondary School and Bachelor's were the most common levels of education. This is the same result as last year. In 2018, however, Bachelor's was the most common one, followed by Secondary School.

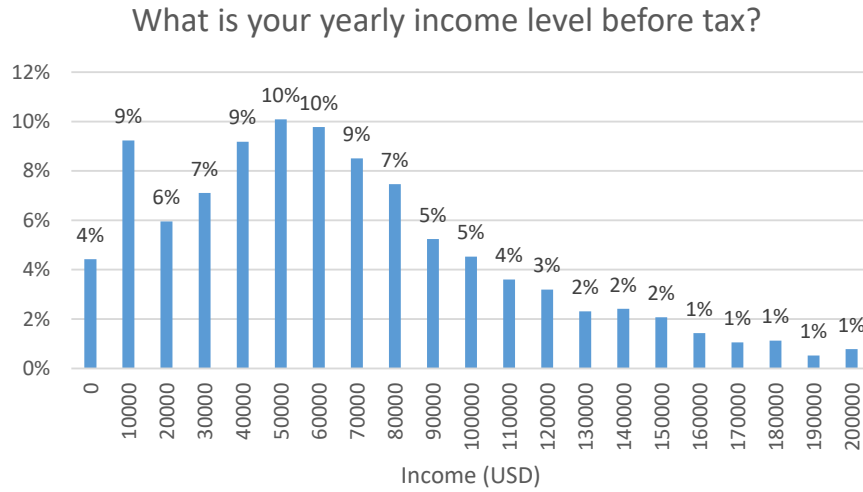
What is the highest level of education you have completed?



### 3.2.7. Income

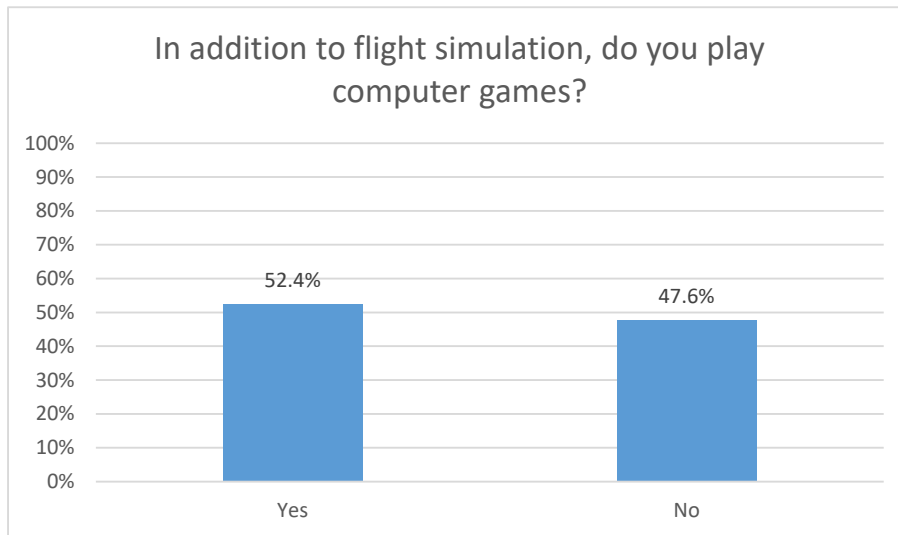
Respondents were asked to enter their annual income before tax in their local currency. Exchange rates as per December 2020 were then used to calculate the income in US Dollars.

The distribution is very similar to last year's survey result. Most respondents are in the interval between \$40,000 and \$70,000. Last year we also noticed a peak in the \$10,000 bracket.



### 3.2.8. Gaming Interest

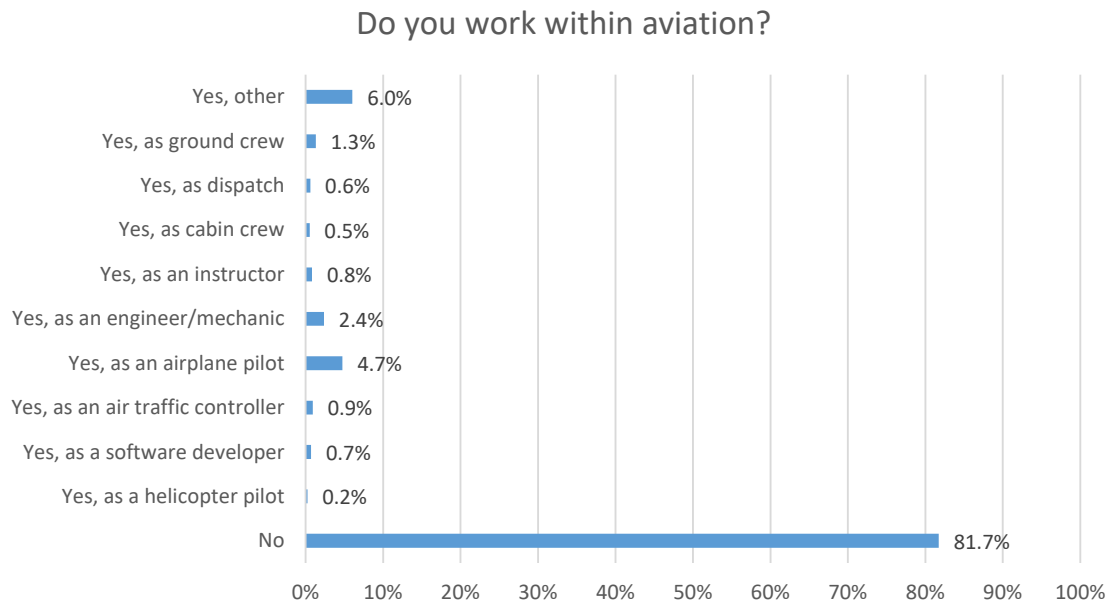
Last year we asked if you use other simulators aside from flight simulators. This year we decided to broaden this question and ask about computer games. About half of the respondents say they play computer games in addition to flying the flight simulator. Commonly occurring words and titles in the responses were: truck simulator, train simulator, FPS (First person shooter), GTA (Grand Theft Auto), COD (Call of Duty), and Minecraft.



### 3.3. Relation to Aviation

#### 3.3.1. Work

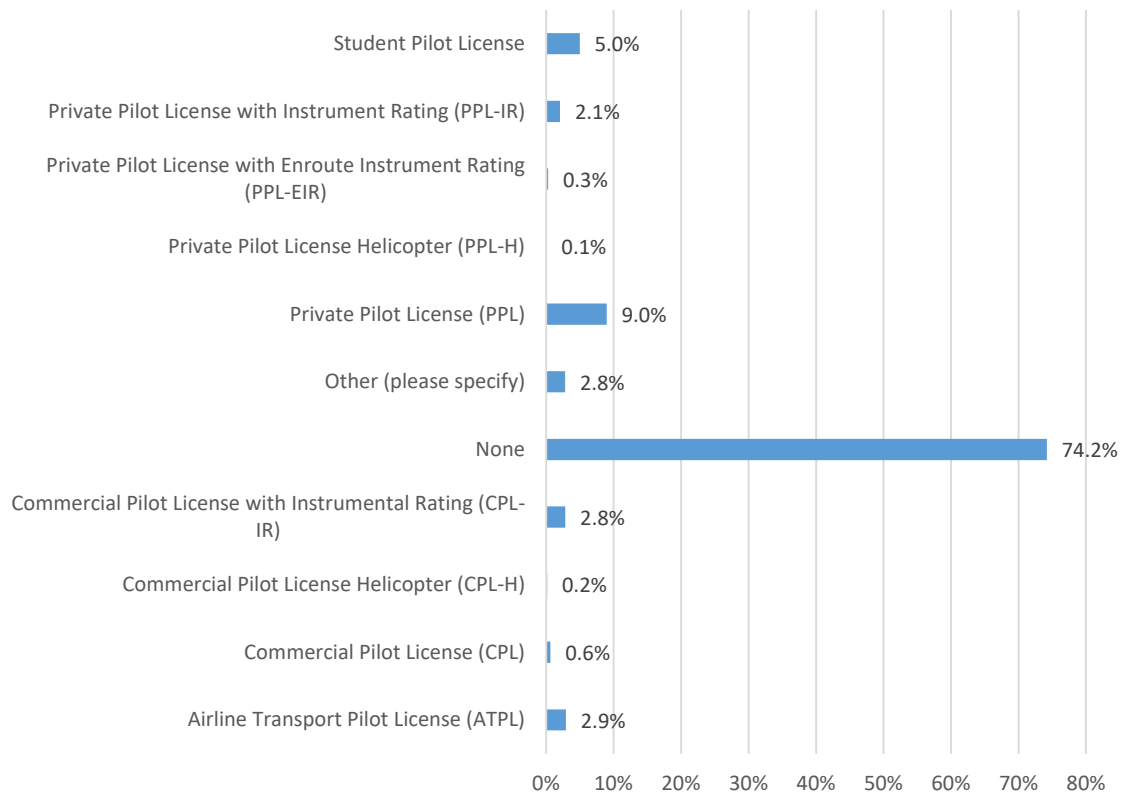
By asking this question we wanted to establish how many of the respondents work within the aviation industry. Almost one in five work within aviation. This is comparable to the previous year's results.



### 3.3.2. Pilot License

One in four flight simulator pilots holds a pilot license. A total of 9% have a Private Pilot Licence (PPL). In last year's survey 30% of the simulator pilots held a pilot license.

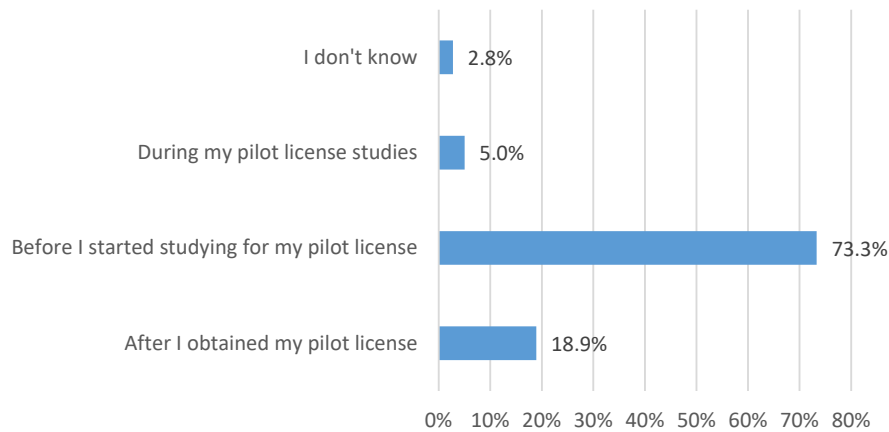
What pilot license do you currently have?



### 3.3.3. Simulation in Relation to Aviation

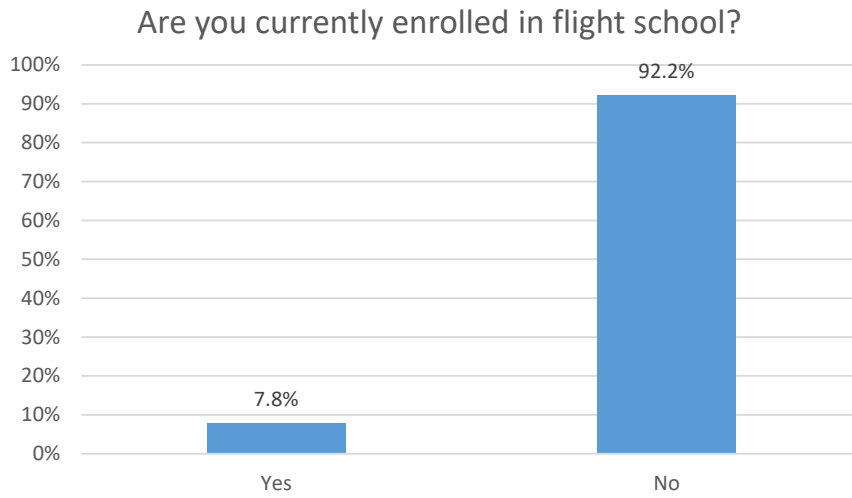
Among the respondents of the previous question who stated that they have a pilot license we asked a follow up question to see if it was the flight simulation that sparked their decision to pursue a license, or maybe the other way around. Almost three out of four got their first flight simulator before they started studying for their pilot license.

When did you get your first flight simulator?



### 3.3.4. Flight School Enrollment

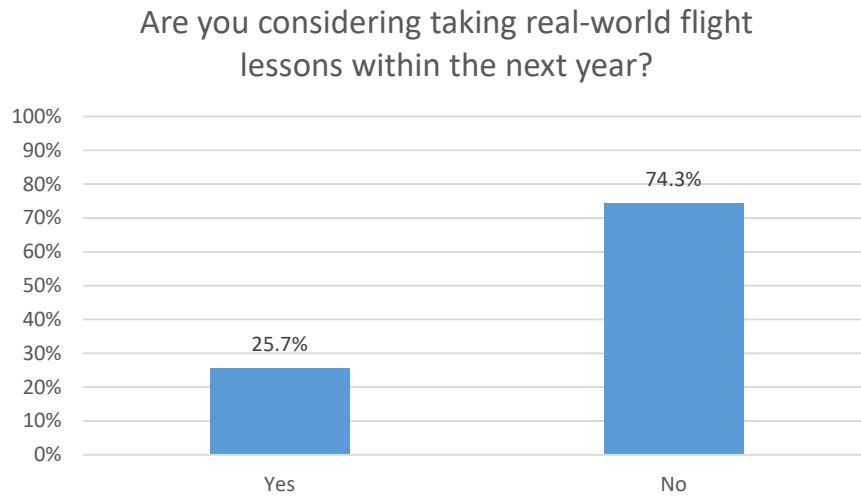
With almost 8% of the simulator pilots enrolled in a flight school, the distribution of respondents is this year is nearly identical to what was presented in the 2018 and 2019 survey.





### 3.3.5. Flight Lesson Consideration

This question was presented only to respondents who stated that they are not enrolled in a flight school. In the vein of last year's result, most respondents are not considering taking real world flight lessons within the next year.

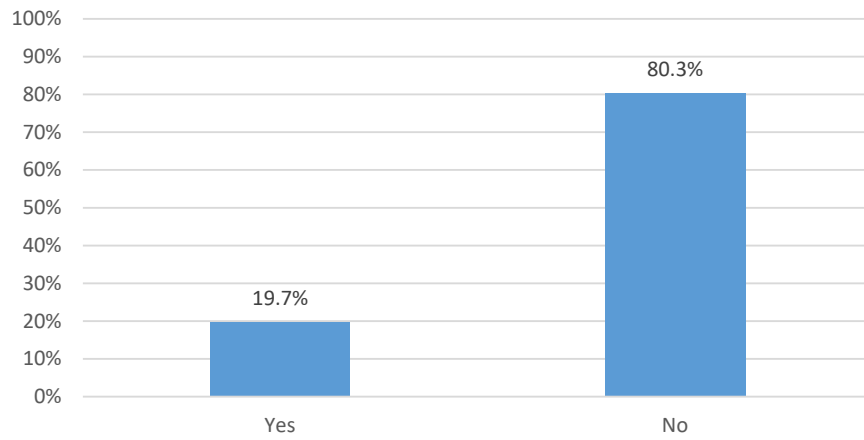


### 3.4. Simulator Habits - Combat

#### 3.4.1. Combat Simulation Interest

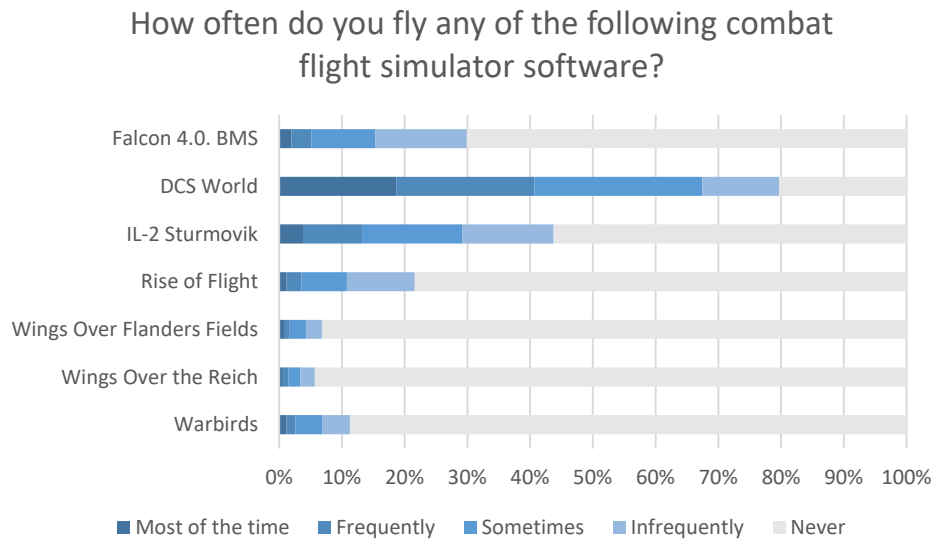
The section about combat simulation was introduced in last year's survey. We started by asking if respondents fly combat missions, and then proceeded with a follow up question to those who are interested in combat flight simulators. One in five fly combat missions in their simulator, a number which we also presented in the previous survey.

Do you fly combat missions in your simulator?



### 3.4.2. Combat Simulator Preference

This question was presented only to the respondents who stated that they fly combat missions. DCS World appeared to be the most popular flight simulator for combat missions, followed by IL-2 Sturmovik and Falcon 4.0 BMS. This was also the result last year when this question was first introduced.

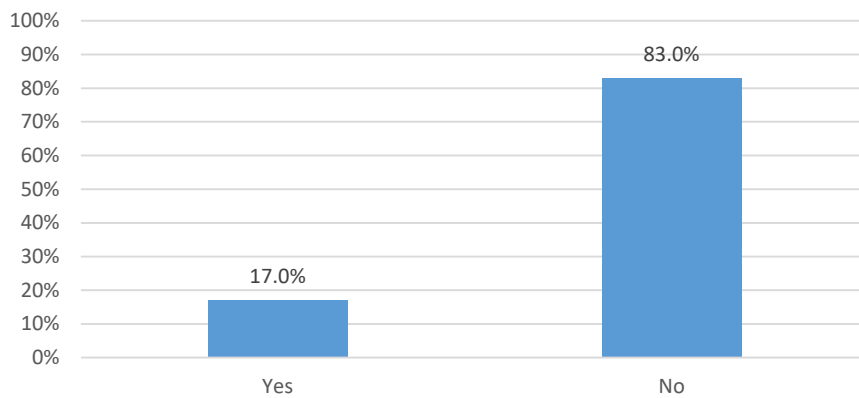


### 3.5. Simulator Habits - Mobile

#### 3.5.1. Mobile Simulation Interest

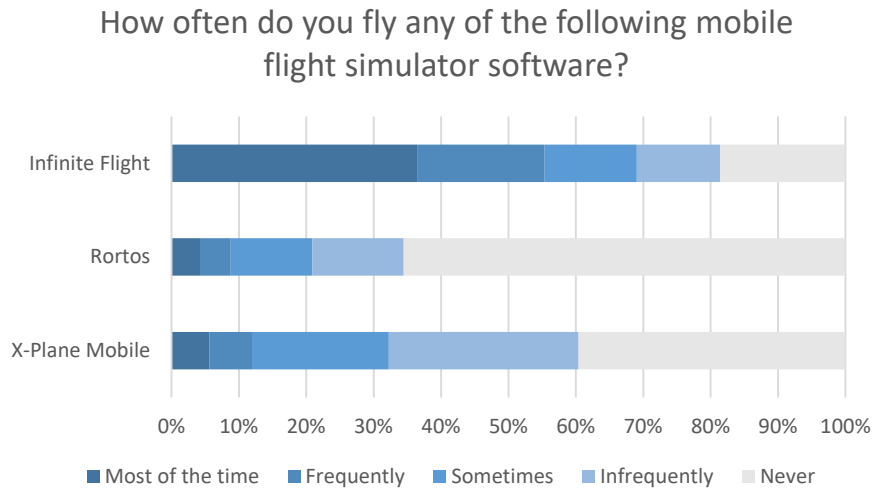
In the last year's survey, we introduced several questions regarding flight simulation on mobile devices. For those respondents who stated that they flew on mobile devices we proceeded to ask some additional questions. The number of respondents who fly simulators on mobile devices have increased from 14% to 17%.

Do you fly simulators on mobile or tablet devices?



### 3.5.2. Mobile Simulator Preference

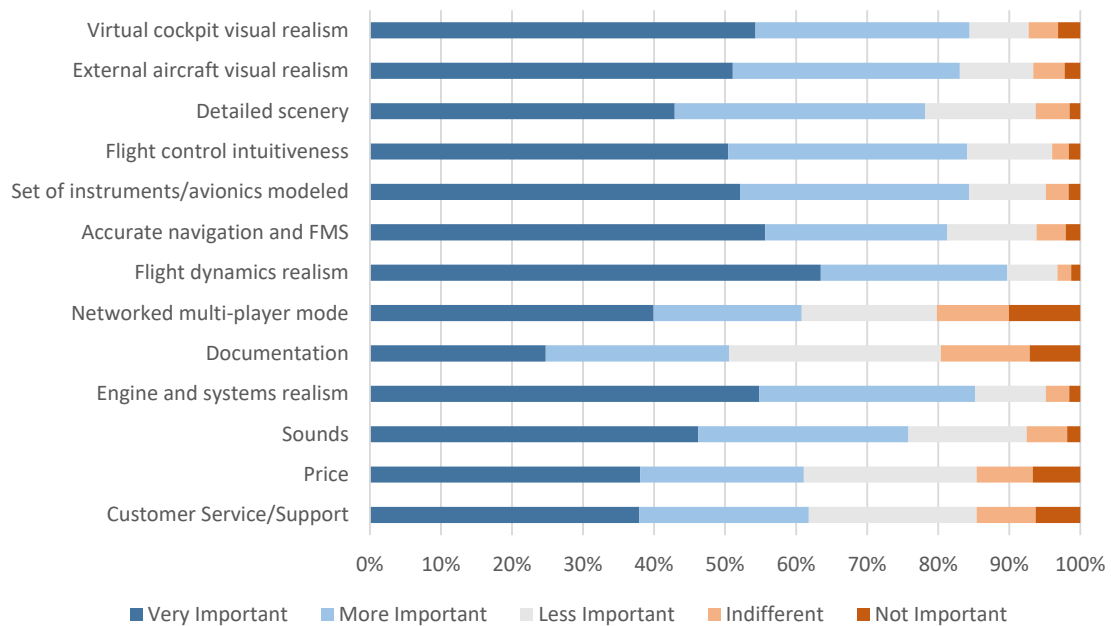
This question was conditional and only presented to the respondents who stated that they fly on mobile devices. Just like the previous year's survey, Infinite Flight is still in the lead as the most popular mobile flight simulator software.



### 3.5.3. Mobile Simulator Feature Importance

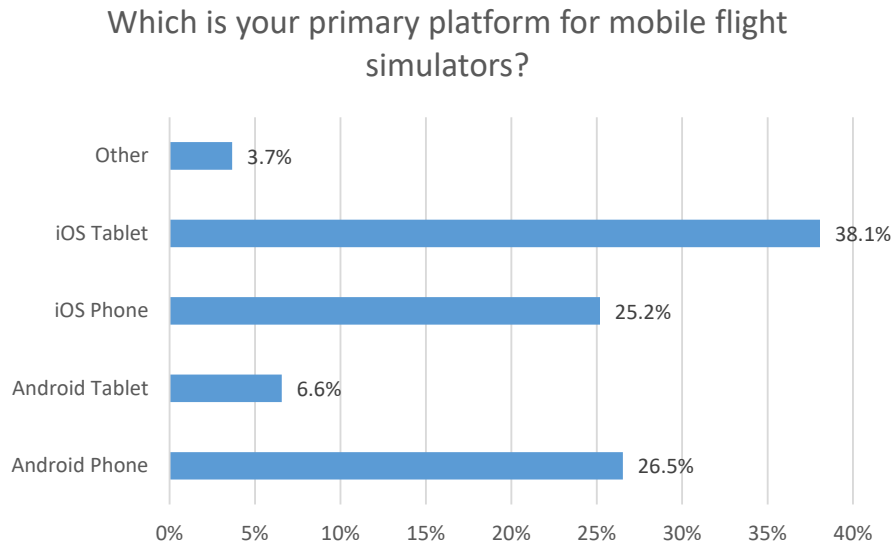
The following question was conditional and only presented to the respondents who stated that they fly on mobile devices. By asking this question we get to know which features of the mobile flight simulator software is the most and least important to the community. As presented last year, flight dynamics is the most important feature while documentation and networked multi-player mode are the least important.

What are the most important features for you in a mobile flight simulator software?



### 3.5.4. Mobile Simulator Device

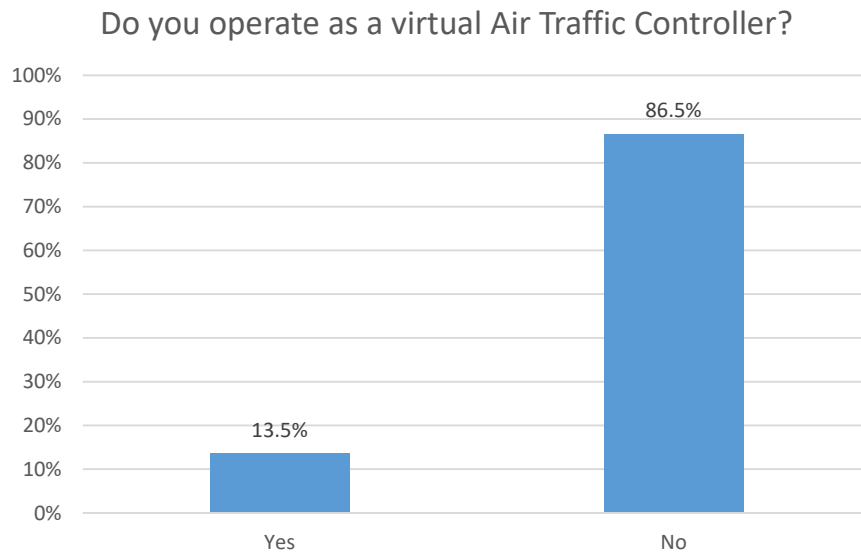
Flight simmers who use mobile devices seem to prefer using iPad. This was also the result last year when this question was first introduced.



### 3.6. Simulator Habits - Air Traffic Control

#### 3.6.1. ATC Simulation Interest

A total of 13.5% of the respondents say they operate as virtual air traffic controllers. The purpose of this question is primarily to screen for the coming follow up questions.

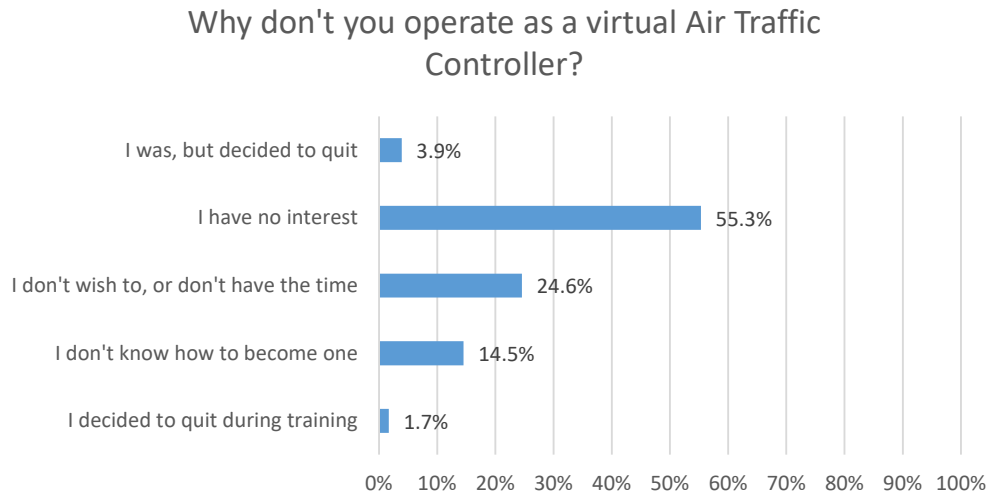




### 3.6.2 Reasons for not operating as an ATC

In this question we set out to investigate the reasons why some respondents have never chosen to operate as virtual Air Traffic Controllers. The question was asked to all respondents who answered No to the question above.

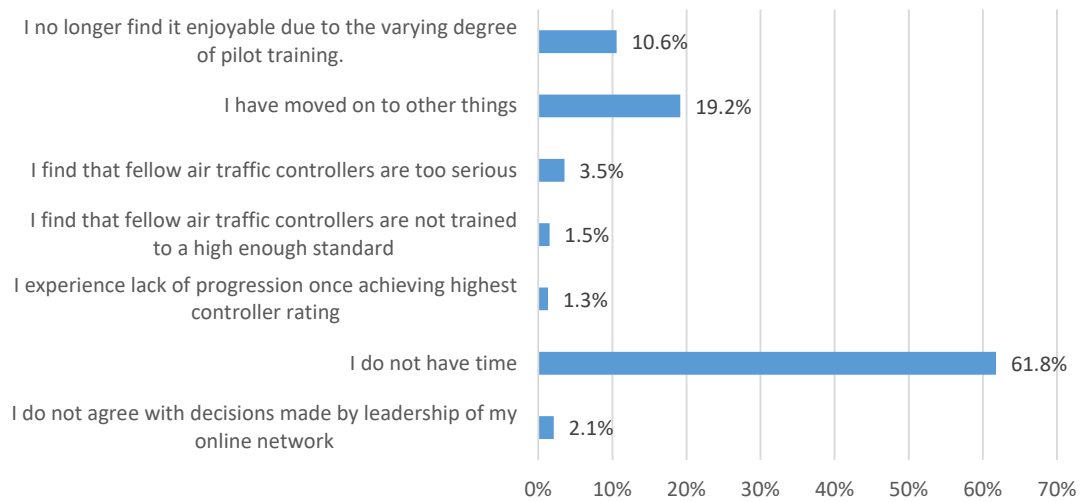
As shown in the diagram below more than half of the respondents do not have the interest. A quarter of the respondents do not wish to, or do not have the time.



### 3.6.3. Discontinued ATC activity

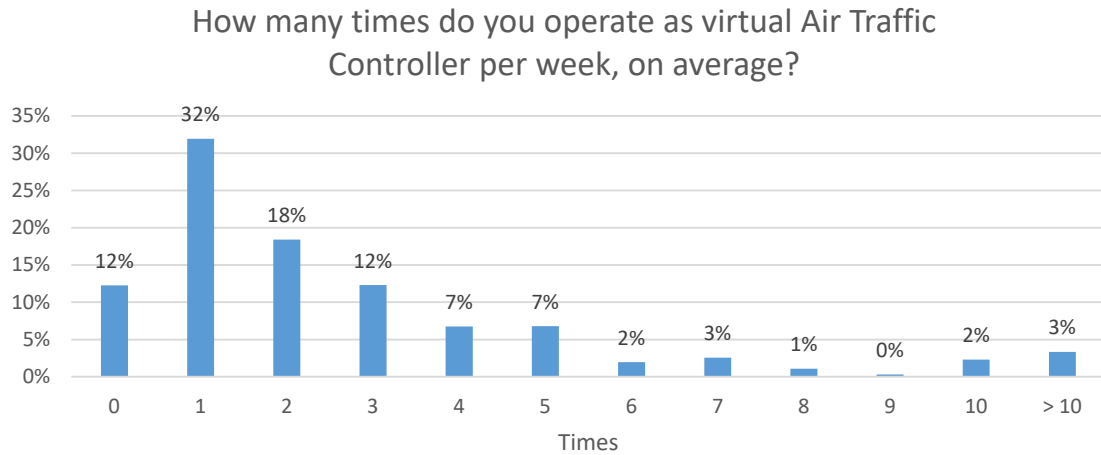
We then decided to follow up on the 3.9 % of respondents who replied that they were previously working as an air traffic controller but decided to quit. We asked them why they no longer operate as controllers. Over 60% responded that they do not have the time anymore.

#### Why do you no longer operate as a virtual Air Traffic Controller?

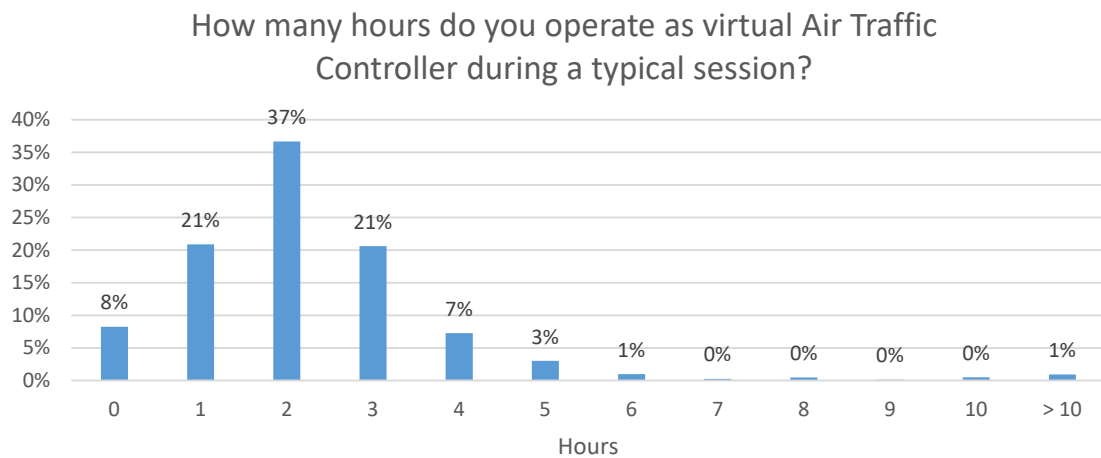


### 3.6.4. ATC Simulation Usage

Among those who stated that they do operate as air traffic controller we asked how many times per week respondents operate as air traffic controllers. As in the previous year, most controllers operate once per week. We also see a decreasing trend in that fewer respondents state that they operate two, three and four times per week.



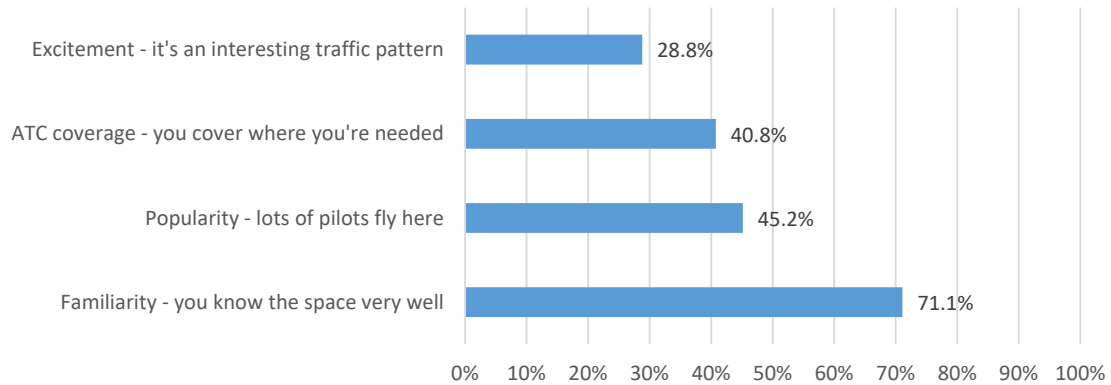
This question was conditional and only presented to respondents who stated that they operate as air traffic controller. We wanted to know how many hours a virtual air traffic controller operates during a typical session on average. We find out that a typical session ranges between 1-3 hours.



### 3.6.5. ATC Simulation Factor Importance

This question was conditional and only presented to respondents who stated that they operate as air traffic controller. We can establish that familiarity of the airspace is the most important factor among the respondents when selecting an airport or area to control, just like last year.

What's important for you when selecting an airport or area to control?



### 3.7. Simulator Habits – General

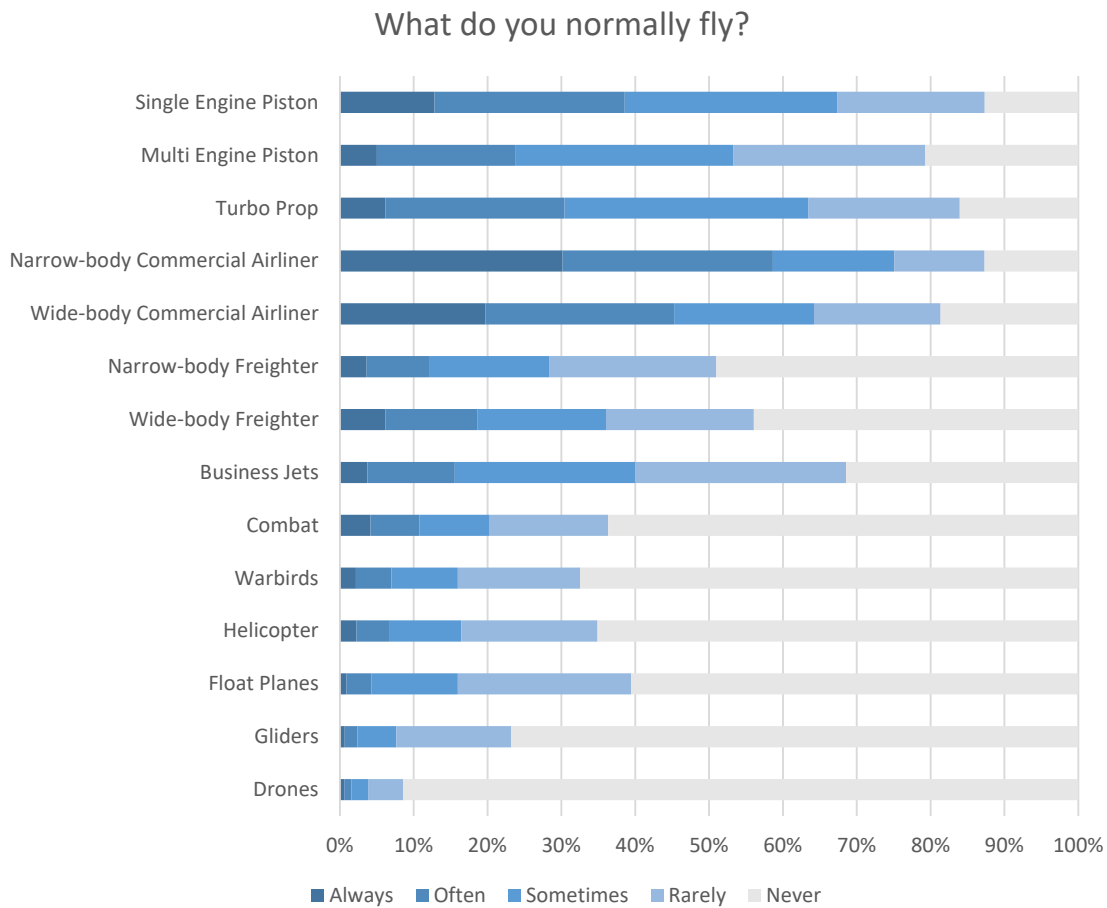
This section on general simulator habits was presented to all respondents.

#### 3.7.1. Aircraft Types

This question was redesigned for this year’s survey. Response alternatives were renamed for improved clarity. The aircraft have now been defined according to size and technical characteristics. In previous years, aircraft were defined by range. Moreover, Warbirds, Float Planes, Gliders and Drones have also been added as alternatives. This means that the results from previous years are not entirely comparable to this year’s results.

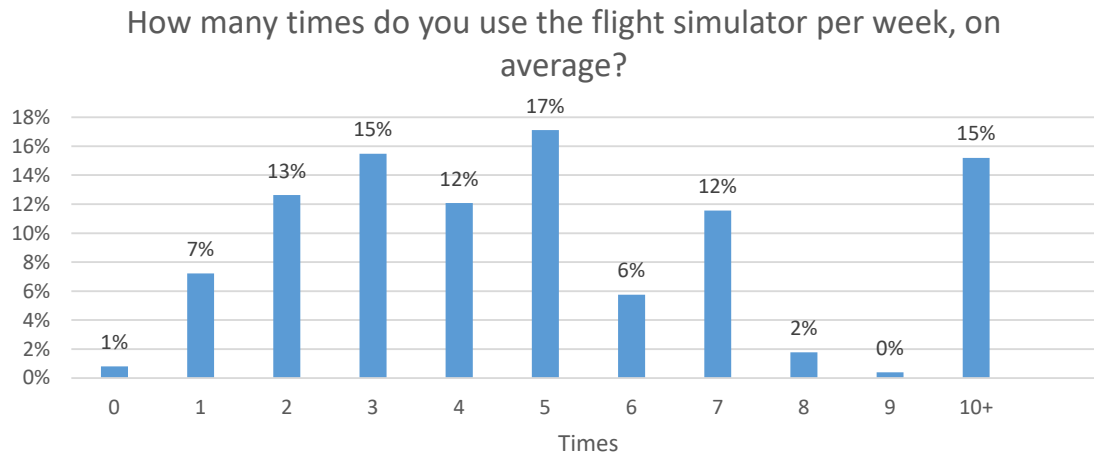
In the previous two years, short/medium haul and single engine private aircraft were the most common. This year Single Engine Piston and Narrow-body Commercial Airliner are the most common. A notable difference, however, is that more respondents claimed to Always or Often fly Narrow-body Commercial Airliners compared to a Single Engine Piston aircraft.

Last year helicopter and combat were the two least common types of aircraft. This year Drones and Gliders are the least popular.

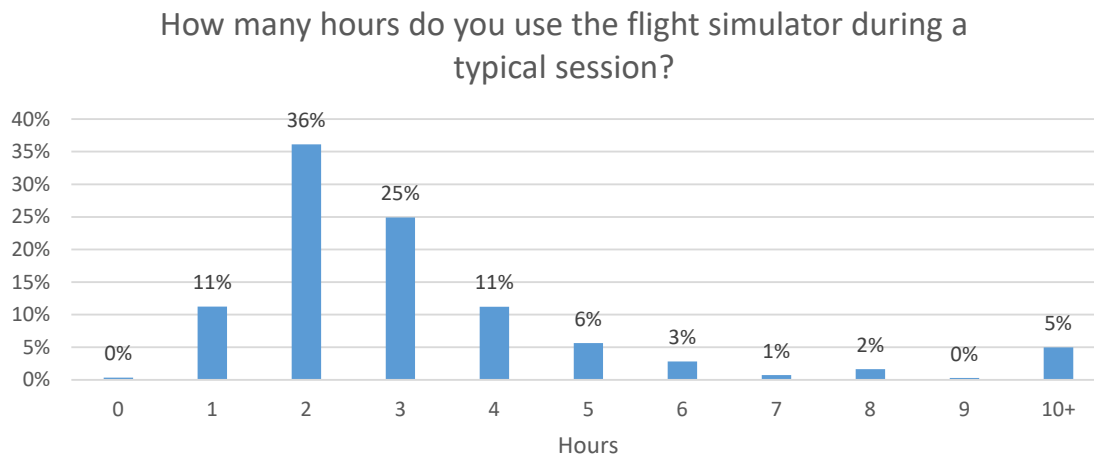


### 3.7.2. Usage

All respondents were asked how many times per week they use a flight simulator. The distribution is similar to 2018 and 2019, except for the increase in respondents who are using the simulator 10 or more times per week. It increased from 5% to 15%.

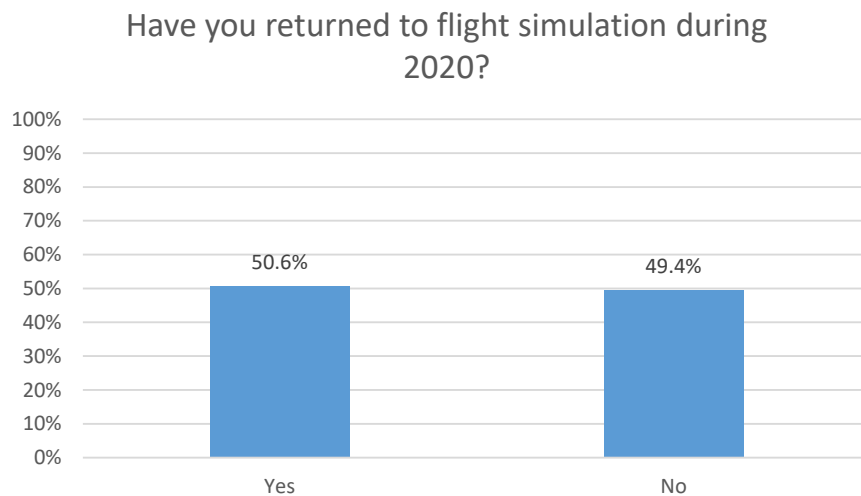


All respondents were also asked how many hours they use the flight simulator during a typical session. We find that most sessions range from 1-4 hours. This question was introduced in this year's survey.

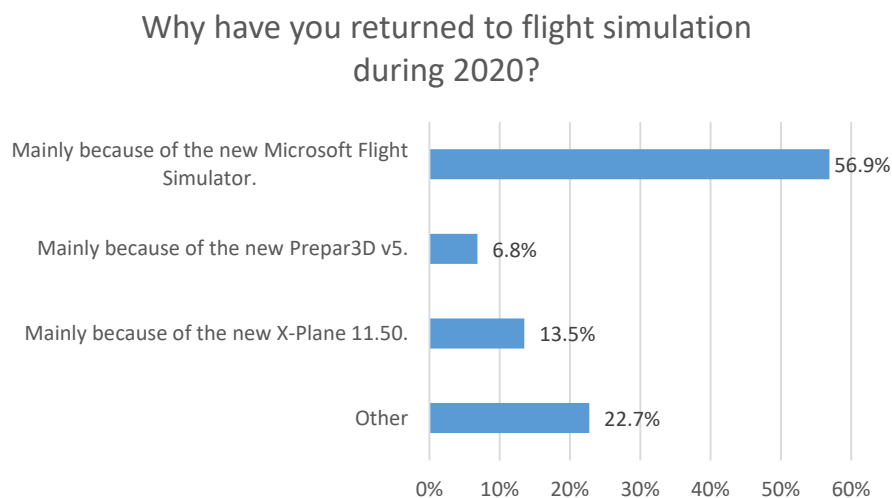


### 3.7.3. Returning to Flight Simulation

In the two previous surveys we asked respondents to tell us for how many years flight simulation has been an interest. However, we noted that for many respondents flight simulation is a periodic interest that comes and does. This year we are trying a different type of questions, namely by asking how many respondents who have returned to flight simulation this year after taking a break from flight simulation. In fact, little over 50% of the respondents restarted their hobby this year.



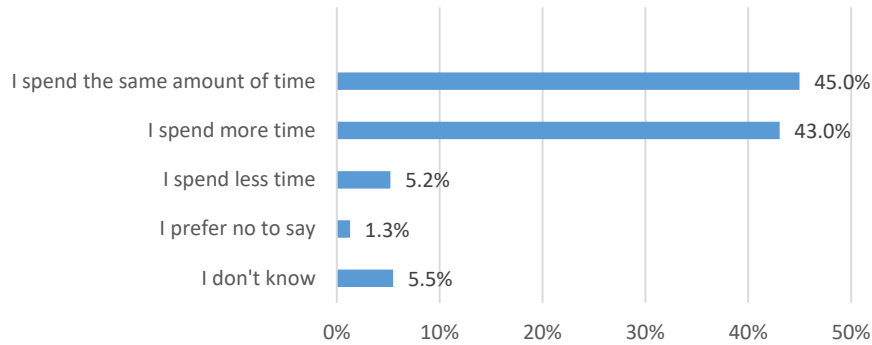
This begs the questions – why did respondents return to flight simulation this year? Among the respondents who stated that they returned to flight simulation this year the vast majority was drawn back by the launch of the new Microsoft Flight Simulator. 12% of the responses in Other stated variations on “Infinite Flight” and their version 20.1-20.3 and reworked B777. 10% stated variations on “never left” which implies they misunderstood the previous question. 8% stated variations on “Covid” or “Corona”.



### 3.7.4. Covid-19

By asking the following question we wanted to know if and how Covid-19 has affected the amount of time spent on flight simulation this year. A total of 43% of the respondents spend more time because of Covid-19, while 45% spend the same amount of time.

To what degree has the amount of time you spend on flight simulation changed as a consequence of Covid-19?

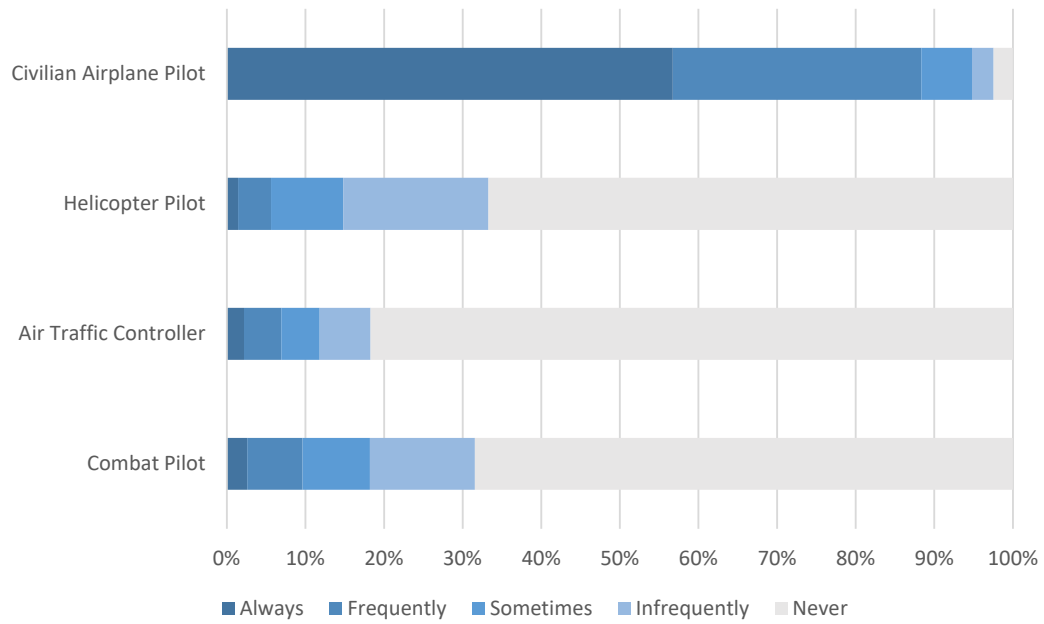




### 3.7.5. Roles

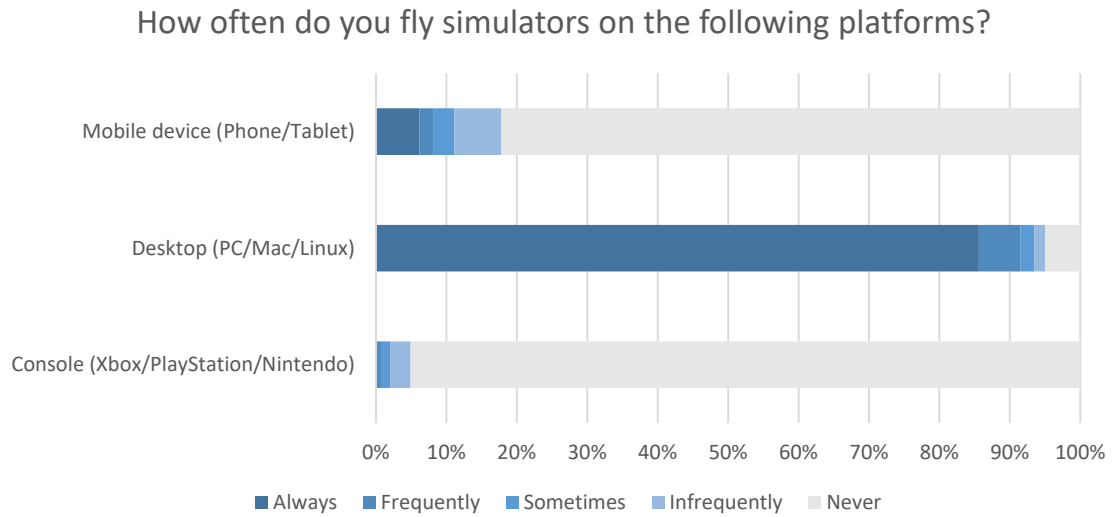
We asked this question to distinguish which type of simulation is the most common. Just like last year, civilian airplane pilot simulation is the most common.

Which type of simulation do you normally do?



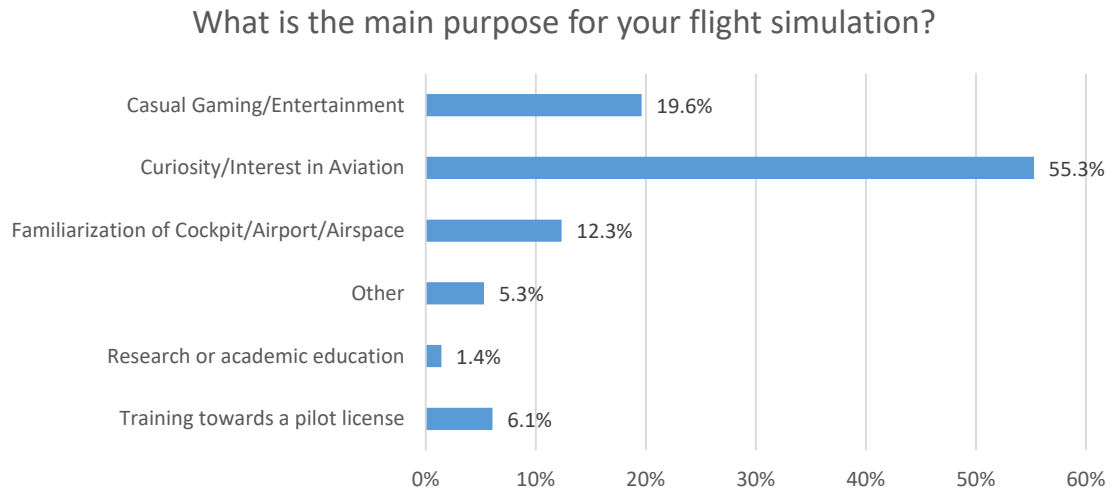
### 3.7.6. Platforms

Just like last year respondents tend to use a desktop as a flight simulation platform, but sometimes a mobile device too. Not many respondents use a gaming console for flight simulation yet.



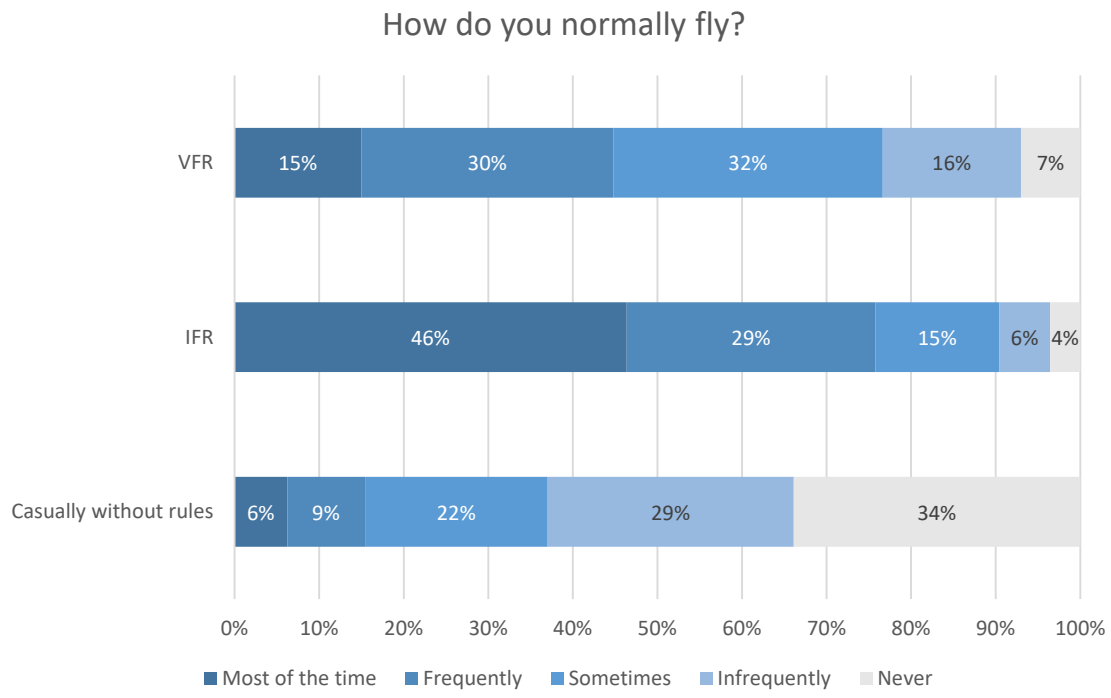
### 3.7.7. Purpose

Just like last year, curiosity/interest in aviation is the main purpose for more than every other flight simmer, while almost one fifth of the respondents fly simulators for casual gaming/entertainment purpose. All results in this graph are very close to what was presented in the previous year's survey.



### 3.7.8. Flight Rules

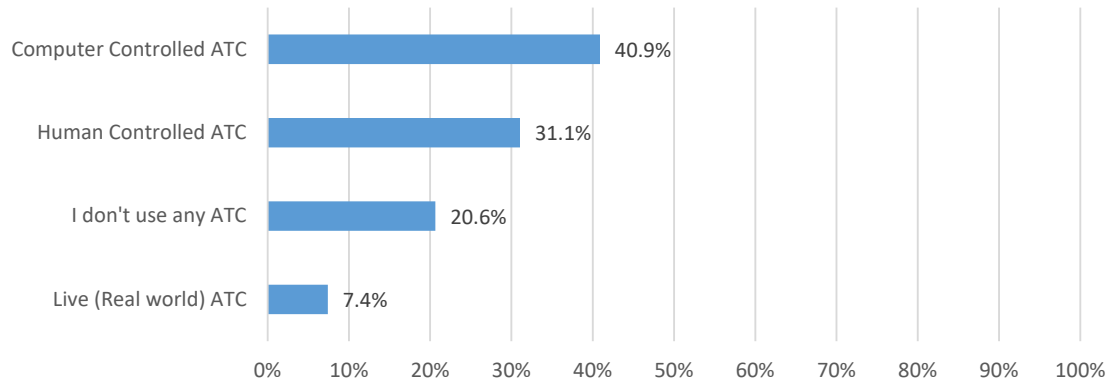
The results are comparable to the last year's survey: IFR and VFR are still more popular than the option of flying "casually without rules" which was introduced as an option in the 2019 year's survey.



### 3.7.9. ATC

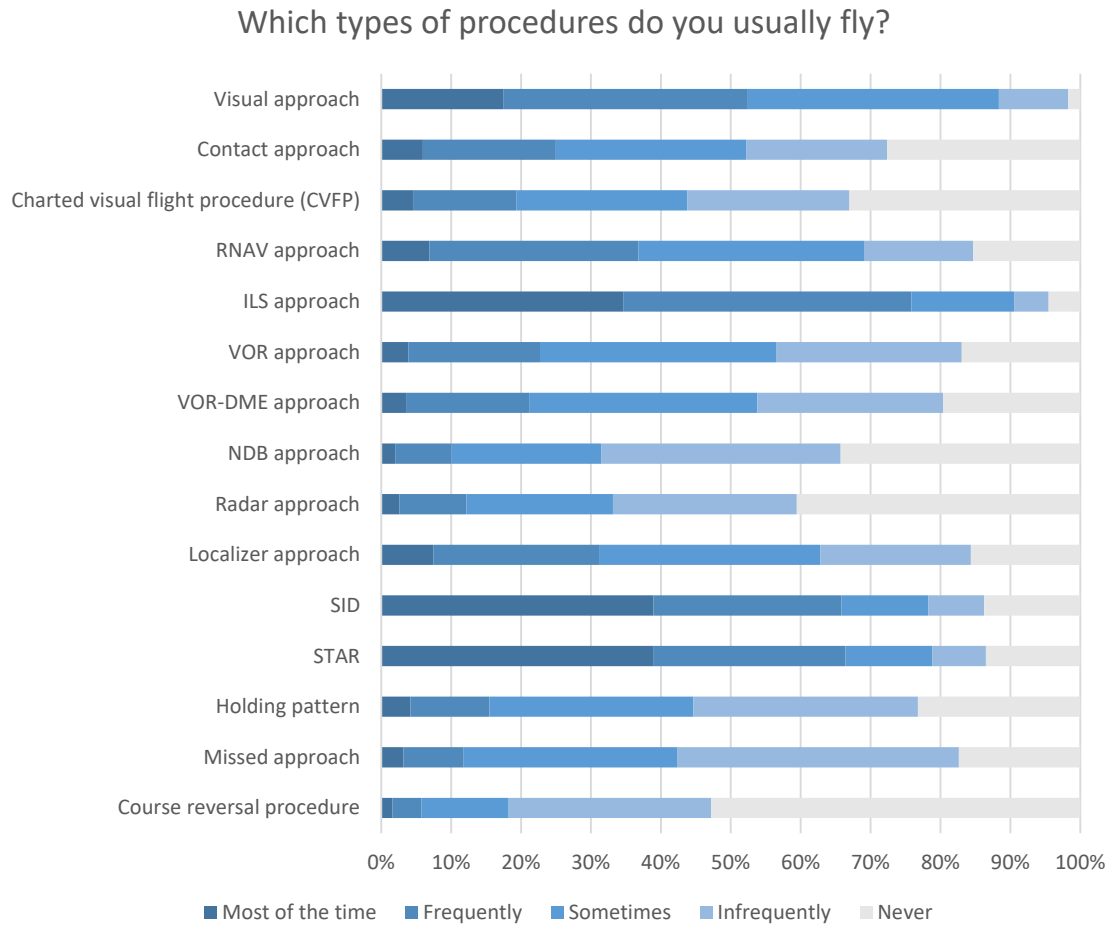
By introducing the following question in this year's survey, we wanted to establish which types of ATC services the respondents mostly use. We find that computer controlled ATC is most popular among our respondents, however almost one in three use human controlled ATC most of the time.

What type of Air Traffic Control do you mainly use when flying?



### 3.7.10. Flight Procedures

With this new question for the 2020 survey, we wanted to know which procedures are most popular. It becomes evident that ILS and visual approaches are frequently flown by our respondents. We do however see that RNAV approaches, SIDs and STARs are also popular.



### 3.8. Consumption Habits

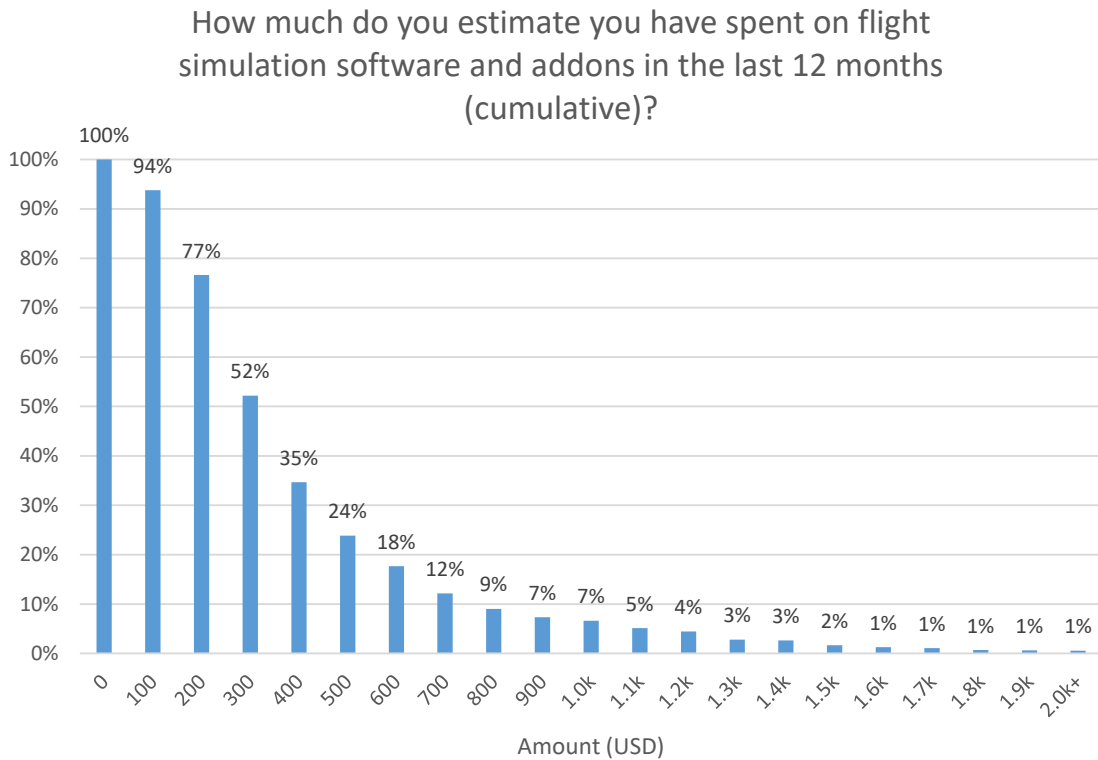
#### 3.8.1. Software Expenses

This question has been a part of the survey 2018 and 2019, but since last year we only present a cumulative graph. The way to read it is: “52% have spent at least \$300 per year.” Obviously, 100% have spent at least \$0.

This year 77% have spent at least \$200. Last year less than 70% spent the same amount. This year 94% have spent at least \$100. Last year less than 90% spent the same amount.

Generally speaking, the distributions are very similar over all three years. For example, in all three years 25% have spent at least \$500 per year. However, if we look in detail we see that more respondents spend less than \$500 per year compared to last year.

The average software spending is \$5,231 dollars. However, removing one of the outliers shifts the average down to \$703. A more reliable measurement is the median which is \$223 dollars. Last year the median was \$250, and the year before that \$245.



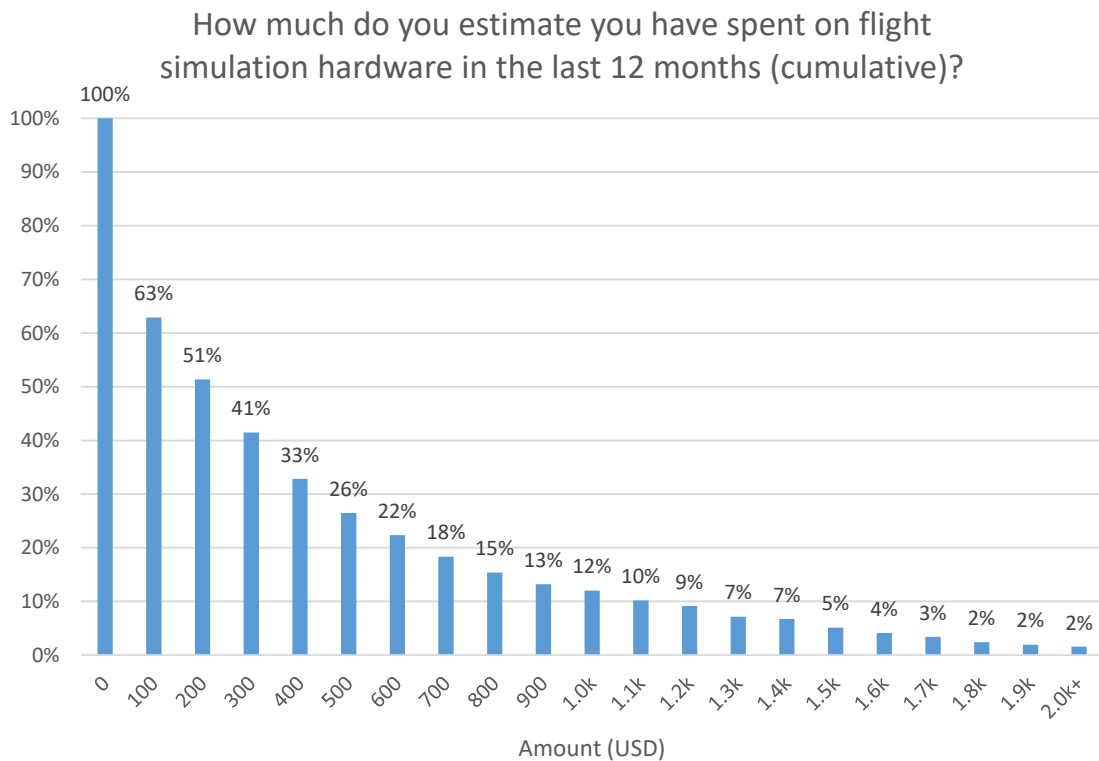
### 3.8.2. Hardware Expenses

This question has been asked in 2018 and 2019 as well. Just like software expenses, hardware expenses are expressed as cumulative graph. It should be read like this: 100% of the respondents have spent at least \$0 dollars this year. 63% have spent at least \$100 per year. 51% have spent at least \$200 per year. 41% have spent at least \$300 per year. 33% have spent at least \$400 per year. 26% have spent at least \$500 per year. 22% have spent at least \$600 per year. And so on.

This year 63% have spent at least \$100. Last year some 55% have spent at least \$100. This year 51% have spent at least \$200. Last year only 40% spent the same amount.

Just like software expenses, the distributions look very similar to the previous year, but when you look into the details respondents have actually spent more money this year than last year.

The average hardware spending is \$1,045, but a more reliable measurement is the median which is \$167. Last year the median was \$111. The year before that it was \$200.



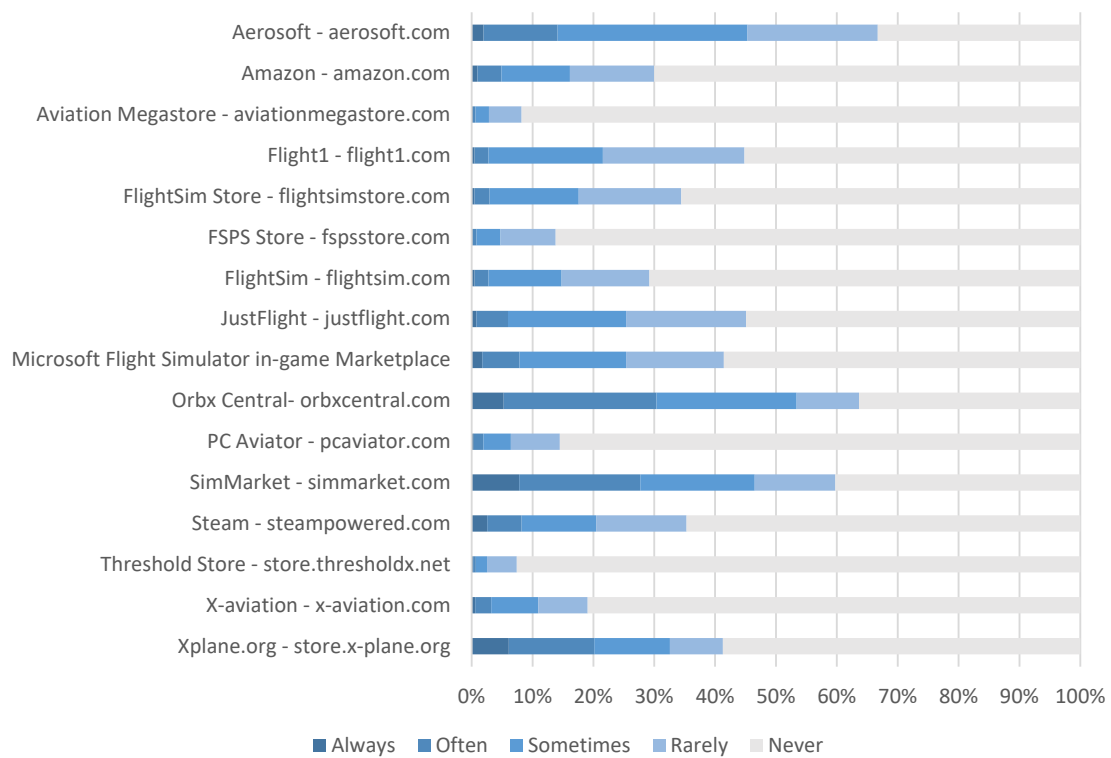


### 3.8.3. Preferred Online Stores

One notable difference from last year is the introduction of Microsoft Flight Simulator in-game Marketplace which was launched following the Microsoft Flight Simulator release. Orbxcentral.com is also introduced as an online store in this year's survey.

A slight drop can be identified among some of the established stores, yet the numbers are in general comparable to the previous year's survey.

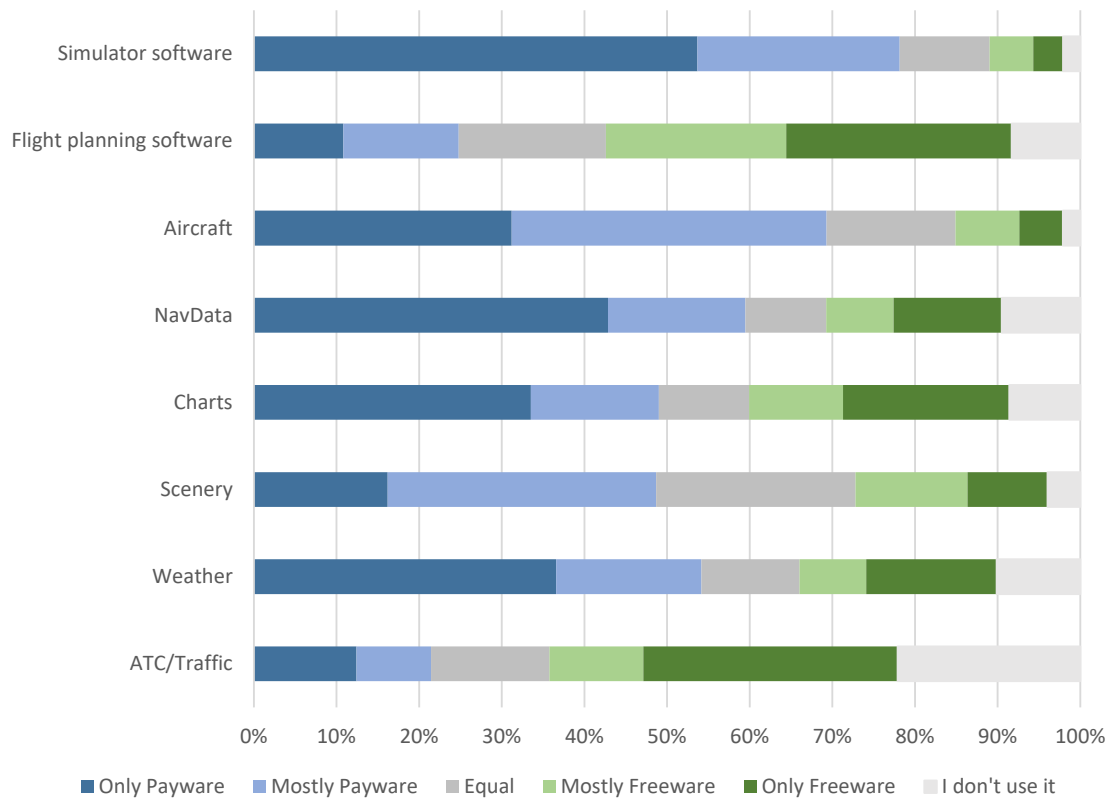
How often do you purchase flight simulation products from these online stores?



### 3.8.4. Freeware Versus Payware

The results from this question are comparable to last year's survey. We find that flight planning and ATC/Traffic software tends to be freeware, whereas simulator software tends to be payware.

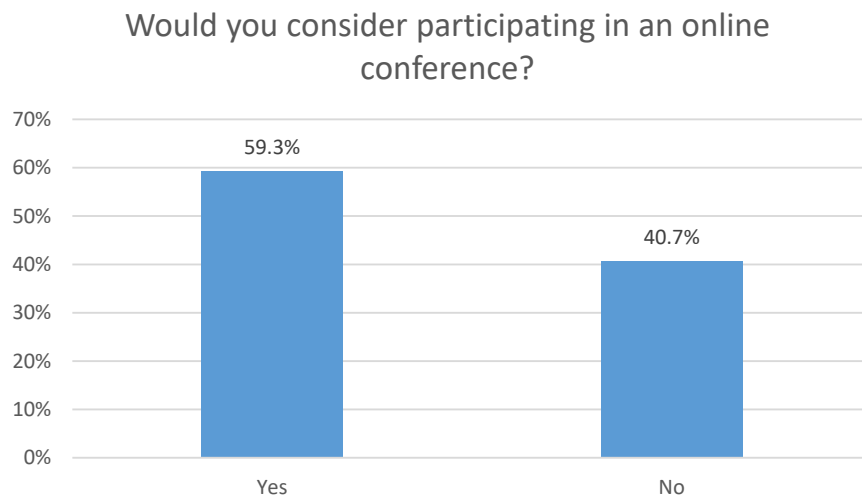
Considering all the software and data which you use for flight simulation, what tends to be freeware versus payware?



## 3.9. Community

### 3.9.1. Conferences

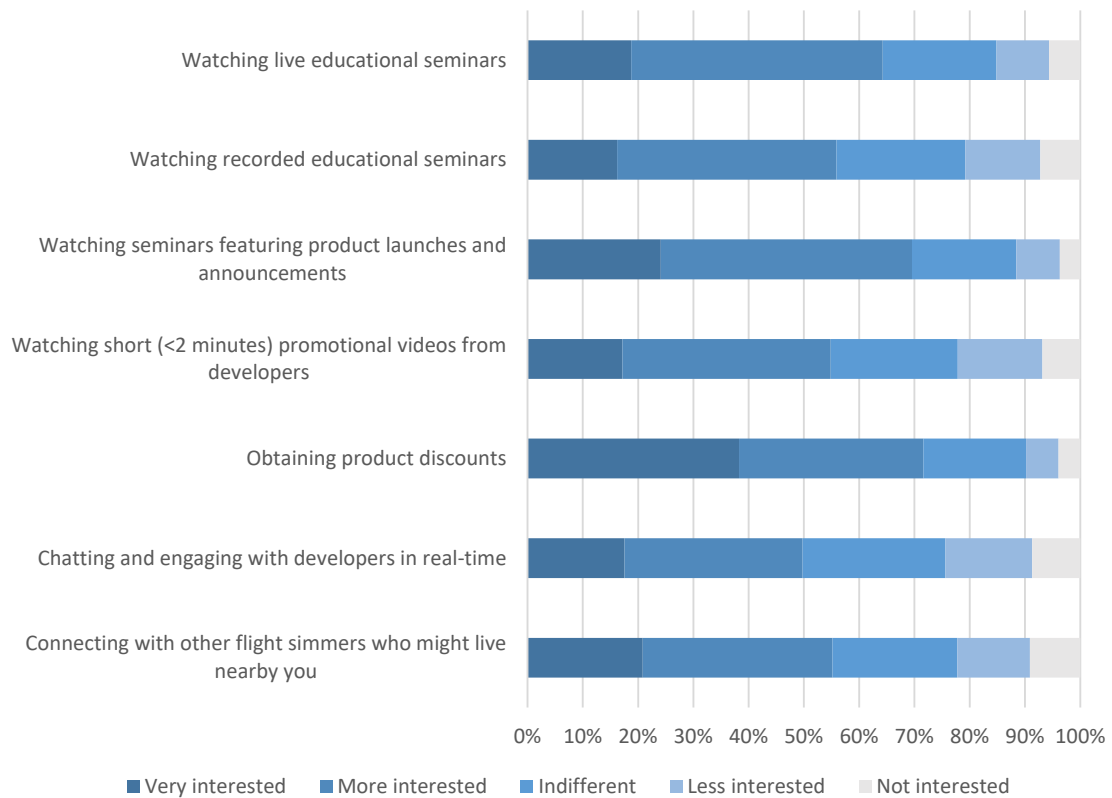
Usually, we ask questions about physical conference attendance. Considering the current global situation where many people are restricted and have not been able to attend conferences in person, an online conference may be an option to connect with each other. Almost 60 % of the respondents would consider participating in such an event.



### 3.9.2. Online conferences

This question was conditional and only presented to the respondent who could consider participating in an online conference. Although there is a degree of interest in all options, watching seminars featuring product launches and announcements as well as obtaining product discounts seems to be slightly more popular than rest of the components.

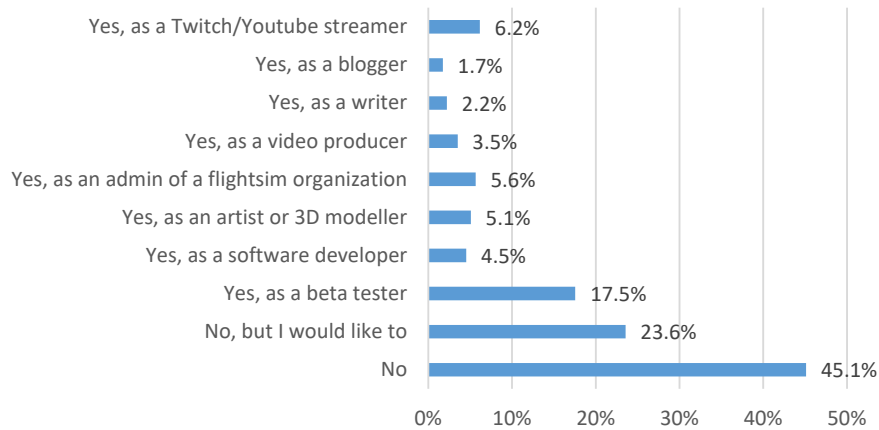
Which components of an online conference would be most interesting to you?



### 3.9.3. Contribution

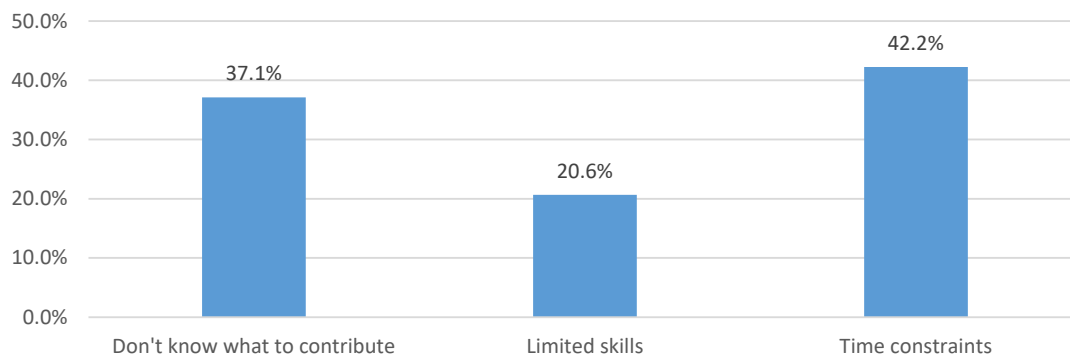
This year we added “No, but I would like to” as an option, which made the answer “No” drop by over 15%. Beta tester continues to be the most common form of contribution.

#### Do you contribute to the flight simulation community?



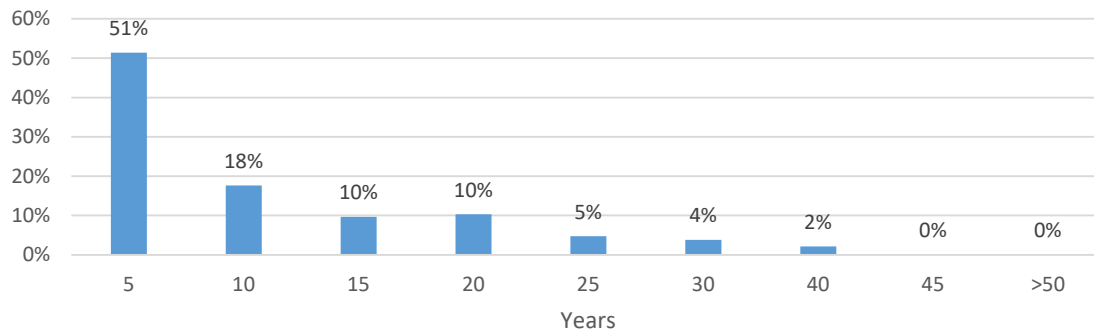
This new question was conditional and only presented to the people who didn't contribute to the simulation community. We find that “Time constraints” is the largest factor which stops respondents from contributing to the flight simulation community.

#### What stops you from contributing to the flight simulation community?



This question is new in this year's survey and the results are very satisfying. Many of you have contributed for several years, some of you up till 40 years.

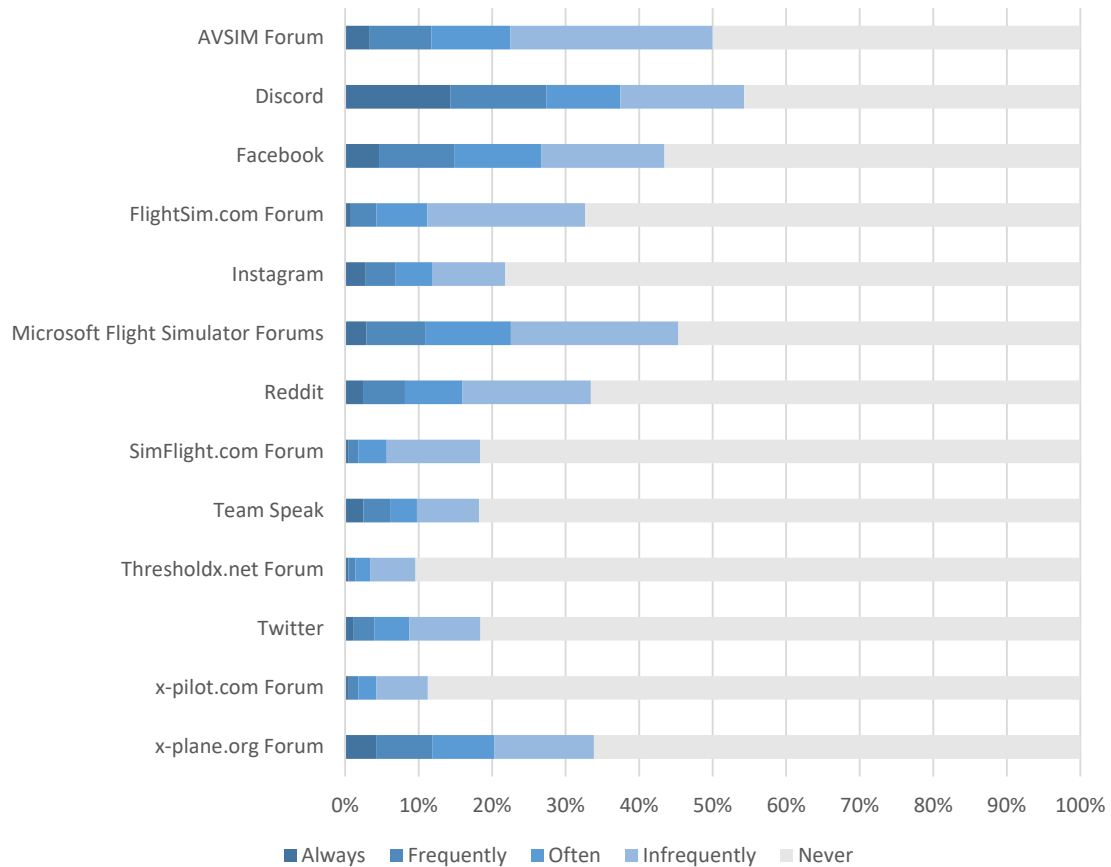
### For how many years have you contributed to the flightsim community?



### 3.9.4. Communication Platforms

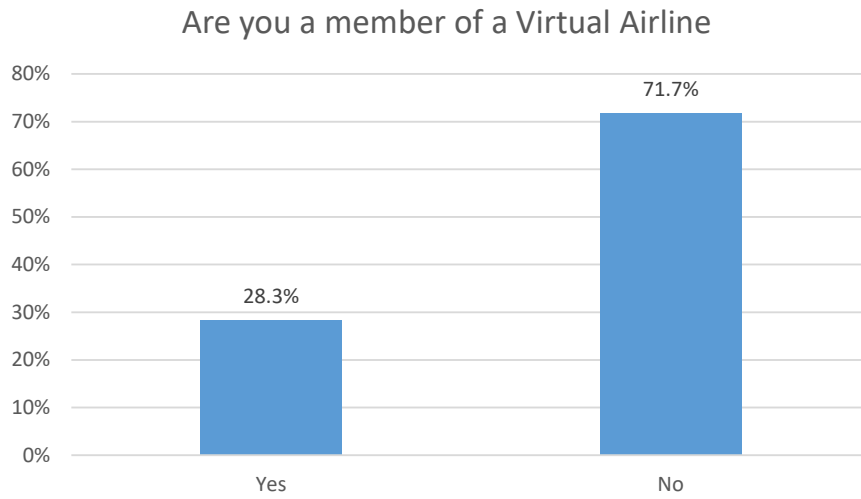
A new communication platform for this year's survey is the Microsoft Flight Simulator Forum. The most popular platforms to communicate with others are currently Discord, AVSIM Forum, Microsoft Flight Simulator Forum and Facebook.

How frequently do you use the following platforms for the purpose of communicating with others in the flight simulation community?



### 3.9.5. Virtual Airline Membership

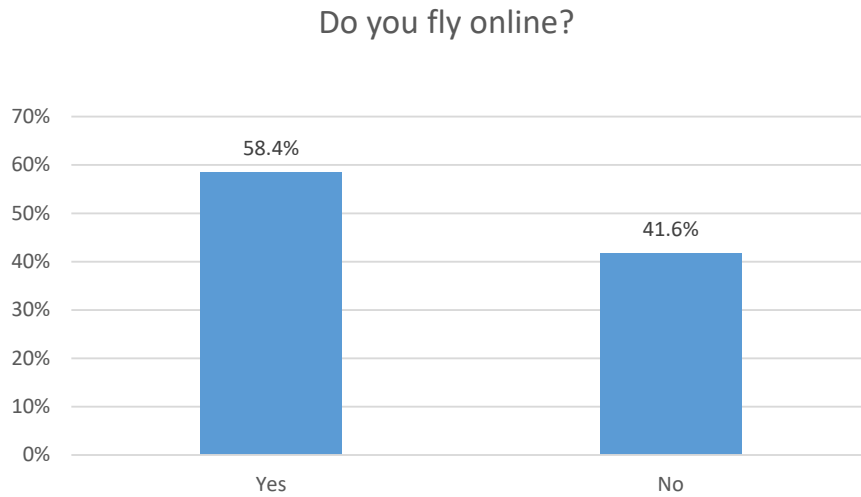
Last year 34% of the respondents were a member of a virtual airline, in comparison to this year's 28.3%.





### 3.9.6. Online Flying

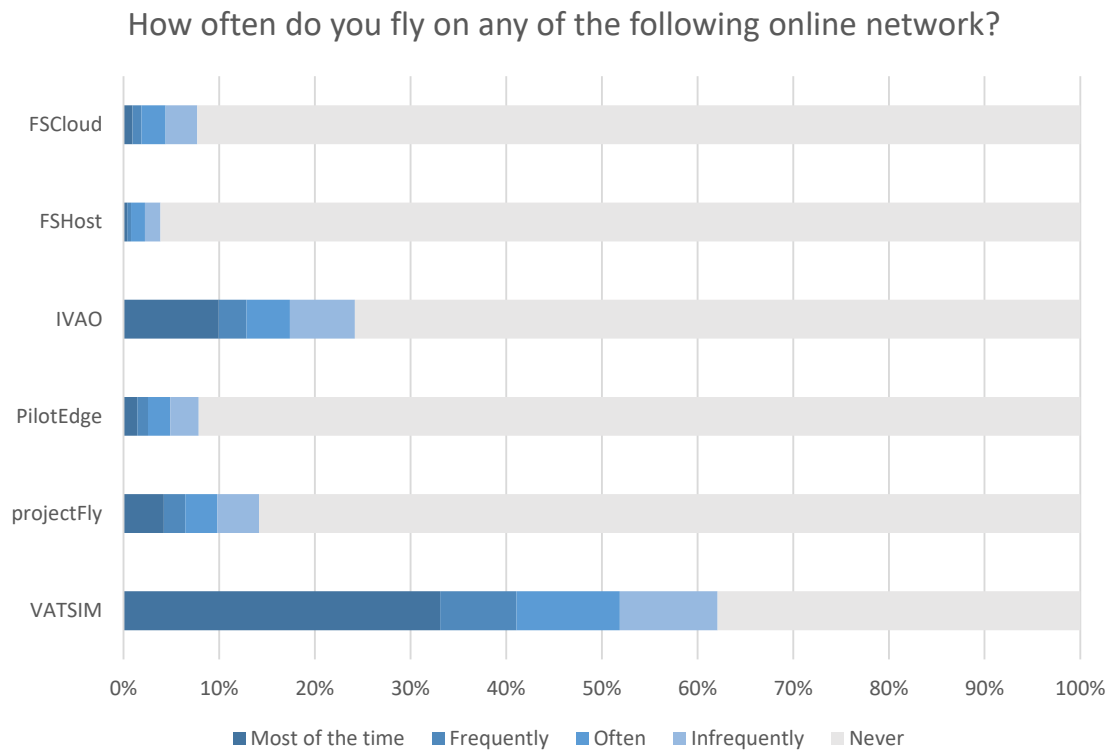
We wanted to know how many people fly online or not and compare the numbers to the previous year. Last year 56% stated that they fly online, meaning that the percentage of simulator pilots who fly online has increased by 2.4%.



### 3.9.7. Online Network Preference

The following question regarding network preference was only asked to the respondents who stated that they fly online.

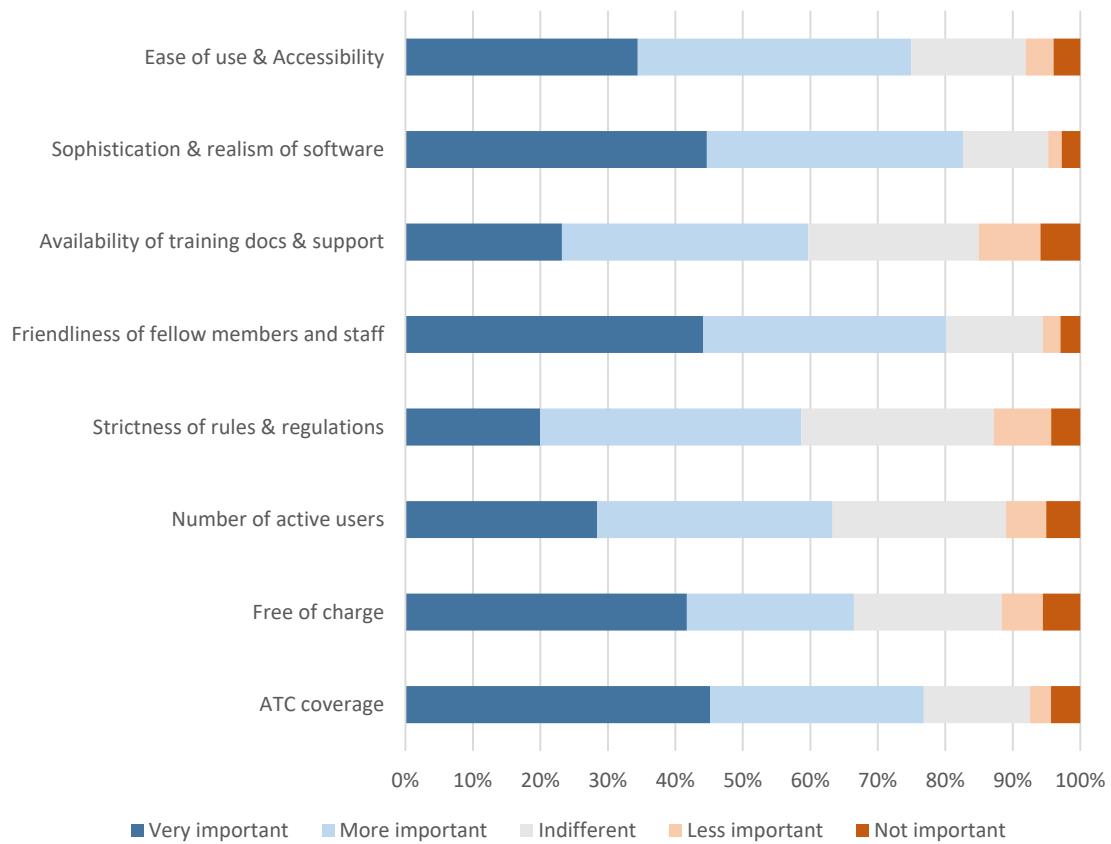
As reported in the previous year's survey, most of the respondents use VATSIM, followed by IVAO and projectFly.



### 3.9.8. Important Factors for Joining Online Networks

This question was introduced last year. Although this year's results are similar, we note that friendliness of fellow members and staff is now top three together with Sophistication and ATC coverage, putting free membership on the fourth place.

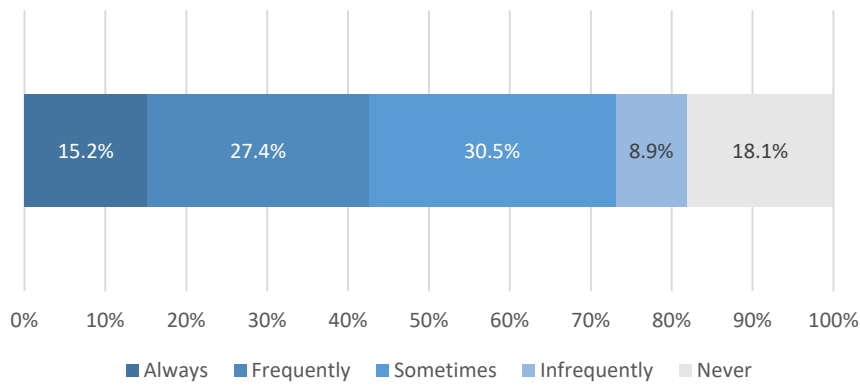
What is important to you when considering joining a network?



### 3.9.9. ATC Importance on Routing

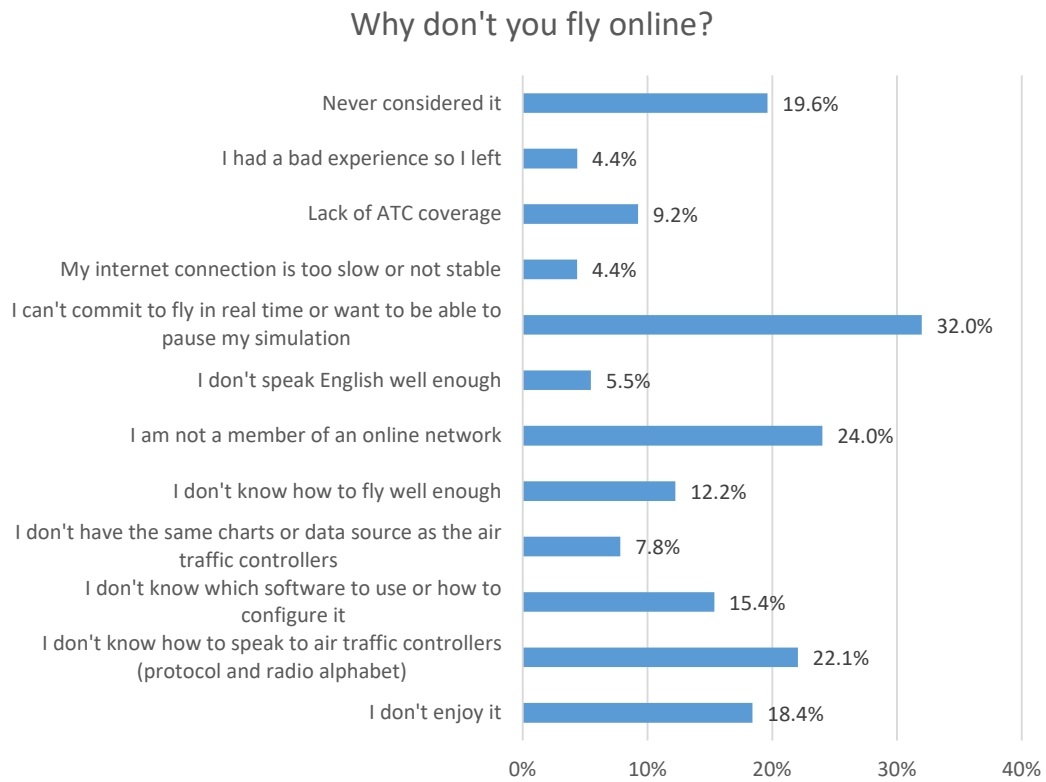
This question was introduced last year for the purpose of establishing the importance of ATC with regards to origin, route, or destination. The answers are along the lines of last year's survey.

Does the availability of ATC influence your choice of origin, route or destination?



### 3.9.10. Reasons for Not Flying Online

This question was conditional and only shown to respondents who stated they did not fly online. The commitment to fly in real time is still the largest reason for not flying online.

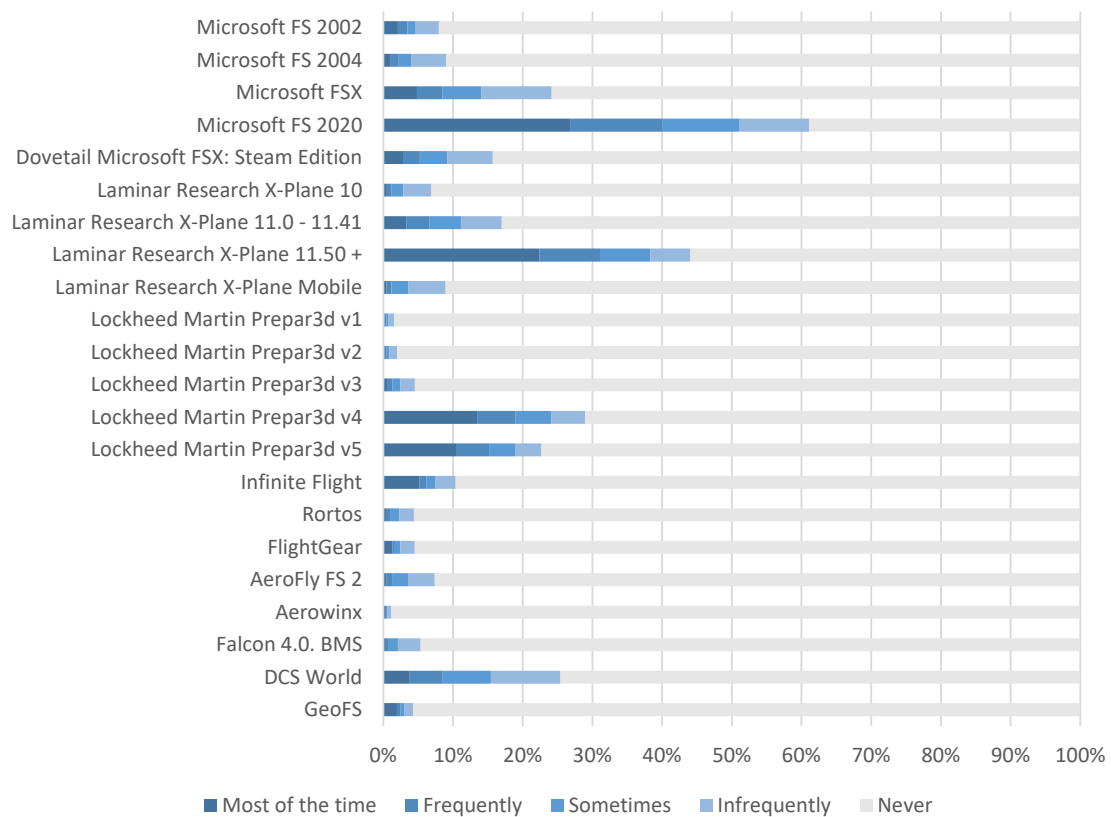


### 3.10. Simulator Platform

#### 3.10.1. Simulator Software

Following the launch of Microsoft Flight Simulator earlier in 2020, this simulator has grown to become the most popular flight simulator among the respondents. Laminar Research X-Plane 11.50+, as well as Prepar3D v4 and v5 are also popular flight simulators.

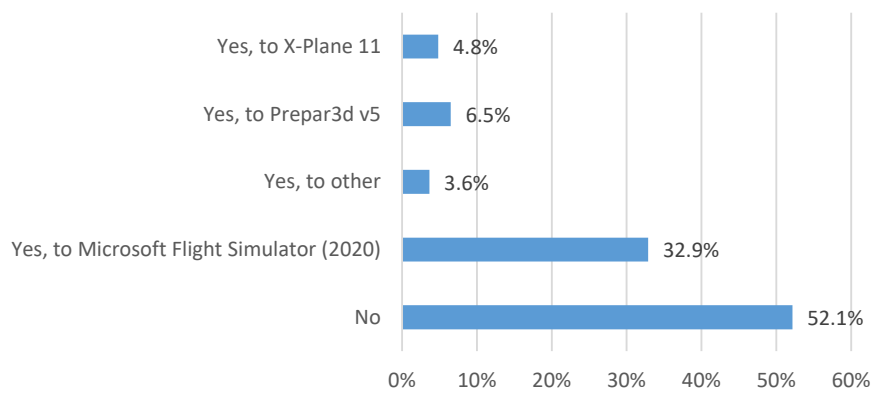
How often do you fly any of the following flight simulator software?



### 3.10.2. Simulator Software Change

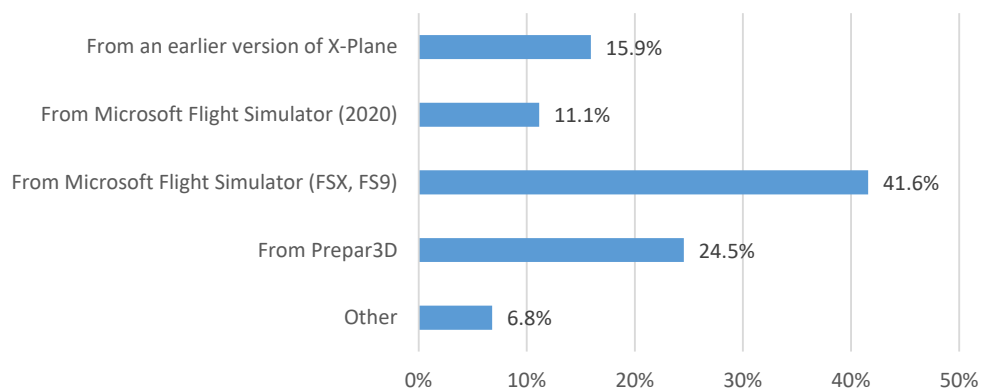
Almost 50% of the respondents have switched their primary flight simulation software during 2020. The majority of these have switched to Microsoft Flight Simulator. In 2019 we asked the community what the likelihood was that they would purchase Microsoft Flight Simulator when it becomes available. Over 60% of the respondents then replied that they would be likely or very likely to buy the new simulator. From this year's survey we can establish that a total of almost one third have so far made Microsoft Flight Simulator 2020 their primary flight simulation software.

Have you switched your primary flight simulation software this year?



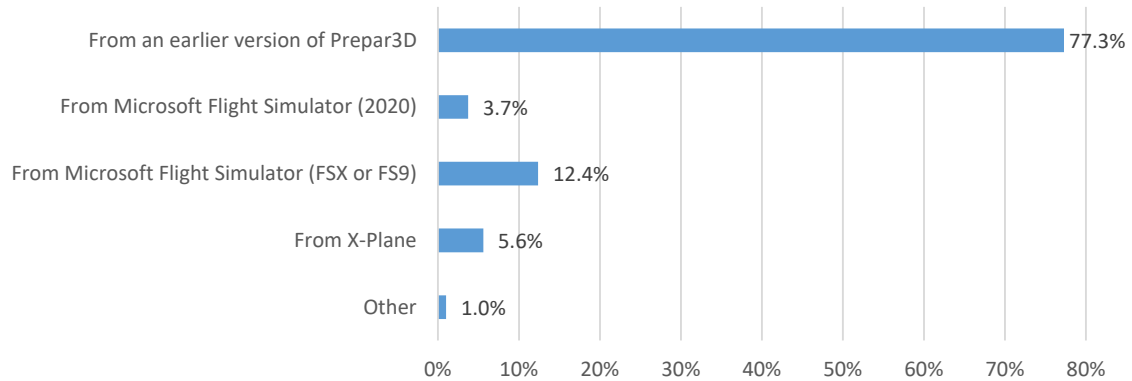
This question was conditional and only presented to the respondents who stated that they switched to X-Plane 11 this year. We can establish that common flight simulators that respondents left for X-Plane 11 were Microsoft Flight Simulator (FSX, FS9) and Prepar3D.

From which flight simulator software did you switch to X-Plane 11?



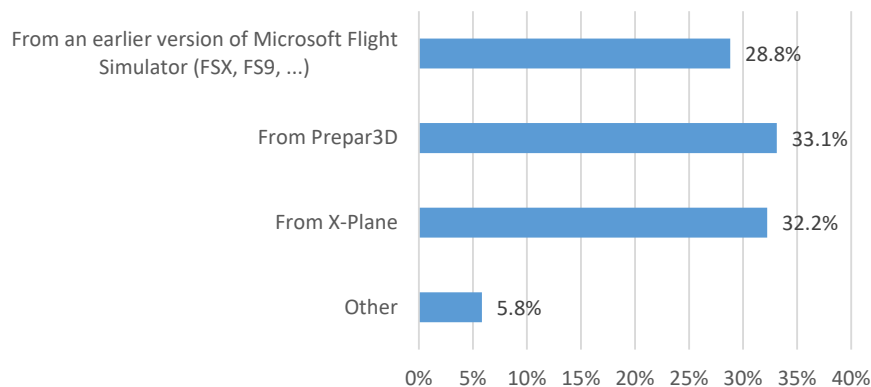
This question was conditional and only presented to the respondents who stated that they switched to Prepar3d v5 this year. By far most of the respondents switched from an earlier version of Prepar3D.

### From which flight simulator software did you switch to Prepar3d v5?



This question was conditional and only presented to the respondents who stated that they switched to Microsoft Flight Simulator this year. The results suggest a spread between X-Plane, Prepar3D, and earlier versions of Microsoft Flight Simulator.

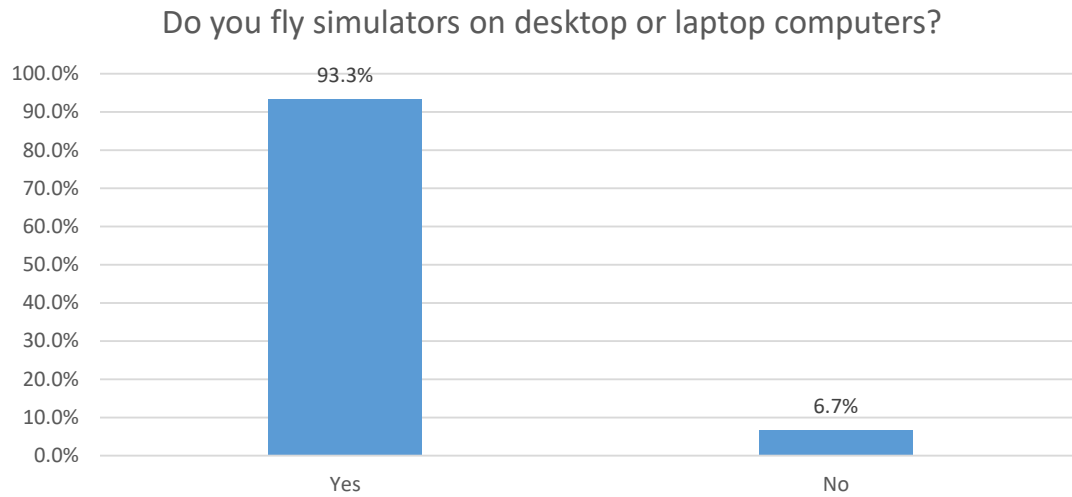
### From which flight simulator software did you switch to Microsoft Flight Simulator?





### 3.10.3. Computer

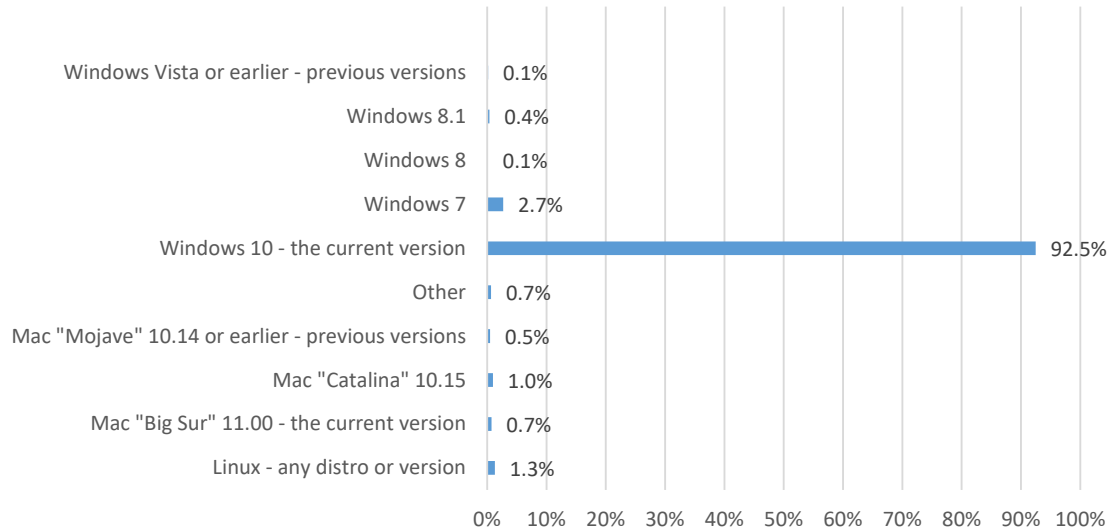
This question is new for this year and was used to filter out laptop and desktop users for upcoming questions. With over 93%, we find that most respondents fly simulators on desktop or laptop computers, compared to other platforms.



### 3.10.4. Operating System

This question was asked in the 2018 survey, but not in the 2019 survey. Just like in 2018 Windows 10 is the most common operating system. In 2018 12.4% was using Windows 8 or earlier. This year we see that a lot fewer users are still using Windows 8 or earlier.

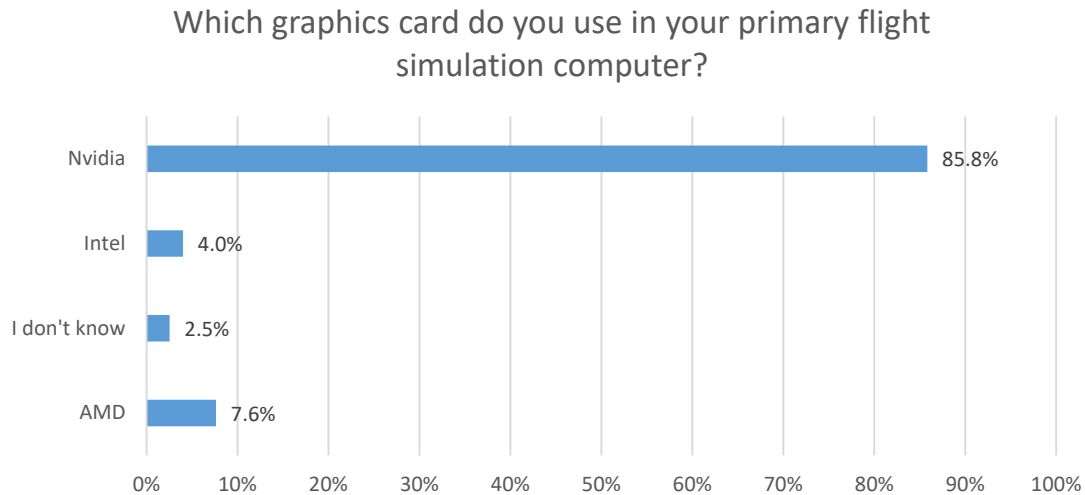
Which operating system are you running on your primary flight simulator computer?



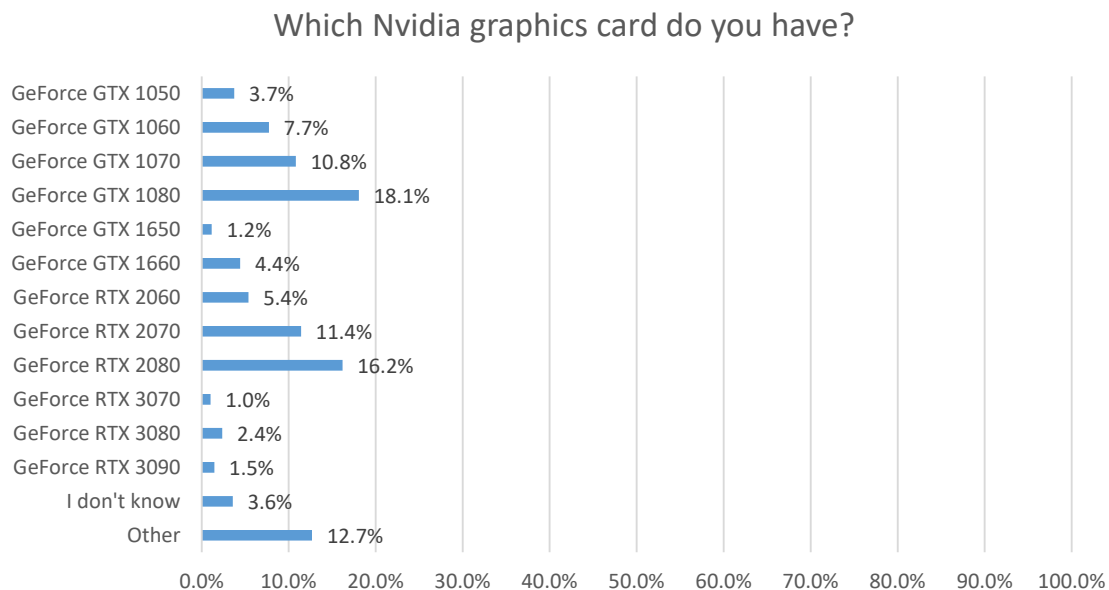
### 3.10.5. Graphics Card Usage

In 2018 we had a question about graphics cards, but not in 2019. This year we decided to revisit this question again and include some follow-up questions to get more information about the performance range of our respondents' computers. The question was asked all respondents who use laptop or desktops.

Nvidia appears to be dominating as the most popular graphic card.

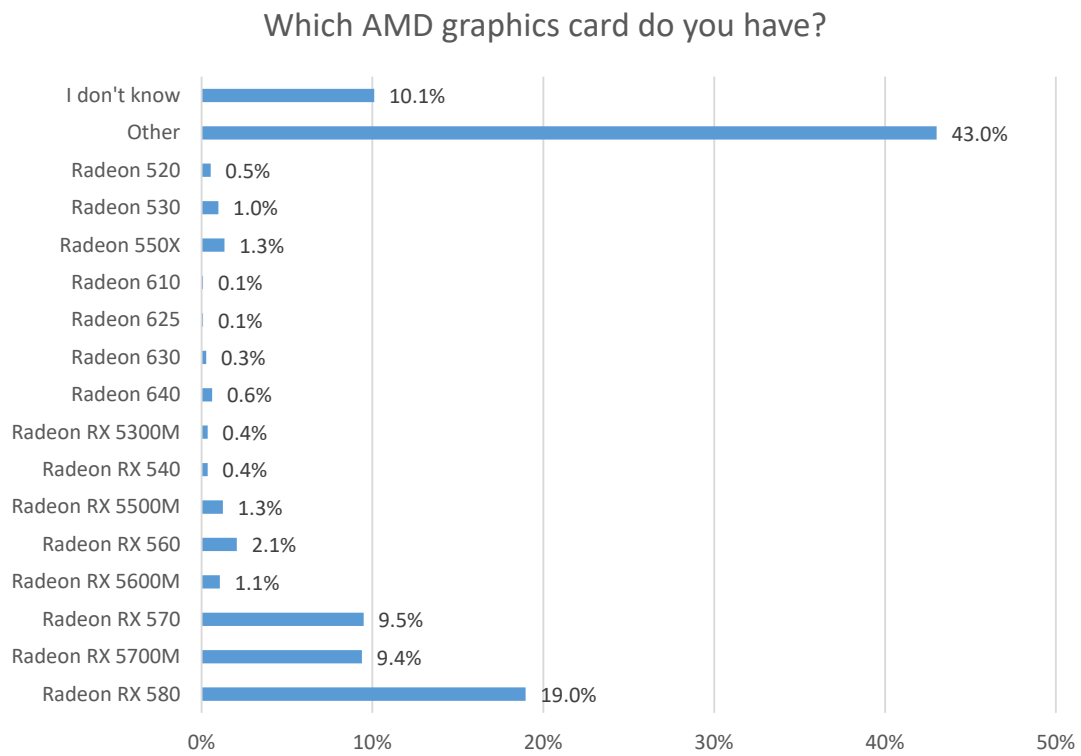


The following question was conditional and only answered by those who had Nvidia graphics card. With 18.1% the GeForce GTX 1080 is the most used graphics card, followed by the RTX 2080 which is used by 16.2% of the respondents.



This question was only answered by those who have an AMD graphics card.

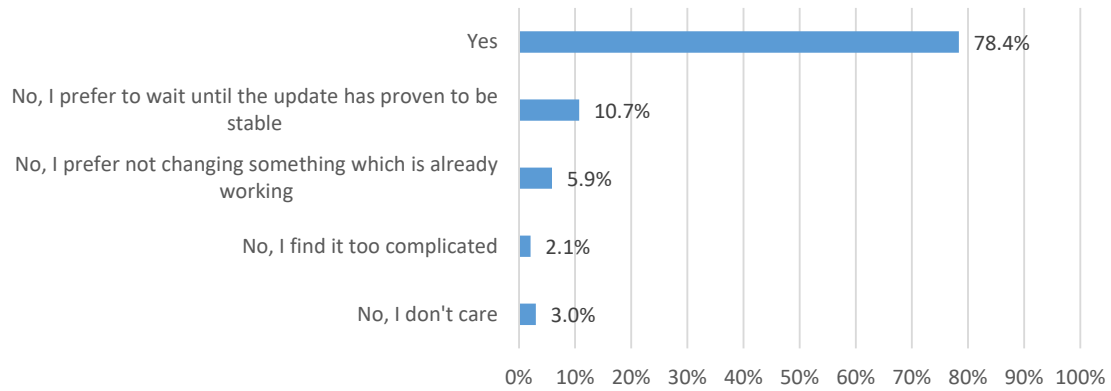
In “Other” we see 27% variations on “Radeon RX 5700 XT”.



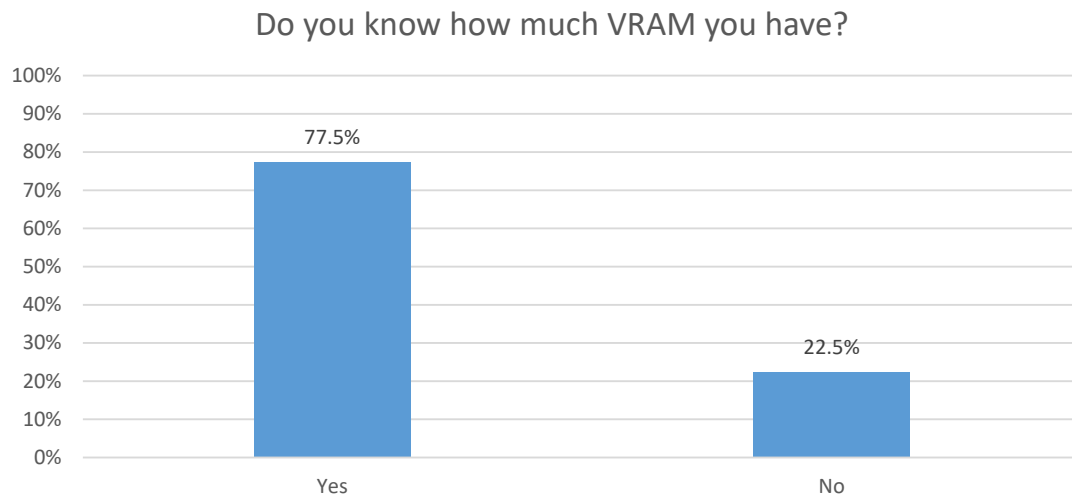
### 3.10.6. Graphics Card Drivers

This is also a new question for this year's survey. Over 78% of the respondents are actively keeping their graphic card driver up to date.

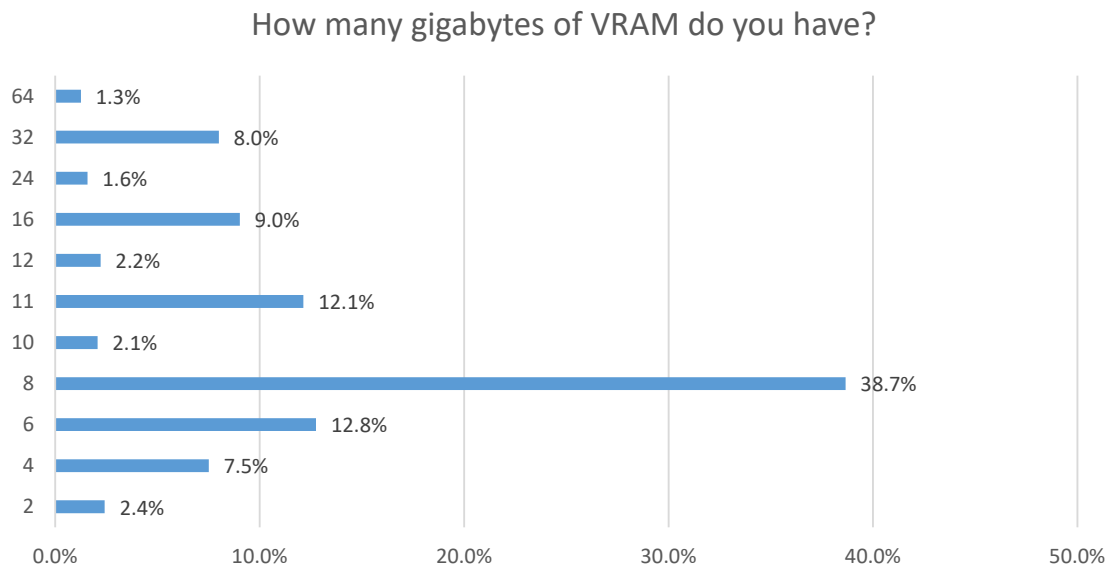
Are you actively keeping your graphics card drivers up to date?



### 3.10.7. VRAM Storage

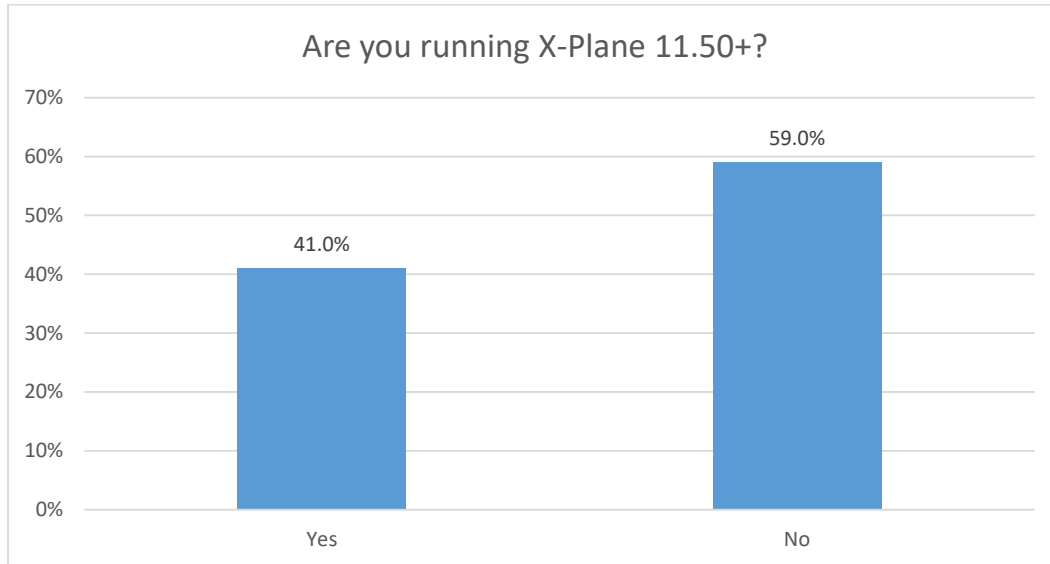


By introducing this question in the 2020 survey, we wanted to find out how many gigabytes of VRAM the respondents have. The diagram below presents all answers that had a popularity of 1% or more among the respondents.



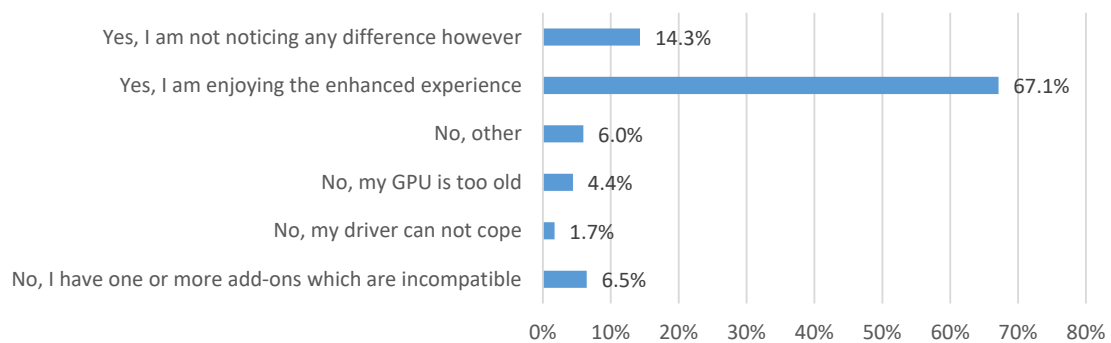
### 3.10.8. X-Plane 11.50 Vulkan/Metal Usage

The new version of X-Plane has support for Vulkan and Metal. We wanted to ask if respondents are using this feature and whether they are noticing any difference. First we asked a conditional question to make sure only X-Plane users responded.



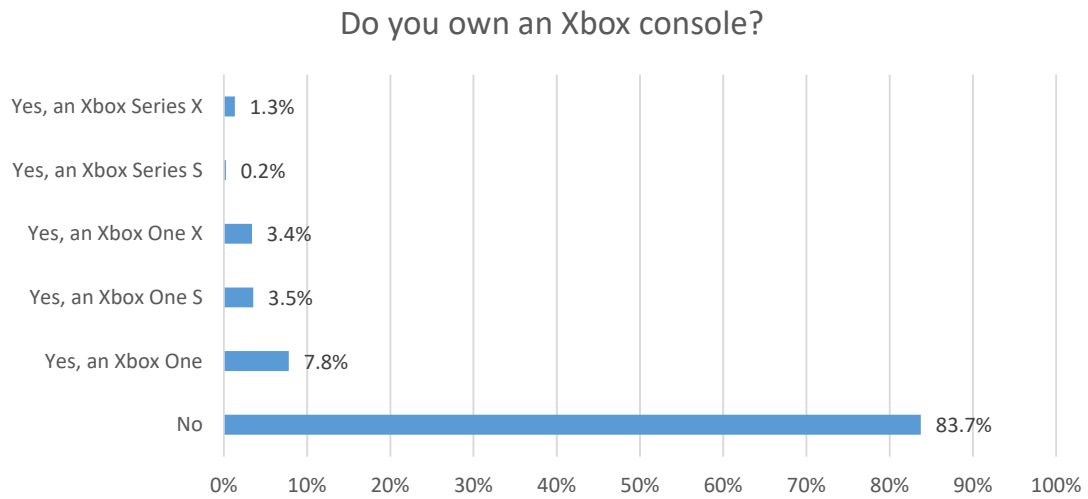
Then the following question was asked to the 41% who stated that they run X-Plane 11.50+. 81.4% of X-Plane 11.50+ users are using the new feature. However, 14.3% are not noticing any difference.

Since you are using X-Plane 11.50+, are you using the new Vulkan/Metal option?



### 3.10.9. Xbox Consoles

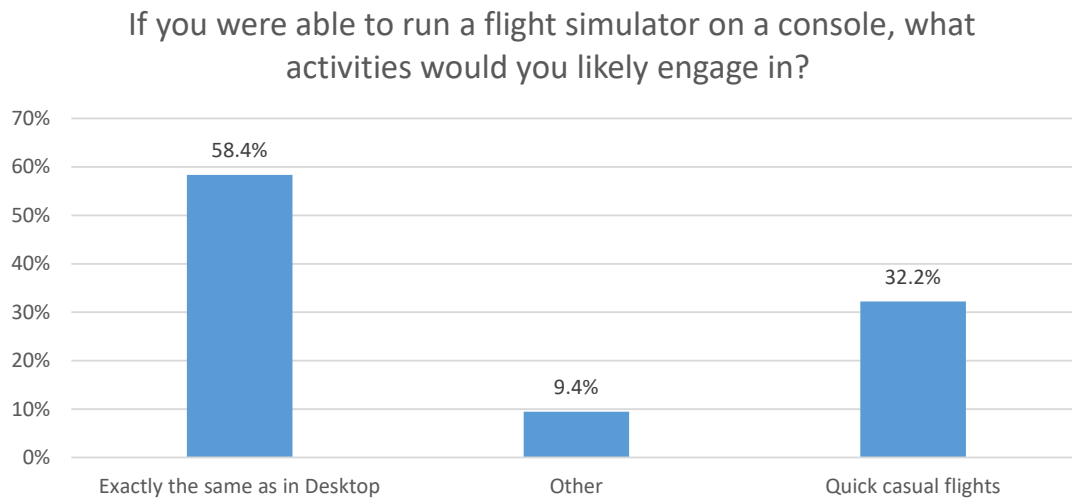
In this year's survey we added the new Xbox Series X and Xbox Series S as answer alternatives. However, the older Xbox models are still more popular. This is probably because the new Xbox series were released very shortly before the 2020 survey was published.





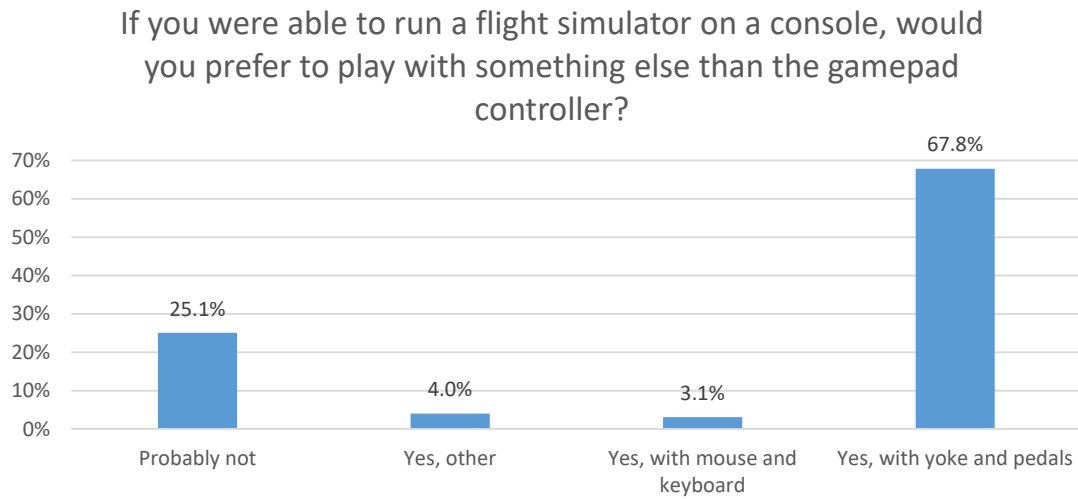
### 3.10.10. Console Activity

Since Microsoft Flight Simulator is anticipated to be released on Xbox we wanted to ask if respondents would use a flight simulator the same way on console as they would on a desktop computer. The results suggest that 58.4 % would do the same activities as when flying on desktop, whereas 32.2% would just do quick casual flights.



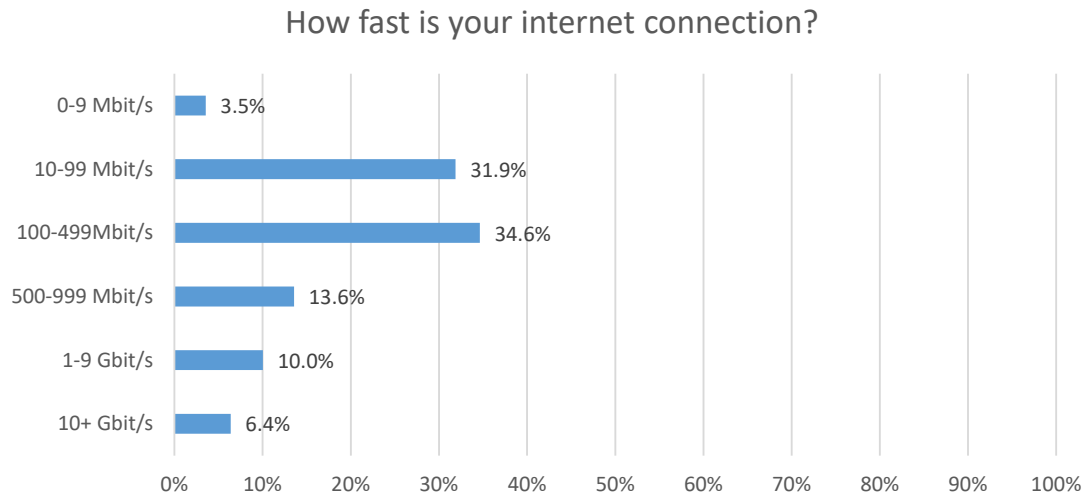
### 3.10.11. Console Controller

Continuing on the topic of consoles, we would like to know if respondents were likely to connect any other peripherals aside from gamepad controllers to fly. In fact, three out of four would prefer to play with something else than gamepad controller, and just over two-thirds would prefer to fly with yoke and pedals.



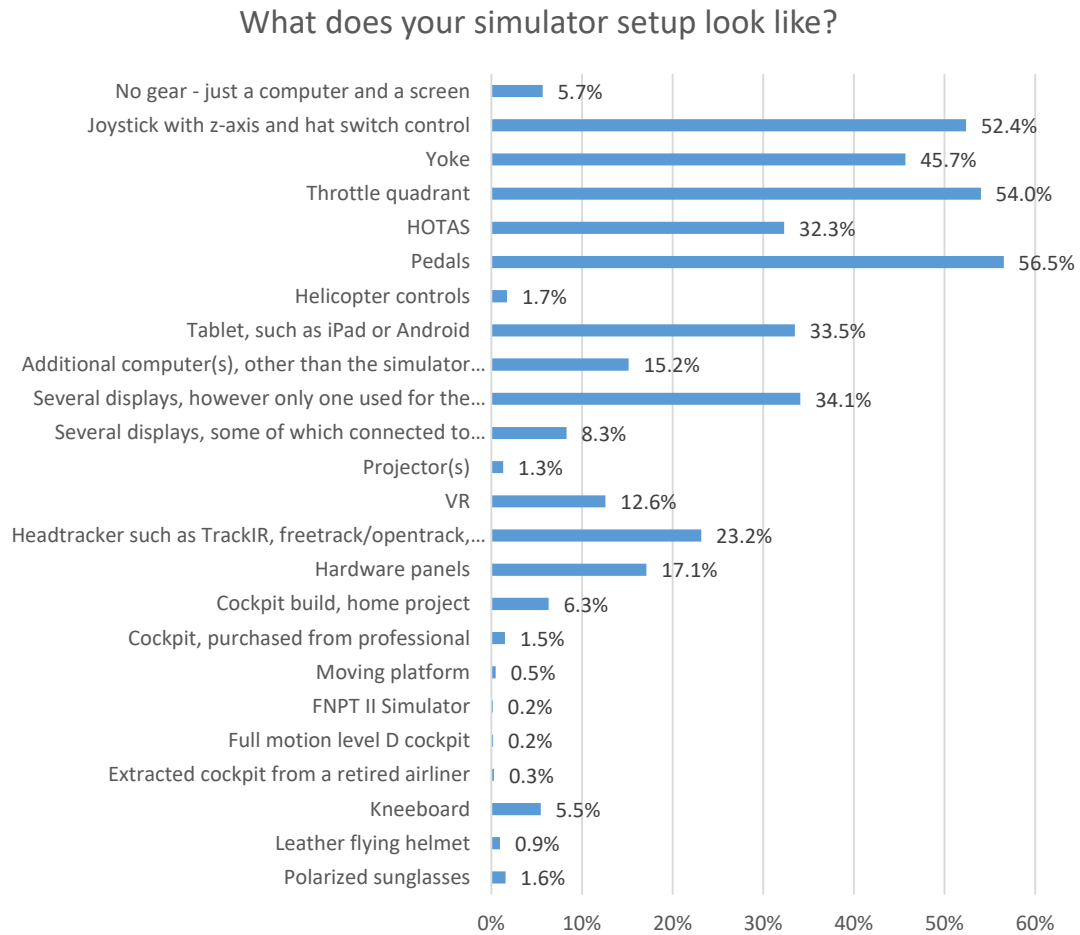
### 3.10.12. Internet Connection Speed

This year respondents typically have speeds of 10 to 499 Mbit/s. The results are comparable to last year's survey. In 2018 the binning of this diagram was different and had more resolution in the 10-50 Mbit/s range.



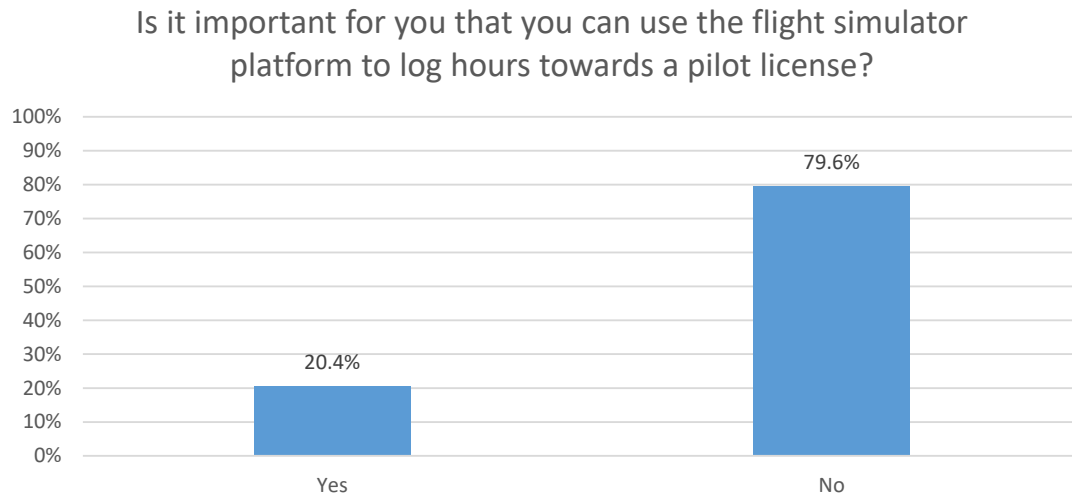
### 3.10.13. Auxiliary Systems

Pedal, Throttle and Joystick are popular, but also tablets and multiple display setups.



### 3.10.14. Qualified Training Device

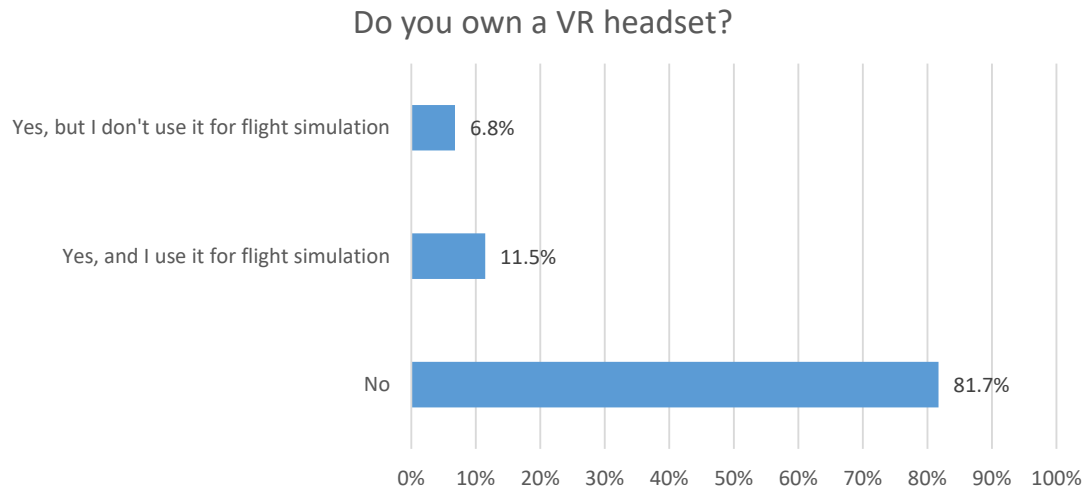
About one-fifth of the respondents think it is important to be able to use the simulator for training towards a pilot license. This is comparable to the results from last year.



### 3.11. Virtual Reality

#### 3.11.1. Ownership

A total of 11.5% of the respondents own a VR headset and use it for flight simulation. Moreover, 80% of the respondents do not own a VR headset. These results have actually been consistent over the two years this question have been a part of the survey.

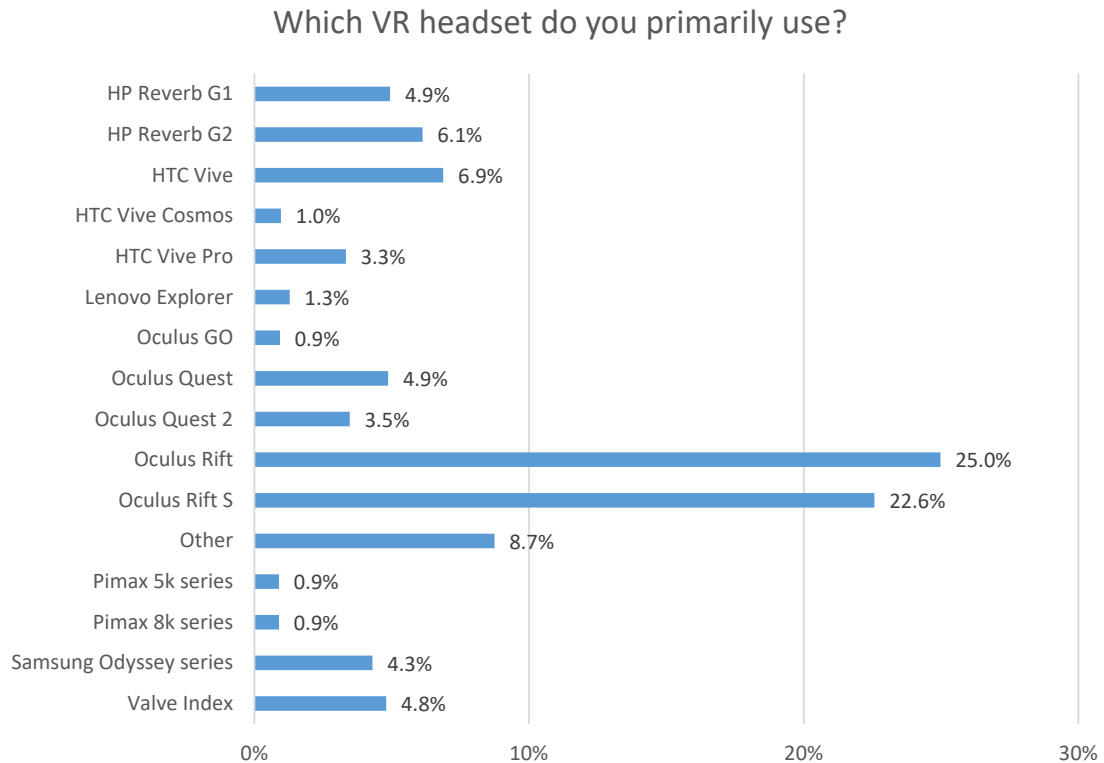


### 3.11.2. Brand

The following questions regarding VR were only asked to respondents who stated they owned a VR headset.

This question was also featured in the 2019 survey. However, for this year we added answer options such as HP Reverb G1 and G2 as well as Oculus Quest and Oculus Quest 2 to reflect the current VR market.

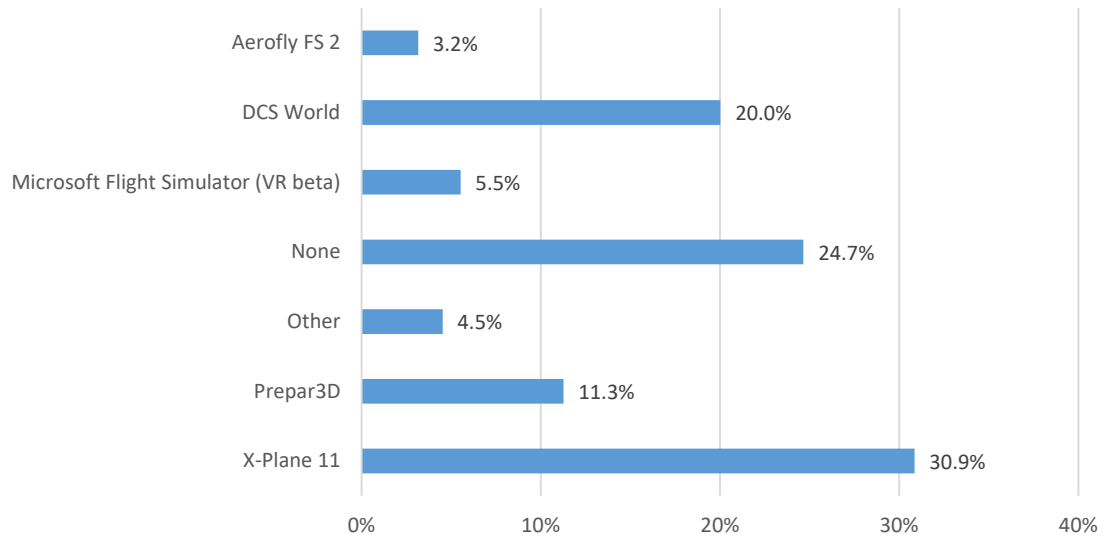
Oculus Rift continues to be the most popular headset.



### 3.11.3. VR Simulator Software

X-Plane continues to be the most popular flight simulator software for VR and increased with 4.1% from last year's survey. DCS World increased with 1% and is still number two. We find Prepar3D on third place with 11.3%, seeing a drop of 5,7% compared to its 17% in the last year's survey.

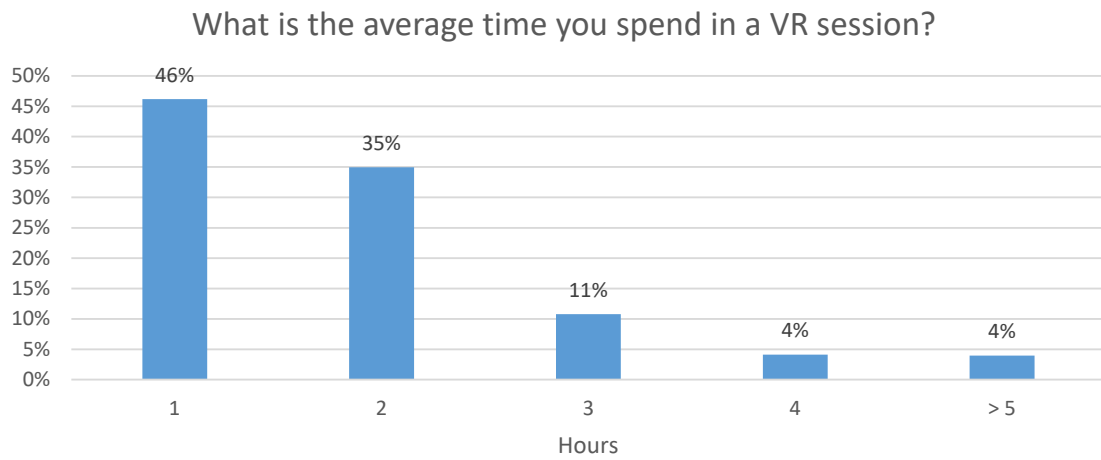
Which flight simulator software do you primarily use together with your VR headset?





### 3.11.4. VR Session Duration

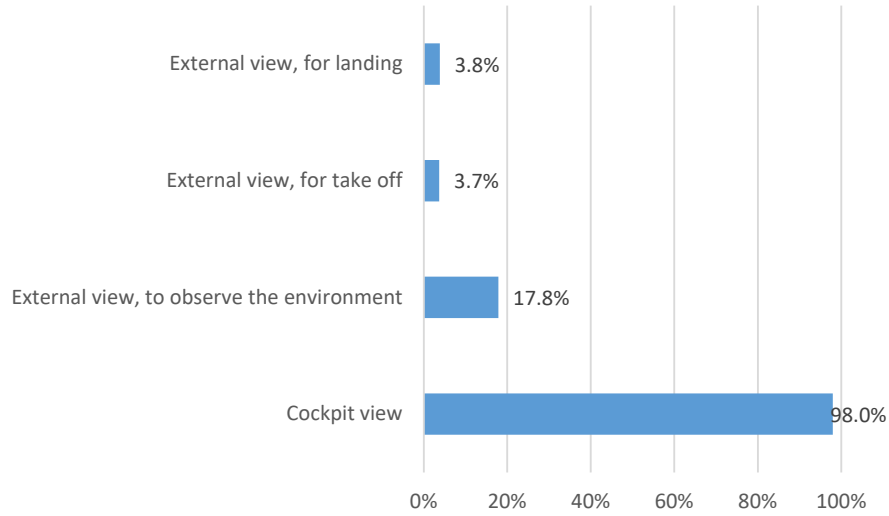
This is a new question for this year's survey. We find that over 80% of the respondents spend one or two hours during a typical VR session.



### 3.11.5. VR Views

We see that when flying in VR, 98% of the respondents use cockpit view.

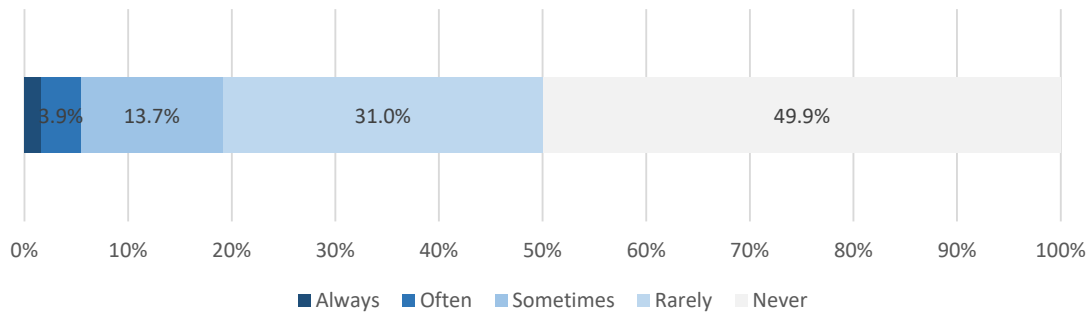
When flying in VR, which views are you using?



### 3.11.6. Motion Sickness

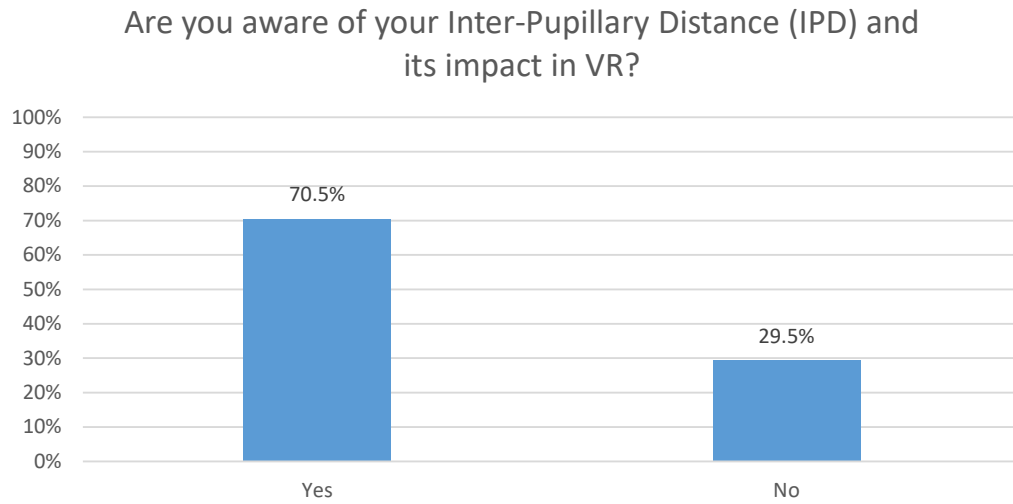
Every other respondent has at some point experienced motion sickness when using a VR headset. The results for motion sickness are comparable to last year.

Do you ever suffer from motion sickness using your VR headset?



### 3.11.7. IPD Awareness

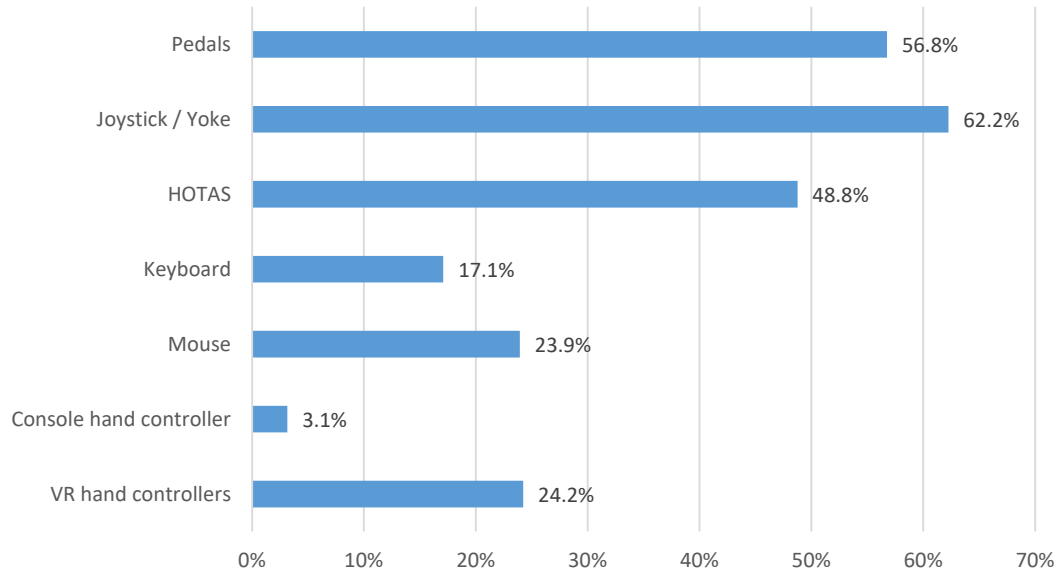
This is a new question for this year's survey. Inter-Pupillary Distance (IPD) is the distance between the centres of the pupils of the eyes measured in millimetres. We note that just over 70% are aware of their IPD and its impact in VR.



### 3.11.8. VR Controls

Top three are the same as in last year's survey. Last year we found pedals at 52%, joystick / yoke at 55% and HOTAS at 41%.

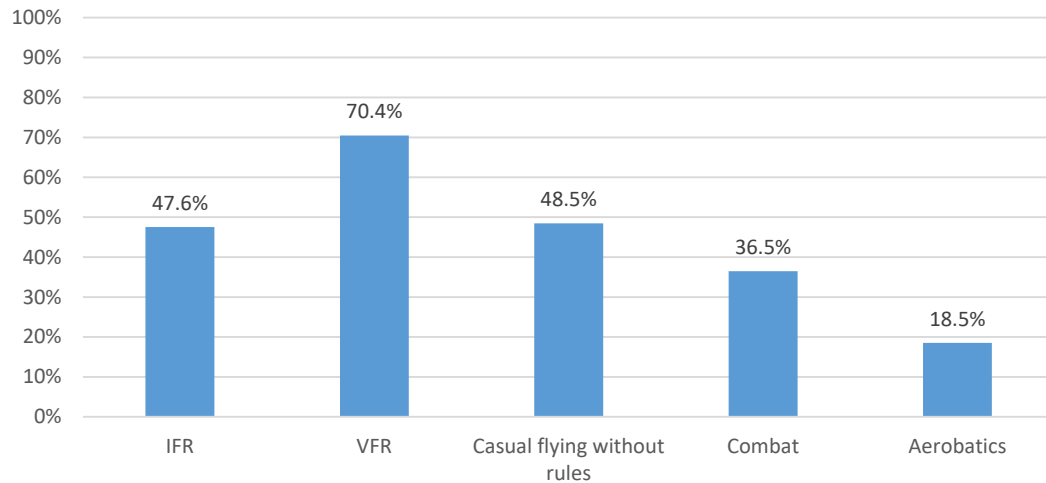
When flying in VR, how do you control the plane?



### 3.11.9. VR Flight Types

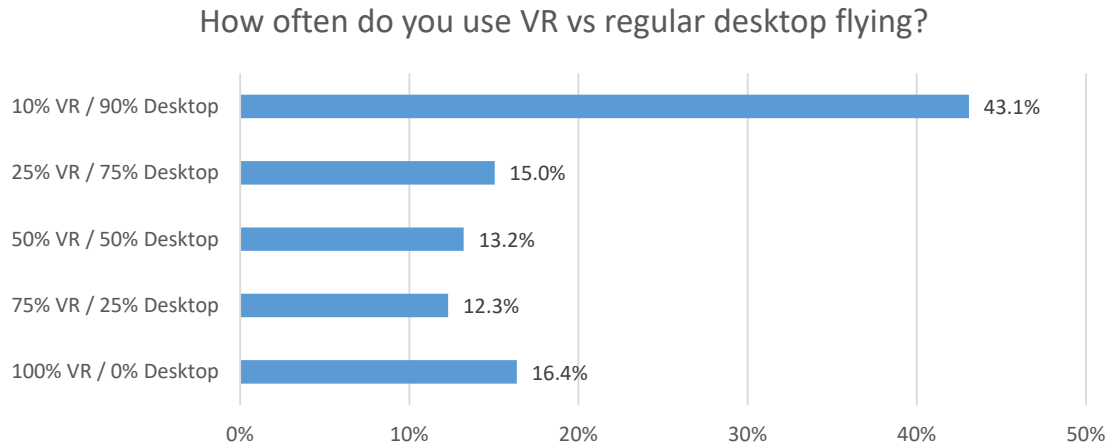
The most common type of flying is VFR, which is same as last year but with an increase by 7.4%. Second place this year we find “Casual flying without rules” which increased by 8.5% compared to the previous year. This puts last year’s number two IFR, which increased by 2.6%, on a third place of the most popular types of flying in VR.

What type of flying do you use VR for?



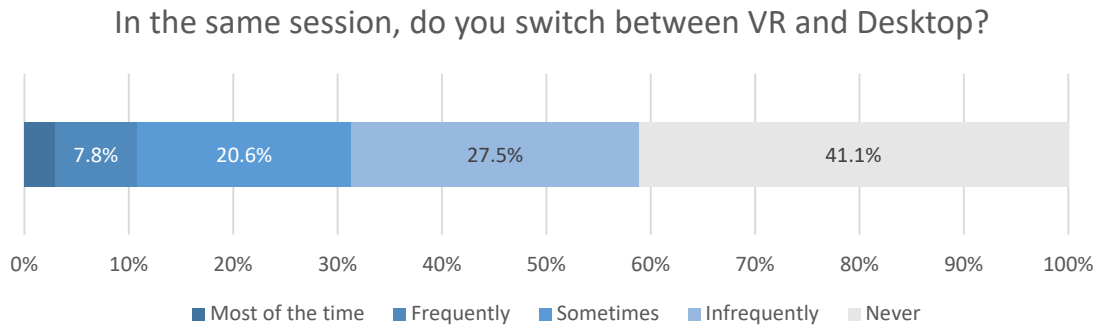
### 3.11.10. VR vs Desktop Flying

This is a new question for this year. We can establish that over 40% of the respondents use VR for about 10% of the time when flying.



### 3.11.11. VR Desktop Switch

By introducing this question, we wanted to know if the respondents switch between VR and desktop during their session. It appears that more than half of the respondents switch between VR and desktop to some degree.

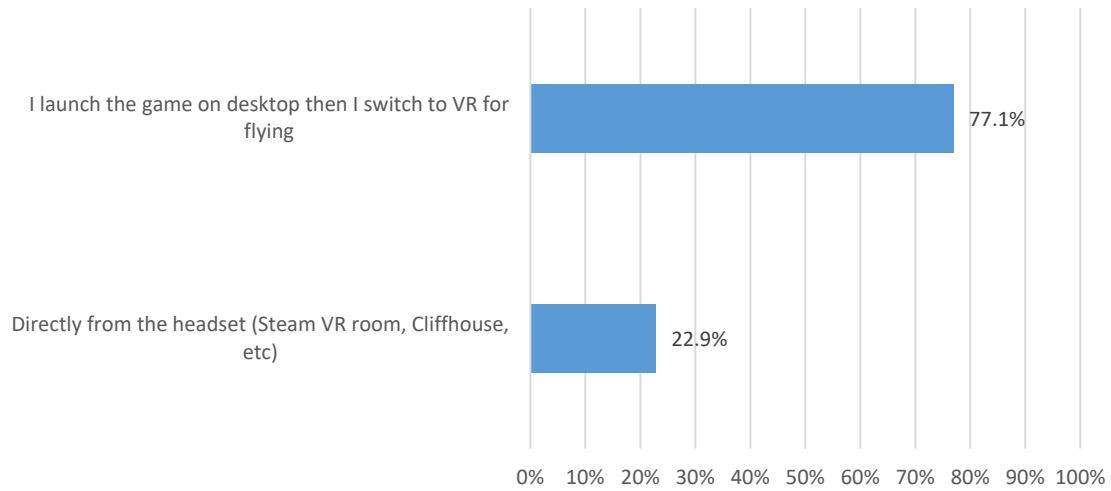




### 3.11.12. VR Launch Method

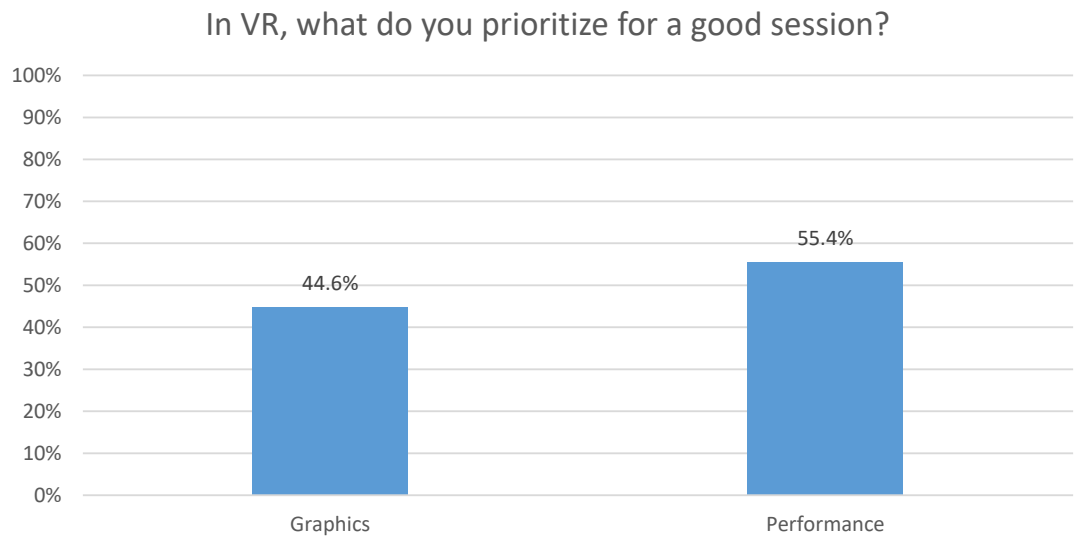
This is also a new question for this year. We see that most of the respondents launch the game on desktop when they switch to VR for flying.

How do you launch a VR session?



### 3.11.13. VR Desirable Factors

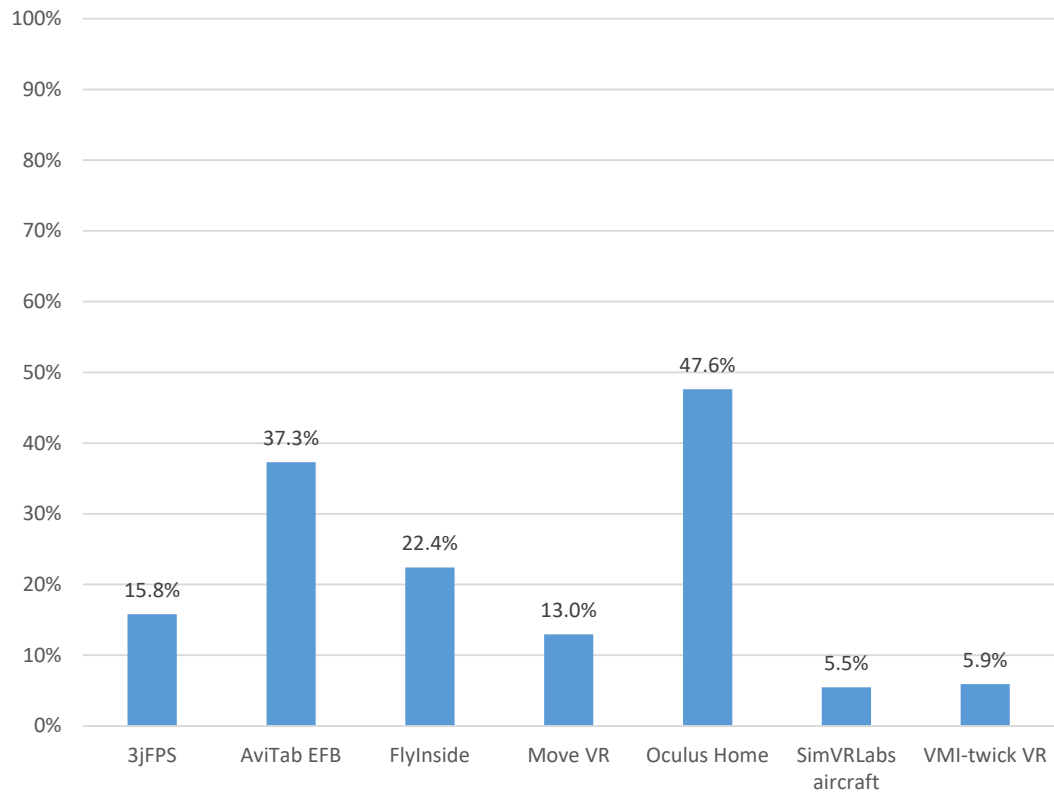
When asking VR users to prioritize between graphics and performance, we see that there is not too much to separate these two components.



### 3.11.14. VR Plugins/Mods

This question was added in last year's survey. In 2019 Oculus Home and AviTab EFB were the most popular. The results are the same this year, but with increased popularity for these two options.

Which plugins/mods do you use to improve your VR experience in the simulator?

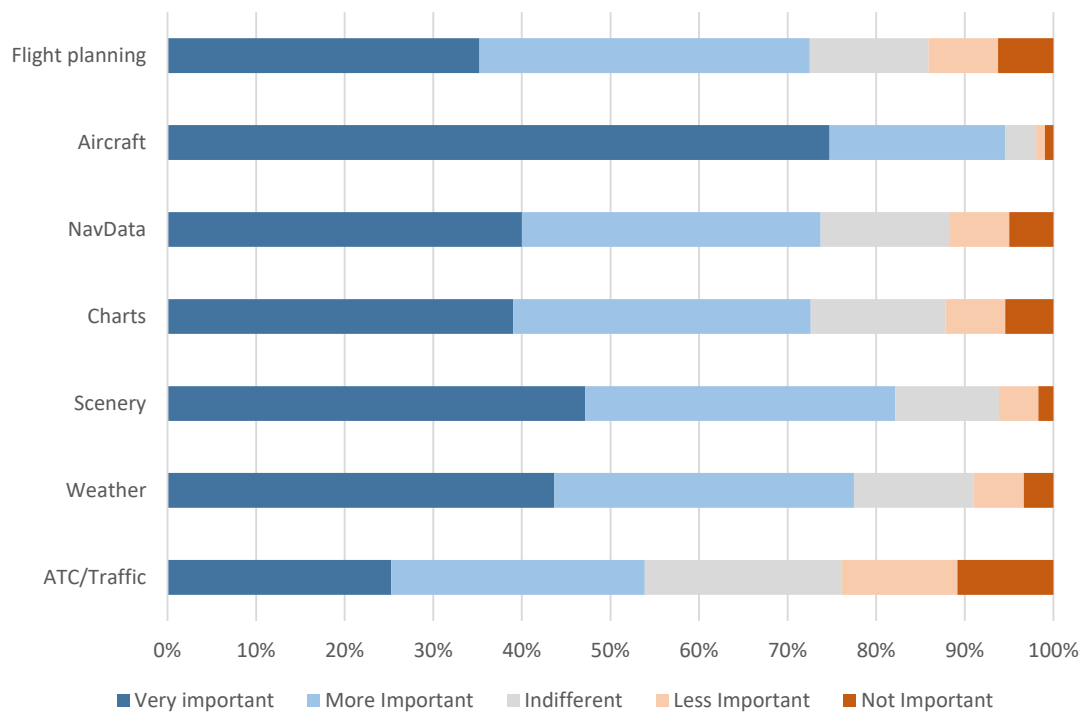


### 3.12. Addons in General

#### 3.12.1. Addon Type Importance

Aircraft, scenery and weather are the most important addon software types among the respondents. The results are in line with last year's survey.

Considering all of the addon software and data you use for flight simulation, which ones do you find the most important?

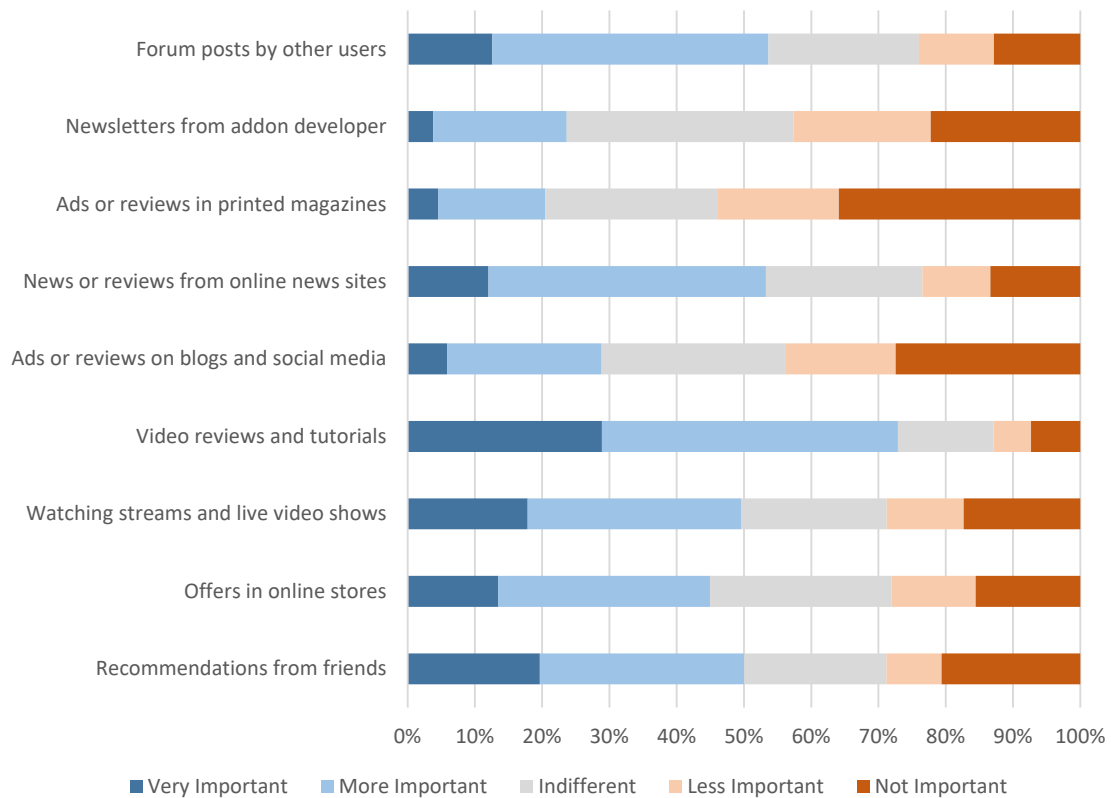


### 3.12.2. Addon Purchase Influences

This question was generalized to cover all types of addon software in this year’s survey. Similar to last year respondents tend to trust video reviews and tutorials, as well as recommendations from friends, when deciding which addon software to purchase. This year we also added the answer option “Watching streams and live video shows”, which also was quite popular.

Like last year’s survey “Ads or reviews in printed magazines” and “Newsletters from developers” have the least influence in the purchase decision according to respondents.

What influences you the most when deciding to purchase addon software?

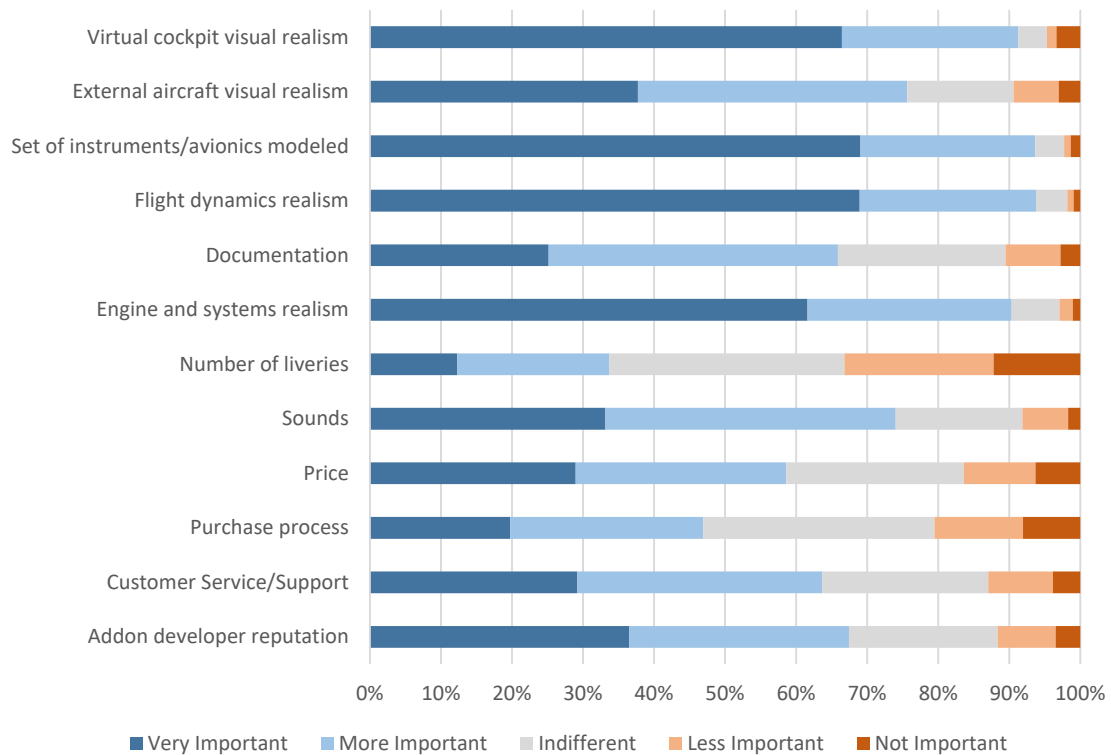


### 3.13. Aircraft Addons

#### 3.13.1. Aircraft Feature Importance

Compared to the last two years, it seems like the same set of features are important to the respondents when it comes to purchasing an aircraft addon. Although every listed feature has shown to be important to some degree, we find that “Virtual cockpit visual realism”, “Set of instruments/avionics modeled” and “Flight dynamics realism” as well as “Engine and systems realism” are considered very important to most respondents.

What are the most important features for you, when deciding which addon aircraft to purchase?

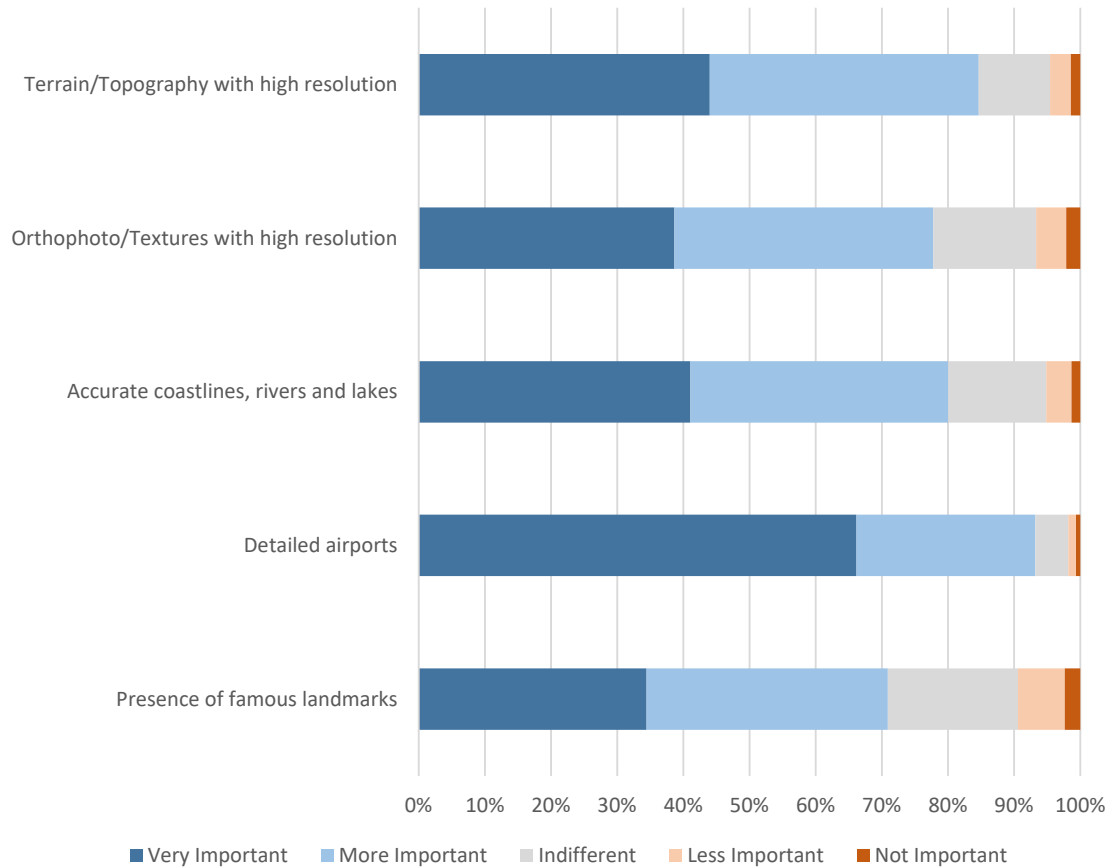


### 3.14. Scenery and Weather

#### 3.14.1. Scenery Importance

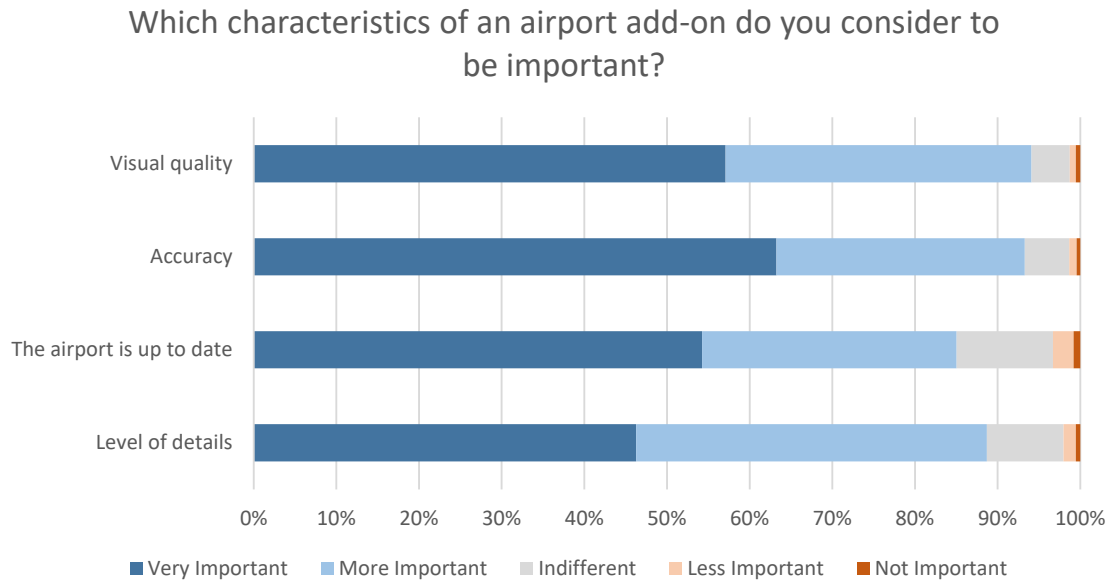
Just like the previous two surveys presented, detailed airports remain the most important aspect of scenery addons. Presence of famous landmarks is the least important, both this year and last year.

Based on the type of flying you do, which aspects of a scenery addon is important to you?



### 3.14.2. Airport Importance

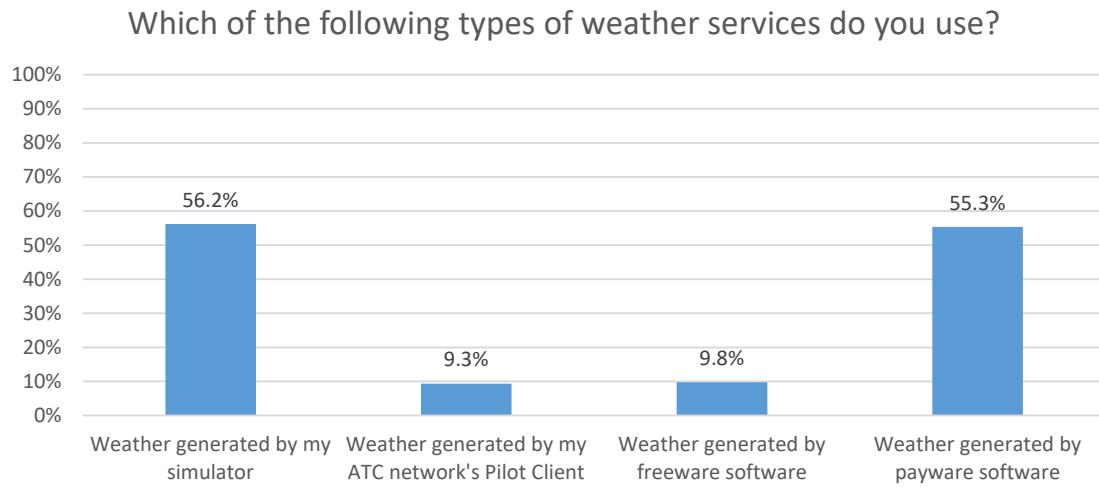
This is a new question for this year's survey, and it shows us what kind of qualities you think are important in an airport add-on. Accuracy seems to be the most important aspect of an airport add-on.





### 3.14.3. Weather Sources

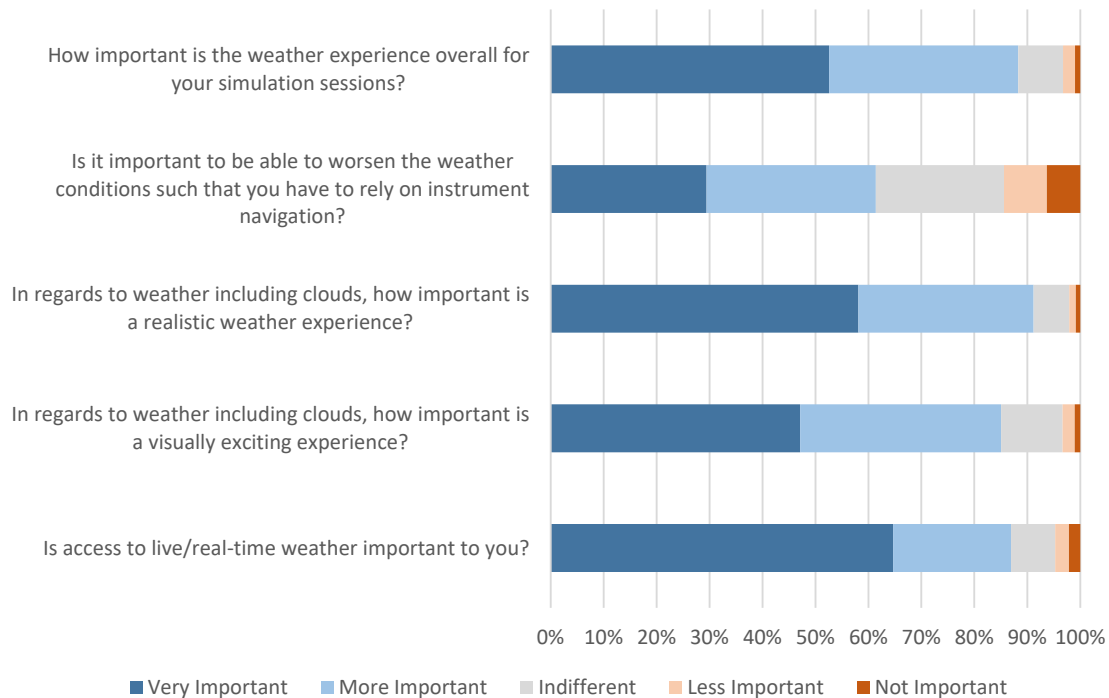
This question was asked because we wanted to know which type of software is used to control the weather in a simulator. We can see a change from last year's answers. "Weather generated by payware software" dropped with 14.7% and "Weather generated by my simulator" increased with 23.2%.



### 3.14.4. Weather Importance

The results are comparable to last year's survey. Access to live/real-time and a realistic weather experience seems to remain the most important feature for weather addons. Being able to worsen the weather conditions such that you have to rely on instrument navigation turns out to have the least importance among the weather statements this year.

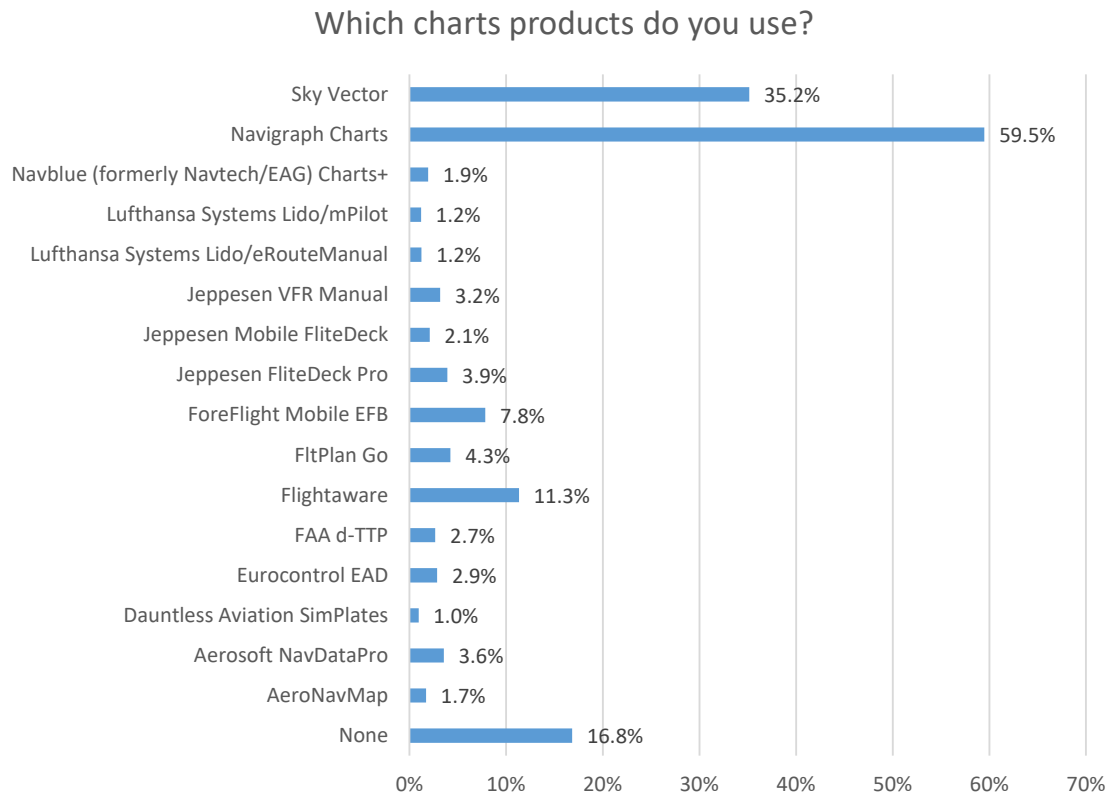
Considering the weather inside the simulator, please rate how important the following aspects are to you.



### 3.15. Charts Products and Addons

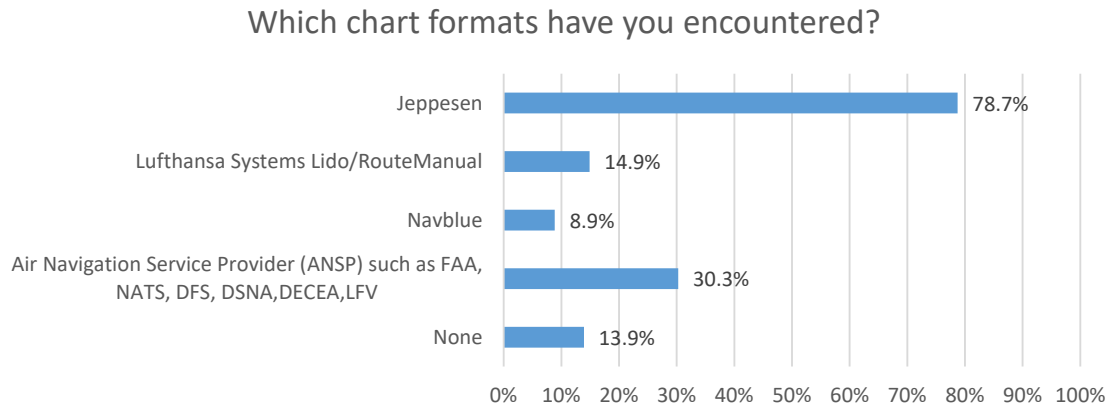
#### 3.15.1. Charts Products Popularity

Navigraph Charts, SkyVector and FlightAware are the most commonly used charts products. This result is consistent with results from the last two years.



### 3.15.2. Charts Products Awareness

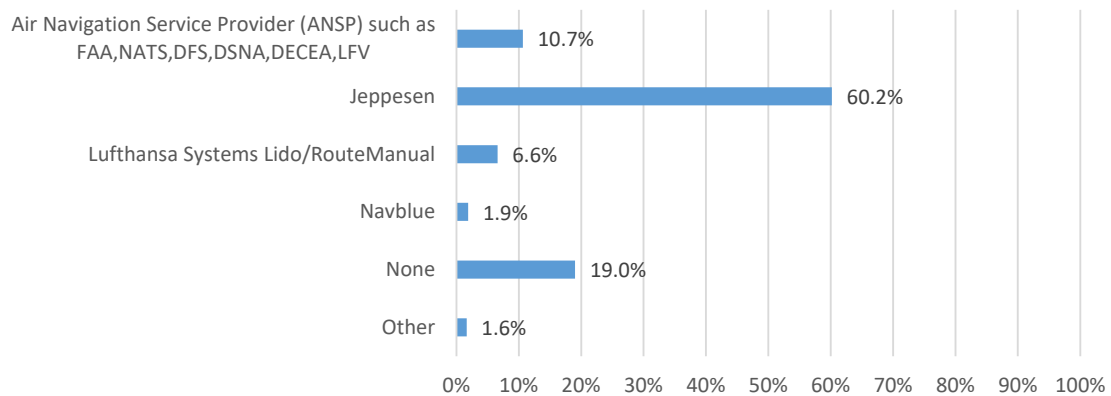
During the last three years respondents are well aware of Jeppesen charts. Respondents also know that charts are available from ANSPs. The awareness of Lufthansa charts has dropped this year, and awareness of Navblue has increased.



### 3.15.3. Charts Preference

With remarkable consistency, respondents continue to prefer Jeppesen charts. 60% of the respondents said they prefer Jeppesen charts this year, last year, and the year before that. Respondents also like charts from ANSPs. This year 10.7% said so. Previous years 12% and 13% said so. 6.6% prefer Lufthansa Systems. This is a decrease from the last two years where 11-12% said they preferred Lufthansa charts. Navblue charts were preferred by 0-1% of the respondents previous years, but is now preferred by 1.9%.

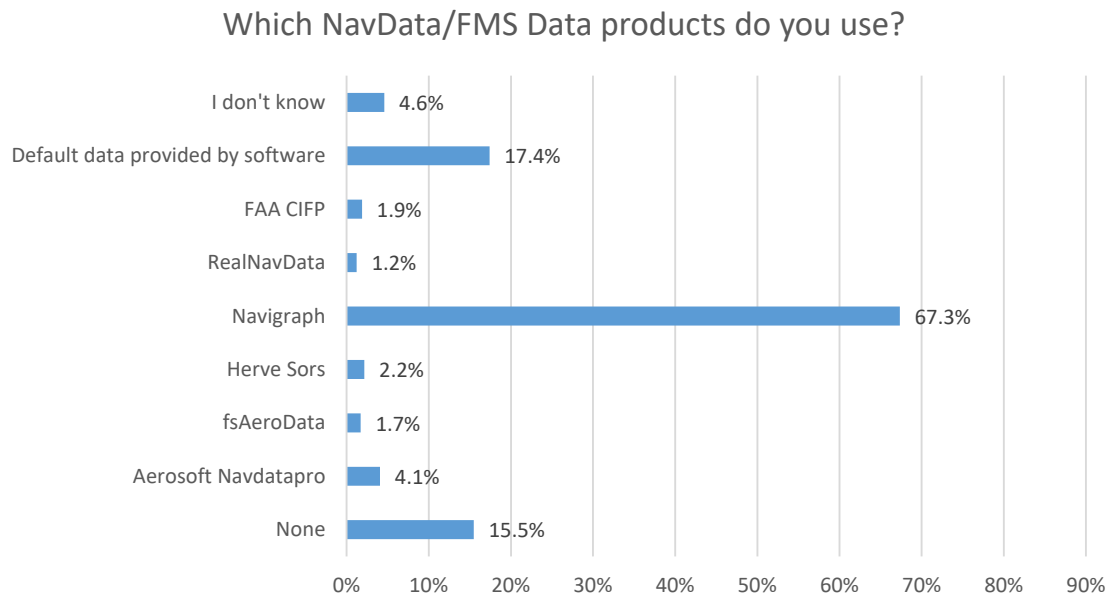
Which chart format do you prefer?



### 3.16. NavData/FMS Data

#### 3.16.1. NavData/FMS Data Products Popularity

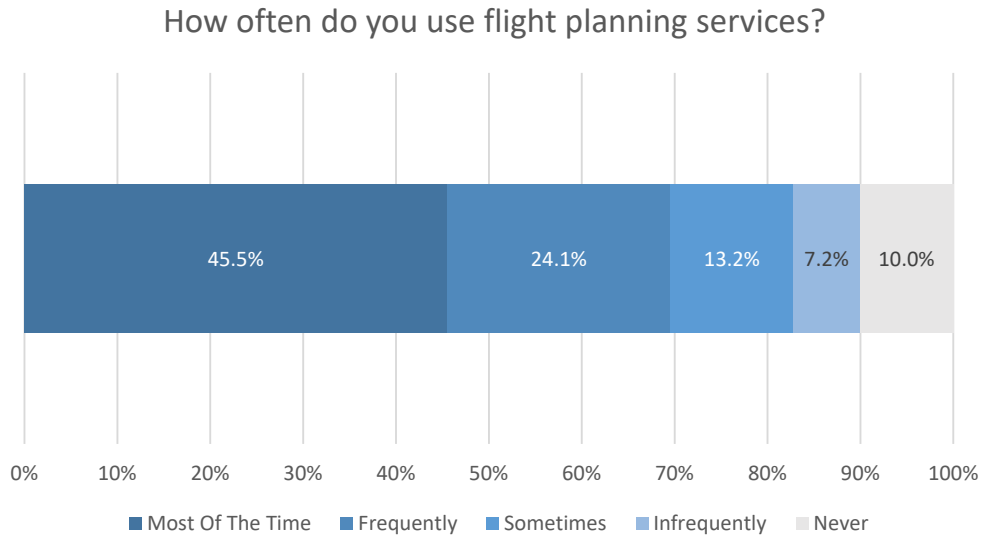
Navigraph is the most popular source of navdata. However, this year we added “Default data provided by software” as answer alternative to this question to measure the popularity of the default navdata provided with some software, e.g. Microsoft Flight Simulator. Because of the confounded origin and application this question is not ideal and is therefore a candidate for redesign next year, because some default navdata provided in software actually originates from Navigraph, like in the case of X-Plane. To get a sense of the potential confusion we also added “I don’t know” as an answer option.



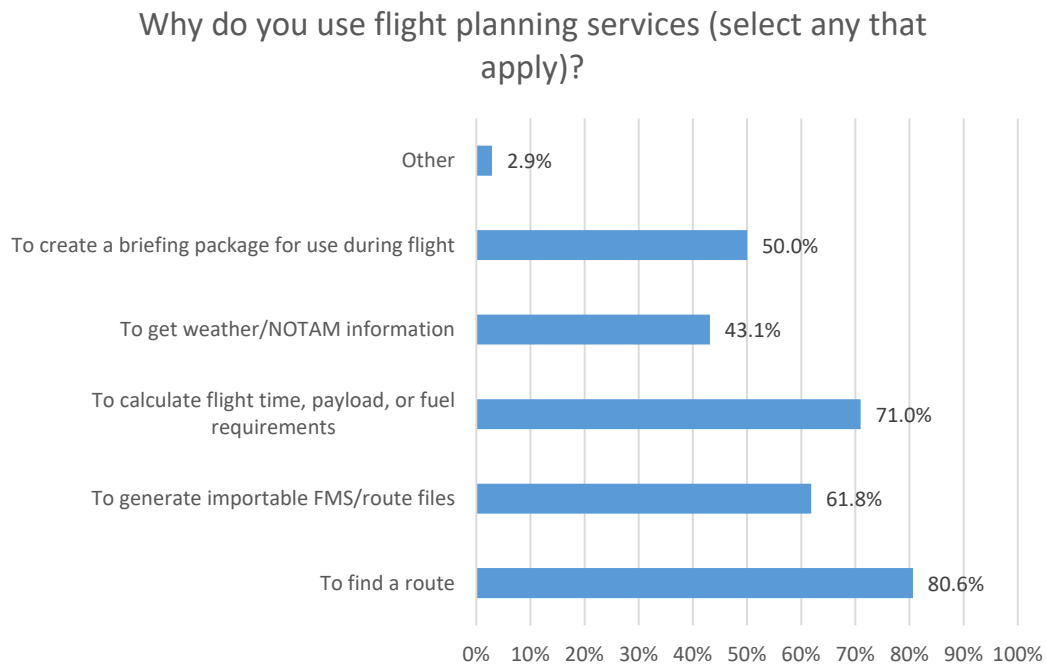
### 3.17. Flight Planning

#### 3.17.1. Usage

Almost one out of two respondents use flight planning services most of the time. The results are comparable to last year's survey.



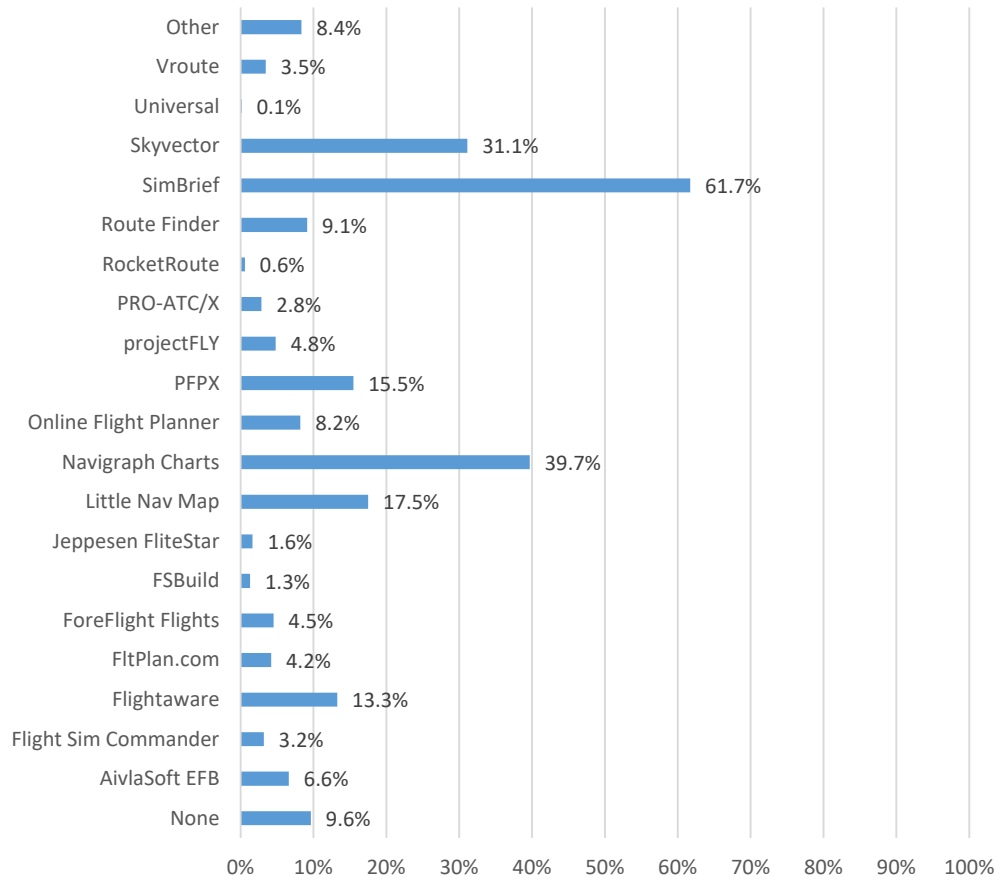
We ask respondents why they use flight planning services to investigate which parts of flight planning that are important. The results are comparable to previous year's survey.



### 3.17.2. Services

Simbrief is the most preferred flight planning software the last two years, followed by Navigraph Charts and SkyVector. Little Nav Map has increased by 4.5% since last year, while FlightAware is decreasing in popularity of the last two years.

Which flight planning software or services do you use?

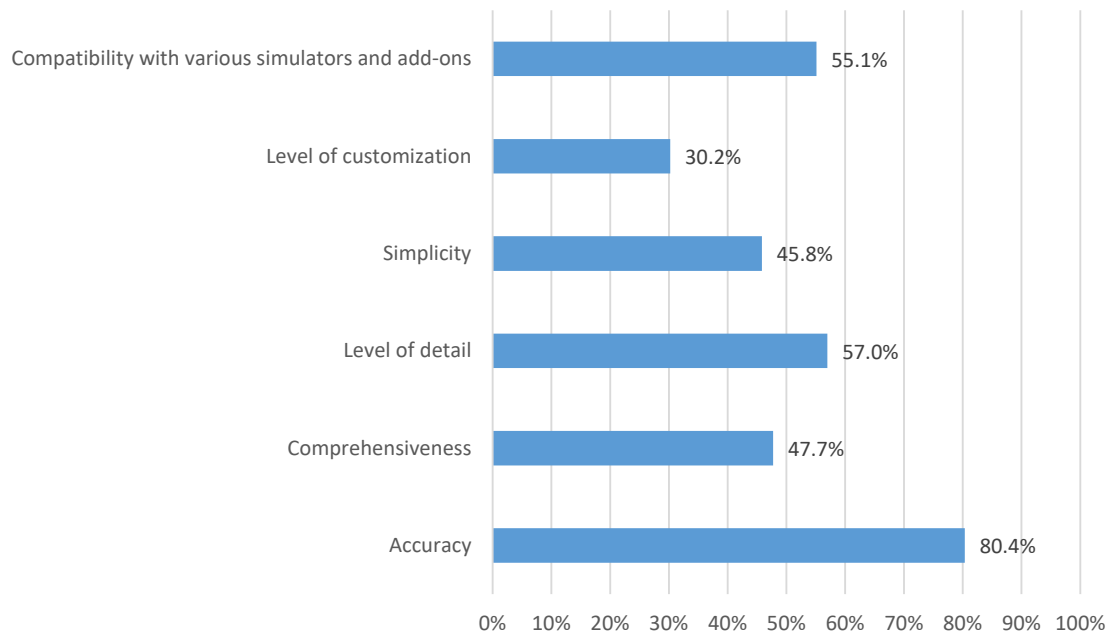




### 3.17.3. Important Features

This question is new for this year's survey. We can see that all aspects are important to some degree. Accuracy does however seem to be the most important feature, followed by level of details and compatibility with various simulator add-ons.

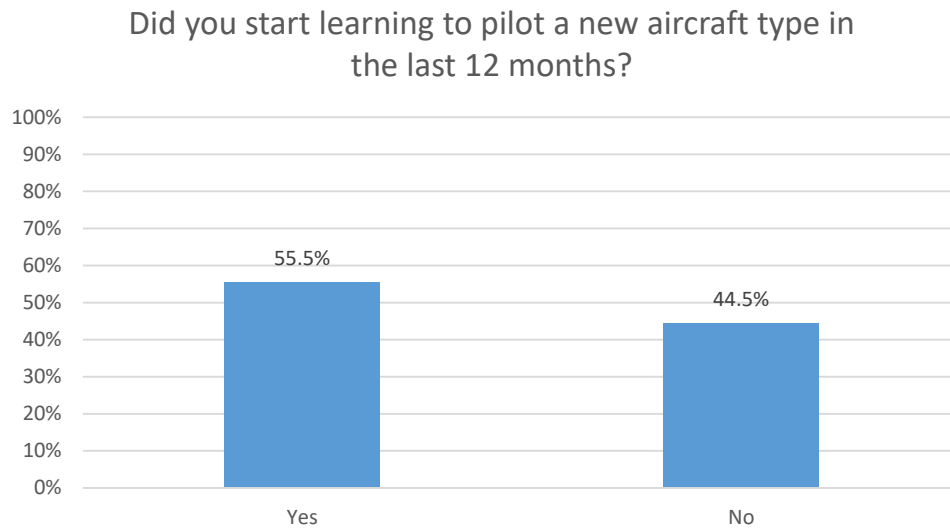
When selecting a flight planning service, what characteristics are most important to you?



## 3.18. Training

### 3.18.1. Learning

By asking all respondents if they started learning to pilot a new aircraft type in the last 12 months, we could establish that this was the case for over 50% of our respondents.

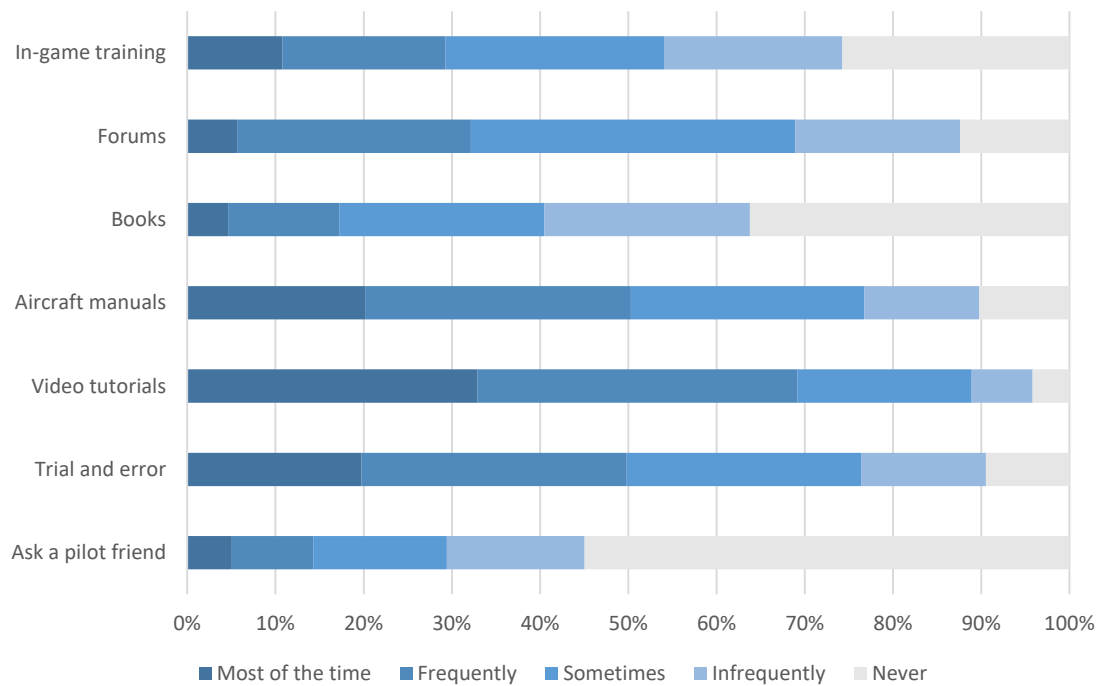


### 3.18.2. Learning Method

This question was conditional and only presented to the respondents who stated that they started to learn a new aircraft the last twelve months.

Among the different resources available when learning to pilot a new aircraft we found that video tutorials, trial and error, aircraft manuals and forums were most popular answer options.

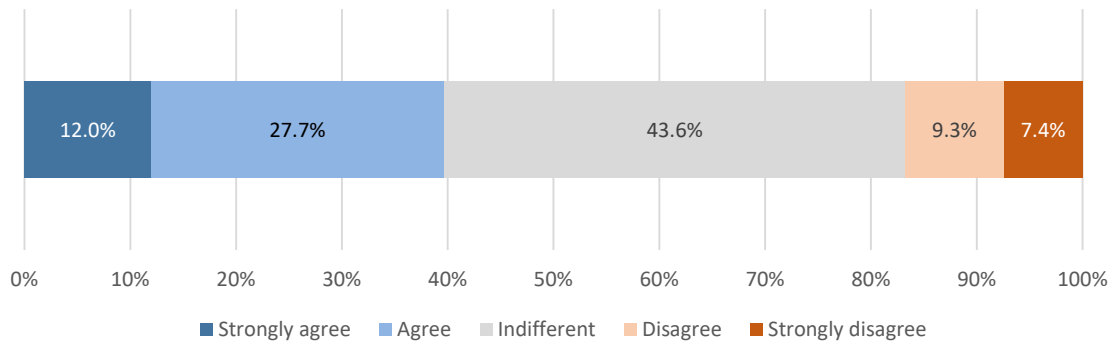
Which resources do you use when learning to pilot a new aircraft?



### 3.18.3. Gamification

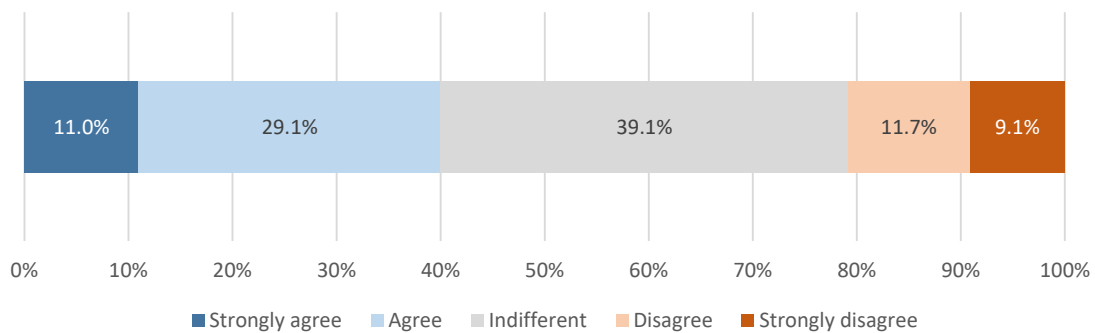
This is a new question for this year. We find that more people are open to the addition of badges to indicate achievements in their flight simulation performance

Do you think it would be a good idea to add badges to indicate achievements in your flight simulation performance, indicating how well you are flying?



As for the previous question, we find that more people are open to the addition of a score to your flight simulation performance, indicating how well they are flying.

Do you think it would be a good idea to add a score to your flight simulation performance, indicating how well you are flying?

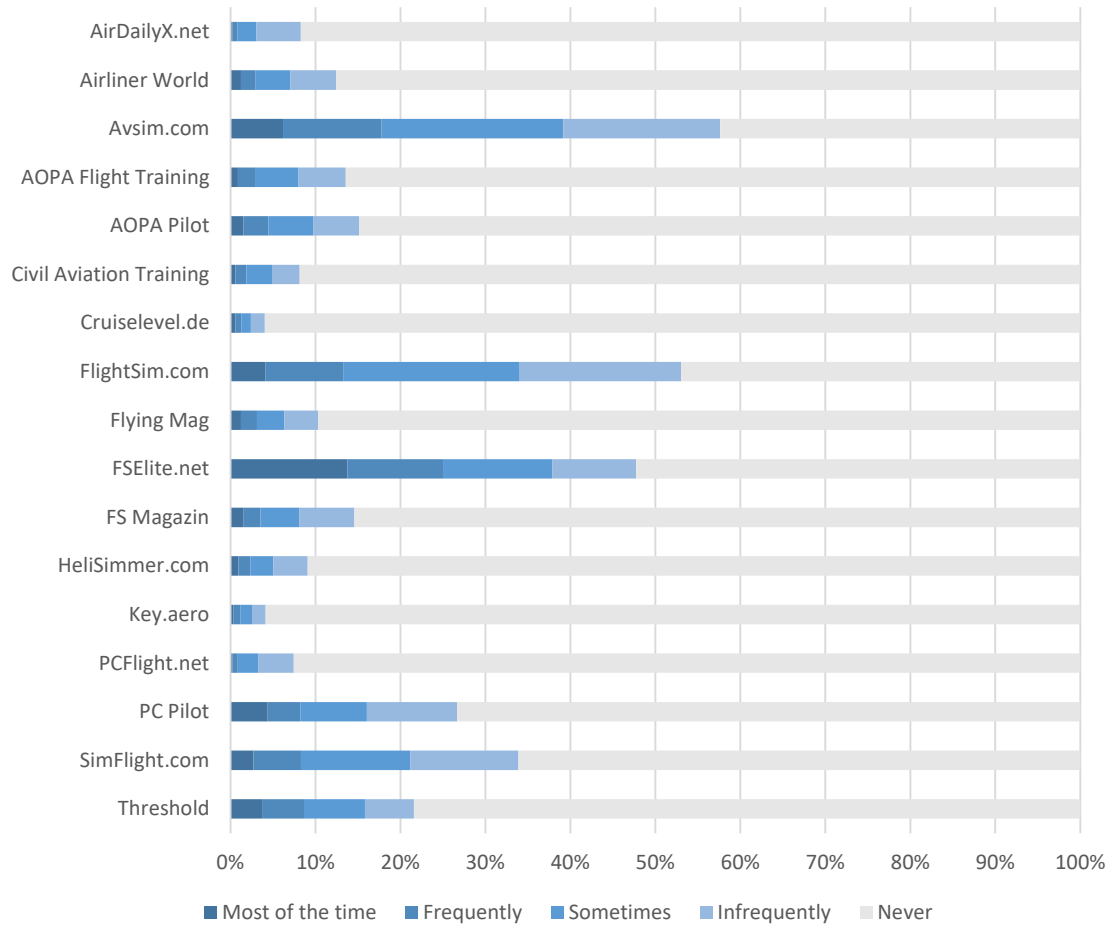


### 3.19. Media

#### 3.19.1. Media Consumption

Avsim.com continues to be the most popular flightsim or aviation related media. FlightSim.com and FSElite.net are also popular.

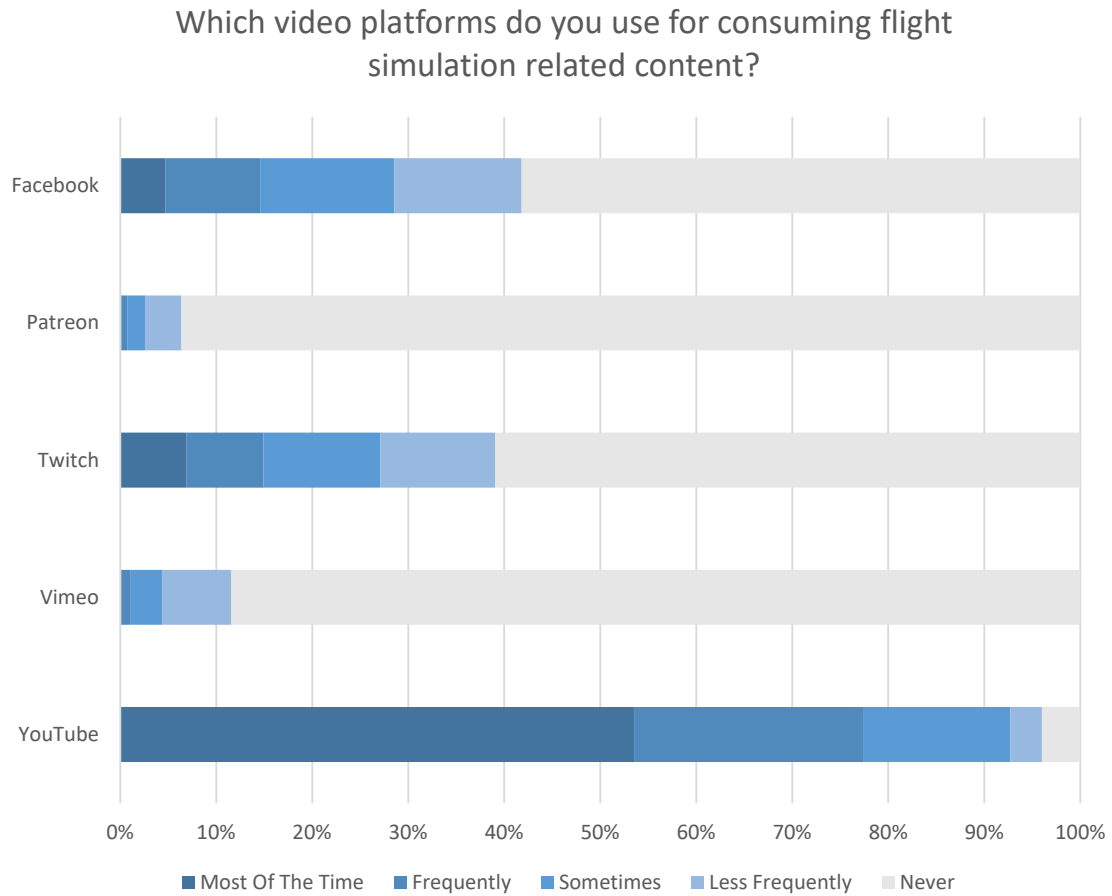
Which flightsim or aviation related media do you consume?



## 3.20. Video

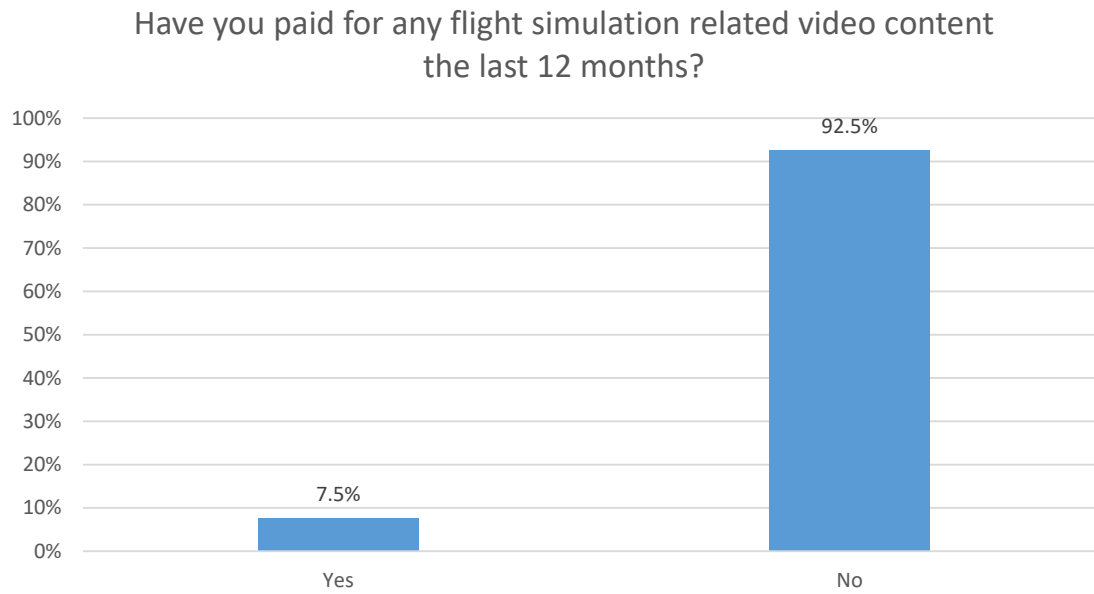
### 3.20.1. Platform Preference

Not unlike the results of the 2018 and 2019 survey, YouTube remains the most popular video platform. Facebook and Twitch are also strong platforms for the consumption of flight simulation related video content.



### 3.20.2. Paid Content

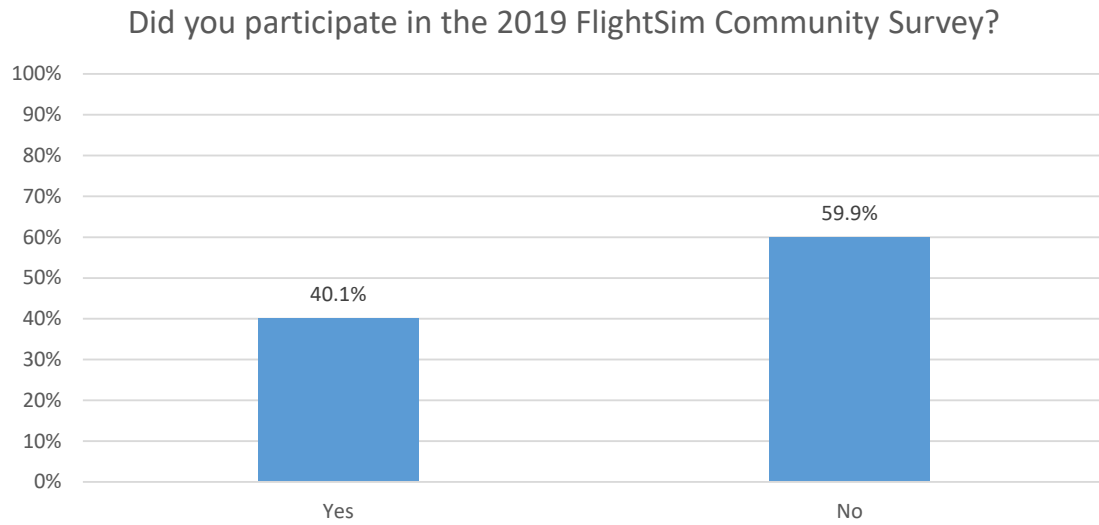
In 2018 and 2019, 9% and 8% of respondents paid for video content respectively. This year even fewer paid for video material.



## 3.21. Survey Meta Analysis

### 3.21.1. Participation

For this survey, 40.1% of the respondents had participated in the last year's FlightSim Community Survey and 59.9% had not. This is comparable to last year where 39% had participated in the 2018 survey, and 61% had not.

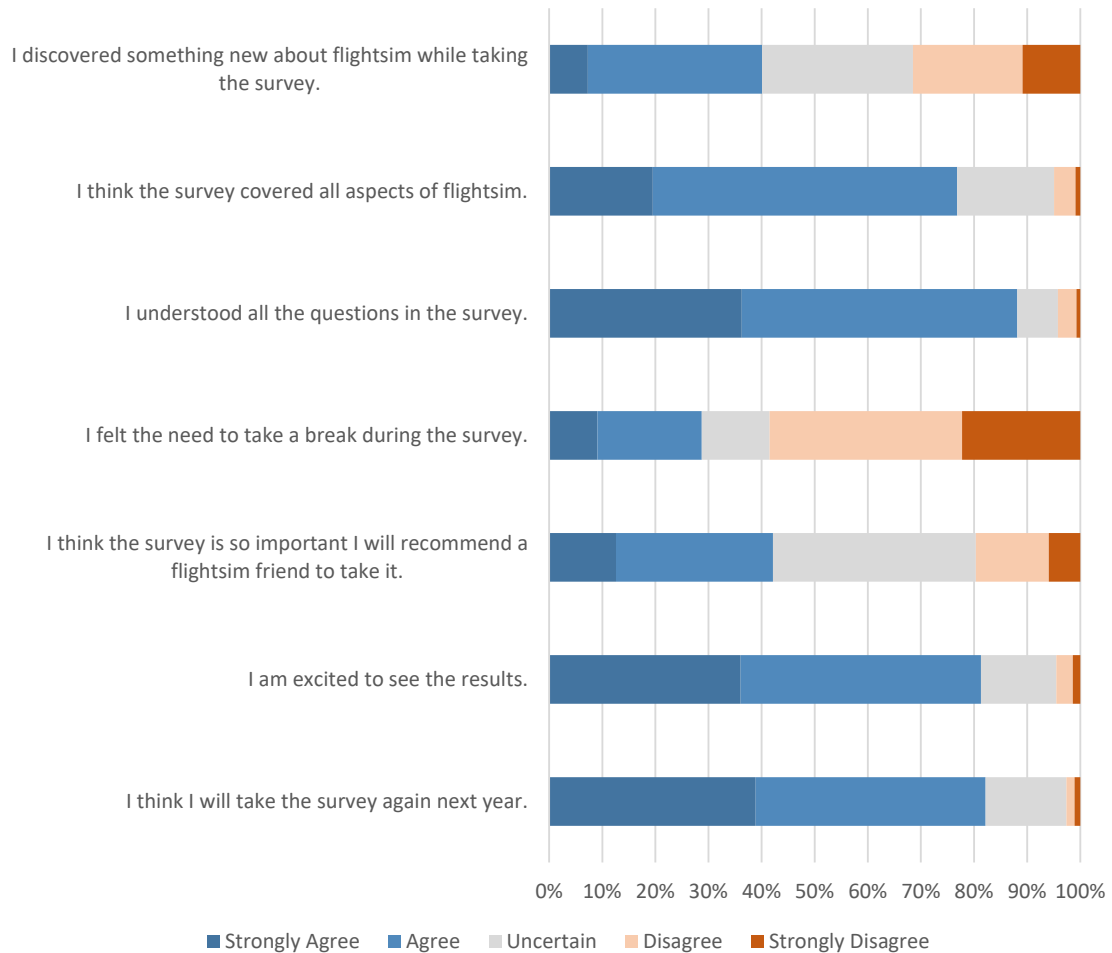




### 3.21.2. Survey Experience

This question was introduced in the last year's survey last year to investigate how the respondents experienced the survey.

Please rate the following statements about the current survey.



## 4. Results

### 4.1. First a Word on Sampling Bias and Validity

Since respondents were not selected according to a random sampling technique, but instead voluntarily chose to participate themselves, there may be a bias in the data collected. This is true for any survey where respondents are invited to participate without randomizing the respondent selection according to the topics the survey set out to investigate.

We want to highlight the fact that this chapter is merely summarizing the collected survey data - not drawing any conclusions. That's why it was renamed from "Conclusion" to "Results" in last year's survey. Since we cannot check whether the dataset is a representative sample of the flight simulation population, we do not conclude anything with absolute certainty. For this reason, we have chosen not to calculate confidence intervals or margin of errors.

So, what can be said about this dataset? First of all, with 23,500 respondents, this dataset must be considered to be large compared to other surveys of its kind. The bigger the sample, the more likely that it is resembling the population. A high number of respondents can mitigate the effect of any selection bias which may be present. Secondly, while the dataset may not be generally conclusive for the entire population, we can still claim that the 23,500 respondents that decided to participate in the survey did indeed reply this way.

Thirdly, we can track trends and make relative comparisons between years. 59.9% of this year's participants were new to the survey and did not take the survey last year. Many of the survey questions have same, or very similar, distributions when comparing two consecutive years. If a sampling bias were present one might anticipate some variance between years – especially when each year has approximately 60% new respondents. If the variance between samples is low one might reason that the result is representative of the population – or that the same type of bias is present in both samples. Low variance in samples over consecutive years may increase the confidence of a representative result, but we will still not be able to be absolutely certain. With these words of caution let's consider the data that was collected.

### 4.2 Brief Summary

Despite the fact that 59.9% of the respondents were new to the survey this year, most of the results are very similar to those of last year. Where we can, we have provided data from previous years next to the diagrams.

Here is a brief non-exhaustive summary of the results:

- Almost all respondents are male.
- Age ranges from 15-85 years, with a notable peak around 20.
- Most of the respondents come from the US, the UK and Germany.
- The majority have a high-school or Bachelor's degree.
- The majority earn \$50,000-60,000 per year, before tax.
- 18.3% work within aviation. 4.7% are airplane pilots.
- 25.8% have some sort of pilot license.
  - 9% have a PPL.
- 7.8% are currently enrolled in flight school.

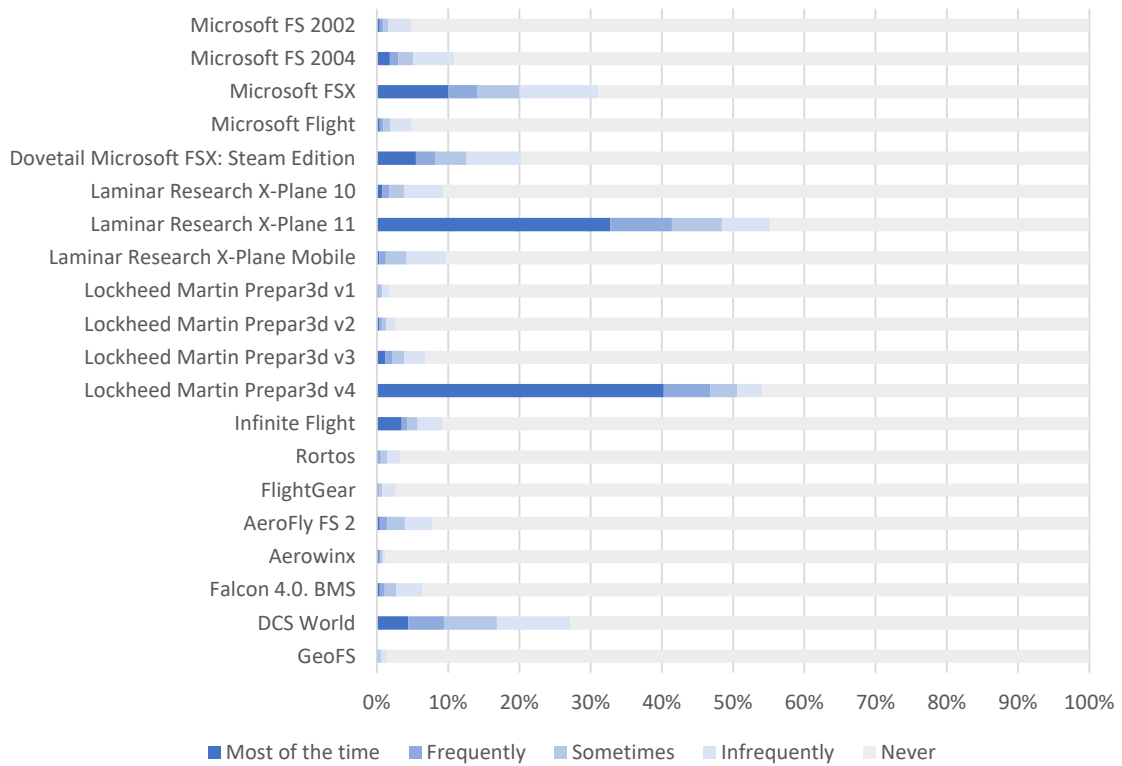
- 25.7% of those who are not consider taking lessons in the coming year.
- 19.7% fly combat simulators.
  - DCS World is the most common one.
- 17.0% fly simulators on mobile or tablet devices.
  - Infinite Flight is the most common one.
- The most popular aircraft type is Single Engine Piston and Narrow-body Commercial Airliner.
- Pilots tend to fly 2-5 times a week, 2-3 hours per session.
- IFR as a little more popular than VFR, but pilots like to fly casually without rules too.
- The median software spending per year is \$223 which is less than last year.
- The median hardware spending per year is \$267 which is more than last year.
- 58.4% fly online, which is a little less than last year.
  - VATSIM is the most popular online network.
- 28.3% are members of a Virtual Airline, which is less than last year.
- Microsoft FS2020 is the most popular simulation platform.
- A majority of respondents did not change simulator platforms this year.
  - The majority of those who did change platform, changed to Microsoft FS2020.
  - Among those who changed to X-Plane 11.50, the majority comes from FSX and FS9.
  - Among those who changed to Prepar3D v5, the majority comes from a previous version of Prepar3D.
  - Those who changed to Microsoft FS2020 come evenly from all three platforms X-Plane, Prepar3D, as well as previous versions of the Microsoft Flight Simulator.
- Last year 48%, 15% and 23% were “Very Likely”, “Likely”, or could “Possibly” imagine themselves change to Microsoft FS2020. According to this year’s survey, only 33% actually changed.
- 16.3% own an Xbox console.
- 18.3% own a VR headset.
  - 50% sometimes suffer from motion sickness.
- Aircraft is the most important type of addon software.
- Video reviews and tutorials are the most influential factors when deciding to purchase an addon.
- Jeppesen are the most well-known and preferred charts format.
- Simbrief is the most preferred flight planning software/service.
- Avsim.com, FlightSim.com and FSElite.net are popular media outlets.
- YouTube is the most popular video platform.
- 7.5% have paid for flightsim related video content this year.
- 40.1% of the respondents took the survey last year.
- A majority of the respondents understood all of the questions in the survey; are excited to see the results; and will take the survey again next year.

## 4.3 Discussion

### 4.3.1. Simulation Platform Popularity

As seen below in last year’s diagram, the most popular flight simulator among 2019 survey respondents was Lamina Research’s X-Plane 11. However, Lockheed Martin’s Prepar3D v4 had a larger following of loyal users who claimed to fly the simulator “Most of the time”. For all practical purposes, one could say it was a tie.

## How often do you fly any of the following flight simulator software? (2019)

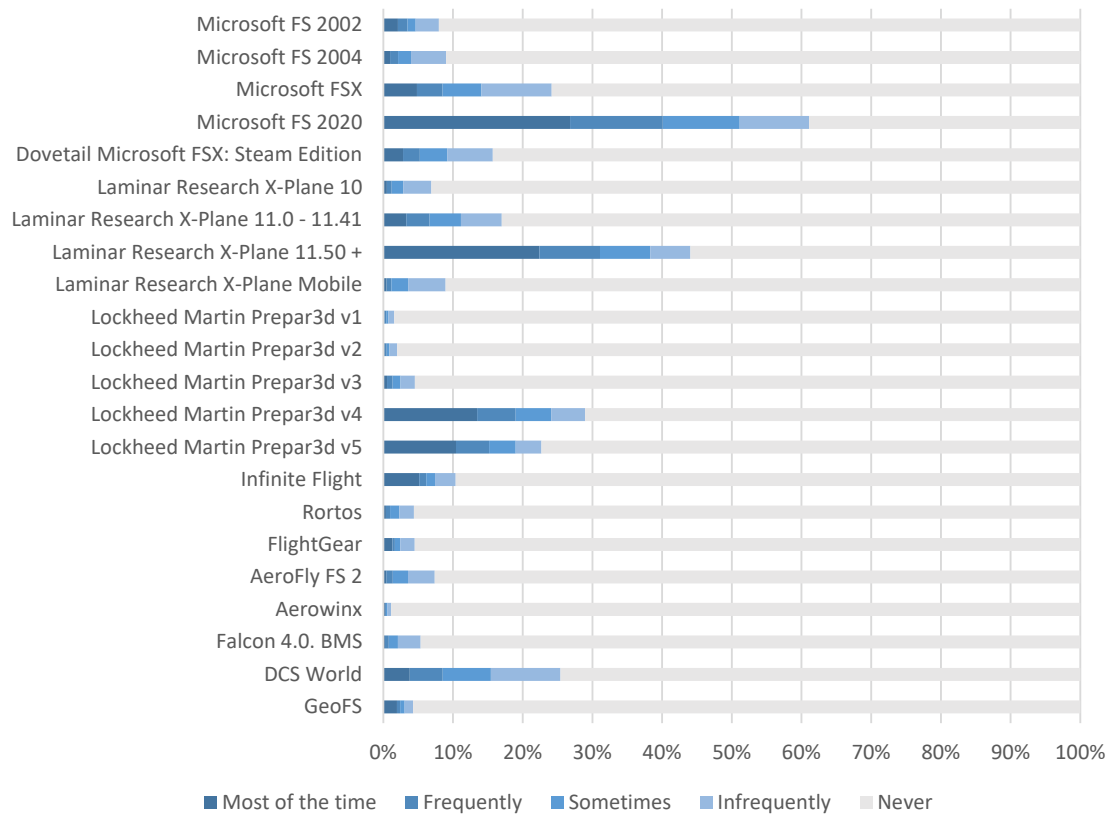


As seen in this year's diagram below, X-Plane continues to be popular, with similar numbers, albeit with a slightly lower number of loyal users. Prepar3D is also popular, although the users seem to be spread out over the two most recent versions.

The most popular flight simulation platform among survey respondents 2020 is the newly released Microsoft Flight Simulator 2020.

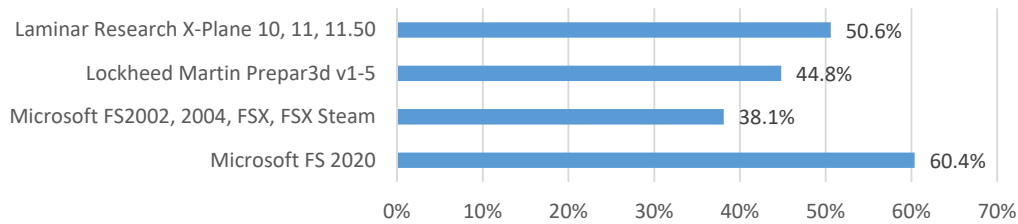
Keep in mind that Prepar3D v5 was released on April 14, the Microsoft Flight Simulator on August 18 and X-plane 11.50 on September 9. None of the simulators have been published for a full year, and are in various stages of maturity, adoption and completeness.

## How often do you fly any of the following flight simulator software?



In the analysis above, the major desktop simulator software are represented by their respective versions. As some respondents may be using multiple versions of the same desktop simulator software, or may be transitioning between such versions, it could be relevant to group these desktop simulators versions into one. In the following graph we have considered all positive use responses (from “Infrequently” to “Most of the time”) for each simulator version by each respondent, and grouped them into the same graph. This graph is more telling of the popularity of the simulator software platform as such. In this analysis we have grouped Laminar Research X-Plane 10, 11 and 11.50; Lockheed Martin Prepar3d v1-5; and Microsoft Flight Simulator 2002, 2004/FS9, FSX, FSX Steam. We have not grouped the latest Microsoft Flight Simulator 2020 with the previous versions from Microsoft to be able to compare it with the others.

## How often do you fly any of the following flight simulator software?



In this diagram we can see that Microsoft Flight Simulator 2020 is reported to be used to some degree (at least “Infrequently”) by 60.4% of the respondents, compared to 50.6% for Laminar Research’s X-Plane, 44.8% for Lockheed Martin’s Prepar3D and 38.1% by the earlier versions of Microsoft Flight Simulator.

### 4.3.2. Follow Up on 2019’s Microsoft Flight Simulator 2020 Release Anticipation

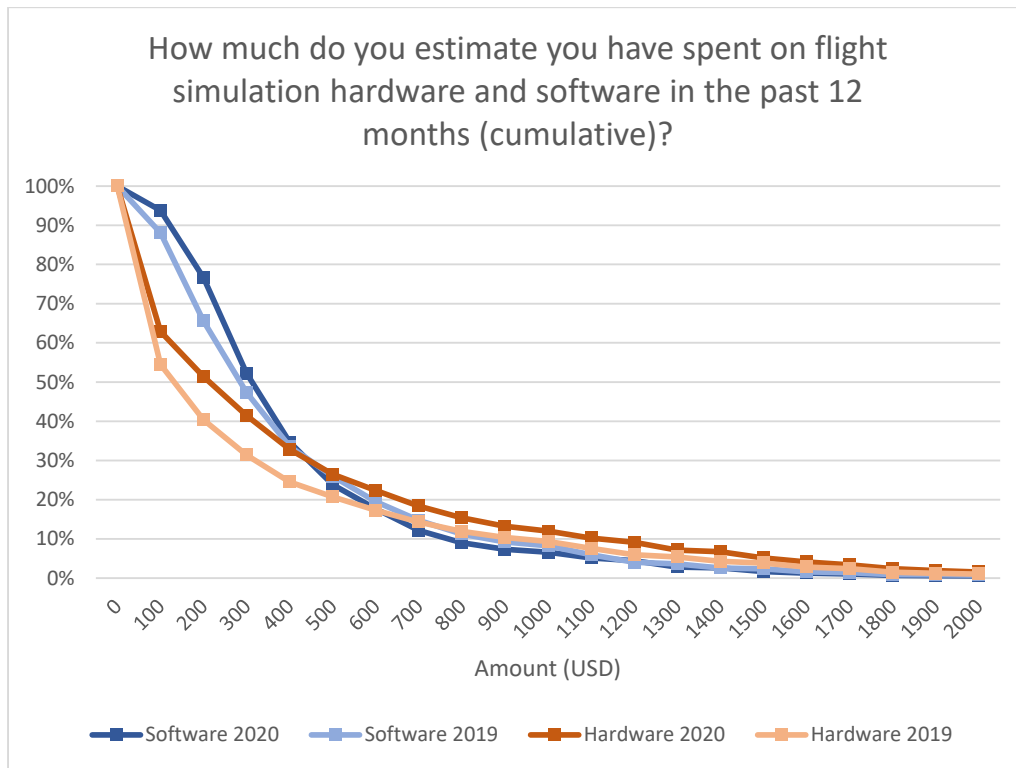
Last year, 48% of the respondents stated that they were “Very Likely” to buy the Microsoft Flight Simulator 2020 as it became available. 15% and 23% replied “Likely” and “Possibly”, respectively. In this year’s survey, however, we see that only 32.9% have switched primary flight simulation software Microsoft Flight Simulator 2020 (3.10.2. Simulator Software Change). At first glance, 32.9% is less than 48% and thus one is prone to conclude that Microsoft Flight Simulator did not become as popular as predicted. However, there are other possible arguments why we should be careful drawing such a conclusion.

For example, last year’s question was about the likelihood of *purchasing* the flight simulator. This year’s question was about whether respondents have *switched* primary flight simulation software. It may be that a respondent actually did buy a copy of the Microsoft Flight Simulator, like stated last year, but still have not started making it the primary simulator software. When asked how often the respondents fly a particular flight simulator software, 27% say “Most of the time”, but 34% fly less frequently (3.10.1. Simulator Software). It is probably among these 34% we find the pilots have not made the Microsoft Flight Simulator into their primary flight simulation software yet.

As mentioned earlier, simulators are in various state of maturity and completeness, and perhaps the areas which a respondent finds important were not fully developed yet. One such area is the selection of high-realism (a.k.a “study level”) airliners. This is one possible interpretation which could explain why some of the 11.1% of X-Plane users claim to have changed from Microsoft Flight Simulator 2020 - presumably back to X-Plane 11 again (3.10.2. Simulator Software Change).

### 4.3.3. Spending

Placing the cumulative spending diagrams for hardware and software from 2019 and 2020 on top of each other tells a much clearer story. This year respondents are have spent more on hardware, regardless of the amount (orange graph). To interpret software spending (blue graph), we have to look closer. This year fewer respondents have spent higher amounts, i.e. more than \$500, on software compared to last year. A plausible reason for this may be that there is not as many software titles available on the new simulator platforms yet, compared to the earlier simulation platforms.



Why are respondents spending more on hardware in 2020 compared to 2019? We hypothesize that respondents have upgraded their simulator setups, as required (or inspired) by the new flight simulator software releases this year, but this survey don't have the data to support such an analysis.

#### 4.3.4. Covid-19 Effects

The survey team discussed at length whether or not to include questions on the ongoing pandemic. Would the questions be perceived as prying or insensitive? Would the insights from such questions be of any use to the community? We have reasoned like this: Looking back on the year that passed, we may want to be able to explain some effects that can be attributed to Covid-19. Looking forward, the pandemic is not over and its effects will be seen over years to come. In the present, readers will wonder why we have omitted one of the most dominating events of the year, would we have excluded these questions altogether.

It seems like the majority spend equal (45.0%) or more (43.0%) time on flight simulation because of Covid-19 (3.7.4. Covid-19). When comparing the usage diagrams between years to confirm this trend, we see that the shape of the distribution is similar, but this year fewer respondents claim to fly 10 or more times per week, and more respondents fly 1-3 times per week. It may not be the frequency that has increased, but the duration. A typical session this year seems to be 2-3 hours (3.7.2. Usage). Unfortunately the question concerning session length was redesign for this year which gives us limited possibilities to compare to last year, but 5-10 hours per week over 2-3 times per week roughly gives the same average session length. Thus it is not clear to say that respondents actually spend more time on flight simulation, however, they may very well feel like they do.

Again, hypothesizing that respondents spend more time at home due to Covid-19 lockdown, we wanted to ask if Covid-19 was the reason why they might have picked up their hobby of flight

simming again. However, there may be different reasons for returning and comparing seemingly different reasons is not easy. That's why we started with a simple Yes (50.6%) / No (49.6%) question (3.7.3. Returning to Flight Simulation). Among the ones that stated that they had returned to flight simulation during 2020, we then tested if the reason was any new simulator: the new Microsoft Flight Simulator (56.9%), the new version of Prepar3D (6.8%), or X-plane 11.50 (13.5%). There was a relatively large portion of respondents that stated some Other (22.7%) reason. 8% who stated "Other" referenced Covid-19.

We also asked, rather straightforwardly, if respondents' employment situation has changed during the past year as a consequence of Covid-19, reasoning that a change in time and income might have an effect on both future usage and consumption. 13.9% report having changes in employment situation due to Covid-19. 4.8% prefer not to say, which is understandable with such a direct question early in the survey. In this context we must also admit a design flaw. This question was presented to all respondents, also those who in the previous question stated to be students, in school, retired, or not currently employed. This probably contributed erroneously to the 81.3% who stated that their employment situation had not changed.

#### 4.3.5. Console, Gaming & Gamification

Since Microsoft Flight Simulator 2020 will become available on Xbox it is interesting to follow how many respondents that own a console. Both this year and last year the console penetration among respondents is about 16%, but we expect this number to go up as more and more console owners join the flight simulation community and participate in this survey.

As more console users join the flight simulation community we hypothesize changes in how the simulator is used and the type of users it attracts.

We think that Microsoft Flight Simulator 2020 for Xbox will serve as a recruitment platform that can grow the flight simulation community. A casual gamer might grow interested in aviation and eventually learn to pilot more advanced aircraft. In doing so, controlling the aircraft will require more than just a gamepad controller and a more elaborate setup will be required. The game design challenge is, of course, to hook users with an appealing gaming adventure, and reel them in with a realistic, challenging, and rewarding experience to trigger the users' will to explore aviation and learn how to fly.

A gamepad controller is a different, some may say a limited, interaction interface compared to using typical simulator peripherals such as yoke and pedals, not to mention the flexibility keyboard commands afford on a computer. Will the gamepad controller bring about simplifications in the game design that potentially reduce the complexity and realism of piloting an aircraft? If so, at what point is the flight simulator perceived as "just a game"? Being just a game is fine, but a simulator has no finite set of objectives to complete and allows for a more flexible user experience. As such the game can entertain, but a simulator can also satiate curiosity and give experiences like a training platform.

We hypothesize that the typical console user prefers easier forgiving flight controls with an entertaining adventure experience rather than seeking the full realism of a simulator. 55.3% of respondents from the current flight simulation community state that the main reason for flight simulation is "Curiosity/Interest in Aviation" while 19.6% claim "Casual Gaming/Entertainment" (3.7.7. Purpose). 32.3% of the respondents say they would do more quick and casual flights on Xbox, but 58.4% would likely fly the exact same way as they do on a desktop (3.10.10. Console Activity).



25.2% say they are fine with a gamepad controller but 67.8% of respondents want to connect a yoke and pedals to a console (3.10.11. Console Controller).

We think we will see these numbers change in next year's survey as the composition of the flight simulation community changes with the launch of Microsoft Flight Simulator 2020 for Xbox.

On the topic user groups it would also be interesting to correlate these results with questions on VFR/IFR/casual flying preference (3.7.8. Flight Rules), aircraft preference (3.7.1. Aircraft Types), and mobile platforms (3.5. Simulator Habits - Mobile and 3.10.3. Computer) to see how sentiments on gaming changes with flight rules, general aviation versus airliners, and the type of interface a user is familiar with.

Furthermore, while being on the subject of game versus simulator, there is also a parallel discussion in the other direction. Instead of discussing how a game can turn into a simulator, we are now discussing how a simulator can be gamified. What do pilots think about the introduction of gamification elements in aviation training? 12% "Strongly agree" and 27.7% "Agree" that it would be a good idea to add badges to indicate how well one is flying. The sentiment is roughly the same for a score (3.18.3. Gamification).

## 4.4. Survey Meta Analysis

Our work with conditional questions seems to have paid off. Despite the increase from 93 to 119 questions in this year's survey, respondents were not presented with all 119 of them due to our conditional questions. Subsequently 60% "Disagree" or "Strongly Disagree" that they needed to take a break during the survey. 80% will take the survey again next year, and 80% are excited to see the results.

## 5. Future Work

This year we are publishing the raw survey data for anyone who wishes to do continued analysis of the responses. The data is anonymous and we have removed all free text as we currently have no way of ensuring that this data does not contain personally identifiable information.

Our ideas some ideas for continued analysis and future work is mainly about correlating response data:

- Correlate flight rule preference (3.7.8. Flight Rules), with aircraft preference (3.7.1. Aircraft Types), purpose (3.7.7. Purpose), and mobile platforms (3.5. Simulator Habits - Mobile and 3.10.3. Computer) to see if IFR pilots prefer a more complex interface than a gamepad controller or if mobile interfaces are indeed sufficient to fly airliners.
- Investigate which type of respondents that prefer which type of flight simulation platform (3.10.1. Simulator Software).
- Correlate country (3.2.5. Country) and age (3.2.1. Age) with spending (3.8.1. Software Expenses, 3.8.2. Hardware Expenses) to see which nationality and age group that spend the least/most. Sentiments on Freeware vs Payware could be interesting too (3.8.4. Freeware Versus Payware).

If you decide download the data and want to share any of your analyses, please post them on social media using [#flightsimsurveyanalysis](#) and we will be happy to repost them.