

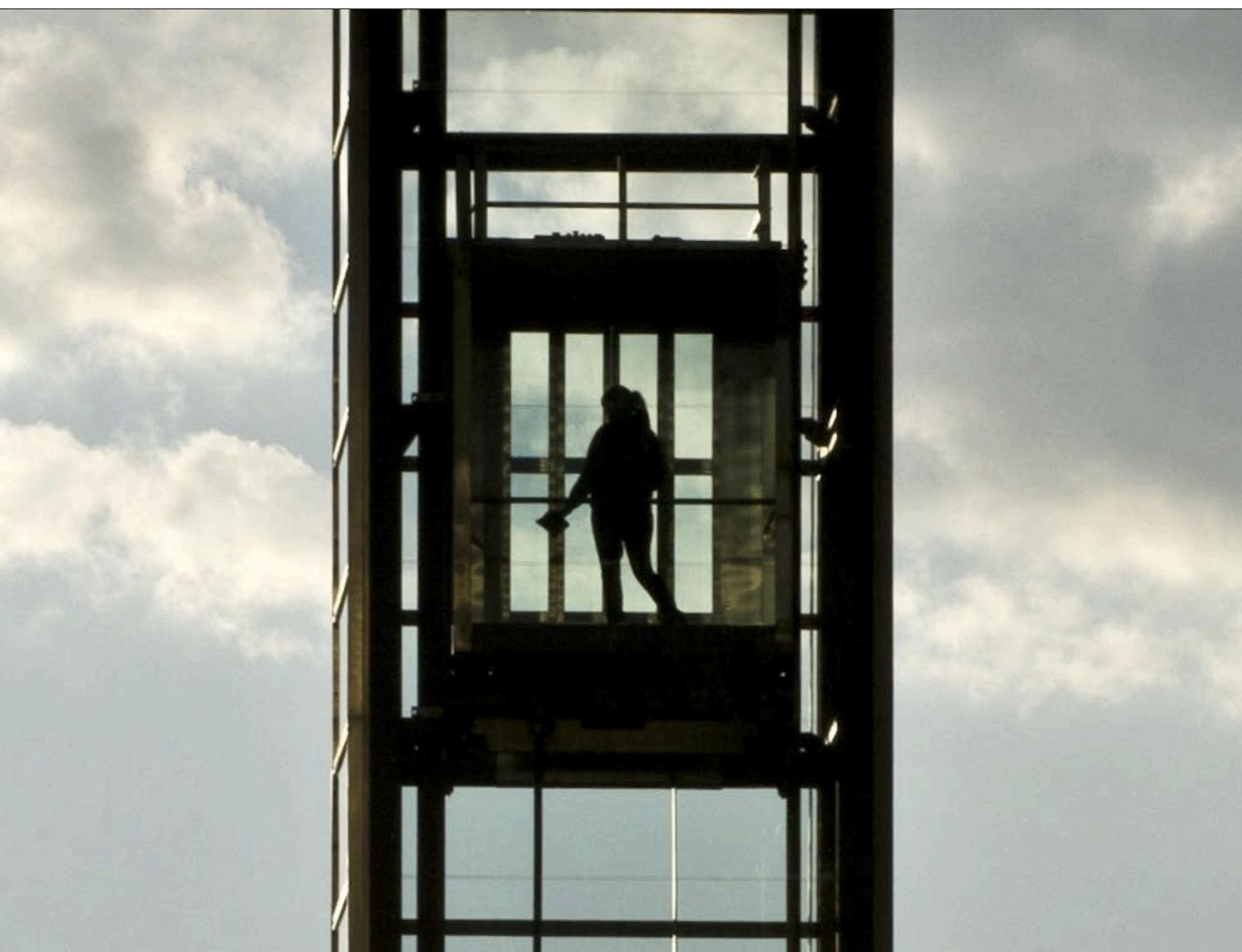
A LOOK AT BRAZILIAN AERONAUTICS ACCIDENTS

# SAFETY IN THE SKIES



Good afternoon and thank you for being here as we look at safety as it relates to air travel. Do you know what the safest means of transport is?

Photo: <https://www.pexels.com/photo/cloudiness-clouds-cloudy-daylight-417045/>



Well, it is the elevator. But I think we can all agree that this is only going to get us so far up and of course, it is restricted by the confines of the building in which it is located.

Photo: RONALDO SCHMIDT/AFP/Getty Images <https://www.brainson.org/shows/2017/03/28/how-do-elevators-work>



For long distance travel...we need to take to the skies!

Photo: [https://www.google.com/search?q=images+of+airplane+take+off+from+rear&tbm=isch&gved=2ahUKEwjus\\_b6s\\_roAhvrm3IEHWJlBG0Q2-ccegQIABAAGoq=q=images+of+airplane+take+off+from+rear&gs\\_lcp=CgNpbWcQAIDiOQFYmpABYPr5AWgCcAB4AIABqwgIAeUGrgEEMTEUMZgBAKABAa0BC2d3cy13axotaw1ngsclient=img&ei=9F2fxu6dBeu-ytMP4sqROAY&bih=717&biw=1118&hl=en#imgrc=M-uYXC\\_azibLTM](https://www.google.com/search?q=images+of+airplane+take+off+from+rear&tbm=isch&gved=2ahUKEwjus_b6s_roAhvrm3IEHWJlBG0Q2-ccegQIABAAGoq=q=images+of+airplane+take+off+from+rear&gs_lcp=CgNpbWcQAIDiOQFYmpABYPr5AWgCcAB4AIABqwgIAeUGrgEEMTEUMZgBAKABAa0BC2d3cy13axotaw1ngsclient=img&ei=9F2fxu6dBeu-ytMP4sqROAY&bih=717&biw=1118&hl=en#imgrc=M-uYXC_azibLTM)

## TROUBLES OF TRAVELING



- Lack of control
- Devastation of an accident
- Fear of heights
- Lack of comfort
- Noisy passengers
- Too close to strangers



So what are the main objections that some people have with regards to flying? The biggest ones are going to involve fear.

Photos: <https://www.google.com/search?sxsrf=ALEKK02Qab0Djxvvv9kGWD6ksNq24c3haQ:1587502815765sq=images+of+crying+kids+on+planes&tbm=isch&source=univ&sa=X&ved=2ahUKEwidigfrtProAhW-lXIEHR7yD20Q7AlGBAGKECYgbiw=1118&bih=717#imgrc=yhTdk0oiuxotIM>

<https://www.google.com/search?sxsrf=ALEKK02Qab0Djxvvv9kGWD6ksNq24c3haQ:1587502815765sq=images+of+crying+kids+on+planes&tbm=isch&source=univ&sa=X&ved=2ahUKEwidigfrtProAhW-lXIEHR7yD20Q7AlGBAGKECYgbiw=1118&bih=717#imgrc=yhTdk0oiuxotIM>

<https://www.google.com/search?sxsrf=ALEKK02Qab0Djxvvv9kGWD6ksNq24c3haQ:1587502815765sq=images+of+crying+kids+on+planes&tbm=isch&source=univ&sa=X&ved=2ahUKEwidigfrtProAhW-lXIEHR7yD20Q7AlGBAGKECYgbiw=1118&bih=717#imgrc=c7GfdaQohq3VXM>

<https://apnews.com/obd43eddb5e14e8d921ee6e1coea3460>

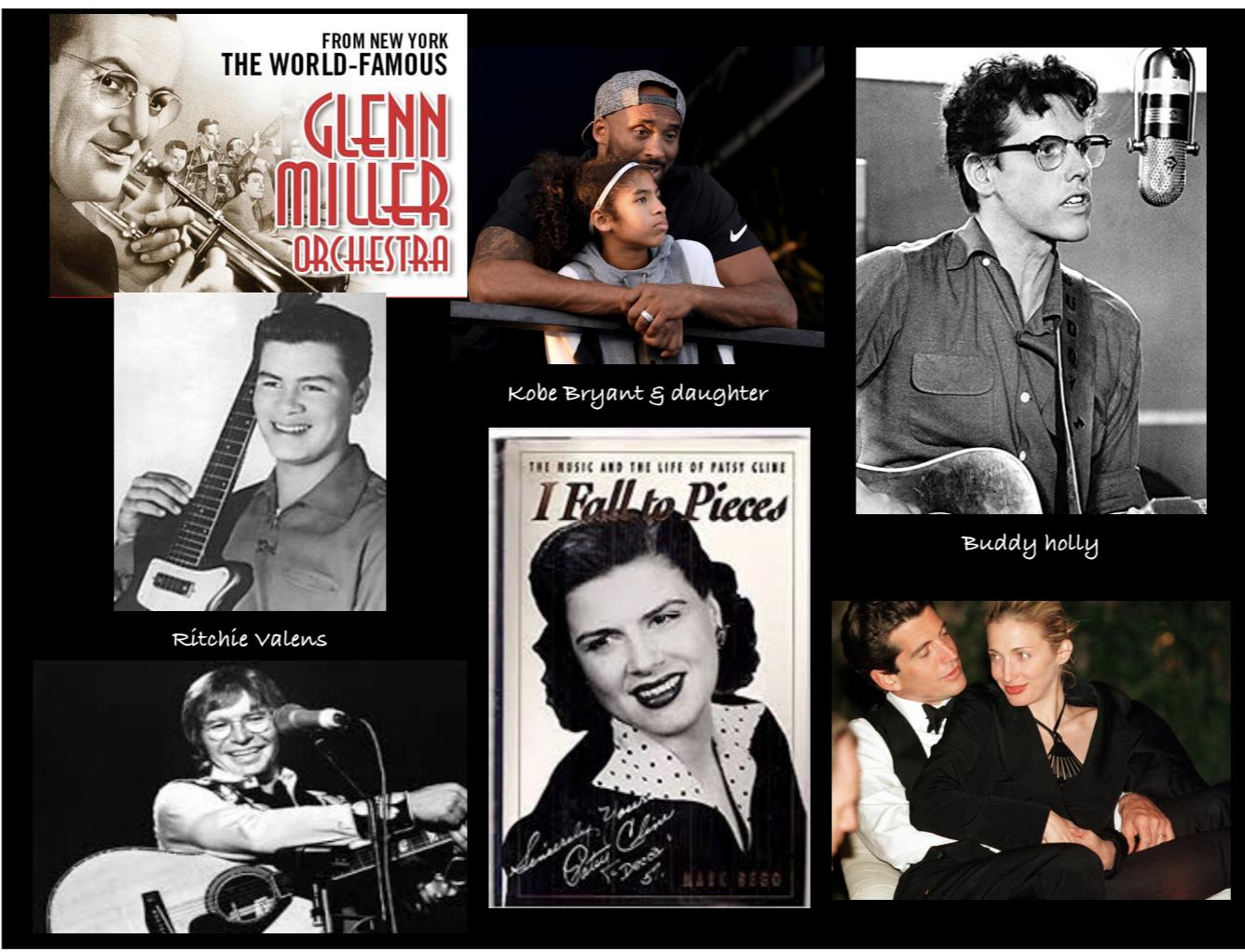
MEDIA COVERAGE OF ACCIDENTS

## FEEDING THE FEAR



Airplane accidents are devastatingly tragic. Because of this, when they do happen, there is a lot of media coverage and speculation about the safety of air travel. Questions about the pilot's ability and capacity to handle occurrences become the topic of discussion. This can take away consumer confidence from these industries.

Photo: [https://www.google.com/search?q=images+of+foggy+small+plane+crash&tbm=isch&ved=2ahUKEwjsox3tfroAhXLRAzBHFuzDGwQ2-ccegQIABAAg&q=images+of+foggy+small+plane+crash&gs\\_lcp=cGNpbWCQA1CBngvYik4FYOWIBWgAcAB4AIABQ4gBpWWSAQIXMZhBAKABAaobC2d3cy13axotaw1ngsclient=img&ei=BGcfxt-gMcuPwbkPgeew4AY&bih=717&bih=1118#imgrc=PTs7sgf1sizKWM&imgdii=nzJAH9ZkyN\\_ALM](https://www.google.com/search?q=images+of+foggy+small+plane+crash&tbm=isch&ved=2ahUKEwjsox3tfroAhXLRAzBHFuzDGwQ2-ccegQIABAAg&q=images+of+foggy+small+plane+crash&gs_lcp=cGNpbWCQA1CBngvYik4FYOWIBWgAcAB4AIABQ4gBpWWSAQIXMZhBAKABAaobC2d3cy13axotaw1ngsclient=img&ei=BGcfxt-gMcuPwbkPgeew4AY&bih=717&bih=1118#imgrc=PTs7sgf1sizKWM&imgdii=nzJAH9ZkyN_ALM)



When these accidents involve people that are famous or well known, it can affect us even more. We tend to develop attachments to these people and when their lives are cut short, we are reminded of our own mortality and how fragile life can be.

Images: from Google images

# 71 People Die in Plane Crash Involving Brazilian Football Team Chapecoense

SCOTT POLACEK 



Some of these have involved athletic teams. For Brazil, it was their first-division soccer team on the way to the South American Cup finals. They were a Cinderella story. In less than 10 years they went from a low minor 'D' league to the top division of Brazilian soccer in 2014. The impact of this crash was world wide.

Photo: <https://bleacherreport.com/articles/2678766-plane-carrying-brazilian-soccer-club-crashes-in-colombia>

ASPECT TO ADDRESS:

## CLIENT CONFIDENCE



We need to ask how we can address some of these concerns in order to restore the public's confidence in the aeronautics industry.

Photo: Google images

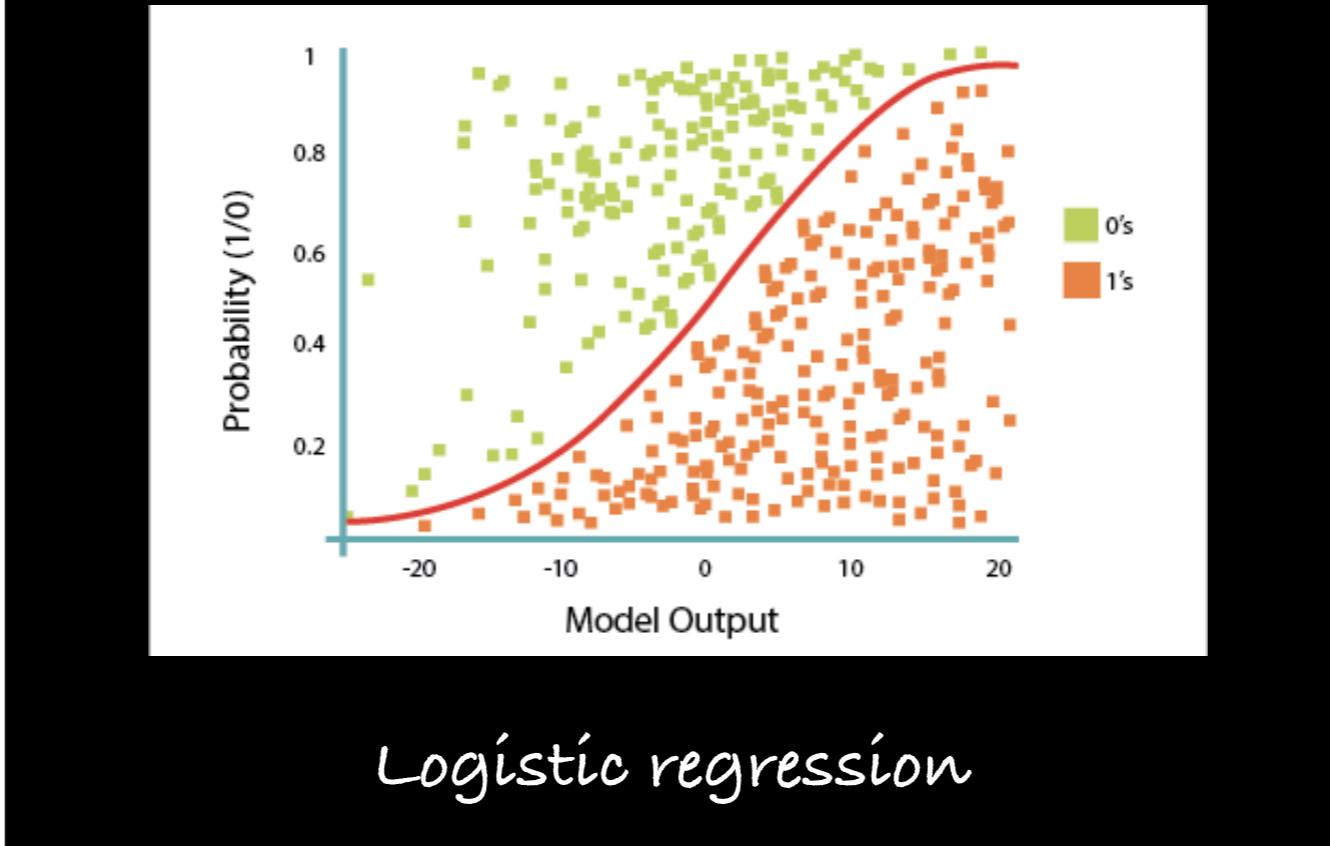


INVESTIGATE ACCIDENTS TO  
DETERMINE PREVENTATIVE ACTIONS

The information for this project was taken from the Brazilian Aeronautics Accidents dataset. We are going to take a look at some of the causes of these accidents and whether we can predict the level of damage an aircraft might sustain based on the different factors involved.

Photo:

# MACHINE LEARNING METHODS



A few different methods of machine learning are used to make these predictions. Logistic regression works to group similar items together. With this method, the model performed with 65% accuracy.

image: [https://subscription.packtpub.com/book/big\\_data\\_and\\_business\\_intelligence/9781788399906/5/cho5lvl1sec43/logistic-regression-model-building-and-training](https://subscription.packtpub.com/book/big_data_and_business_intelligence/9781788399906/5/cho5lvl1sec43/logistic-regression-model-building-and-training)

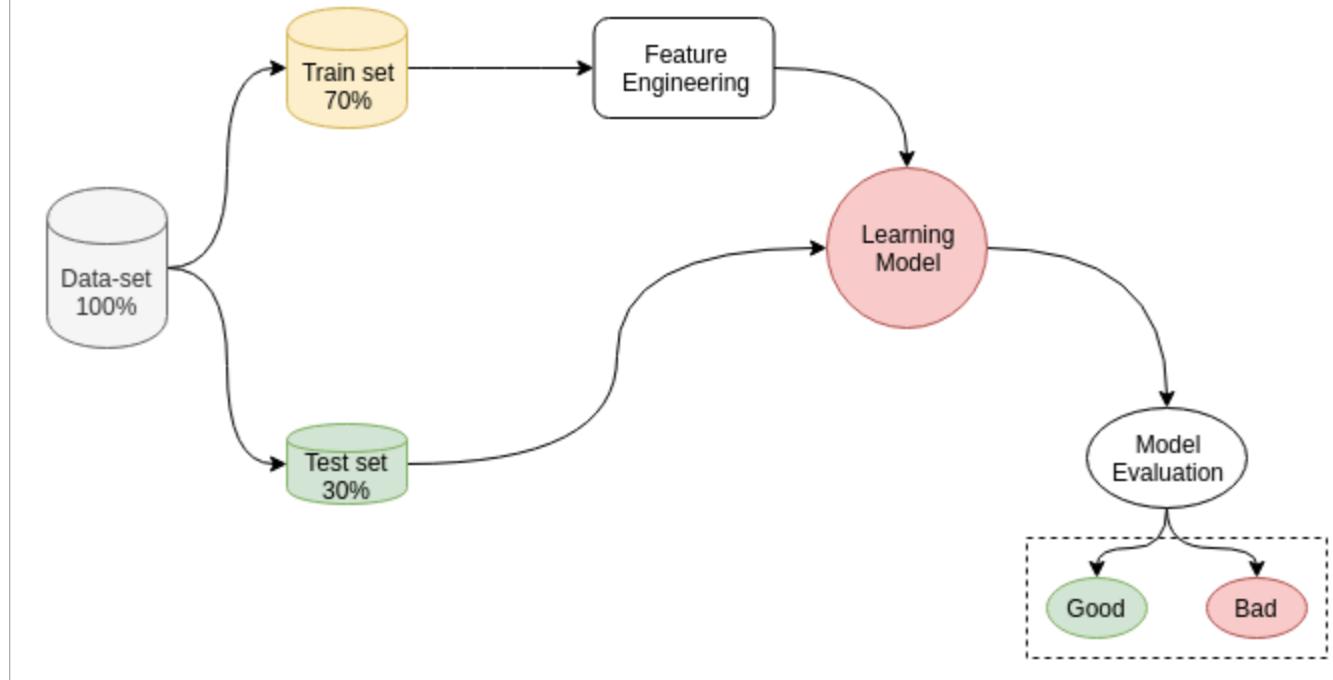


## DECISION TREES

Most of us are familiar with the thought process of a decision tree. In a decision tree, data is assigned a label. In the diagram, for instance, the model would ask if the data belonged in the orange category or the pink category. This method classified the data correctly only about 57% of the time.

image: <https://blog.bigml.com/2013/04/19/a-new-way-to-visualize-decision-trees/>

# DEEP LEARNING MODEL

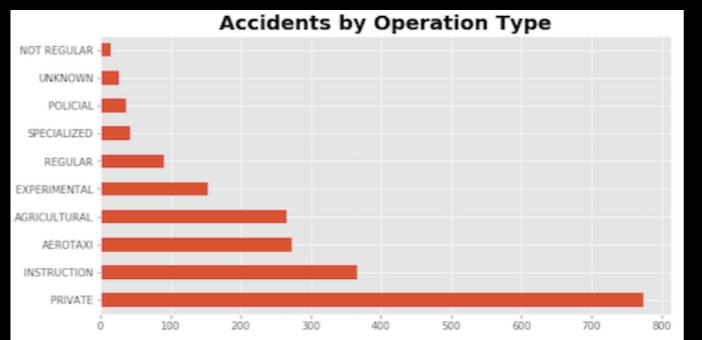
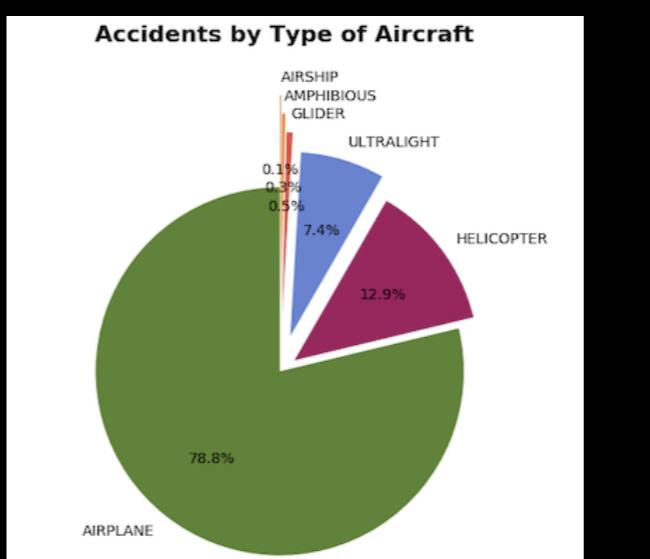


With deep learning, the data is split into two parts. One part is used to train the model while the other is used to see how it performs with data it hasn't seen before. This method gave the best performance with a 67% accuracy.

image: <https://towardsdatascience.com/cross-validation-430d9a5fee22>

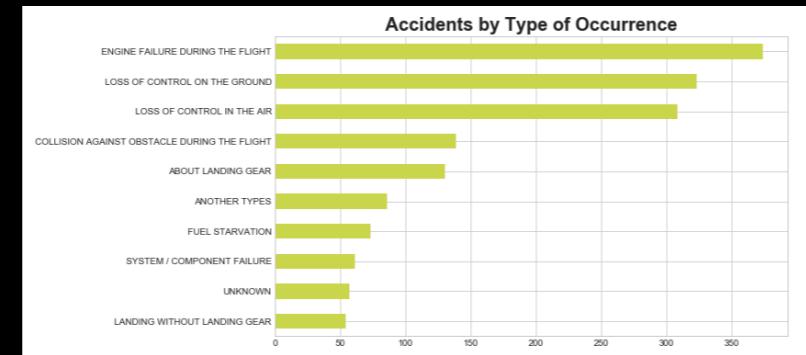
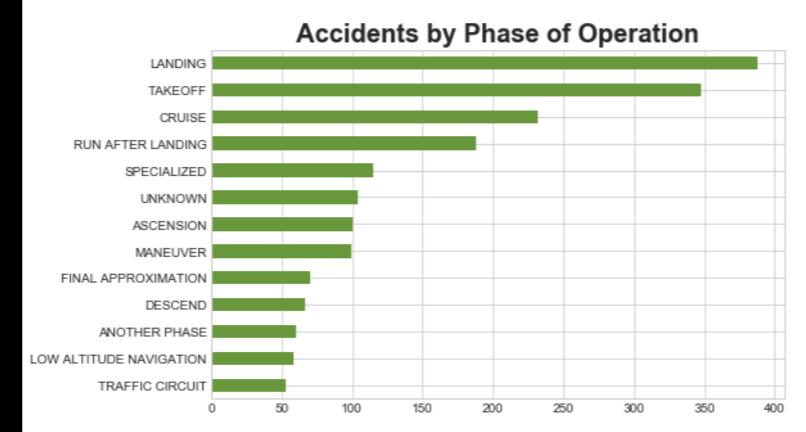
## FLIGHT FINDINGS:

- Private Airplanes
- Flight Instruction
- Air Transportation Services
- Agricultural Purposes



Here we can see the breakdown of the different types of aircrafts involved and the percentages of each.

The main types of accidents involved private aircrafts, followed by those used for instructional and agricultural purposes.



## PROBLEM PHASE:

- Landing
- Take off
- Engine failure
- Loss of control

As you can guess, landing and taking off ranked well above the other phases of flight for when the accident occurred. Engine failure and loss of control are the main problem issues for these accidents.

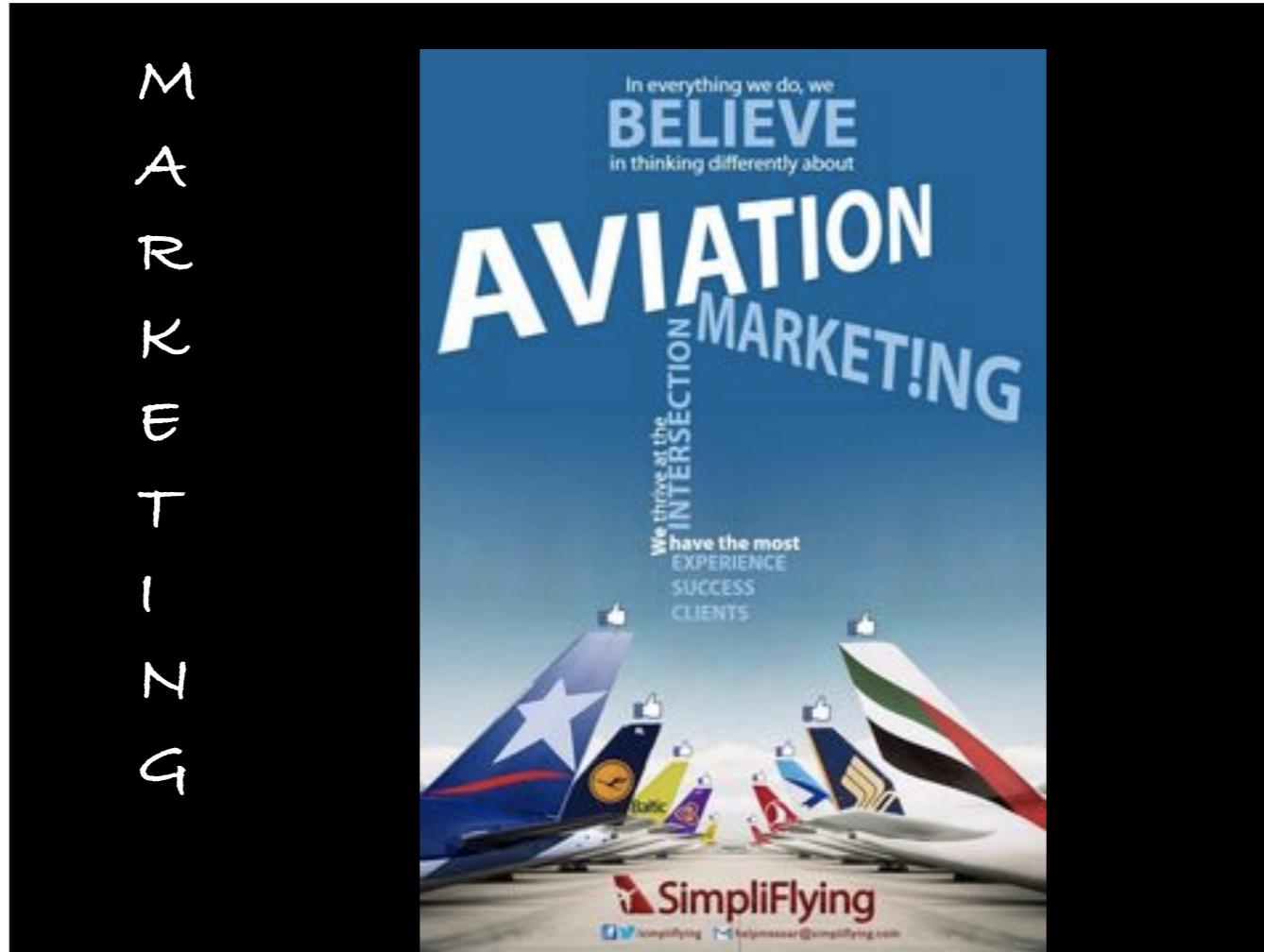
How can your clients be  
AIRBORNE WITH ASSURANCE



We are not able to control all factors involved, but there is a lot of areas that can be addressed.

Image: [https://www.dreamstime.com/stock-photo-businessman-flying-paper-plane-big-wearing-goggles-scarf-isolated-sky-background-image41032632#\\_](https://www.dreamstime.com/stock-photo-businessman-flying-paper-plane-big-wearing-goggles-scarf-isolated-sky-background-image41032632#_)

# M A R K E T I N G



Addressing fear factors by educating the public on the safety of air travel is a major issue. Another area to consider is more programs for younger students in order to introduce them to the excitement of flight and the many aspects of the aeronautics industry.

image: <https://www.pinterest.es/simpliflying/airline-airport-marketing/>



T  
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**TRAINING**  
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Increased training requirements, both virtually and hands on, for various weather and emergency situations can help better prepare pilots.

Images: <https://www.pouted.com/ways-use-virtual-reality-in-workplace/>

<https://business.facebook.com/FlyAeroGuard/>



## MECHANICAL MAINTENANCE

Guidelines for mandatory mechanical inspections along with minimum fuel requirement policies can be implemented. These are more in place for the commercial industry but lacking for personal and private use.

image: <https://www.techrepublic.com/article/a-smart-torque-wrench-and-google-glass-improve-ge-aviation-mechanics-efficiency-by-8-12/>



I've listed a few items that can be considered for future exploration.

Photo: by me on my way to visit 2 of my kids in Florida. Sunrise over the clouds!

## WEATHER FACTORS



Weather is a major factor to consider for flight safety. Strong winds and lack of visibility from fog or storms can easily contribute to aeronautic accidents. Weather information could be investigated for these accidents.

Photo: <https://13wham.com/news/local/foggy-weather-rolls-into-our-area>



The top 2 times for aeronautics accidents in this data are 8 & 8:30 pm. It would be interesting to look more in to the time factor of these accidents.

Photo: <https://www.playbuzz.com/angelgabrielli10/what-time-of-day-are-you>



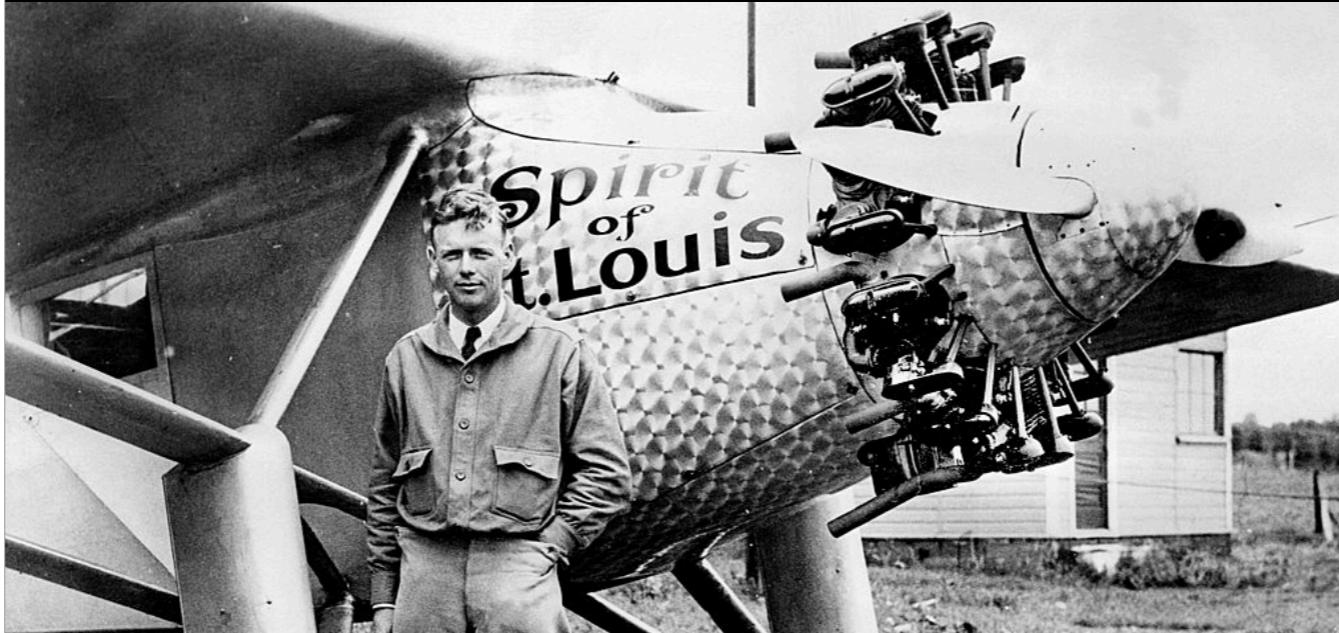
## MECHANICAL VS PILOT ERROR

The data can be separated into those accidents that occurred from mechanical failure and those that resulted from pilot related issues. Comparisons can then be made between these two factors.

Photo: <https://komonews.com/news/local/3-survive-after-small-plane-crashes-on-hillside-near-ellensburg>

"Sometimes, flying feels too God-like to be attained by man. Sometimes, the world from above seems too beautiful, too wonderful, too distant for human eyes to see."

-CHARLES LINDBERGH



I would like to close by reading a quote from Charles Lindbergh.

Photo: <https://www.gettyimages.com/photos/charles-lindbergh?mediatype=photography&phrase=charles%20lindbergh&sort=mostpopular>



Thank you again for meeting with me today.

photo: <https://www.airliners.net/photo/Sky-Service/Cessna-150M/1581979/L>