

# Sailplanes

5





Sailplanes in the GA domain differ somewhat from other General Aviation applications. This has to do with how gliding is performed. In other domains you jump on board your aircraft and you start flying but that is not so simple with sailplanes – unless you are flying a motor glider of course. Sailplane operations depend on teamwork. You will not go anywhere unless you have a team around you that makes sure that you are safely towed into the air. This added operational complexity has provided the gliding community with a collaborative team spirit and a cohesive atmosphere for safety. The gliding community with the leadership of the European Gliding Union (EGU) has been active in EASA's work on the new Sailplane OPS and FCL rules and has provided EASA with valuable input and insight into sailplane operations. The analysis that EGU with the diligent support from the British Gliding Association (BGA) has provided insight on where the risks are and what they should be called so as to be of the best use for the gliding community.

This chapter covers Sailplane operations where the state of registry is an EASA MS using EASA's accident dataset.

## 5.1.1 Key Statistics

The key statistics for this domain are in the tables below and include comparison of the number of accidents (fatal and non-fatal) and serious incidents for the 10-year period 2007-2016 and the last year (2017). It also includes the comparison of the fatalities and serious injuries happened in those accidents between the same timeframe.

**Table 12.** Key statistics for sailplanes, 2007-2017.

|                 | Fatal Accidents | Non-Fatal Accidents | Serious Incidents |
|-----------------|-----------------|---------------------|-------------------|
| 2007-2016 total | 254             | 1992                | 55                |
| 2017            | 25              | 138                 | 18                |

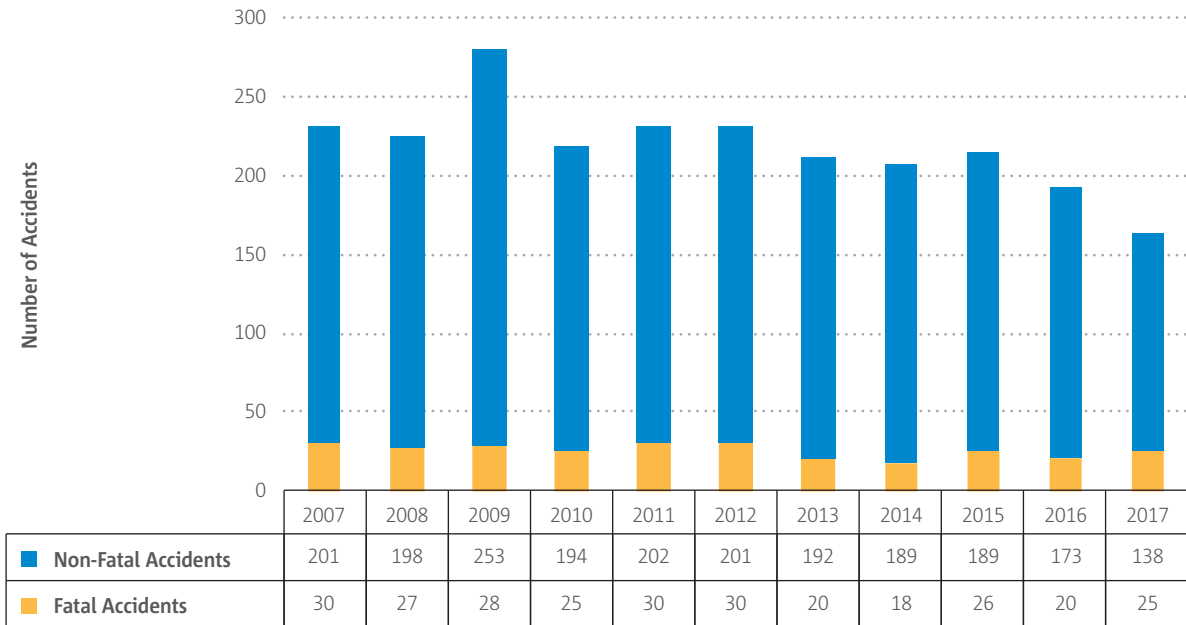
  

|                 | Fatalities | Serious Injuries |
|-----------------|------------|------------------|
| 2007-2016 total | 295        | 336              |
| 2017            | 27         | 20               |

For Sailplanes, there was an increase of fatal accidents in 2017 with 25 fatal accidents causing 27 fatalities. The number of nonfatal accidents was substantially lower than the 10-year average with 138. There was a significant decrease in the number of serious injuries. A detailed picture showing the historical fatal and non-fatal accident development can be seen in Figure 55 and fatal and serious injuries in Figure 70 below. It can be seen that number of fatal accidents have been very stable through the last decade. However, the overall trend in terms of number of accidents is decreasing.

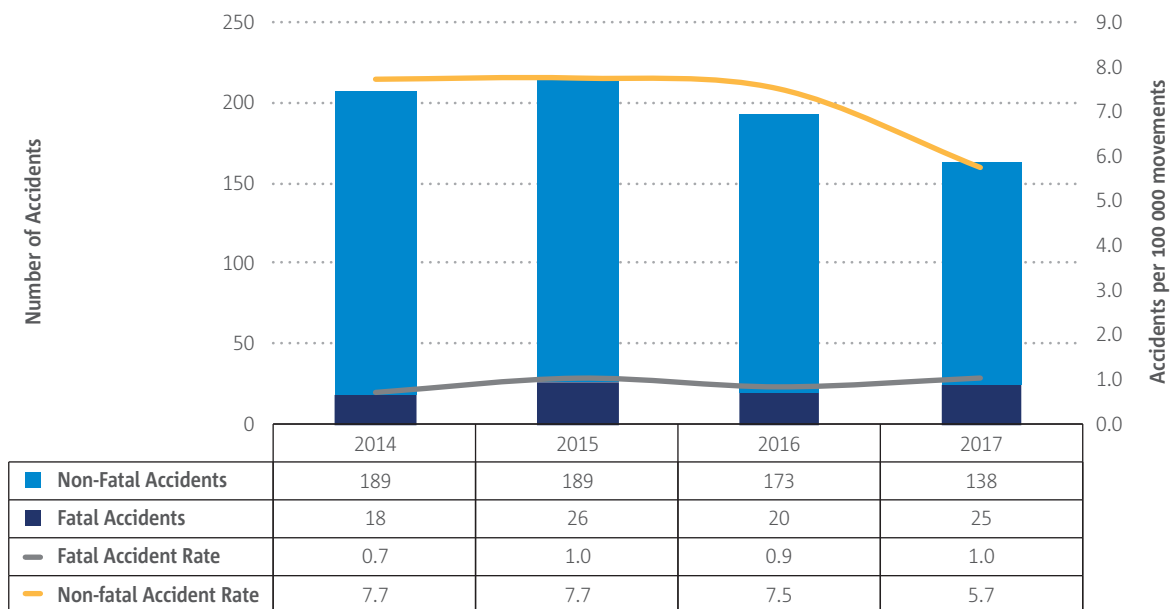


► **Figure 68.** Sailplane fatal and non-fatal accidents 2007-2017



There are no accurate figures available on number of movements. However, by using the available data reported by NAAs in 2016 and a joint survey performed by AOPA and EASA in relation to fleet size and estimation of movements and use that data to estimate for the rest of the EASA MS it is possible to estimate number of flights from 2014-2016. It was decided to use the average EU GDP increase of 2.6% from 2016 to 2017 to estimate the movements for 2017.

► **Figure 69.** Estimated accident rates for Sailplane operations 2014-2017



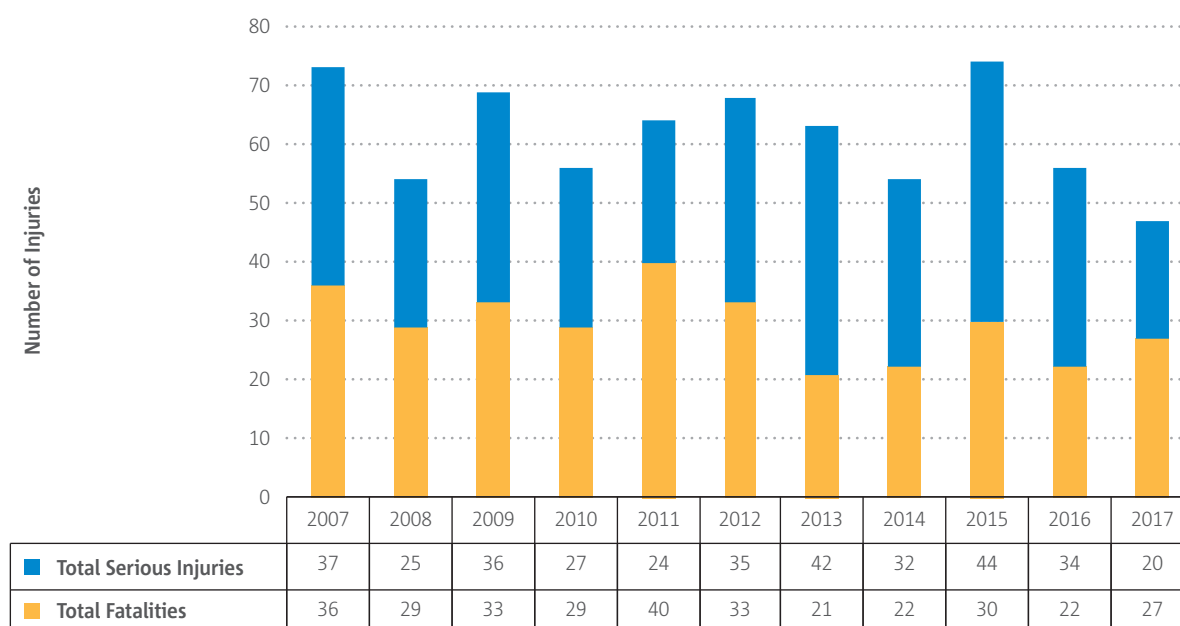
It should be noted that the rates displayed in the Figure 69 are estimated for all EASA MS. It should also be noted that accidents rates are different between individual EASA MS. This is in particular evident when comparing geographically where the accidents occurred. Number of fatal accidents are higher in the Alpine area than in areas with lower or more even landscape. The duration of the flights are also longer in the mountainous areas than in the lower parts of Europe where the number of movements is higher but the duration of each flight is much shorter.



The fatal accident rate is relatively stable over the four year period but then non-fatal accident rate is dropping in 2017. As the exposure data is very fragmented it is impossible at this time to provide an accident rate map of Europe. NAAs, flight clubs and associations are encouraged to both collect and share aggregated exposure data with EASA to enable better overview of the current situation.

There were 27 fatalities in sailplanes in 2017, which is in line with the figures over the preceding decade. The number of serious injuries in 2017 was the lowest in the time period analysed. As can be seen in Figure 56 a downward trend from 2007 to 2017 is evident.

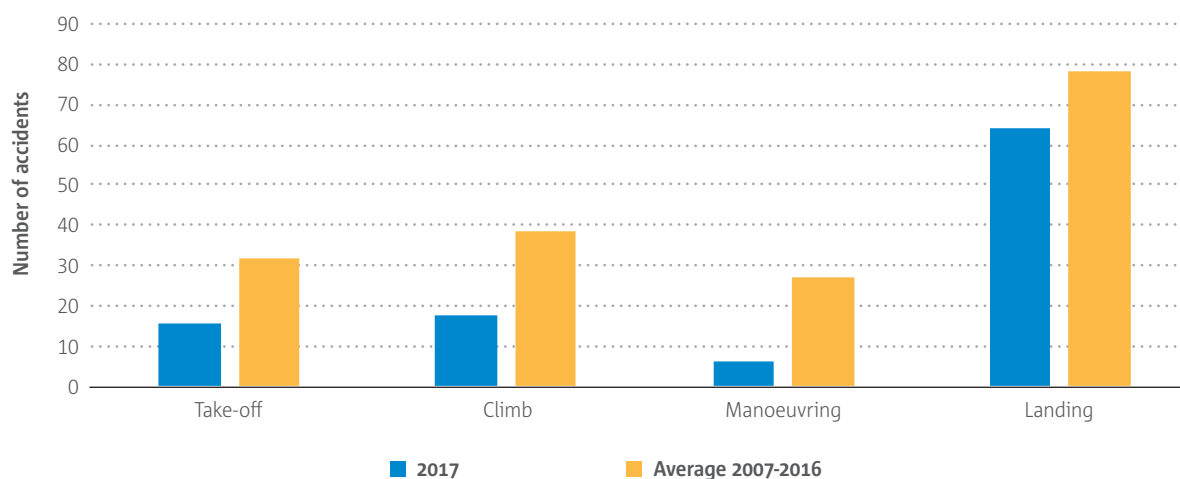
► **Figure 70. Sailplane fatalities and serious injuries 2007-2017**



### 5.1.1.1 Phase of flight

In terms of flight phase the majority of the glider/sailplane accidents occur during the landing phase of the flight. Either it is a landing on an airfield or an off-field landing due to loss of lift. It is mostly perception of the situation which causes hard landings and/or ground loops. It should be noted that Figure 71 contains all landings both on airfield and off-field landings. During takeoff it is often a wing touching ground during a winch launch, during climb it is loss of control during the winch launch.

► **Figure 71. Number of Sailplane accidents per flight phase**



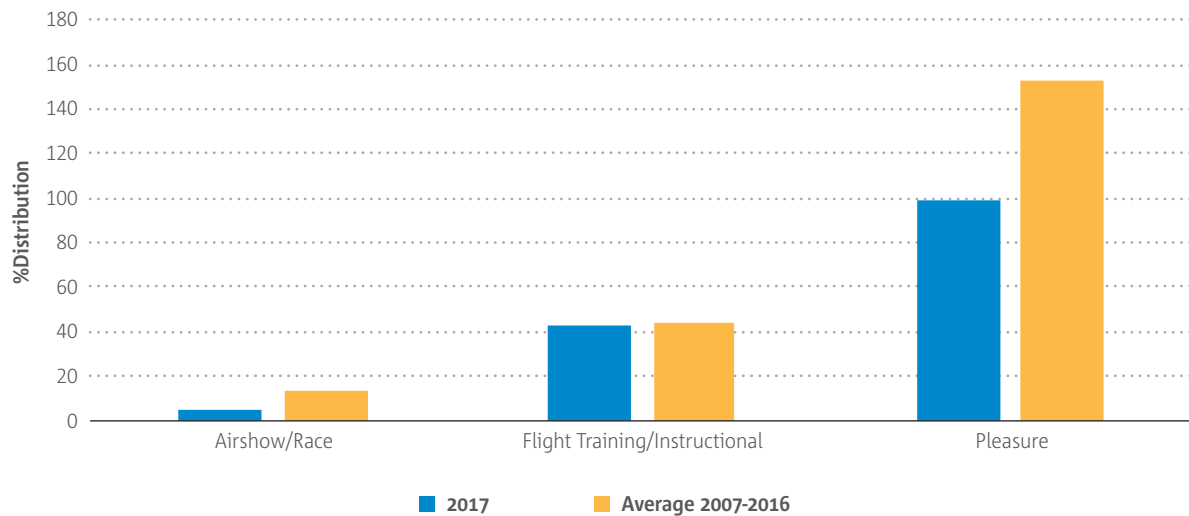


When looking at the landing phase specifically it can be seen that over 70% of the landing accidents are during Level-off/touch down or during landing roll at the airfield. Last year 30% were attributed to off-field landings where the aircraft landed outside the airfield perimeter. As the event type 'Off-field landing' is relatively new it does not give a perfect picture. It can be assumed that some of the 'Level-off/touchdown' event types have occurred during an off-field landing.

### 5.1.1.2 Sailplane operation type

Figure 72 shows that the main operation types on Sailplanes are pleasure flying and instructional flights.

► **Figure 72.** Distribution of Sailplane accidents per operation type.





## 5.1.2 Safety Risk Portfolio

The main Key Risk Areas (KRAs) used in other domains within this report have been omitted and Safety Issues (SIs)/Accident Categories have been used instead in this joint analysis done by EGU/BGA and EASA. It is well worth noting that these safety issues or accident categories are formed by the apparent immediate cause of the accident. It should also be noted that the 'In Motor Gliders/Tugs' safety issue, contains accidents that can only occur on a powered aircraft.

► **Figure 73.** Percentage of Sailplane Fatal Accidents per Safety Issue - EASA dataset 2013-2017

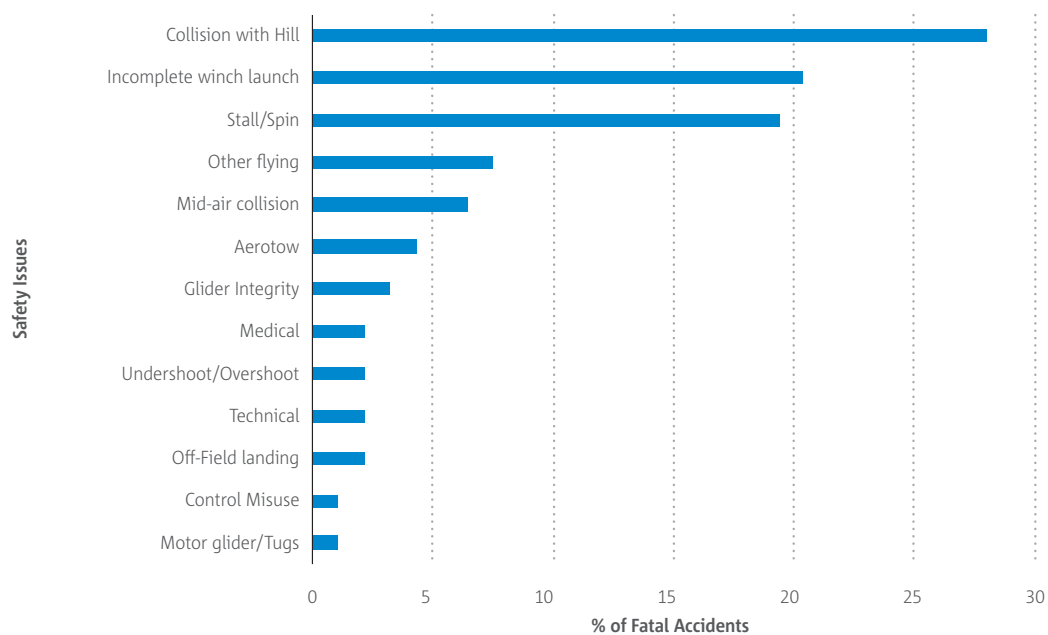


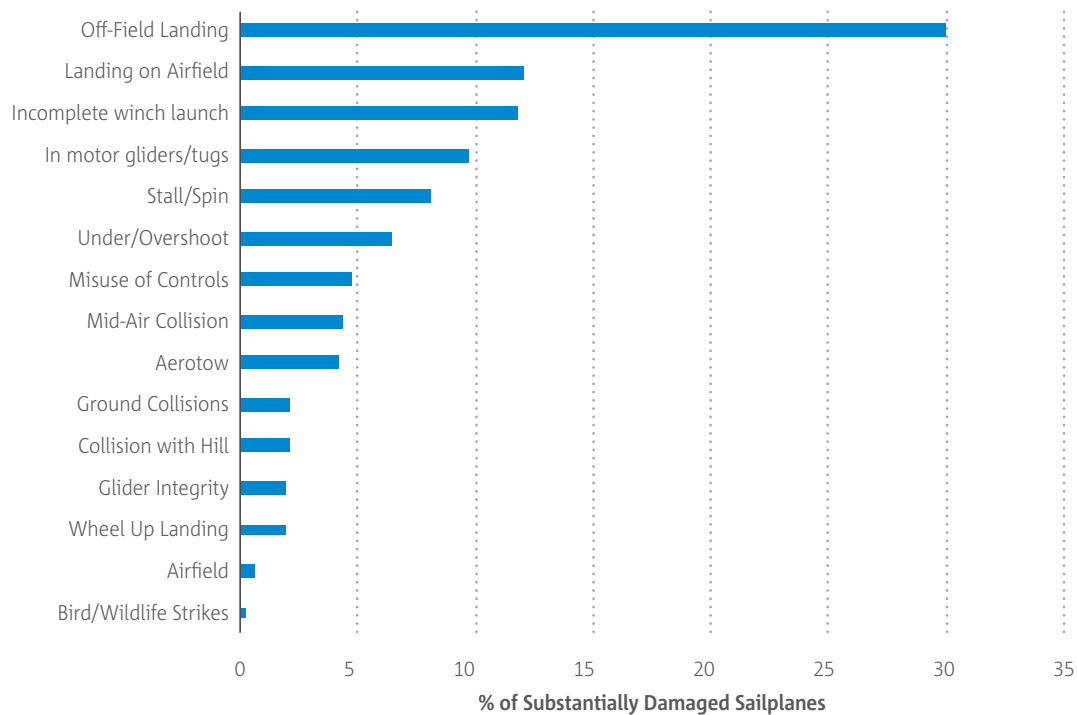
Figure 74 shows us the fatal accidents being mapped onto the safety issues. It should be noted that of 108 fatal accidents from 2013-2017 there were 15 occurrences where there was no information available to determine the immediate cause of the accident. The largest killers are:

- **Collision with hill:** Alpine flying is popular but very unforgiving. The strong winds that form around the mountains can be deadly.
- **Winch launches:** During the take-off run the aircraft swerves due to wing tip hitting the ground, angle of attack is too high causing structural overload or stall, or pilot loses control due to incomplete winch launch.
- **Stall/spin:** Loss of control is a big part of the picture when it comes to winch launches but also during the approach and landing phases of the flight.
- **Mid-Air collisions:** Searching for thermal lift with other sailplanes at the same time and approaching an airfield where communication is minimal or non-existent increases the risk of mid-air collisions.

The 'Other flying' safety issue contains 3 structural overload during flight, 1 aerobatics accident, 1 dive into the ground, 1 unexplained loss of control and 1 suicide. The Glider Integrity issue relates to the 'Pre-flight planning and preparation' used in the last version of the portfolio including assembly of the Sailplane before flight.



► **Figure 74.** Substantially damaged or destroyed Sailplanes - EASA dataset. Average percentage per safety issue.



Considering Figure 74 it shows accidents where sailplanes suffered substantial damage or were considered to be damaged beyond repair. The main Safety Issues are:

- **Off-field landings:** Landings in an unfamiliar territory – crop fields and other agricultural areas where it can be difficult to determine the quality of the designated landing field from above.
- **Landing on airfield:** The second Safety Issue involves landings at airfields. This includes the hard and bounced landings, causing a swerve or a runway excursion.
- **Incomplete winch launches:** This type of take-offs requires a good coordination between the pilot and the ground crew. Too high angle of attack or incorrect adjustments for the winch can cause unexpected and unintended results for the people involved.
- **In motor gliders/Tugs:** These are occurrences that can only occur to motorised sailplanes e.g. involving engine failures.
- **Stall/spin:** Loss of control is the cause of many of the fatalities. Actions are needed to address these accidents.
- **Under/overshoot:** This Safety Issue involves unstable approaches, speed and approach control in general.

### 5.1.2.1 Identified Safety Issues and safety issue analysis

The EASA dataset for 2015-2017 has been risk scored according to the European Risk Classification Scheme (ERCS). This allows a comparison of the key risk area and the aggregated ERCS risk score, identifying the highest risk and most commonly occurring key risk area accidents.



► **Figure 75.** Sailplanes ERCS Scores plotted per Safety Issue.

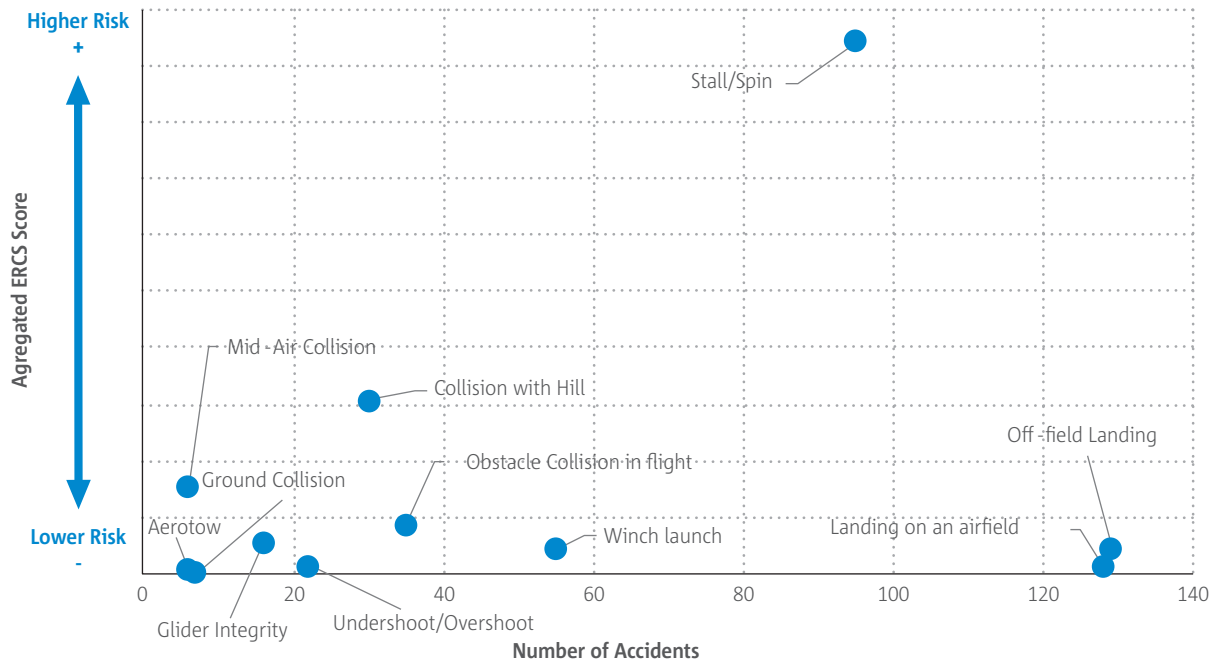
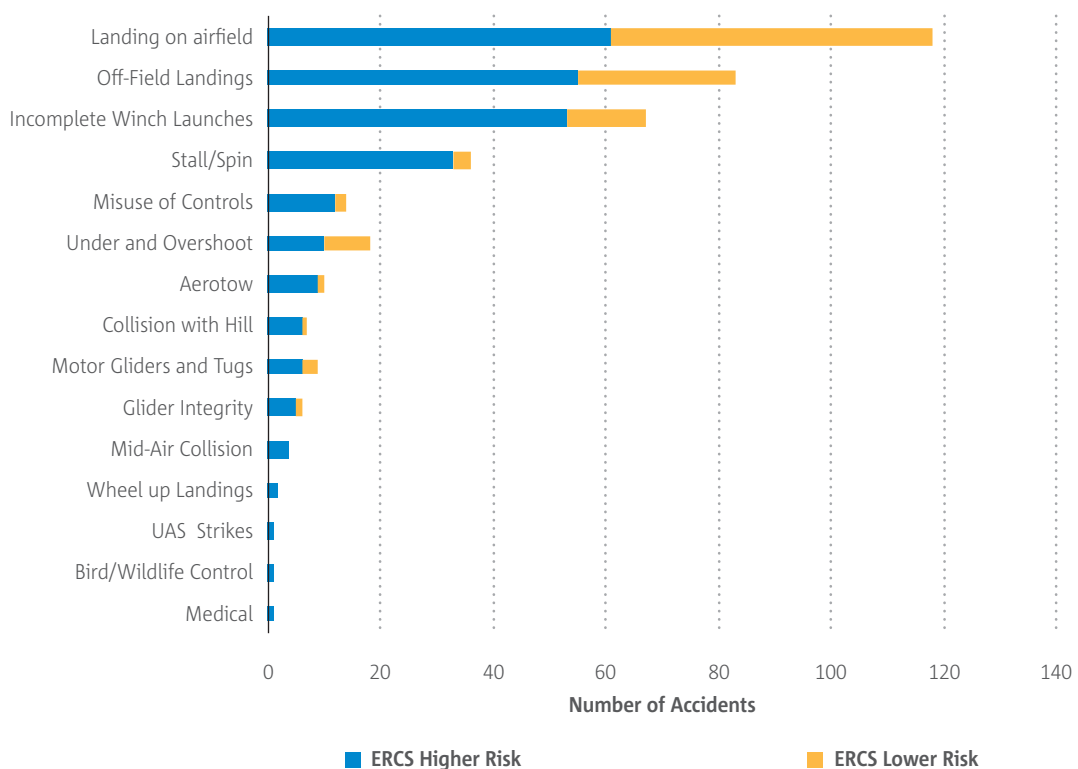


Figure 75 displays the aggregated risk vs. the number of accidents in Sailplane operation. Note that the scale of the risk is not visible as the actual risk score is not relevant. The figure shows quite clearly that the attributed risk in occurrences involving a stall or a spin resulting in a fatality or serious injury is quite high. On the other hand the figure shows also that in spite of high number of accidents the risk of a fatality or serious injury is very low. Both the Off-field landing and Landing on an airfield issues are very low in risk. Collision with Hill is showing a clear distinction in terms of risk but other safety issues show low risk but also with fewer accidents behind them.

► **Figure 76.** Sailplane Safety Issues split between Higher and Lower Risk base on the ERCS score.





## Sailplanes

Figure 76 gives us a different perspective. The higher risk occurrences are the yellow and red areas in the risk matrix where the lower risk areas are green. The safety issues 'Landing on airfield' and 'Off-field landings' contain many occurrences resulting in both higher and lower risk occurrences. The higher risk occurrences are not high enough to push them up the scale in Figure 75 as fatalities and serious injuries are few. The main outcome of the high risk accidents are substantial damage of the sailplane involved. It can also be observed that 'Incomplete Winch Launches' has much fewer lower risk occurrences. This implies that both damage and injuries are more severe in that type of accidents. The safety issue 'Stall/Spin' has fewer still lower risk accidents but the number of fatalities are much higher. This explains why Stall/spin is so high in Figure 75.