



**Network Manager**  
nominated by  
the European Commission



# EVAIR Safety Bulletin No 18

**Summer seasons 2012 – 2016**





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EVAIR Safety Bulletin No 18 delivers the ATM statistics for the summer seasons during the period 2012-2016. The statistics are based on the EVAIR and IATA STEADES ATM occurrence reports and their analysis. EVAIR statistics address European airspace, while IATA STEADES are global. Air operators and ANSPs remain the main data providers. We take the opportunity to thank to all of them for the continuous support and cooperation.

Since EVAIR comprises Voluntary ATM Incident Reporting, our data providers have total freedom regarding the periodicity of data provision. They can opt to do so on a daily or monthly basis. There is also total freedom as far as the reporting form point is concerned. The only request is that occurrence reports contain the minimum required information defined in the ICAO requirements. The narrative part of the occurrence report is crucial to making effective analyses. Clearly depicted events in the narrative sections of the occurrence reports are the foundation stone for effective analysis.

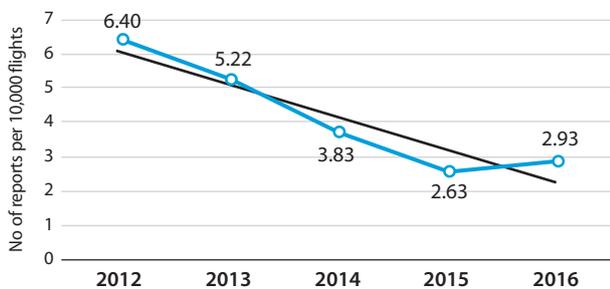


Figure 1: Incident data collection for summer seasons 2012 - 2016

### Data collection

Some 6,700 pilot reports were provided to EVAIR for the summer period 2012-2016. For the same period, more than 200 Air Operators, including business jets, provided their occurrence reports.

After three years of consecutive decreases, in summer 2016 we saw a slight increase in the number of reports. One of the potential reasons for the increase in the number of reports is that EVAIR re-established its cooperation with a certain number

## EVAIR FUNCTION MANAGER'S PERSPECTIVE

of Air Operators which had stopped reporting due to changes in personnel.

In the field of Call Sign Similarity/Confusion (CSS/CSC) reporting, where we receive reports from ANSPs, we received more than 15,000 reports for the summer period 2012-2016. As for the pilot reports, mainly call sign confusions, we recorded an increase in the number of reports in 2016 compared to 2015. It is important to say that the number of call sign confusion reports provided by Air Operators was very low. In 2016, EVAIR received about 60 call sign confusion reports.

### Feedback – Reporting motivator and support for quick fixes

After a few years of steady increases in feedback reports (SMS investigations conducted at operational level), in 2016 we recorded a slight decrease. In 2016 almost 38% of the reports in the EVAIR data base were covered by investigation reports. This percentage would have been much higher if Air Operators/ANSPs had asked for feedback for each report provided. In fact, since EVAIR deals with low-level severity occurrences, in many cases the explanation was provided on the frequency, meaning that Air Operators/ANSPs did not ask for feedback.

The time frame for the provision of feedback reports is important, since it is to some extent an indicator of the SMS performance of Air Operators and ANSPs. We managed to evolve from a figure of almost two months for summer 2015 to slightly over one month for summer 2016.

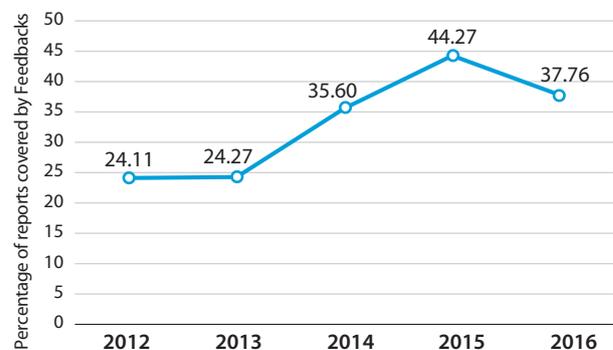


Figure 2: Percentage of pilot reports covered by ANSP feedback 2012 - 2016

It is very encouraging to see that ANSPs have now started using the feedback process facilitated by EVAIR almost to the same extent as Air Operators (more proactive in the past). For both these groups, it is very important to close open reports and share lessons learned. Feedback is one of the best motivators for the reporters to continue reporting.

## Main trends

### Events

In the past, within the EVAIR data base, 'Missed approach/Go-around' was the area with the largest number of reports. However, over the last two years, this area has been overtaken by 'ACAS RA' reports. During summer 2016, even 'Call Sign Confusion' recorded a few more reports than 'Missed approach/Go-around'. Three out of seven areas regularly monitored by EVAIR recorded an increase in the number of reports during the summer season 2016 ('ACAS RA', 'Level Bust' and 'Call Sign Confusion').

### Contributors to incidents

Three out of seven contributors identified as the most common for most events recorded within the EVAIR data base showed an increase in the number of reports during the summer season 2016 ('Air-Ground Communication', 'Mistakes' and 'Lapses'. The rest recorded a decrease, in some cases (especially 'Traffic Information') a very significant decrease.

### ACAS RA data collection

After years of domination by Missed approach /Go-around in terms of the number of reports, over the last two summer seasons ACAS RA took the lead. In addition, after the decrease in summer 2015, ACAS RAs recorded an increase in summer 2016 with 0.56 reports per 10,000 flights. An increase was also recorded in the number of locations where the occurrences took place. Our ACAS experts have been especially focussed on the false RAs caused by hybrid surveillance tracking anomalies. More about this problem can be found on page 41.

### Laser interference

For the third year in a row, EVAIR recorded a decrease in 'Laser interference' reports. However, some regions are still under

severe threat of 'Laser Interference'. In most of the reported events pilots followed the recommendations to report interference to the ATC, who then referred the matter to the local police.

Pilots also followed the recommendation not to look at the source of the light, thus avoiding potential eye injuries.

### Call sign confusion

EVAIR continues to monitor the effectiveness of the EUROCONTROL Call Sign Similarity de-confliction Tool (CSST) and the associated CSS Service Level 1 (i.e. single aircraft operator de-confliction). The main objective of the monitoring is to record and, to a certain degree, analyse the call sign similarity and confusion (CSS/C) reports received from ANSPs and aircraft operators. For the summer period 2012-2016, EVAIR received 15,100 reports from 15 European Air Navigation Service Providers. The most important outcome of the statistics based on the ANSP reports is that Air Operators using the Call Sign Similarity de-confliction Tool (CSST) recorded 5.5 fewer call sign similarities than non-tool users.

### RPAS/drones – an emerging threat

During the summer season 2016 EVAIR recorded a considerable increase in the number of RPAS/drone reports. All the reports contained in the EVAIR data base concern small drones as defined within EASA "Open" category. The most affected phase of flight, with more than 80% of the reports, was approach. Some of the occurrences took place on higher FLs, above FL100, which is quite high for small drones which are supposed to fly at very low altitudes. In a few cases, commercial traffic had to wait in holding patterns because of drone activities which had not been coordinated with ATC.

### GPS outages

In summer 2016, GPS outage reports continued to increase. The most affected area is still the Black Sea - Caspian Sea axis and four to five hundred miles north and north-west from that axis. So far EVAIR has not received reports with lost navigation capabilities or pilot requests for the navigational assistance from ATC services. The EUROCONTROL team made up of navigational experts, IATA and EVAIR works in coordination with other stakeholders to identify all possible consequences

when the satellite signal is lost, and to find the best way to raise awareness and mitigate identified problems.

## **Stakeholders' Corner**

### **IATA**

The International Air Transport Association (IATA) safety department conducted an analysis of selected topics related to Air Traffic Management (ATM) reports at the request of EUROCONTROL. This independent analysis enables EUROCONTROL to perform high-level comparisons of the data and information captured in the EUROCONTROL Voluntary ATM Incident Reporting System (EVAIR).

The analysis was conducted on Air Safety Reports (ASR) held in IATA's Global Aviation Data Management (GADM) Safety Trend, Analysis, Evaluation and Data Exchange System (STEADES) database. The STEADES database is comprised of de-identified safety incident reports from over 198 participating airlines throughout the world, with an annual reporting rate now exceeding 200,000 reports/year. The STEADES database incorporates a number of quality control processes that assure analysis results.

The scope of the analysis for the EVAIR Safety Bulletin included research of ASRs for summer periods (April 1st to September 30th inclusive) over the years from 2012 to 2016. During these summer periods a total of 483,350 reports were submitted and collated into STEADES. The airlines participating and submitting data to STEADES represent a total of 30,722,915 flights during the summer periods from 2012 to 2016. This is equivalent to an average of 31% of the world's flights during these summer periods.

### ***Security and Confidentiality***

When collecting and processing data, EVAIR follows strict security and confidentiality arrangements. The safety data provided are properly safeguarded and de-identified and the information is used only for the promotion and enhancement of aviation safety.

### ***EVAIR Suggestions/Improvements***

EVAIR is constantly looking for ways to improve its services and products. Suggestions and proposals are more than welcome. Please forward any thoughts, ideas or comments to Ms Dragica Stankovic, EVAIR Function Manager:

[dragica.stankovic@eurocontrol.int](mailto:dragica.stankovic@eurocontrol.int)

## ATM EVENTS AND SUPPORT TO EUROPEAN SAFETY ACTION PLANS

Together with IATA, EVAIR presents seven different ATM issues: 'Level Bust', 'Runway Incursion', 'Missed approach/Go-around', 'ACAS RAs', 'Call Sign Confusions', 'Loss of Communication' and 'Wake Turbulence' (Figures 3 & 4). For the areas monitored together with the main stakeholders, ANSPs, Air Operators and EUROCONTROL produced either action plans or studies in order to help to the stakeholders resolve or mitigate safety concerns. The task of EVAIR and IATA is to monitor these areas of concern, identify main trends and potential areas for further improvements, but also to raise awareness on potential recurrences of the same problems.

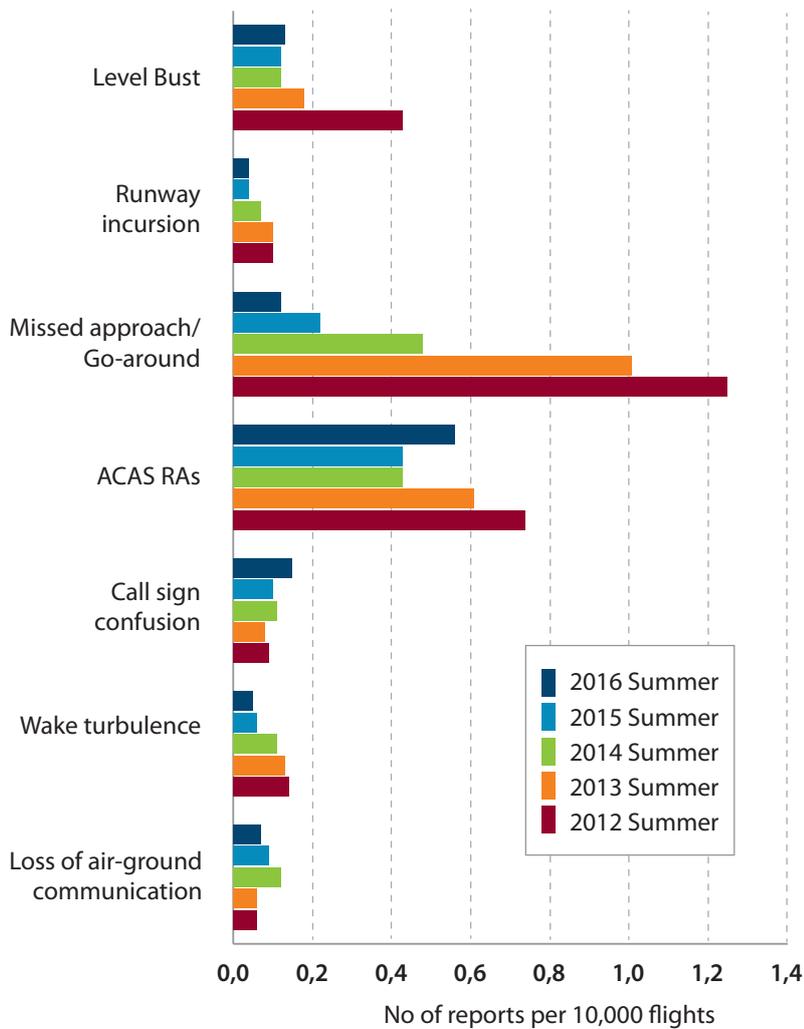


Figure 3: European ATM events summer seasons 2012 – 2016

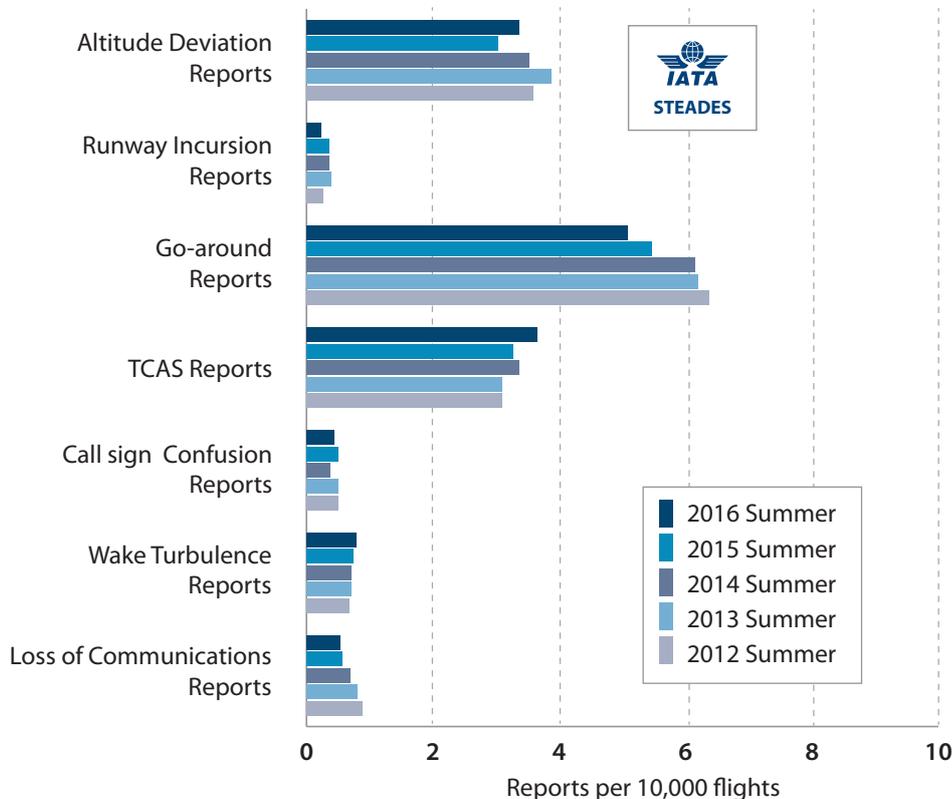


Figure 4: ATM events summer seasons 2012 – 2016

IATA STEADES in general posts higher trends. One of the potential reasons for this difference is that STEADES is the global mechanism for data collection, while EVAIR is European.

Two areas of concern in both data repositories ('Go-Around' and 'TCAS RA') through the monitored period had higher numbers of reports than the others. On the other hand it is interesting to see that over the last four years both data bases recorded decreases in the number of 'Go-Around' reports. Within IATA STEADES 'Go-Around' is the area with the highest number of reports. Within EVAIR, thanks to the significant decrease in 'Go Around' reports over the last four years, ACAS RAs took the lead.

Of the seven areas monitored in 2016, four showed similar trends in both repositories, either increasing or decreasing. More detailed statistical information for each of the events monitored is presented later in this Bulletin.

You can also find out more about each of the event types on SKYbrary:

[http://www.skybrary.aero/index.php/European\\_Action\\_Plan\\_for\\_the\\_Prevention\\_of\\_Level\\_Bust](http://www.skybrary.aero/index.php/European_Action_Plan_for_the_Prevention_of_Level_Bust)

[http://www.skybrary.aero/index.php/European\\_Action\\_Plan\\_for\\_the\\_Prevention\\_of\\_Runway\\_Incursions](http://www.skybrary.aero/index.php/European_Action_Plan_for_the_Prevention_of_Runway_Incursions)

[http://www.skybrary.aero/index.php/European\\_Action\\_Plan\\_for\\_the\\_Prevention\\_of\\_Runway\\_Excursions\\_\(EAPPRE\)](http://www.skybrary.aero/index.php/European_Action_Plan_for_the_Prevention_of_Runway_Excursions_(EAPPRE))

To learn more about STEADES, go to:

[www.iata.org/steades](http://www.iata.org/steades)

## CONTRIBUTORS TO ATM OCCURRENCES: SUMMER SEASONS 2012-2016

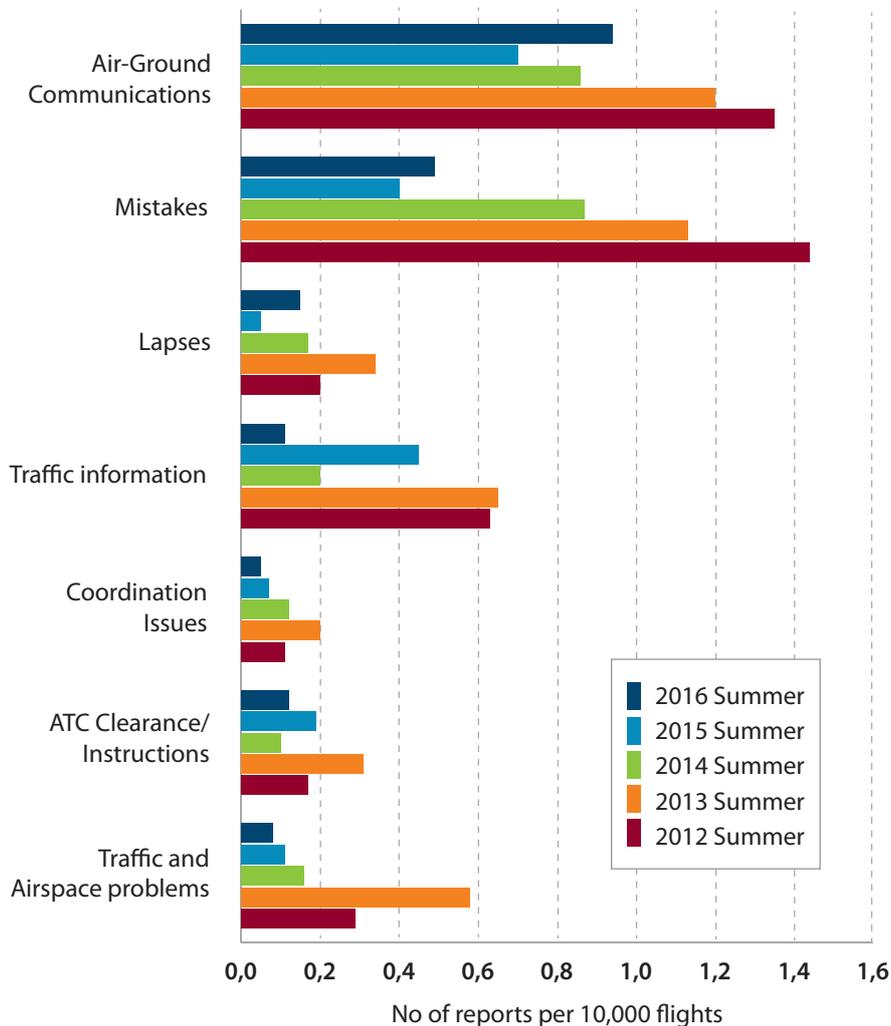


Figure 5: 5 Contributors to ATM incidents – all phases of flight summer seasons 2012 – 2016

EVAIR is one of the rare regional data bases which is able to identify occurrence contributors and provide the relevant statistics. The number of contributors is extremely high and it would be impossible to show all of them. Therefore we decided to identify those which are common to the majority of the various types of occurrences, especially those presented in Figure 3. One of the advantages of addressing and resolving contributors which are common to different types of events is that it makes the work of safety experts cost-efficient.

The activity most frequently mentioned, at least as a partial mitigation solution for different ATM occurrence contributors,

was training. The conclusion was based on the feedback reports we receive from Air Navigation Service Providers and Air Operators.

Out of seven contributors monitored, three 'Air-Ground Communication', 'Mistakes' and 'Lapses' recorded an increase in summer 2016, however these areas recorded a decrease in summer 2015. On the other hand the area 'Traffic information', which had seen an increase in summer 2015, recorded a significant decrease in summer 2016.

## GO-AROUND: SUMMER SEASONS 2012-2016

Before we address the figures for 'Go-around' events, we should consider why we monitor 'Go-arounds'. The answer is that, although it is a normal safety procedure, this does not mean that there are no associated safety issues. Our monitoring and high-level statistics, together with feedback provided by air operators and ANSPs, support this theory. Therefore, EVAIR and IATA STEADES will continue monitoring 'Go-around' until such time as we see significant improvements and solutions for the 'broken' or breached barriers associated with the manoeuvre.

Over the last four years 'Go-around' trend lines have shown a decrease in the number of reports per 10,000 flights. However, when we look at the total number of 'Go-around' reports compared to other types of event and the fact that 'Go-arounds' account for almost 13% of the overall EVAIR data for the 2012-2016 summer seasons, we still have to keep an eye on this area and monitor developments.

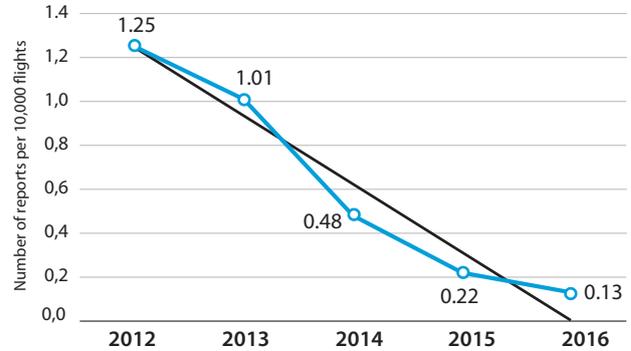


Figure 6: Missed approach-Go-around summer seasons 2012 - 2016

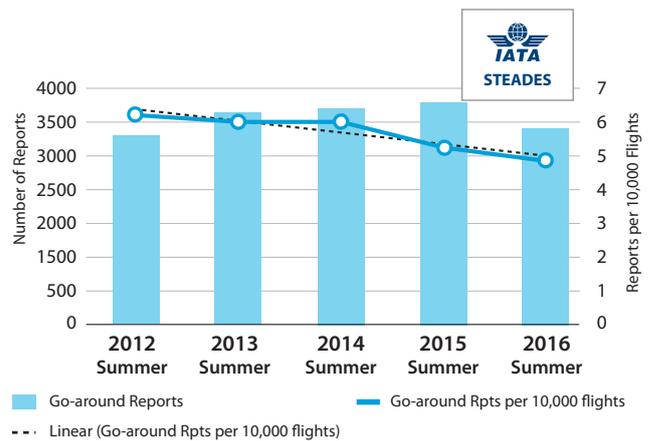


Figure 7: Go-around reports summer seasons 2012-2016

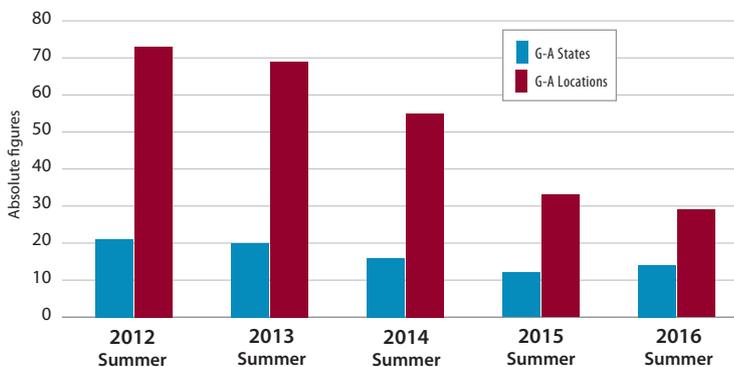


Figure 8: Go-around reports: States and locations for summer seasons 2012-2016

Looking at the number of European States and locations where 'Go-arounds' occurred we can say that a 'Go-around' is an event with a pan-European dimension, however a closer look at the data base shows that over the last five summer seasons 88% of the 'Go-around' events took place within five States. It is also important to say that these are the States with the highest traffic and that we have the best occurrence reporters in these States from Air Operators and ANSPs alike. All these elements could have an impact on the number of 'Go-around' reports we recorded in the EVAIR data base.

Training remains one of important corrective factors. More on proposed corrective measures can be found in the outcomes agreed at the 2013 Safety Forum and the various activities and studies developed by EUROCONTROL in coordination with our main stakeholders, air operators, ANSPs, professional associations, etc.

[http://www.skybrary.aero/index.php/Portal:Go-Around\\_Safety\\_Forum\\_Presentations](http://www.skybrary.aero/index.php/Portal:Go-Around_Safety_Forum_Presentations)

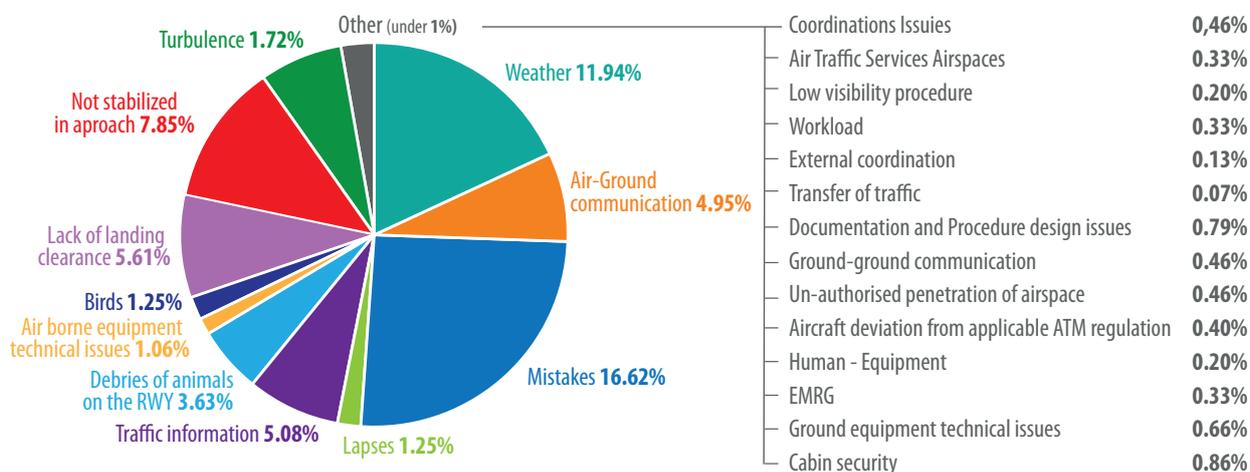


Figure 9: Go-Around contributors summer seasons 2012- 2016

The EVAIR team made a search through the various levels of the EVAIR data base to identify as many 'Go-around' contributors as possible. More than 30 contributors were identified. 27 of these are shown in Figure 9. The reason for not showing all contributors is to avoid too busy graph and not readable.

'Traffic and airspace problems' is the area with the highest percentage, almost 29%. This area incorporates pilot problems, traffic load and complexity and airspace problems. 'Mistakes', with 16.6%, is in second place. The areas which fall within 'Mistakes' are decision-making, judgment, planning and workload.

The areas we would like to highlight to our readers have relatively low percentages, but higher risk, namely 'Lack of landing clearance' (5.6%), RWY occupied (4.4%) and Documentation and procedure design issues (0.79%).

## De-identified 'Go-around' events recorded during summer 2016:

### Sep 2016 Airline report

Cleared by approach control to intercept ILS RWY 16L. When established, called ATC and was instructed to continue approach. A/C configured early due to distance with the preceding aircraft. As the aircraft vacated the runway we called ATC for clearance to land at approximately 0.7 DME. Tower frequency was given. Tower frequency selected but frequency was engaged and clearance to land was not given in time. Go-around initiated. Vectors for ILS 16 L given by ATC, crew informed of the reason for go-around. Fuel on landing was approximately 3,600 Kgs.

### ANSP feedback facilitated by EVAIR

The approach controller instructed pilot to reduce speed and to change the frequency. Pilot read back only first part of the instruction related to the speed but did not change the frequency. The late change of the frequency created the delay in contacting the Tower and busy frequency.

### Oct 2016 Airline report

Top of decent, we received the ATIS which stated RNAV approach runway 18 in use, and LOC18 and ILS 02 not available due to maintenance (which was not NOTAM-ed). The crew were not RNAV trained. The tailwind component for runway 02 was 10 knots so we requested VOR approach runway 02. That was denied and at FL200 we were advised to expect VOR3 let-down procedure runway 18. This was briefed by the PF (first officer) and after numerous radar vectors we were cleared for approach. The descent profile states a minimum altitude outside 7 miles of 2650. We descended and commenced the visual part of the approach aiming for a 7 mile final.

We established on finals with 4 whites on the PAPI's and continued the approach with a descent rate appx 1100-1500ft/min until approaching 500' when the PM (captain) called unstable go-around. A go-around was executed, runway heading to 4000'. During the go-around the configuration warning sounded as the gear was put up before flap 15 was selected in error. This was immediately corrected and a normal go-around was flown. Due to fuel going below reserve

(2400kgs) captain took control and executed a visual circuit to land on runway 18 which was all stabilised by 500'. A normal landing was executed with 2400kgs of fuel on-board.

### ANSP feedback facilitated by EVAIR

Even though ATIS broadcast (RWY in use 18, Caution ILS 02 and localiser 18 unserviceable due flight check and inspection until 14:00), RWY 02 was requested by the pilot. ATC instructed to "expect VOR/DME 3 approach RWY 18 and expect visual when RWY insight, descent FL200 (wind more than 10 kts from 200°).

Number 1 in landing sequence initiated an RNAV GNSS approach for RWY 18. Flight was vectored to KONEV point and cleared VOR/DME 3 approach over KONEV. After having RWY and the number 1 landing traffic in sight, confirmation was received from pilot who was cleared for visual approach RWY 18 and was sent to TWR freq. When the flight was 4NM North of RWY 18 crossing 2100 ft, ATC informed about the "wind 200° 12 kts and cleared to land RWY 18. 72 seconds after the last ATC instruction, pilot reported "going around". The flight was sent to APP frequency. Flight was vectored by APP to join right-hand downwind RWY 18. As a result of go-around, the landing was with 10 minutes delay. Flight crew think that ATC service was not good.

Conclusions are:

- ATC service was sufficiently efficient
- Even though RWY 18 was in use, pilot did not consider ATIS broadcast (RWY in use 18) and requested VOR RWY 02,
- The NOTAMs with regard to flight check ILS RWY 02 and LLZ RWY 18 did not reach the flight crew.

If the a/c and the crew had had RNAV GNSS approach capability this missed approach incident would not have occurred.

- If the flight crew had got a detailed airport briefing pre-flight (including VOR DME3 approach procedure), a/c would have executed stable approach to land RWY 18.
- ATC/pilot workload and a/c fuel consumption increased due to missed approach incidents.

## RUNWAY INCURSIONS SUMMER SEASONS 2012-2016

In summer 2016, EVAIR recorded more or less the same number of runway incursions as in summer 2015. IATA STEADES global data in summer 2016 recorded the lowest level in the last four years. In both data bases the trend lines show the downwards directions.

For the summer period 2012-2016 runway incursions accounted for 1.6% of the EVAIR data. Everyone who deals with the ATM safety data knows that the risk of a serious incident or accident associated is much higher with runway incursions than with other types of occurrence. More in-depth analysis shows that in the summer period 2012-2016 the main issues related to runway incursions were 'Lining Up' and a few 'Taking Off' without clearances. After the investigations conducted by Air Operators and ANSPs, these events were categorized as serious incidents. The data also show that 15% of runway incursions were associated with go-arounds.

Figure 10: Runway Incursion summer seasons 2012 - 2016

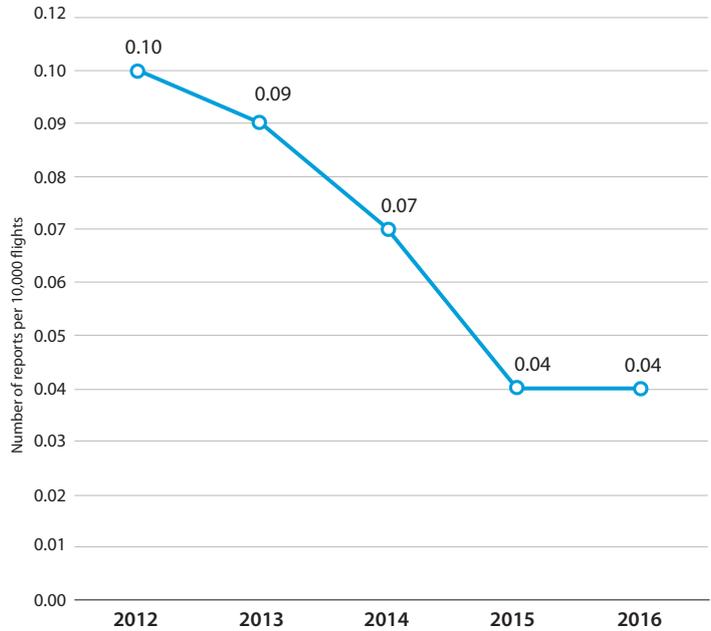
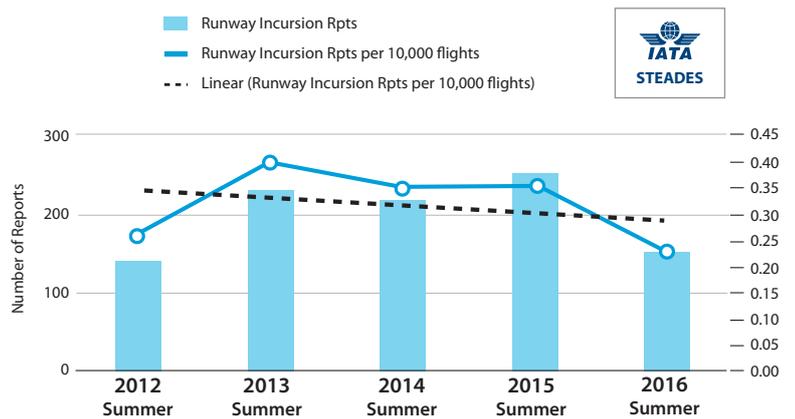
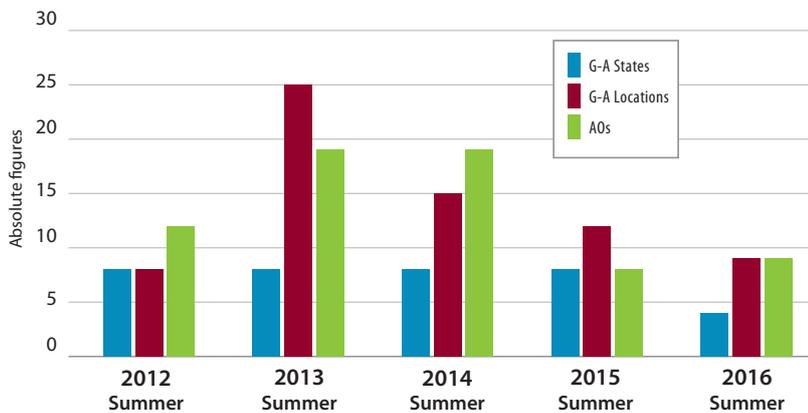


Figure 11: Runway Incursion summer seasons 2012-2016



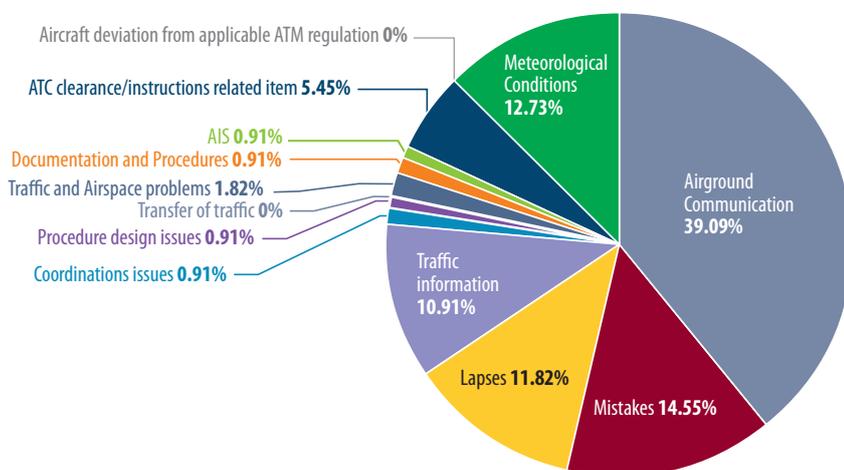
**Figure 12:** Runway Incursions States, Locations & Air Operators (AO)s summer seasons 2012-2016



EVAIR data on the number of reports per State, location and Air Operator (Figure 12) shows that the number of States where runway incursions occurred reduced significantly in summer 2016 compared to the same period of 2015. The number of occurrences per location also fell. The only area with more reports in summer 2016 than summer 2015 is the number of Air Operators involved in runway incursions (Figure 12).

Accounting for almost 40% of runway incursions, air-ground communication is the most frequently recorded contributor for summer seasons 2012-2016 (Figure 13). Elements of 'Air-Ground communication' with more reports were Hear-back omitted; Misunderstanding/Misinterpretation and High R/T workload. Within 'Mistakes', the area with the second highest number of reports contributing to runway incursions, the most frequently recorded issues were planning and failure to monitor. As regards 'Lapses', the problem identified most often was 'Conflict Detection'.

**Figure 13:** Runway Incursions in-depth analysis of cumulated figures summer seasons 2012 – 2016



More details about contributory factors, as well as mitigating measures and recommendations, can be found in the European Action Plans for the prevention of Runway Incursions (and Excursions).

<http://www.skybrary.aero/bookshelf/books/151.pdf>

## **De-identified occurrence reports**

### ***Jul 2016 – Airline report***

A/C 1 was instructed to abort the take-off from RWY 26 after acknowledging a clearance that was intended for another aircraft taking off from RWY 17R. Crew considers this to be a serious event and wanted to obtain some more information from ATC. According to the crew, the sequence of events is as follows: Approaching holding point 26, A/C 1 was instructed to hold short. While holding short, A/C 1 was asked if they were ready for immediate take-off, which was accepted by the crew. A/C 1 was cleared to line up and told to be ready for immediate take-off. This instruction was acknowledged by the crew. A/C1 was cleared for take-off, which was acknowledged by the crew.

When the aircraft started moving, ATC told A/C 1 to abort the take-off as the instruction was intended for a different aircraft taking off from RWY 17R.

### ***ANSP Feedback facilitated by EVAIR***

The event has been classified as a Runway Incursion. A/C 1 catches communication intended for A/C 2 and more than once the crew drops full call sign in their read-backs. ATCO should have requested call-sign from the station that replied 'ready for an immediate'. There was timely ATCO recovery action.

### ***June 2016 - ANSP's report***

ATC have cleared A/C to cross runway 04L and hold short of runway 04R because there was another traffic on final. The read-back was correct, however, the crew entered RWY 04R without authorization. After that, the controller cleared A/C1 for immediate take off.

### ***Airline feedback facilitated by EVAIR***

Crew consisted of experienced pilots, well rested and prepared for the flight. It is difficult to pinpoint a clear reason for the event. The most probable explanation is that the crew was very used to getting a "standard" clearance: "Cross 04L and line up 04R".

The PIC as the pilot taxiing explained that he did his utmost to make the flow as smooth as possible – one continues motion of own plane adjusting taxi speed to allow landing of the aircraft on short final to RWY 04R without having to stop before the runway stop line. He thinks that he might have focused too much on this smooth motion of the plane prior to entering RWY 04R. He also explained that "normally we never hold before entering RWY 04R" (not trying to excuse himself, but as a possible explanation). Both pilots when told by the TWR controller were in no doubt that they had entered RWY 04R without clearance. The PIC also explained that he felt really sorry and annoyed with himself afterwards

## LEVEL BUST SUMMER SEASONS 2012-2016

For the summer periods 2012-2016 'Level bust' occurrences account for 4.5% of total EVAIR reports. This is the same percentage as for the previous five years. Both data bases, EVAIR and IATA, recorded a slight increase in the number of reports during summer 2016 but maintained the five-year downward trend.

70% of the 'Level Busts' recorded in the EVAIR data base occurred within the en-route, 21% within the approach and 9% within the take-off phase of flight. In 9.5% of the 'Level Bust' occurrences ACAS acted as the last safety barrier. This is slightly higher than the rate for the previous five-years.

Figure 14: Level Bust summer seasons 2012-2016

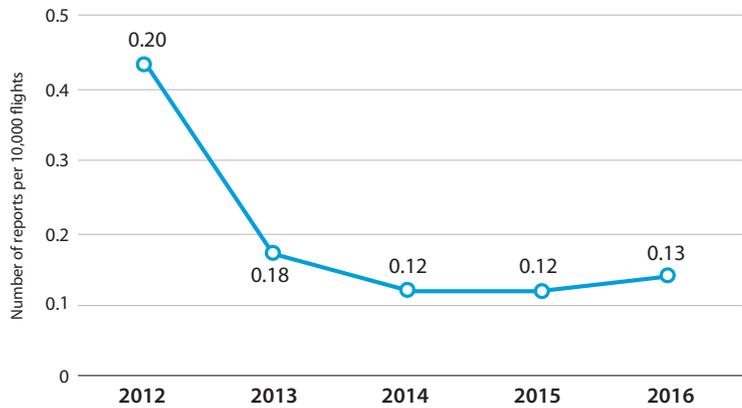


Figure 15: Altitude Deviation summer seasons 2012-2016

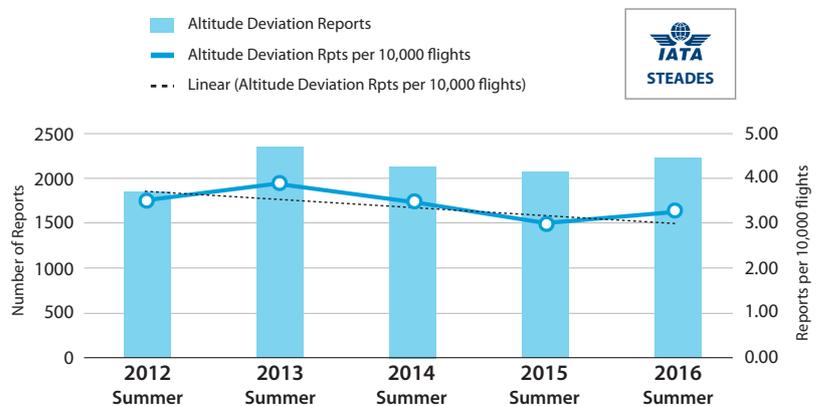


Figure 16: Level Bust contributors cumulative figures summer seasons 2012 – 2016

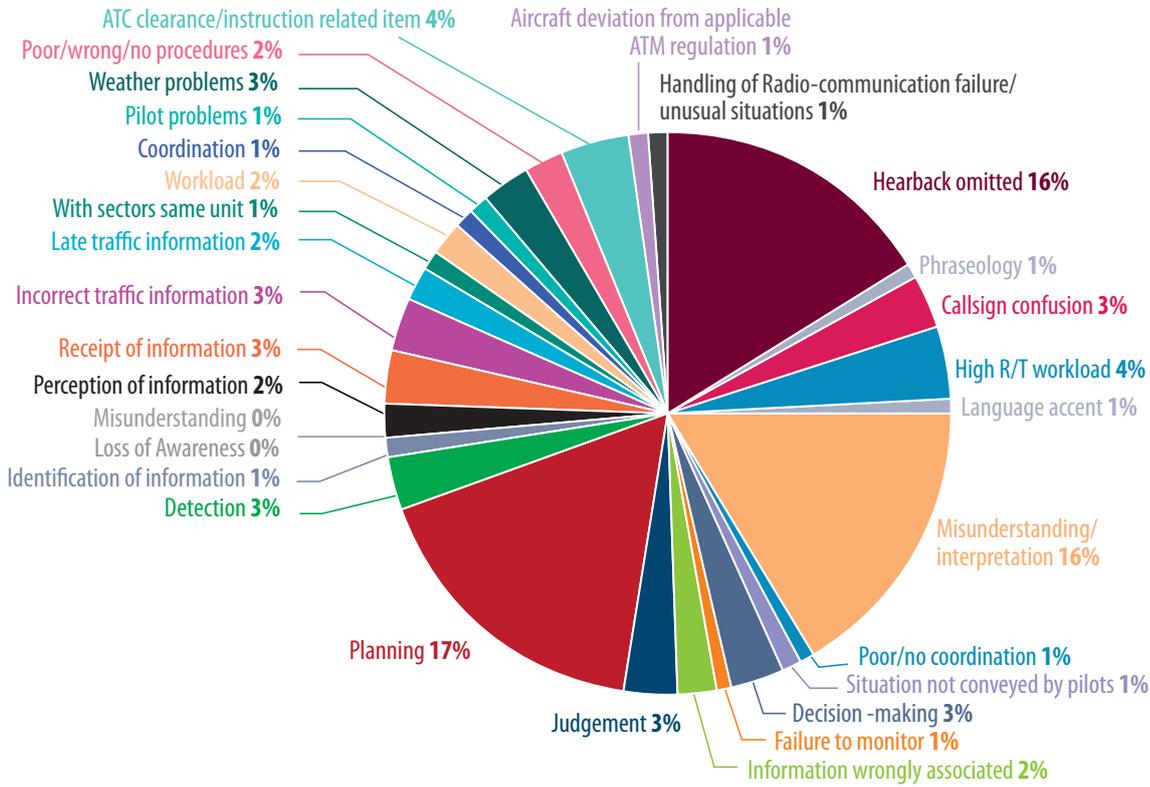
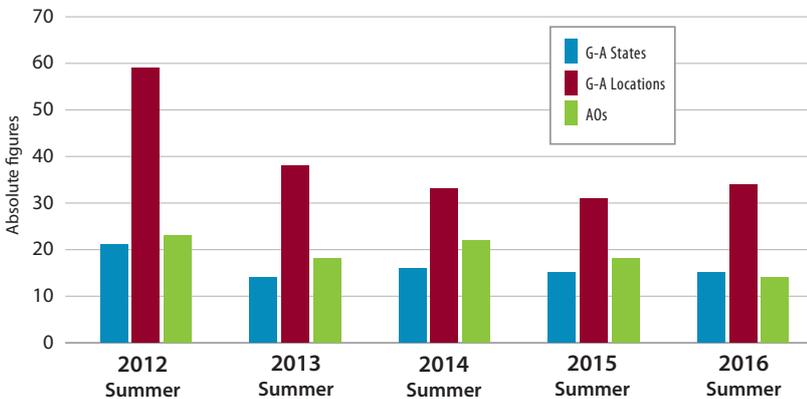


Figure 16 shows a high granularity of the 'Level Bust' contributors. We identified 30 different contributors, but stopped at this level. We could drill further down but feel that this higher level of granularity still gives enough information on where to focus our efforts to mitigate or improve the 'Level Bust' situation.

Figure 17: Level Bust per States, Locations & Air Operators summer seasons 2012 - 2016



Over the last five summer seasons 'Level Bust' occurred in total at 105 different locations, with 57 different commercial AOs involved. These figures are slightly higher than for the previous five years. One third of all 'Level Busts' occurred at seven locations. These locations are within the core area of the European airspace and are at the same time the areas with the highest traffic demands.

## De-identified occurrence reports

### *June 2016 - Airline report*

Misunderstanding due to similar call signs. Initiated preliminary descent after a read back to ATC. Requested a descent to FL 220 and frequency change. After changing frequency we realized that there was a problem and stopped our descent immediately. At that moment the ATC told us to revert back to the previous frequency. ATC confirmed that we had taken the call from another aircraft and that we had descended 150 ft below our cleared altitude and that it was technically registered. No TCAS TA or RA received, but they told us that we were within 5 miles 850ft above another aircraft.

### *Feedback from ANSP facilitated by EVAIR*

At 05:29 UTC, ATC sector 1 had cleared a/c1 to descend to FL250. Some 3 minutes later, the same airline but a/c2 made its initial call at FL390 to the same sector. It was cleared direct to SATNA.

At 05:36:38UTC, a/c1 was instructed to call ATC sector 2. There was a read-back from both aircraft, but the controller didn't detect this: they were on two different frequencies. Our system couples these, meaning that it re-transmits transmissions made on one frequency to all other coupled frequencies.

The read-back from a/c1 was probably blocked out by this re-transmission of the read-back from a/c2. Unfortunately, a/c2 contacted the given frequency, where the controller identified

it as a/c1. He was only expecting one a/c1 company and had no knowledge of a/c2, as it was never foreseen to come to him. He instructed a/c1, citing the call-sign, to descend to FL220, which was read back by a/c2. The next call was from the 'real' a/c1, at which point the controller in ATC sector 2 realised the mix-up. He instructed a/c2 not to descend, which was acknowledged. The pilot was then instructed to return to the previous frequency.

A/c2 had started descending, which created a conflict with an a/c3 opposite at FL380. Our system noticed that the selected level from the a/c2 changed to FL220 and alerted the controller. He attempted to call a/c2, but the pilot did not answer. The mode C only changed when the aircraft had already passed each other. We noted a minimum distance of 3.8Nm and 850ft.

It's amazing that the three parties involved mixed up call signs that at first sight aren't too similar. We've noticed, however, that controllers and pilots tend to be less attentive to the middle bit of the call sign; they pay more attention to the company identifier and the end of the call sign. This appears to be amplified by a distinct letter at the end. It seems to be much more likely to happen to X-RAY at the end than to BRAVO for example. There's probably a good psychological explanation, but it's ironic that a system that was developed to avoid call sign confusions may actually be causing them.

We are close to introducing a Radio Direction Finding system that could help minimize cases like this. Another remark is that from the a/c2 point of view, the clearance to FL220 would have come at a very strange time: it had only just levelled at FL390 some 5 minutes before and was still nearly 250 NM away from the destination. Initial descent would normally come at least 100NM later. To be cleared from FL390 to FL220 in one go would be rather exceptional. Such awareness could also have helped to detect the mistaken identity.

## EVAIR SUPPORT TO CALL SIGN SIMILARITY IMPLEMENTATION PROJECT

EVAIR continues to monitor the effectiveness of the EUROCONTROL Call Sign Similarity de-confliction Tool (CSST) and the associated CSS Service Level 1 (i.e. single aircraft operator de-confliction). The main objective of the monitoring is to record and, to a certain degree, analyse the call sign similarity and confusion (CSS/C) reports received from ANSPs and aircraft operators. There is a particular emphasis on data involving CSST user airlines although the reports received of CSS/C events involving aircraft from non-CSST user airlines is also useful as this helps provide a performance comparison between the two sets of operators. More importantly than that though, is that the information is also used to facilitate ad hoc mid-season changes to conflicting call signs, thus providing an ongoing safety benefit. Moreover, this activity does not concern only similarities within one airline's schedule but also works across airlines (irrespective of their CSST use status) and so provides a multi-AO dimension to the proceedings. EVAIR monitoring results are also used, inter alia, for CSST safety assessment and as a decision-making element to proceed with Level 2.

### CSST Operations Update

Following the new version of the CSST, which became available with NM Release 19.0 in 2015, the next major step was the transfer of CSST from its stand-alone url to the NOP Portal with NM Release 20.0 in March 2016. Unfortunately, due to technical hitches, this had to be postponed and the move has been delayed and will most likely be implemented as part of the NM N-connect Project. Other technical advances that are being examined include improving the granularity of CSST AUA (ATC Unit Airspaces) profiles and simplifying the download of the conflict list. The former is especially important as this will be needed to facilitate Service Level 2 (Multi-AO operations).

### CSS User Group

CSS User Group 14 meeting was held at EUROCONTROL HQ in Brussels on 24 January 2017. The main outcomes from the meeting were:

- A commitment from all involved parties, led by the EUROCONTROL CSS Project Manager, to revitalise the promotion of the CSST and, in particular, to stress the improved

safety and efficiency benefits enjoyed by CSST user airlines. This regular column in the EVAIR Safety Bulletin is part of the ongoing publicity campaign.

- The decision to circulate the agreed call sign similarity and confusion 'descriptions' – as published in EVAIR Safety Bulletin No 16 – to ANSPs and airlines in an effort to improve the consistency of CSS/C reporting.
- Discussions on the 'clustering' approach to the incremental introduction of Service Level 2 multi-AO operations; these will be captured in a working paper which will be distributed to the UG for consideration and further comment.
- A decision to trial the 'clustering' approach – for a volunteer group of AOs – during winter season 2017/18.
- News from the Middle East region that carriers there are continuing to develop their call sign similarity de-confliction activities. More airlines are now assigning alphanumeric call signs to their flights that fly to/from Europe or transit European airspace, which is very welcome. In addition, some Middle Eastern are considering the possibility of forming a 'cluster' of airlines to bring in a multi-AO dimension to their CSS/C work.

### Call Sign Similarity Service Level 2 (Multi AO De-confliction)

As described above, the next steps in the move towards CSS Service Level 2 multi-AO operations will be to trial the clustering approach during winter season 2017/18. In addition, as explained previously, work will continue to try, over time, to introduce some improvements to the CSST to facilitate the expansion of the task from single AO detection and de-confliction to a more multi-AO dimension.

### CSST Access and Additional Tokens

It is pleasing to report that new AOs continue to join the CSST family. There is, however, still room for more, so new CSST users would be especially welcome. Please note that an NM token is required for access to CSST. The service can be added to the existing token or an additional token can be purchased for only €200. This is a small price to pay set against the time saved by using CSST; once added, CSST access will be guaranteed for the remaining life of the token. The hope is that the fee will not discourage AOs from signing up to use the

tool as it represents good value for money.

To make things run more smoothly, AOs need to clearly identify the request for access to the CSST. To that end, AOs who apply for a new token or ask to extend an existing one must ensure that CSST is put in the Purpose of Request box. To extend an existing token, it will also be necessary to insert user ID (CCID).

The application form can be found at <http://www.eurocontrol.int/network-operations/access-service-request-form>

### **Call Sign Management Cell (CSMC) Support**

The CSMC ([nm.csmc@eurocontrol.int](mailto:nm.csmc@eurocontrol.int)) is also on hand and can provide limited help to AOs to navigate the application process. The CSMC prepares the CSST for the forthcoming season and is available to discuss AO training requirements. Subject to CSMC staff availability, CSST familiarization sessions may be provided in Brussels or, if requested, provided on-site at the AO's premises; both may be subject to UPP arrangements.

### **Learn More About Call Sign Similarity**

If you are interested in learning more about the CSS Project then please contact the CSS Project Manager and Co-chair of the CSS User Group, Mr Richard Lawrence, at:

[richard.lawrence@eurocontrol.int](mailto:richard.lawrence@eurocontrol.int) or via  
[callsign.similarity@eurocontrol.int](mailto:callsign.similarity@eurocontrol.int)

You can also contact the Call Sign Management Cell (CSMC) at [nm.csmc@eurocontrol.int](mailto:nm.csmc@eurocontrol.int)

and find more information on the Call Sign Similarity Project at: <https://www.eurocontrol.int/services/call-sign-similarity-css-service>

## CALL SIGN SIMILARITIES AND CONFUSION: SUMMER TRENDS 2012 – 2016

EVAIR continues to use two tracks to monitor Call Sign Similarities and Confusion: one from the airlines and the other from ANSPs. Reports from pilots mainly relate to confusions, while those from ANSPs relate to similarities and confusion.

### PILOT REPORTS – CALL SIGN CONFUSION SUMMER SEASONS 2012 – 2016

Figure 18: Call Sign Confusion: summer seasons 2012 - 2016

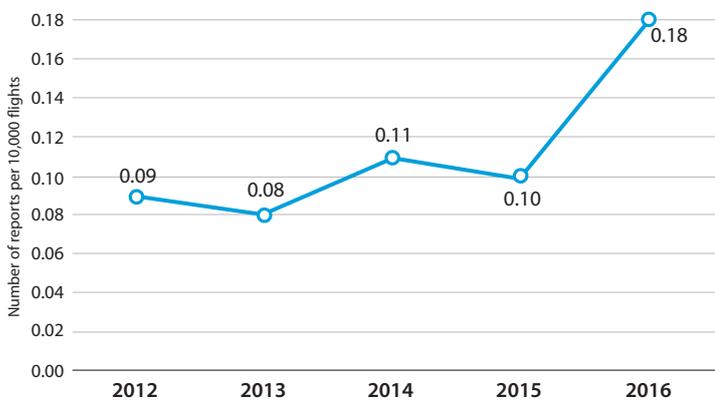
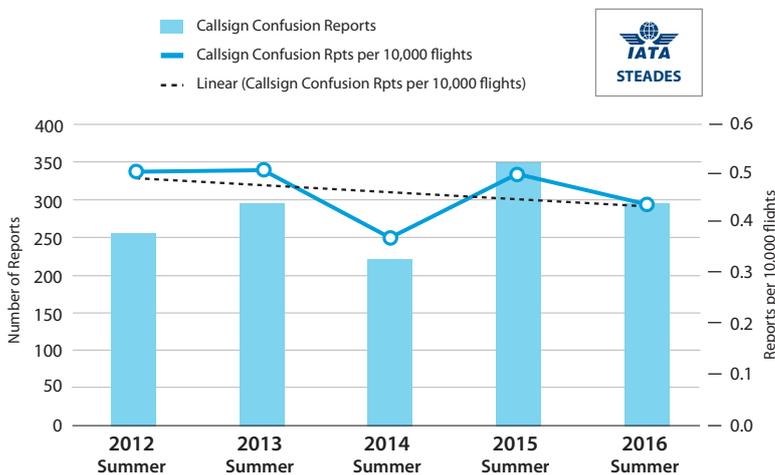


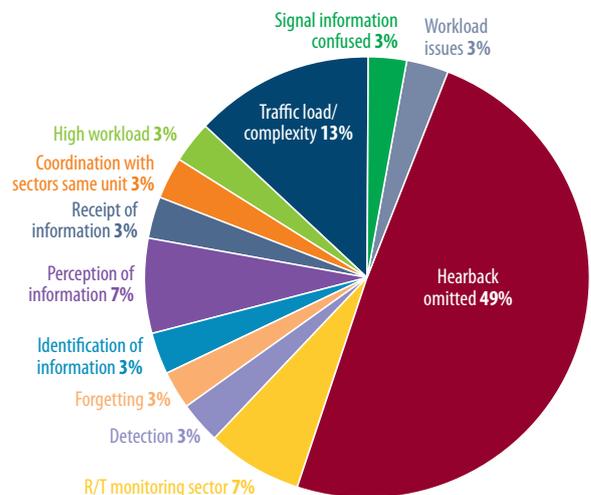
Figure 19: Call Sign Confusion: summer seasons 2012 - 2016



EVAIR and IATA STAEDES repositories show different yearly and general trends. EVAIR recorded an increase in 'Call Sign Confusion' during summer 2016 while IATE STAEDES recorded a decrease. It is very difficult to explain the situation and to draw any conclusions in this regard. A rise in the reports within the EVAIR repository could be explained by the invitation extended to Air Operators at different meetings to report their Call Sign Confusion events.

For the summer seasons 2012-2016, 30 different air operators reported call sign confusion within ECAC airspace. The occurrences were located in 22 countries. Two thirds of the events occurred within the airspace of four countries. For the monitored period ACAS acted as the last safety barrier in 1.5% of cases, which is lower than for the previous period.

Figure 20: Call Sign Confusions: ATM contributors in summer seasons 2012 – 2016



According to the Call Sign Confusions based on pilot reports, there was direct ATM involvement in 27% of the reported occurrences, which is a few percent more than for the previous five years. In 71% of the reports ATM was not involved and contributors are to be found on the airborne side.

## AIR NAVIGATION SERVICE PROVIDERS' CALL SIGN SIMILARITIES AND CONFUSIONS

For the summer period 2012-2016, EVAIR received 15,100 reports from 15 European Air Navigation Service Providers. Some of them provide their data on a daily basis and some of them on a monthly basis. Those providers submitting Call Sign Similarities/Confusions on a daily basis benefit from the support provided by EUROCONTROL Call Sign Management Cell Services and faster resolution of problems, at least in cases where AOs are willing to change their call signs on an ad-hoc basis before the end of the season.

**Figure 21:** Number of AOs with the CSS/C as identified by ANSPs summers 2012 – 2016

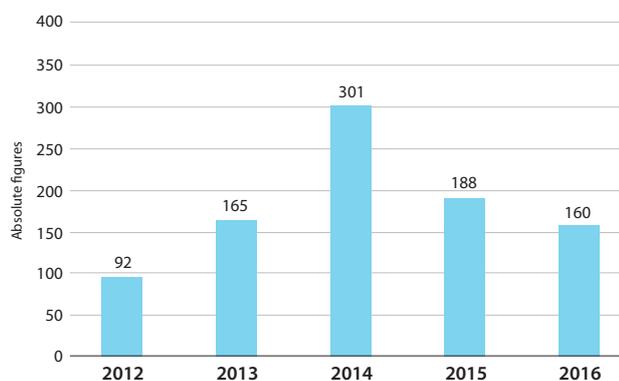


Figure 21 sets out the number of AOs which had flights with similar call signs. Over the last two years we recorded a decrease in the airlines which had flights with similar call signs. While it is true that the number of CSS/C reports was higher in the summer 2016 than in the previous summer, we believe that the use of the Call Sign Similarity De-Confliction Tool (CSST) and the use of alphanumeric call signs by those who do not use CSST, still gives positive results.

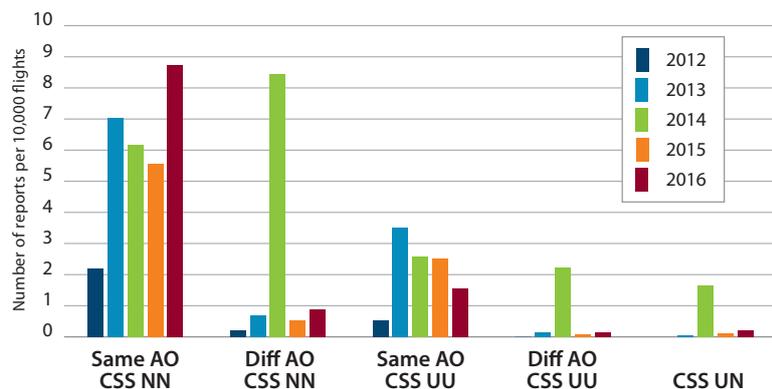
Yearly trends of the CSSs between tool and non-tool users within the same AO and between different AOs are presented in the Figure 22. If we compare the number of CSS reports between non-tool users (same AO CSS NN) and tool users (same AO CSS UU), we see that tool users have 5.5 fewer times call sign similarities than non-tool users per 10.000 reports. In our opinion this sends a clear message that by using the CSST tool AOs can significantly reduce the number of Call Sign Similarities.

**CSS NN - Call Sign Similarities among AOs non-toll users.**

**CSS UU - Call Sign Similarities among AOs tool users.**

**CSS UN - Call Sign Similarities between AOs tool users and non-tool users.**

**Figure 22:** Call Sign Similarities non-tool users and tool users summer seasons 2012 – 2016



**Figure 23:** Call sign confusion: non-tool users and tool users summer seasons 2012 - 2016

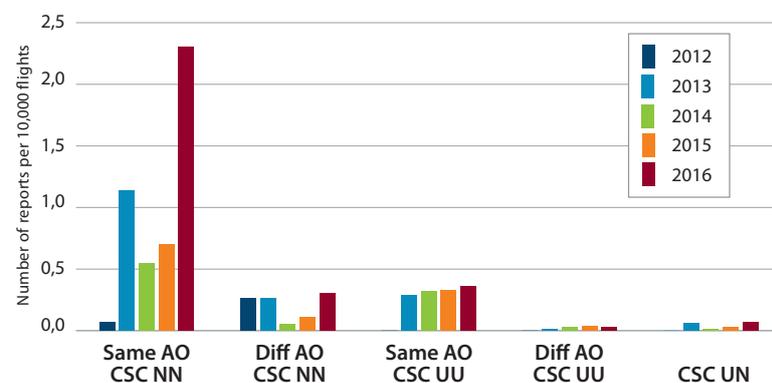


Figure 23 shows the yearly trends in Call Sign Confusions between tool and non-tool users within the same AO and between different AOs. In 2016 same AO's non-tool users have more than seven times more reports versus those who use the CSST.

**CSC NN - Call Sign Confusions among AO non-tool users.**

**CSC UU - Call Sign Confusions among AO tool users.**

**CSC UN - Call Sign Confusions between AO tool users and non-tool users.**

## AIR-GROUND COMMUNICATION: SUMMER SEASONS 2012-2016

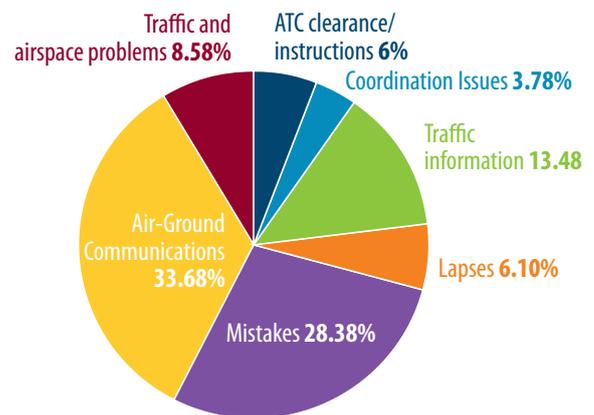
'Air-ground communication' consists of two main areas: 'Spoken' and 'Operational' communication (see definitions on page 41).

In the EVAIR data base 'Air-Ground communication' is one of the contributors with the highest rates. For the summer period 2012-2016 'Air Ground communication' is present as a contributor in 32% of all reports. In summer 2016 'Air Ground communication' recorded a 22% increase compared to summer 2015. Cumulative figures (Figure 24) show that in comparison with the other contributors common to the majority of the occurrence reports, 'Air-Ground communication' has the highest percentage (34%).

Of the two areas falling within 'Air-ground communication', 'Spoken' has always had the higher rate. For the summer period 2012 – 2016 (Figure 25) we recorded the same percentage (62%) as for the previous five years.

'Air-ground communication' is the most common contributor to 'Runway and Taxiway Incursions', 'Level Busts', 'ACAS RAs', 'Call Sign Confusion' and 'Go-around'.

**Figure 24:** Top seven contributors to ATM occurrences: cumulative figures for summer seasons 2012 - 2016



**Figure 25:** Two major air-ground communication areas: cumulative figures for summer seasons 2012 - 2016

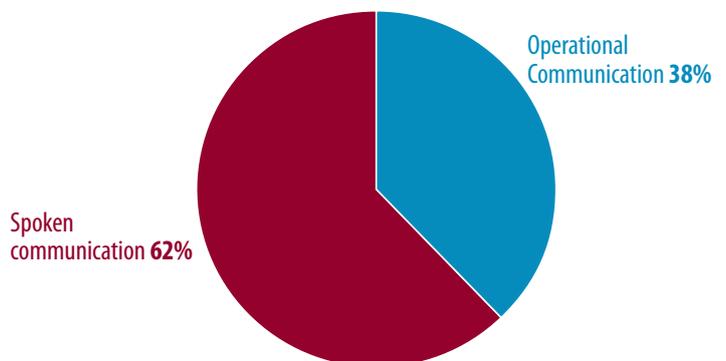


Figure 26 presents a trawl through 'Spoken communication'. 'Misunderstanding/Interpretation' is the area with the highest trends. After three years of a relatively stable rate, in summer 2016 this area recorded a 45% increase. 'Language/Accent' and 'Situation not conveyed by pilots', are the only areas which recorded a decrease in the number of reports during the summer season 2016.

For the summer period 2012-2016, 'Operational Communication' recorded the same percentage as for previous years. Within 'Operational communication', 'Hear back omitted' is the area with the highest number of reports. After three years of decrease, during summer 2016 'Hear back omitted' recorded a significant increase (104%). Another two areas, 'Phraseology' and 'Transfer of communication' recorded an increase in summer 2016 compared to summer 2015.

'Handling of radio communication failure/unusual situations' recorded the lowest level within last five years. This area covers pilots forgetting to turn on the loudspeakers after taking off a headset; wrongly selected frequency; problems communicating with ATC; frequency blocked by other aircraft; frequency range of the ground stations and lack of readability; and use of the second transmitter and forgetting to change it back to the working frequency, etc.

Figure 26: Spoken communication summer seasons 2012-2016

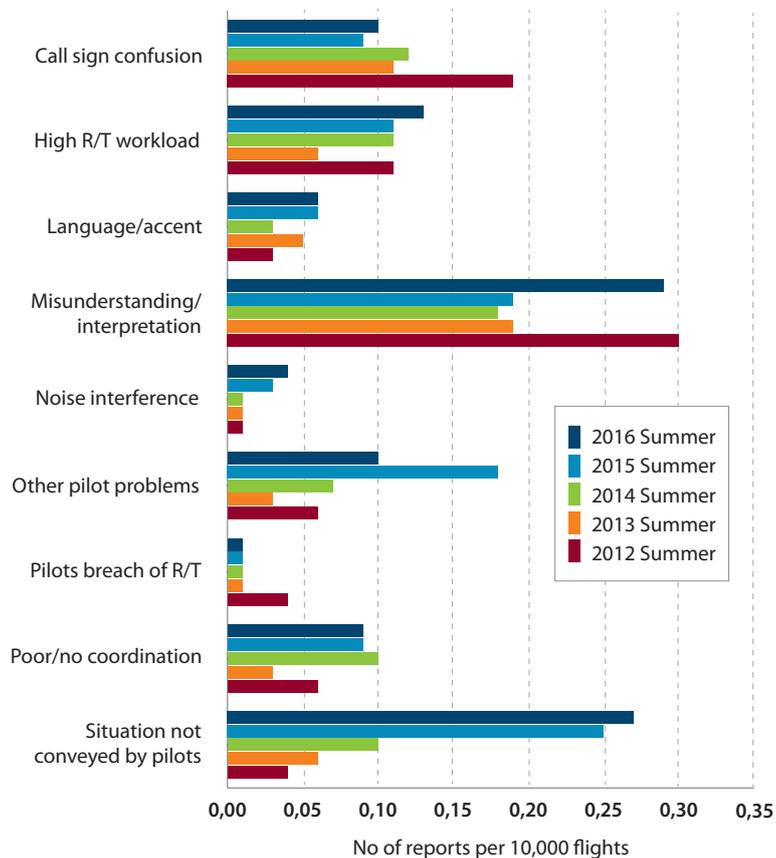
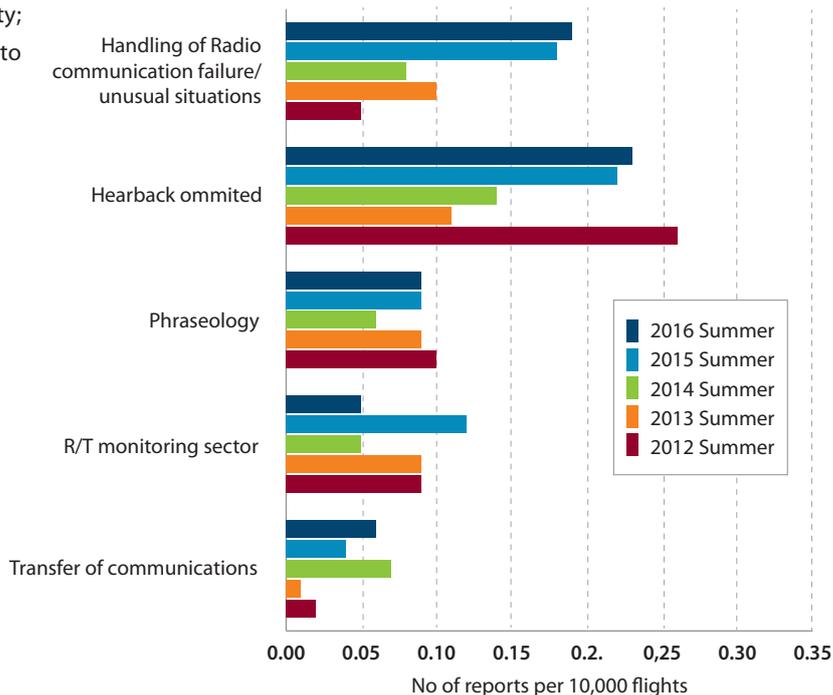


Figure 27: Operational communication seasons 2011-2015



## LOSS OF COMMUNICATION: SUMMER SEASONS 2012-2016

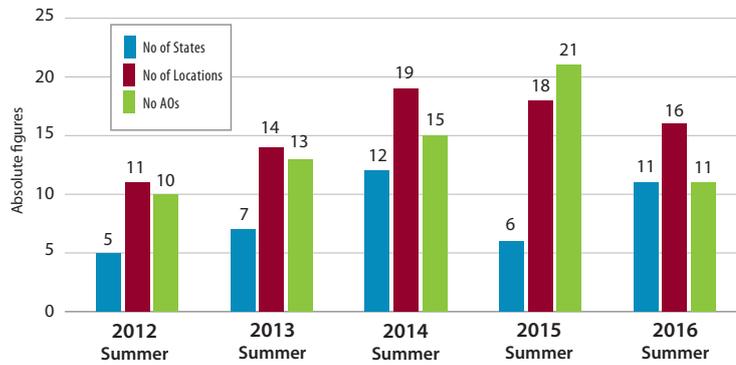
The 'Loss of Communication' customized analysis, prepared by EVAIR, are part of the EUROCONTROL Agency 'Loss of Communication' project.

In general the number of loss of communication events is not so high. For the summer seasons 2012-2016 they account for some 2% of all reports collected. However the risk associated with the loss of communication is high.

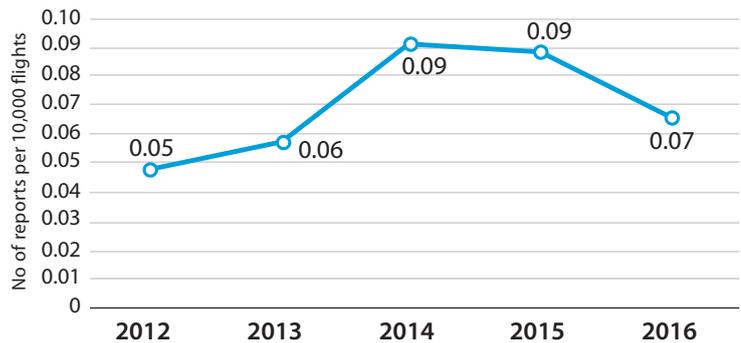
For the summer periods 2012-2016, EVAIR identified in the data base 117 'Losses of communication' (Figure 29). 'Loss of communication' was recorded at 44 locations in 24 States and with the participation of 40 Air Operators. Total figures are a bit higher than the previous five years.

Figures for summer 2016 are better than those for summer 2015. Namely, there is a decrease in the number of reports in general but also a decrease in the number of locations and AOs which participated in 'Loss of communication' events. The only increase recorded was in the number of States involved (Figure 28).

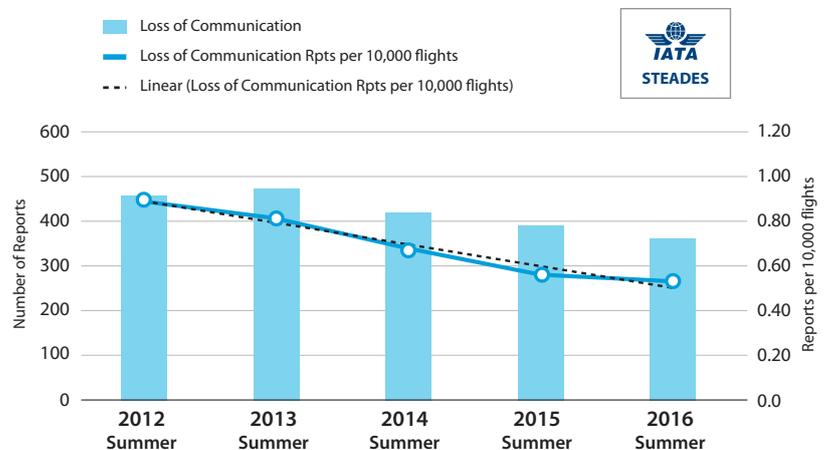
**Figure 28:** Loss of communication No of States, Locations & AOs involved summer seasons 2012-2016



**Figure 29:** Loss of communication: summer seasons 2012 - 2016



**Figure 30:** Loss of communication: summer seasons 2011 - 2015



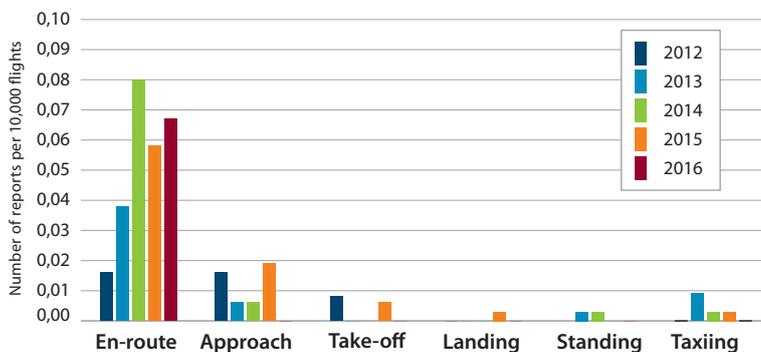
We would like to highlight that 45% of 'Loss of communication' events occurred at just 6 locations. This is one of the indicators where efforts must be focused in order to reduce the risk of having 'Loss of communication' occurrences. About 8% of the 'Loss of communication' occurrences were associated with other types of occurrence such as Runway Incursion, Level Bust, ACAS RA, and Go-Around. 7% were associated with military interceptions, which could further complicate the traffic situation.

As shown in Figure 31, most 'Losses of communication' occur during the en-route phase which was the case for all the 'Losses of communication' reports received in summer 2016.

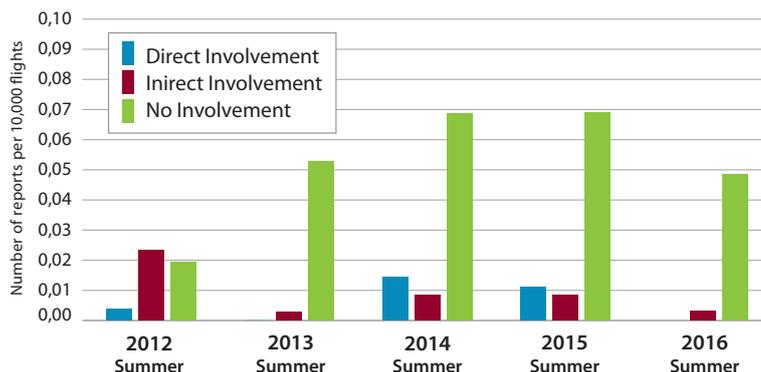
As regards ATM involvement (Figure 32), 'No involvement' had much higher trends than 'Direct or Indirect involvement'. In summer 2016 'Direct involvement' recorded a slight increase vs the same period in 2015.

More details related to the problems behind 'ATM Direct, In-direct and No involvement' are presented in Figure 33.

**Figure 31:** Loss of communication – Phases of flight summer seasons 2012 - 2016



**Figure 32:** Call Sign Similarities non-tool users and tool users summer seasons 2012 – 2016



'Handling of radio communication failure/unusual situations', part of air-ground communication, is the area with the highest percentage of the main contributors to 'Loss of communication'. In the majority of cases the causes are attributable to the airborne side (aircraft equipment and pilots), and in a few cases to ATM. The most frequent airborne problems are incorrect frequency settings, incorrect loud speakers setting, radio transmitter problems, radio frequency volume problems, radio outage, solar storm, non-readable frequency, de-activated emergency fr, problem with the Controller-Pilot Data Link Communications (CPDLC), no check of compulsory points, etc.

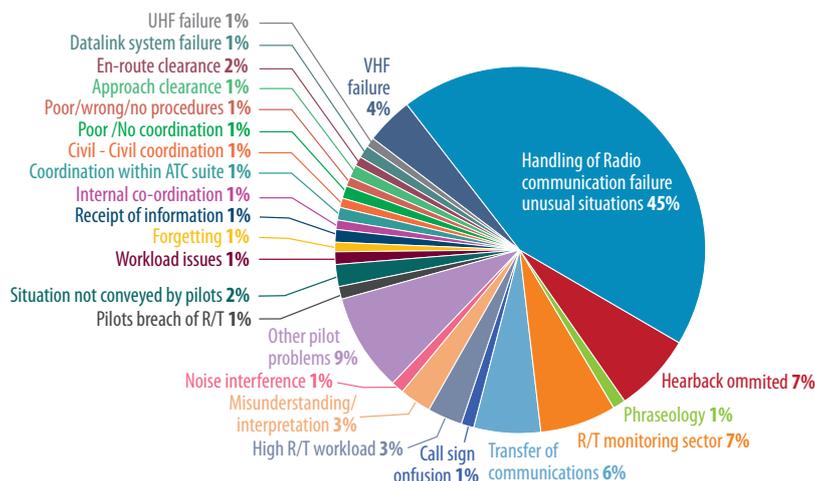
As regards ATM, the main problems are incorrect frequency instruction, transfer of communication, internal and external coordination, interference, low radio frequency coverage.

### De-identified occurrence reports

#### Jul 2016 - Loss of communication: pilot report

A/c was contacted on 121.5 to contact ATC sector 4. Crew tried to contact ATC sector 4 but without success. A/c tried again to contact ATC sector 4. Contact resumed and then transferred to ATC sector 6, who informed us that they had been notified of previous loss of communication with ATC sector 4 and requested details. Details given without further issues. VHF 1 control panel flagged as inop as subsequently noticed frequency selected toggle switch had lost its feedback click and if pushed and held active frequency would toggle back to previous. Also if pushed firmly would toggle back to previous. There had been earlier issues, which with hindsight could now be explained, but unable to determine problem at that time. Suspect that communication lost as frequency toggled back to previous and when called on 121.5 out of range of previous sector.

**Figure 33:** Loss of communication – Main causes in summer seasons 2012-2016



#### Feedback from ANSP facilitated by EVAIR

A/c 1 was correctly in contact with ATC sector 3. A/c 1 had been taken in radar separation at 20h56 and put back direct PARTU at 20h59. When the controller of ATC sector 3 transferred him to ATC sector 4 frequency it was not him but another plane, a/c 2, who read back. This error was not noticed by the controller. A/c 1 quietly followed its route, was not in conflict with other plane and the controllers on ATC sector 4 didn't realize the lack of radio contact. At 21h26, while a/c 1 was leaving ATC sector 4 airspace, the controller tried to transfer him to the frequency of ATC sector 5. Not getting an answer, the controller of ATC sector 4 called sector 5 to ask if a/c 1 was already with them, but didn't think to ask ATC sector 3. Sector 4, having no radio contact with a/c 1, tried several calls on 121.5 and then informed his Supervisor.

At 21h32 the Supervisor of sectors 3 and 4 called the Supervisor of sector 5 to indicate the loss of communication. It was decided that the Supervisor of sectors 3 and 4 would inform the military authorities and the Supervisor of sector 5 would try a call on 121.5 when a/c 1 would be closing on the antennas of their ATC.

#### Feedback from ANSP facilitated by EVAIR

- The absence of ACARS procedure with the airline did not allow the Supervisor to get back a/c 1.
- The fact that the airline did not have CPDLC meant that the controller could not hand over the a/c 1 safely from ATC sector 3 to ATC sector 4.
- Since "frequency status" coding colours were not available on our equipment, the controller of ATC sector 3 could not notice the lack of radio contact with a/c1.

## SPECIFIC EVENTS - LASER THREATS ACROSS EUROPE: SUMMER SEASONS 2012-2016

For the third year in a row, EVAIR recorded a decrease in laser reports (Figure 34). Throughout the period monitored, Approach phase is the most affected (Figure 35). For the summer periods 2012-2016 the number of approach interferences reduced slightly (2%) compared to 2011-2015. The reduction in the number of laser reports in the summer 2016 was complemented by a reduction in the number of locations and air operators affected (Figure 36).

In most events pilots reported that they informed ATC and did their best not to look at the position from where the laser illumination was coming, hence following the main recommendation on laser interference. In some of the reports from summer 2016 pilots highlighted that the duration of the interference was from 10-15 seconds with multiple attacks during approach. In a few cases the police were waiting on the ground and asked pilots to file the report.

Figure 34: Laser: summer seasons 2012-2016

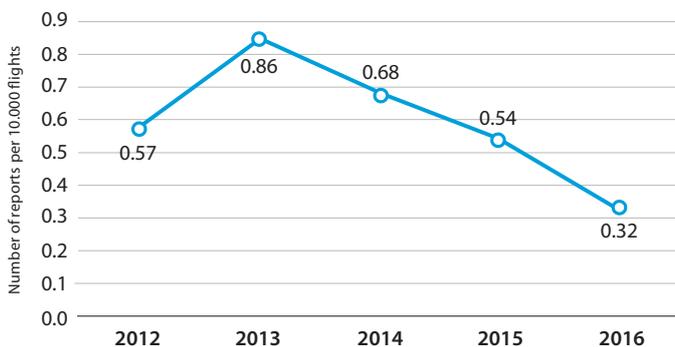
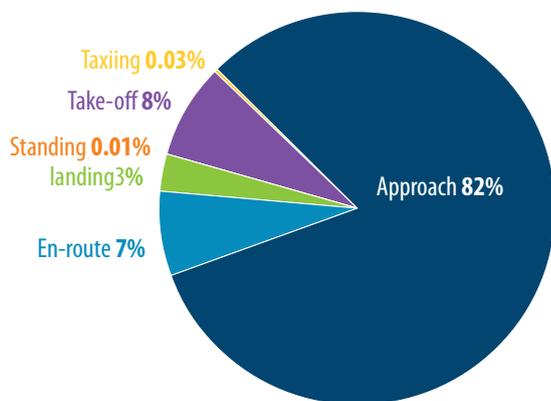


Figure 35: Laser, phase of flight: summer seasons 2012-2016



Following the decrease in the number of laser reports, we regularly cross check trends with the various stakeholders. In the majority of cases these stakeholders do not have the same reports as EVAIR. Cross checks show that in some geographical regions there is still an increase in laser interference regardless of whether or not regulation is in place. In other words, practice shows that the absence of harmonized European regulation reduces the effect of national regulations addressing the problem of the use of lasers against aircraft. The absence of harmonized regulation means that equipment bought within countries without regulation can be transferred legally across Europe.

States, ANSPs, and air carriers expect support from EASA to push for European regulation and to improve the situation regarding the illegal use of laser devices against aviation.

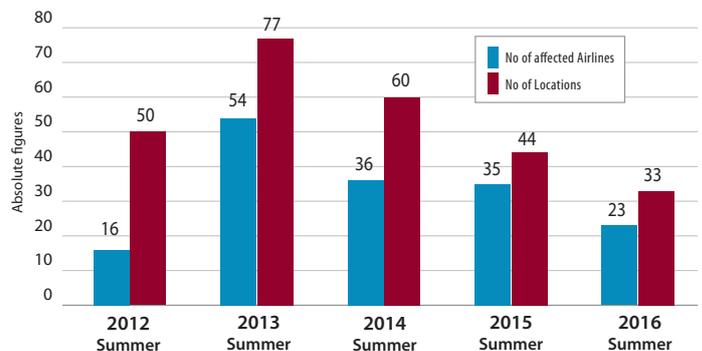
Our data providers can send reports to:

[dragica.stankovic@eurocontrol.int](mailto:dragica.stankovic@eurocontrol.int)

or to: [evair@eurocontrol.int](mailto:evair@eurocontrol.int)

More information about lasers is available on SKYbrary ([www.skybrary.aero](http://www.skybrary.aero)).

Figure 36: Laser interference No of locations and No of affected carriers: summer seasons 2012-2016



## De-identified occurrence reports

### *Apr 2016 - Airline report*

Laser turning onto a Base Heading on Approach for RWY 07R. Captain sitting in right seat (training flight) bothered by right eye irritation and reflex blinking, quickly moved head assuming laser attack. The Captain then carefully looked again and was rewarded with another eyeful of green laser. Landing lights turned off, laser no longer able to find the flight deck though could be seen for a few seconds flicking around. Captain quite distracted and concerned about right eye though no apparent damage as vision appeared to be okay. No operational consequence apart from 2 missed calls due the distraction. Location of the laser was hard to pinpoint at that altitude.

### *May 2016 - Airline report*

At 400'QNH on MLS 27R a green laser was shone into the flight deck, from the right hand side. The First Officer who was PF was temporarily dazzled in his right eye. Due consideration was given to a handover of control, or a go-around. But it was considered safer to continue for a normal landing with the FO remaining in control. ATC tower was informed as the aircraft vacated the RW after landing. The police met the AC on stand.

### *June 2016 - Airline report*

On the base leg to ILS RWY 08 we, and the traffic behind us, were hit by a laser coming from somewhere near GS intercept point. The captain put the laser goggles on, as did I. In addition, I kept my head below the glare shield and put the window blinds down on my windows. The approach could continue without further problems.

### *Sep 2016 - Airline report*

During radar vectors a bright green laser was directed at the aircraft from 12 o'clock, approximately 5 miles away. Both crew shielded their eyes with their hands and reported laser attack to ATC. After landing a report was filed with airport police. This was a much brighter laser than anything previously experienced, resulting in minor eye orbital pain for the captain. The F/O was unaffected. Captain wears glasses. Captain requests a short sim detail to explore if and how we could keep the aircraft safe in the event of temporary loss of vision for both crew members.

## RPAS – REMOTELY PILOTED AIRCRAFT SYSTEMS (DRONES) SUMMER SEASONS 2012-2016

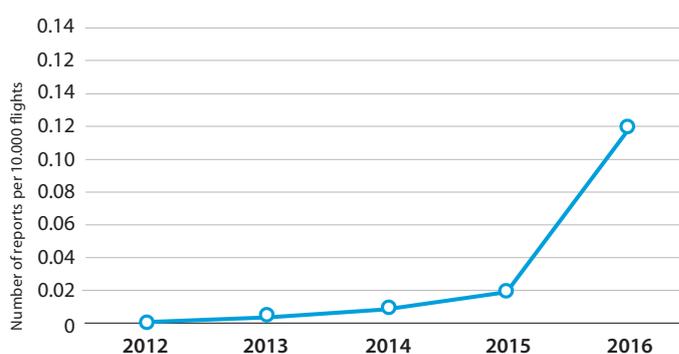
The EVAIR data for the summer seasons 2012-2016 show that RPAS/drones are a rapidly growing safety issue. There was a major increase in summer season 2016 compared to summer season 2015 and we see the trend continuing into 2017 too. Our contacts with ANSPs and national authorities indicate that the reports we have in EVAIR are just the tip of the iceberg. This is because some airlines see drones as more of a security problem and they do not report them to us. We hope that this situation will change and that in the future air carriers and ANSPs who encounter drones will report these occurrences to EVAIR. However, although not all drone occurrences have been captured, those which we have in the EVAIR data base give a good indication of the problem and the associated trends.

During the period observed almost all occurrences happened within controlled airspace at lower altitudes and the drones were operated without any coordination. In the EVAIR data base we identified 13 locations within core European airspace where drones were encountered. Major European hubs are the most affected.

The most affected phase of flight, with more than 80% of reports, is approach. The take-off phase for the period monitored accounted for some 20% of drone reports. Some of the reports were at FL135, which is quite high for drones which are supposed to fly at low altitudes and outside controlled airspace. We also recorded a few cases of commercial aircraft waiting in approach holding patterns because there were reports from the air that drone activities had been observed within the final approach. As a safety measure, ATC decided to instruct pilots to wait in the holding pattern.

EUROCONTROL is very active on RPAS. Recently edition 4.0 of the ATM RPAS Concept of Operations (CONOPS) was issued. This document describes the operations of RPAS in European Airspace that are capable of meeting the requirements set per airspace classification, including Very Low Level (VLL) operations. The CONOPS fully complements the EASA CONOPS. <http://www.eurocontrol.int/sites/default/files/publication/files/rpas-atm-cocept-of-operations-2017.pdf>

Figure 37: Drone summer seasons trends 2012-2016



As part of the drone activities on 6-7 Apr 2017, EUROCONTROL also hosted a very successful RPAS workshop gathering a large number of different stakeholders (ANSPs, drone manufacturers and service providers, Air Operators, Regulators including EASA and the European Commission, etc.). The focus of the workshop was drone operations below 500ft and Visual Sight of Line (VLOS) and Beyond Visual Sight of Line (BVLOS) operations, which appeared to be the most critical. The objective of the workshop was to develop a joint short-term action list aiming at the harmonised European ATM approach in integrating RPAS operations. <http://www.eurocontrol.int/rpas>

If you are interested in learning more about the EUROCONTROL RPAS Project then please contact the RPAS Project manager Mr Mike Lissone – [mike.lissone@eurocontrol.int](mailto:mike.lissone@eurocontrol.int).

The following are additional links where our readers can find RPAS/drone information published by various international organisations:

ICAO 'Manual on RPAS' (Doc 10019) <http://cfapp.icao.int/tools/ikit/rpasikit/story.html>; EC 'Roadmap for the integration of civil RPAS into the European aviation system' [www.ec.europa.eu/transport/modes/air/news/2015-03-06-drones\\_en.htm](http://www.ec.europa.eu/transport/modes/air/news/2015-03-06-drones_en.htm);

EASA 'Concept of operations for drones'

[https://www.easa.europa.eu/system/files/dfu/204696\\_EASA\\_concept\\_drone\\_brochure\\_web.pdf](https://www.easa.europa.eu/system/files/dfu/204696_EASA_concept_drone_brochure_web.pdf);

<http://jarus-rpas.org/> - Joint Authorities for Rulemaking on Unmanned Systems

We would like to take this opportunity to invite Air Operators and ANSPs as our main data providers to provide their occurrence reports with drone involvement. It helps greatly to monitor the situation and participate in ongoing activities initiated within EUROCONTROL and elsewhere.

### **De-identified occurrence reports**

#### ***May 2016 - Airline report***

During the final approach in VMC on our trajectory we saw "Phantom" type drone, white, with 4 rotors, medium size. Drone was some 4 metres above us. We continued our approach and landing and informed ATC. At the parking position police were waiting and asked us to file a report.

#### ***May 2016 - Airline report***

Passing 10,000ft during descent, near air-miss with a drone. First visual sighting was about 0.5 nm ahead of the aircraft path. I saw that we would clear the UFO but it was so quick that any evasive action would have been difficult. The size of the UFO was definitely a factor as it was so small I saw it at the last second and my FO even didn't have the time to see it. There was no TCAS alert.

#### ***May 2016 - Airline report***

On approach to RWY 22L at 4 nautical miles and 1,200 feet a drone was sighted extremely close to the aircraft, too late to take any evasive action. The drone appeared to be approximately 1 meter in length and green with possible purple markings. The drone passed about 20-40 feet above the aircraft at 11 o'clock.

#### ***Aug 2016 - Airline report***

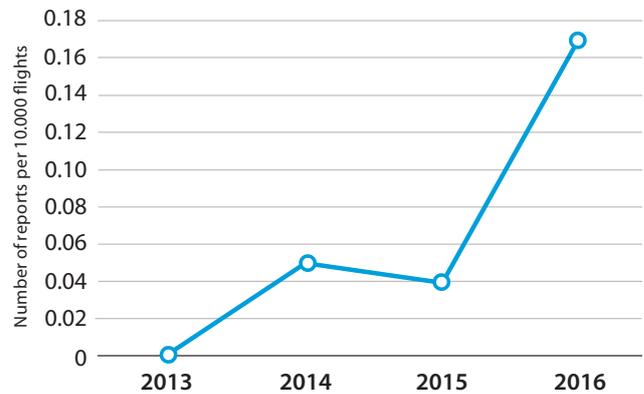
Within the approach phase a blue drone was seen just ahead & passed very close, approximately 50' to the right hand side of the aircraft. Crew reported the event to ATC. No time for avoiding action.

## GPS OUTAGES: SUMMER SEASONS 2013-2016

It is the fourth summer season that EVAIR has been monitoring and collecting 'GPS outage' reports. Our main data providers are, as usual, Air Operators. However, we are in contact with Air Navigation Service Providers in order to share information on the airspace within their authority and to cross check whether they have received similar information. The collection of GPS outage reports is fully supported by IATA, which is also part of the team set up within EUROCONTROL to deal with these issues. Our navigation experts are in contact with the FAA and, together with EVAIR, with ICAO with whom we share main trends and findings. Before summer 2016 GPS reports accounted for 1% of EVAIR reports, however thanks to the considerable increase, GPS outages account for 5.6 % of the summer 2016 EVAIR data.

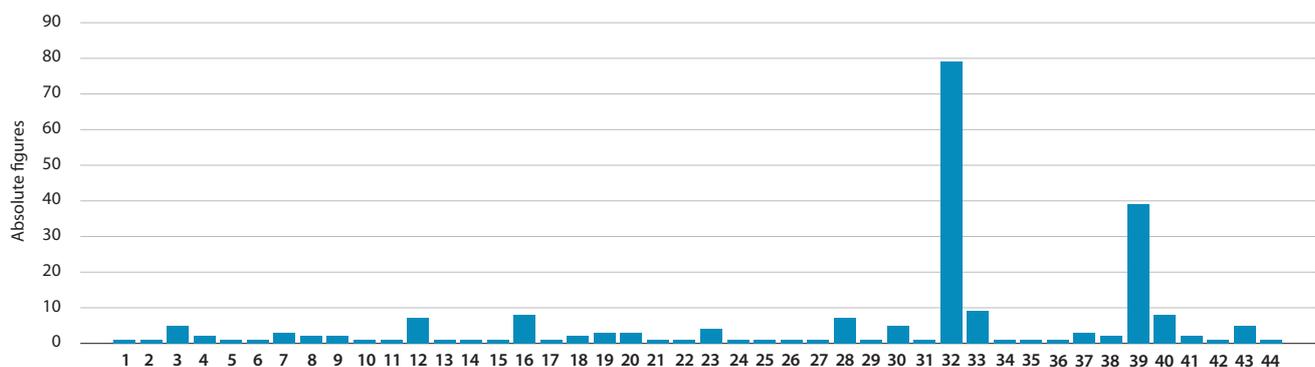
Concluding with summer 2016, 13 Air Operators reported to EVAIR on GPS outage issues. On the basis of the reports filed, we identified 44 different areas within ECAC and outside ECAC airspace (Figure 39). Within some of these areas there were more than 70 reports. As already announced in the previous EVAIR Safety Bulletins, the most affected area extends over and along the Black Sea and Caspian Sea axis and four to five hundred NM North and North-West from that axis. Unfortunately, for confidentiality reasons and because certain Air Navigation Service Providers affected by GPS problems did not allow us to publish the names of the locations, we still cannot provide fuller information.

**Figure 38:** GPS outages: summer seasons 2013-2016

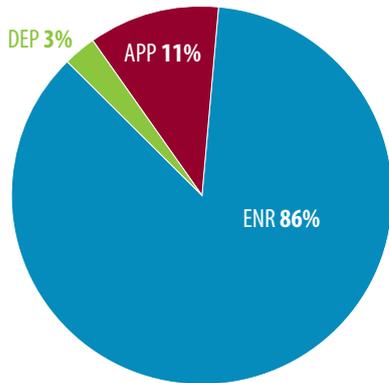


Since the very beginning of the monitoring of GPS outages, the most affected phase of flight, accounting for 90% of reports has been en-route (Figure 40). The reason for this is that in the area affected there is mainly overflying traffic at FLs connecting Europe with the Middle and Far East.

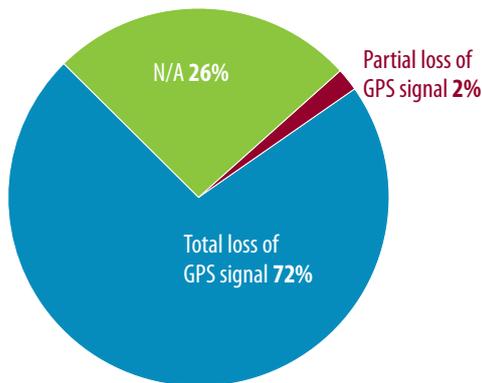
**Figure 39:** GPS outage locations: summer seasons 2013-2016



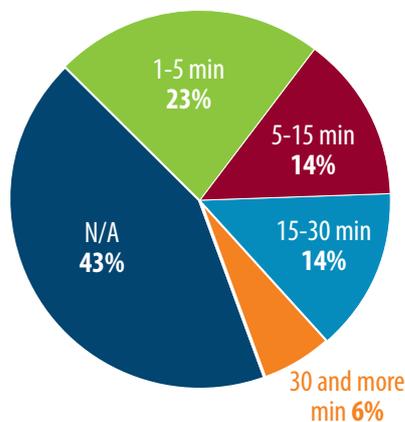
**Figure 40:** GPS Outage trends per phase of flight summer seasons 2013-2016



**Figure 41:** GPS system failure summer seasons 2013-2016



**Figure 42:** Duration of GPS outages summer seasons 2013-2016



When naming certain issues related to GPS outages we adopted the wording used by pilots in the narrative parts of their incident reports. The reason for using the pilots' 'taxonomy' is that the current EUROCONTROL HEIDI and ICAO ADREP taxonomies do not extend to GPS.

As explained above, on the basis of pilot GPS reports we identified two main areas related to GPS failures: 'GPS system failure' and 'Duration of the lost signal'. Within GPS system failure we established two sub-categories: 2GPS failed and 1GPS failed. After sharing our information with the stakeholders dealing with GNSS and safety, we realised that it would be better to know whether GPS was lost totally or partially. Totally means that if there were two GPS receivers on board, both of them failed, or if there was only one and that failed, the effect was the same on the flight - total loss of the GPS signal. Therefore, following the position of our stakeholders in Figure 41 we used the taxonomy as proposed by our stakeholders dealing with GNSS and safety.

The other sub-category of the new taxonomy we introduced in EVAIR was 'Duration of the lost signal', which is self-explanatory and we assume that there is no need for additional explanations.

The graph 42 shows that GPS was lost from one minute up to three hours. It is important to stress that in many reports we know from the air operators that after passing through the affected zone the GPS equipment started working normally. Most often the GPS signal was lost for 1-5 min (23%). From the perspective of the affected airspace, we could say that the area was relatively small. However, where the signal was lost for more than 30 minutes up to three hours, this means that the area affected was very large.

We noticed that at the beginning of 2017 we received fewer reports. After our contacts with the Air Operators we realised that for pilots flying every day through the most affected airspace it became a daily event, and no longer a surprise. Moreover, some airlines took measures by issuing internal information to their pilots, as well as some ANSPs like Turkey, which issued a NOTAM on the GPS outage problem. We believe these facts contributed to the reduction in the number of reports noted in the first part of 2017.

Nevertheless, we would like to ask our main stakeholders - Air Operators and Air Navigation Service Providers - to continue reporting all their GPS issues to the appropriate authorities and also us. It is a huge help to our small team consisting of EUROCONTROL navigation experts, the IATA and Network manager safety unit, which part is EVAIR, in continuing with our work with other stakeholders to find the root cause of the problems and identify adequate solutions.

### **De-identified occurrence reports**

#### ***April 2016 - Airline report***

During approach we lost GPS signal. ATC was informed, radar vectors requested and provided. GPS signal was restored.

#### ***Sep 2016 - Airline report***

During cruise we noticed our GPS signal disappeared and reverted to inertial navigation. The navigation function was updated to allow the FMS to update via ground-based nav aids. The GPS signal returned after about 30mins.

## ACAS REPORTING SUMMER SEASONS 2012-2016

EVAIR tries to provide ACAS RA statistics in line with the agreement we have with our stakeholders to monitor the operational, procedural and technical elements of ACAS. This is an activity taken on following the successful implementation of the mandatory carriage of ACAS II. The aim of monitoring remains unchanged - to support the continued safe and effective operation of ACAS by identifying and measuring trends and issues associated with Resolution Advisories (RAs).

ACAS is the generic term for the Airborne Collision Avoidance Systems, of which TCAS II is the only system implemented to date. The purpose of ACAS is to improve air safety by acting as a 'last-resort' method of preventing mid-air collisions or near-collisions between aircraft. Although ACAS II implementation was completed in 2005, ACAS monitoring continues to improve safety by identifying technical and procedural and operational deficiencies. TCAS II version 7.1 has been mandated in European Union airspace on all civil aircraft over 5,700 kg MTOM or 19 passenger seats as of December 2015 and EVAIR's monitoring is focused on the performance of the new TCAS version.

As in previous issues in this Safety Bulletin we present statistics generated from the data provided by airline and ANSP safety managers. As mentioned in a previous EVAIR safety bulletin, unfortunately due to technical problems affecting our data providers, we are still unable to prepare statistics for ACAS RAs collected through the automated track by the Automated Safety Monitoring Tool. We are doing our very best to re-launch the compilation of these statistics.

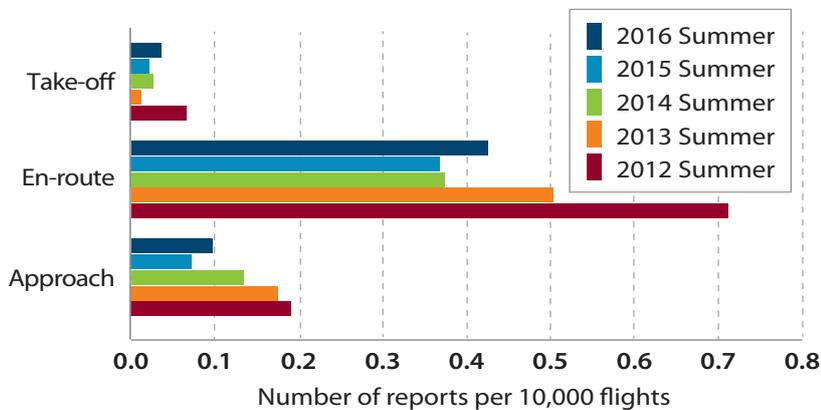


Figure 44: Manually reported ACAS incidents by phase of flight summer seasons 2012 – 2016

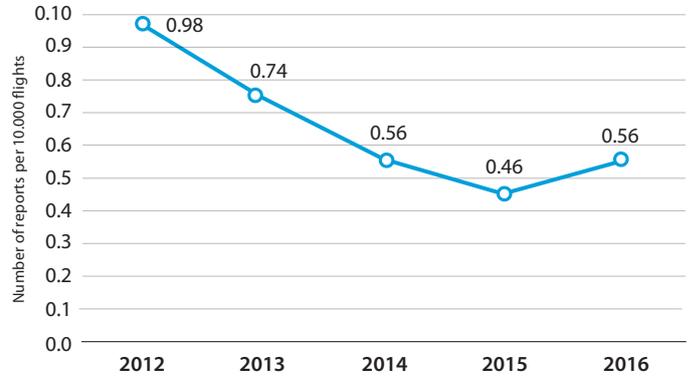


Figure 43: Manually reported ACAS incidents summer seasons 2012 – 2016

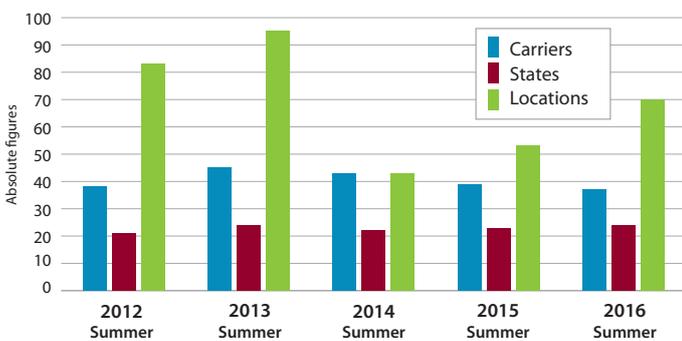
We regularly remind our readers that some ACAS/TCAS reports which have not been followed up in the form of feedback provided by the ANSPs rely on pilot and air traffic controller perceptions and memories of the events, rather than measured or calculated values. We also want to stress that a significant number of ACAS RA reports were supported by ANSP feedback based on operational investigations, including radar and voice records.

After four years of the decrease including year 2011, in the summer 2016 we recorded a small increase in the number of ACAS RA reports. It is difficult to say now if the trend will continue. We go on with the monitoring to check in which direction the trend will go. We would like to say that in accordance with our experience, within the monitoring of each type of the events, we see decreasing trend after set of actions and mitigation measures. However, after three to five years of decrease we see the re-start of the increase. One of the possible reasons for that is the complacency and at the same times the change of the staff within the AOs dealing with these issues. Namely, usually new staff who comes is not fully familiar with everything what was done before they took over the position and the responsibility for certain safety subject and then we see the repeating of the problems. Therefore we will monitor the situation to check if we enter this phase of repeating problems which have been already addressed.

In general in the EVAIR data base the largest number of ACAS RAs occurred within the en-route phase of flight. However, when making different kind of searches we see that in some regions, especially the core area of the European airspace, the largest number of ACAS RAs occurred within the approach phase. Like with the general trends of the EVAIR ACAS RAs, within the en-route phase we recorded the increase of the number of reports in the summer 2016. The increase came after three years of the decrease. The increase of the number of reports we recorded also within the approach and take-off phase.

Figure 45 shows the absolute figures for ACAS RA unique reports by 'Carrier', 'State' and 'Location'. In summer 2016 we recorded ACAS RAs on 70 different locations across European airspace which is 32% more than in 2015. What concerns other monitored areas, we recorded slight increase of the number of States but at the same time slight decrease of the number of carriers participating in the ACAS RA events.

**Figure 45:** Manually reported unique ACAS occurrences per State, locations & Air Operators summer seasons 2012 – 2016

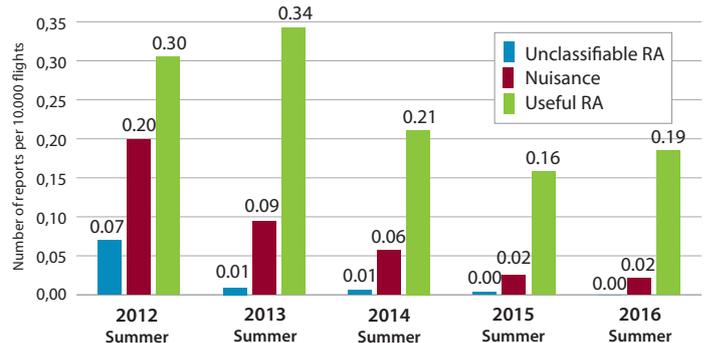


ICAO ADREP definitions of types of RAs are shown below.

- **Useful RA** - The ACAS II system generated an advisory in accordance with its technical specifications in a situation where there was or would have been a risk of collision between aircraft.
- **Unnecessary (Nuisance) RA** - The ACAS II system generated an advisory in accordance with its technical specifications in a situation where there was not, or would not have been, a risk of collision between aircraft.
- **Unclassifiable RA** - The ACAS II system generated an advisory that cannot be classified because of insufficient data.

We see that the number of 'Nuisance RAs' kept very low levels. In the summer 2016 we recorded the same figures as in the summer 2015. It is difficult to say if this is because pilots stopped reporting "Nuisance RAs" or it is because there are not too many of them. Useful RA has higher levels than the other type of the RAs. It says that pilots have high confidence in the ACAS RAs. In summer 2016 we recorded a slight increase of the number of 'Useful RAs' versus the summer 2015.

**Figure 46:** ACAS RA Classification summer seasons 2012 - 2016



## ACAS RA INSTRUCTIONS SUMMER 2012 - 2016

ACAS RAs are very often triggered by the high vertical rate. Figure 47 shows that the 'Level off-Level off' RA, which in TCAS II version 7.1 replaced the 'Adjust Vertical speed Adjust' RA, which typically occurs due to high vertical rates, had the largest number of reports for the last five summer seasons and in addition showed the increase in the summer 2016 versus the same period in 2015. As usual we take the opportunity to remind pilots that they should follow the ICAO recommendation to reduce the vertical rate to 1500 ft/min in the last one thousand feet of climb or descent (unless otherwise instructed by ATC).

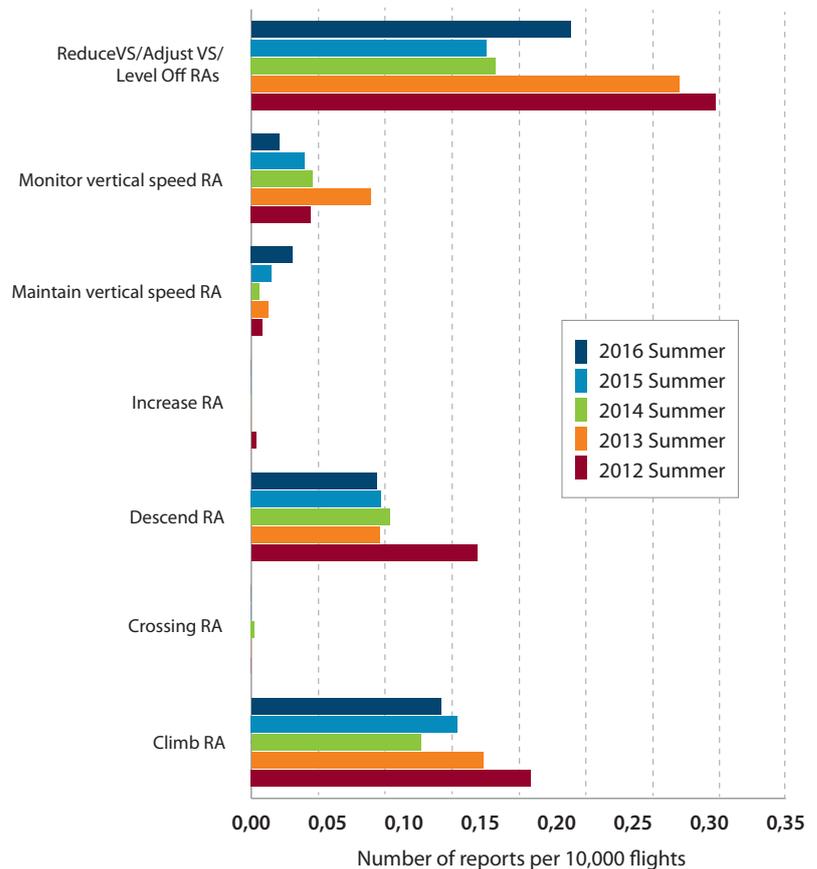
### FALSE RAs CAUSED BY HYBRID SURVEILLANCE TRACKING ANOMALY

The EUROCONTROL Network Manager Safety Unit has been advised by a number of European ANSPs about instances of false TCAS RAs that have occurred in their airspace.

The common factor in these events is that the RA receiving aircraft is fitted with TCAS II with the hybrid surveillance function. The hybrid surveillance function has been introduced together with version 7.1 in order to reduce active interrogations and radio-frequency pollution.

The RAs are triggered when two aircraft are crossing at the same level, or in vertical convergence, but the conditions for RA generation are not met and ATC standard horizontal separation is assured. The false RA<sup>1</sup> is generated only on the 'front' aircraft against an aircraft that is between 5 to 7 NM behind or parallel. Once an RA has been declared, the TCAS logic will not terminate the RA until the range between the aircraft is diverging significantly.

Figure 47: ACAS RA Instructions summer seasons 2012-2016



Since December 2012 through the mid-May 2017 the total of 171 cases of false RAs have been reported. In all cases, there has been no erosion of horizontal separation or possible risk of collision between the two aircraft at the time when the RA was issued; hence, from a pilot and controller perspective the RAs have been unexpected. Nevertheless, the pilots have, quite properly, followed the RA instructions (with one exception when there was no reaction to the RA). Whilst this is correct, from an air traffic management viewpoint the manoeuvres disrupt the flow and increases cockpit and ATC workload; they may also precipitate follow-on conflicts, especially in congested airspace when adjacent flight levels are often occupied<sup>2</sup>.

<sup>1</sup> TCAS II MOPS (EUROCAE ED-143) define a false RA as an advisory caused by a false track or a TCAS malfunction.

<sup>2</sup> One loss of separation with a third party aircraft has been reported as a direct consequence of an aircraft responding to false RA.

In the reported events an average vertical deviation from the cleared level was 673 ft and the maximum deviation was 3000 ft. On average, a false RA lasted 33 seconds with singular events lasting over 236 sec. The hybrid surveillance false RAs in 75% of cases happened to aircraft in level flight, 11% to climbing and 14% to descending aircraft. Two-third of the events occurred at or above FL360.

In two of the reported false RA cases a loss of separation occurred with a third party aircraft as the aircraft receiving a false RA left its cleared level and climbed towards an aircraft above at a crossing track. Moreover, there were two cases of prolonged (in one case lasting close to 4 minutes) RAs causing significant deviation from the flight path.

This anomaly so far has been only affecting some Airbus single aisle and wide body aircraft. In December 2014 EASA published a Safety Information Bulletin concerning the problem<sup>3</sup> and is undertaking an action to address the problem with the relevant equipment manufacturers.

Further, on 19 May 2017 EASA published an Airworthiness Directive number 2017-0091 to address this problem by 2 June 2018 (<https://ad.easa.europa.eu/ad/2017-0091>).

Pilots are reminded that all RAs shall be followed promptly as no determination whether the RA is false can be made in real-time (that is only possible during post-event analysis). Any deviation from ATC clearance shall be reported without delay.

ANSPs and aircraft operators that suspect that they have experienced false RAs are requested to provide details to EUROCONTROL and EASA.

## De-identified occurrence reports

### Sep 2016 - Airline report

During cruise at FL370 we encountered a TCAS traffic advisory followed shortly by a TCAS RA. Traffic was the same level, crossing right to left behind us at approximately 5nm. A climb instruction was given so PF (FO) disconnected the autopilot and ordered flight directors off as per SOP. Aircraft climbed to approximately FL377 after which a "level off" order was given. Approximately 10s after maintaining flight level, ATC reported 6NM separation minimum which matched our TCAS so PF asked for autopilot re-engagement. Autopilot was temporarily engaged at this point after assuming that the TCAS was spurious due to the separation of the other aircraft, but shortly afterwards disengaged again as a precaution due to still being in RA mode. A few seconds afterwards "clear of conflict" was instructed so the autopilot was re-engaged for a second time and the aircraft was then descended to resume FL370. Overall TCAS seemed somewhat spurious, with no evidence of an AIRPROX.

### ANSP feedback facilitated by EVAIR

Conflict between two aircraft was identified more than 15min before it. Measuring tool gave a minimum distance between both aircraft expected to be around 6Nm. Applying SOP, ATC asked both aircraft to maintain their current heading. Distance and minimum distance expected were monitored until both aircrafts diverged. A/C 1 announced and followed a TCAS RA whereas separation between both aircrafts was never below 6NM (operational minimum separation is 5 NM or 1000 ft).

Following this event, ATC wrote a report and radar data were sent to the HQ for further analysis. The analysis proved the triggered TCAS RA was a false RA caused by the 'Hybrid surveillance 7.1 equipment.

<sup>3</sup> The full text of the EASA Safety Information Bulletin no. 2014-33 can be found here: <http://ad.easa.europa.eu/ad/2014-33>

#### **17/06/2016 - Airline report**

Cruising at FL 360 crew received TCAS RA followed by RA 'Climb Climb' order. PF applied memory items. After receiving 'Clear of conflict' ATC advised and, FL 360 resumed. Initial RA caused by hybrid surveillance, crew following it resulted a loss of separation with another traffic. According to radar data analysis this RA was caused by a/c 1, which was on assigned radar heading, and approaching to FL 360 at distance 7,6 NM at critical moment. Minimum separation between a/c 2 and a/c 1 was 7,1 NM. There was no TCAS RA triggered on board of a/c 1. But a/c 2 crew inevitable reaction to TCAS RA led to the loss of separation with flight a/c 3 (A321), which was cruising at FL 370 at crossing direction. Minimum separation was 3,1 NM. Crew of a/c 3 were already on other ACC frequency and reported TCAS TA upon query.

#### **28/04/2016 - Airline report**

During descent to FL70 and passing FL100, we noticed a traffic 800ft below and flying inbound our position. We received TCAS advisory followed by resolution advisory. First climb followed by increased climb. ATC radar informed. We initially received traffic info of VFR traffic maintaining FL100. It was obvious it couldn't be this traffic that triggered the resolution as after aggressive pitch up to avoid, this traffic was still approaching and even climbing faster toward us. After challenging ATC radar for details, they informed us it was actually a F16 out of their responsibility as not enunciated in their airspace.

## ANNEX 1 – EUROPEAN ACTION PLANS

### EUROPEAN ACTION PLAN FOR AIR-GROUND COMMUNICATIONS SAFETY

The Air-Ground Communication (AGC) Safety Improvement Initiative was launched by the EUROCONTROL Safety Team in 2004, and addresses communication issues identified in the Runway Incursion and Level Bust Safety Improvement Initiatives as well as other issues of concern, such as call sign confusion, undetected simultaneous transmissions, radio interference, use of standard phraseology, and prolonged loss of communication. Communication between air traffic controllers and pilots remains a vital part of air traffic control operations, and communication problems can result in hazardous situations. A first step towards reducing the incidence of communication problems is to understand why and how they happen. The Action Plan is available on the ALLCLEAR Communication Toolkit

<http://skybrary.aero/index.php/Solutions:ALLCLEAR>

### THE EUROPEAN ACTION PLAN FOR THE PREVENTION OF LEVEL BUST

Reducing Level Busts is one of EUROCONTROL's highest priorities. EUROCONTROL began raising awareness of the Level Bust issue in 2001, organised a series of workshops, and established a Level Bust Task Force to define recommendations and to formulate an action plan to reduce Level Busts.

The Level Bust action plan is the outcome of work carried out by EUROCONTROL's cross-industry Level Bust Task Force, which was set up in 2003. The Task Force reviewed the evidence available, identified the principal causal factors, and listened to the Air Navigation Service Providers and aircraft operators with experience in reducing Level Busts.

The Action Plan contains recommendations for Air Traffic Management, Air Traffic Controllers, and Aircraft Operators. It is designed to reduce the frequency of Level Busts and reduce the risks associated with Level Busts. Implementation of the Action Plan will be monitored by the Task Force monitoring group reporting to the EUROCONTROL Safety Improvement Sub Group (SISG).

<http://www.skybrary.aero/bookshelf/books/244.pdf>

### THE EUROPEAN ACTION PLAN FOR THE PREVENTION OF RUNWAY INCURSIONS (EAPPRI)

The number of runway incursion reports is rising. Accidents continue to take place on runways. Findings from the incident and accident reports have been used to determine the new recommendations contained in the updated European Action Plan for the Prevention of Runway Incursions.

The increasing availability of runway incursion incident reports is a positive indication of the commitment of organisations and operational staff to prevent runway incursions and runway accidents by learning from past accidents and incidents and sharing this information across Europe.

The new recommendations contained in the Action Plan are the result of the combined and sustained efforts of organisations representing all areas of aerodrome operations.

The organisations which contributed to this action plan are totally committed to enhancing the safety of runway operations by advocating the implementation of the recommendations that it contains. These organisations include, but are not limited to, Aerodrome Operators, Air Navigation Service Providers, Aircraft Operators, and Regulators.

[http://www.skybrary.aero/index.php/European\\_Action\\_Plan\\_for\\_the\\_Prevention\\_of\\_Runway\\_Incursions\\_\(EAPPRI\)](http://www.skybrary.aero/index.php/European_Action_Plan_for_the_Prevention_of_Runway_Incursions_(EAPPRI))

### CALL SIGN SIMILARITY (CSS)

The European Action Plan for Air Ground Communication Safety (conceived inter alia by EUROCONTROL, aircraft operators (AOs) and the Flight Safety Foundation) identified call sign similarity (CSS) as a significant contributor to air-ground communication issues. Analysis of ATC-reported events shows that 5% involve incidents where CSS is involved.

Research and CBA studies show that the most cost-efficient way of providing a long-lasting, Europe-wide solution is to create a central management service to de-conflict ATC call signs. This strategy provides economies of scale and rapid payback on investment (3 years). More importantly, it is calculated that it will eliminate over 80% of CSS incidents and thus improve safety.

<https://www.eurocontrol.int/services/call-sign-similarity-css-service>

## ANNEX 2 – DEFINITIONS

The following definitions are extracted from the HEIDI and/or HERA Taxonomies.

**HEIDI** (Harmonisation of European Incident Definitions Initiative for ATM) is intended to finalise a harmonised set of definitions (taxonomy) for ATM-related occurrences.

**HERA** (Human Error in European Air Traffic Management) develops a detailed methodology for analysing human errors in ATM, including all types of error and their causal, contributory and compounding factors.

More information can be found at:

**HEIDI:** <http://www.eurocontrol.int/articles/esarr-2-reporting-and-assessment-safety-occurrences-atm>

**HERA:** <http://www.eurocontrol.int/services/human-error-atm-hera>

### DEFINITIONS

**ATC clearance/instruction (HEIDI):** related to incorrect or wrong aircraft action. Authorisation for an aircraft to proceed under conditions specified by an air traffic control unit and deviations from the clearance which cause runway incursions, taxiway incursions, apron incursions, Level Bust, unauthorised penetration of airspace, etc.

**Coordination (HEIDI):** internal coordination encompassing coordination with sectors within the same unit, and sectors within the ATC suite; external coordination, civil/civil and civil/military; and special coordination, covering expedite clearance, prior permission required, revision and other special coordination.

**Contributory factors (HEIDI):** part of the chain of events or combination of events which has played a role in the occurrence (either by easing its emergence or by aggravating the consequences thereof) but for which it cannot be determined whether its non existence would have changed the course of events.

**Decision-Making (HERA):** covers incorrect, late or absence of decisions

**Failure to Monitor (HERA):** failure to monitor people, information or automation

**Judgment (HERA):** mainly associated with separation

**Lapses (HEIDI):** psychological issues encompassing: Reception of information, Identification of information, Perception of information, Detection, Misunderstanding, Monitoring, Timing, Distraction, Forgetting and Loss of Awareness.

**Level Bust (HEIDI):** any unauthorised vertical deviation of more than 300 feet from an ATC flight clearance (departing from a previously maintained FL, overshooting, undershooting, levelling-off at a level other than the cleared level).

### Mental/Emotional/Personality issues (HERA):

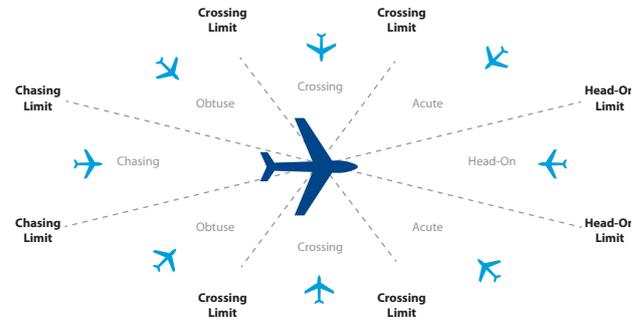
include the following items:

- Mental capacity: loss of picture or safety awareness
- Confidence in self, in others, in information, in equipment, in automation
- Complacency
- Motivation/Morale
- Attitudes to others
- Personality traits: aggressive, assertive, under-confident, risk taking
- Emotional status: stressed, post incident
- Mis-stored or insufficiently learned information
- Planning: insufficient, incorrect or failed
- Recall of information: failed, inaccurate, rare information, past information
- Violations: routine, exceptional

**Mistakes (HEIDI):** psychological issues encompassing: Information wrongly associated, Workload issues, Information not detected, Failure to monitor, Recall of information, Misunderstanding or insufficiently learned information, Judgment, Planning, Decision-making, Assumptions and Mindset.

**Operational communication (HEIDI):** Air-Ground, Ground-Ground and Use of Equipment for verification testing. Air-Ground communication encompasses hearback omitted, pilots' read back, standard phraseology, message construction, R/T monitoring including sector frequency monitoring and emergency frequency monitoring, handling of radio communication failure and unlawful radio communications transmission. Ground-Ground communication refers to standard phraseology, speech techniques, message construction, standard use of equipment, radio frequency, telephones, intercoms, etc.

### RA geometry between two Aircraft (ASMT)



**Runway Incursion (ICAO):** Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take-off of aircraft.

**Spoken communication (HEIDI):** human/human communication encompassing air-ground and ground-ground communications but also call sign confusion, noise interference and other spoken information provided in plain language. Air-ground communication refers to language/accent, situation not conveyed by pilots, pilot's breach of radio telephony (R/T), workload, misunderstanding/misinterpretation, and other pilot problems. Ground-ground communication refers to misunderstanding/misinterpretation, poor/no coordination.

**Taxiway Incursion (HEIDI):** any unauthorised presence on a taxiway of an aircraft, vehicle, person or object that creates a collision hazard or results in a potential loss of separation.

**Traffic & Airspace problems (HEIDI):** there are four set of causal factors under this heading:

- **Traffic load & complexity**, encompassing excessive and fluctuating load, unexpected traffic demand, complex mix of traffic, unusual situations (emergency, high risk, other), abnormal time pressure, under load and call sign confusion.
- **Airspace problems** composed of flights in uncontrolled and controlled airspace, airspace design characteristics (complexity, changes, other) and temporary sector activities (military, parachuting, volcanic activity, training)

- **Weather problems** such as poor or unpredictable (snow, slush, ice, fog, low cloud, thunderstorm, wind shear)
- **Pilot problems** concerning language, culture and experience aspects.

**Traffic Information (HEIDI):** essential and local traffic information provided by an air traffic controller to the pilot. Essential information is related to the provision of traffic information containing:

- a) direction of flight of aircraft concerned;
- b) type and wake turbulence category (if relevant) of aircraft concerned;
- c) cruising level of aircraft concerned;
- d) estimated time over the reporting point nearest to where the level will be crossed;
- e) relative bearing of the aircraft concerned in terms of the 12-hour clock as well as distance from the conflicting traffic;
- f) actual or estimated position of the aircraft concerned.

Local traffic in this context consists of any aircraft, vehicle or personnel on or near the runway to be used, or traffic in the take-off and climb-out area or the final approach area, which may constitute a collision hazard to the other aircraft and about which the information has to be provided.

**Workload issues (HERA):** concern both minimal and excessive workload.

## ANNEX 3 – ACRONYMS

<b>ACAS</b>	Airborne Collision Avoidance System
<b>ACARS</b>	Aircraft Communication Addressing and Reporting System
<b>ADREP</b>	Aviation Data Reporting Programme
<b>AGC</b>	Air Ground Communication
<b>ANSP</b>	Air Navigation Services Provider
<b>AO</b>	Aircraft Operator
<b>APP</b>	Approach
<b>ASMT</b>	ATM Safety Monitoring Tool
<b>ASR</b>	Air Safety Report
<b>ATC</b>	Air Traffic Control
<b>ATCO</b>	Air Traffic Controller
<b>ATIS</b>	Automatic Terminal Information System
<b>ATM</b>	Air Traffic Management
<b>ATS</b>	Air Traffic Service
<b>AUA</b>	ATC Unit Airspace
<b>AUA</b>	ATC Unit Airspace
<b>BVLOS</b>	Beyond Line of Sight
<b>CONOPS</b>	Concept of Operations
<b>CPDLC</b>	Controller-Pilot Data Link Communications
<b>CSMC</b>	Call Sign Management Cell
<b>CSC</b>	Call Sign Confusion
<b>CSS</b>	Call Sign Similarity
<b>CSSNN</b>	Call Sign Similarity Non-tool user
<b>CSST</b>	Call Sign Similarity Tool
<b>CSSUU</b>	Call Sign Similarity Tool user
<b>CSS UG</b>	Call Sign Similarity User Group
<b>DME</b>	Distance Measuring Equipment
<b>EASA</b>	European Aviation Safety Agency
<b>EC</b>	European Commission
<b>ECAC</b>	European Civil Aviation Conference
<b>EVAIR</b>	EUROCONTROL Voluntary ATM Incidents Reporting
<b>FAA</b>	Federal Aviation Authority
<b>FO</b>	Flight Officer

<b>GADM</b>	IATA's Global Aviation Data Management
<b>GNSS</b>	Global Navigation Satellite System
<b>GPS</b>	Global Positioning System
<b>GS</b>	Glide Slope
<b>EAPRE</b>	European Action Plan for Prevention of Runway Excursions
<b>EAPRI</b>	European Action Plan for Prevention of Runway Incursions
<b>FL</b>	Flight Level
<b>HEIDI</b>	Harmonisation of European Incident Definitions Initiative for ATM
<b>HERA</b>	Human Error in European Air Traffic Management
<b>IATA</b>	International Air Transport Association
<b>ICAO</b>	International Civil Aviation Organization
<b>ILS</b>	Instrument Landing System
<b>LB</b>	Level Bust
<b>LLZ</b>	Localizer
<b>LOC</b>	Localizer
<b>MLS</b>	Microwave Landing System
<b>NM</b>	Network Manager
<b>NOP</b>	Network Operations Portal
<b>NOTAM</b>	Notice To Air Man
<b>PF</b>	Pilot Flying
<b>PIC</b>	Pilot in Command
<b>QNH</b>	Atmospheric Pressure at Nautical Hight
<b>RA</b>	Resolution Advisory
<b>RNAV</b>	Area Navigation
<b>RPAS</b>	Remotely Piloted Aircraft Systems
<b>RWY</b>	Runway
<b>STEADES</b>	Safety Trend Evaluation and Data Exchange System
<b>TA</b>	Traffic Advisory
<b>TCAS</b>	Traffic Collision Avoidance System
<b>THR</b>	Threshold
<b>VFR</b>	Visual Flight Rules
<b>VLOS</b>	Visual Line of Sight
<b>VMC</b>	Visual Meteorological Conditions
<b>VOR</b>	VHF Omnidirectional Range







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