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EVAIR Safety Bulletin No 17 provides the ATM statistics for the period 2011-2015. We apologise to our readers for the fact that due to internal problems, the 2011-2015 statistics have been slightly delayed. We have not changed our good practices and as usual, the ATM statistics are the outcome of the cooperation between EVAIR and IATA STEADES. As regards data provision, we are continuing our cooperation with the airlines and ANSPs as our main data providers. The data have been provided via the SMS of the airlines and ANSPs. The majority of the airlines and ANSPs provide the data on a daily basis, although there are a few providers who do so on a monthly basis. Thanks to the cooperation with IATA STEADES, this bulletin is able to set out the ATM statistical view and the trends at European and global level.

Feedback – Reporting motivator and support for quick fixes

The feedback process, which starts with the preliminary report and ends with the reply relating to the submitted report, is one of the most important EVAIR activities. Replies concerning identified causes and measures taken or proposed help ensure that problems are resolved quickly and efficiently. Over the last five years, the average time for the provision of feedback was 72 days. With the exception of 2014, throughout the monitored period we recorded a steady decrease in the number of days needed for the provision of feedback; in 2015 it took on average 39.5 days (Figure 2).

Main trends

Events

In addition to the laser beam, ACAS RAs and Go-Arounds are the trends where we have a higher number of reports than in other monitored areas. We would like to draw attention to the increasing number of new types of events we have started to monitor: RPAS/Drones and GPS outages

RPAS/Drones – An Emerging Threat requiring a solution

The boom in drone reports started in 2015, although the first reports were recorded in 2011. We suspect that there...
are far more drone occurrences than are reported to EVAIR. The majority of the reports in our database relate to the ‘Open category’, drones which weigh up to 25kg and fly at low altitudes. EASA identified them as a low risk and without the need for the involvement of Aviation Authorities. We have recorded reports which can be categorised as very serious, since vertical and horizontal separation with commercial traffic was, according to the pilots’ reports, literally a few metres. The majority of the events we recorded occurred in the approach phase.

**GPS Outages**

The majority of the reports recorded at EVAIR were in the area of political disputes. In this regard the Black Sea-Caspian Sea axis is the most affected. Analysis of the GPS outages identified 35 different FIRs where GPS problems occurred once or several times. Within the monitored period, in some FIRs the problem was repeated more than 40 times. Some of the GPS events occurred on the boundary between two or three different FIRs. Recently Turkey was forced to issue NOTAMs due to the substantial and rapid increase in GPS outages.

**ACAS RA data collection**

Over the last three years, EVAIR has recorded a steady decrease in the number of ACAS RAs per 10,000 flights. Airline associations and ANSPs together with EUROCONTROL have made a considerable effort to help bring about an overall improvement.

**Laser Interference**

The yearly trend shows the decrease in laser interference across Europe. As usual, the approach phase of flight was the most affected. According to the reports, busy airports have been constantly affected. Some airports on the coast were more affected during the summer season. Since there is still no EU regulation relating to laser interference, aviation experts expect that in the coming years EASA will take more concrete steps in this regard.

**Call Sign Confusion**

New Air Operators continue to join the Call Sign Similarity de-confliction family. For the period 2011-2015, EVAIR received almost 25,000 reports from 15 European Air Navigation Service Providers. In 2015 we recorded a 25% decrease in the number of AOs with ‘Similar Call Signs’. EUROCONTROL Call Sign Similarity Tool (CSST) users recorded throughout the monitored period levels of call sign similarities there were more than twice as low as those for non-CSST users.
The airlines participating and submitting data to STEADES accounted for a total of 53,990,591 flights from 2011 to 2015. This is equivalent to approximately 30% of the world’s flights during that period. Report narratives for contributory factors were not analysed.

The STEADES database is comprised of all types of de-identified aviation safety incident reports from over 197 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 backing up analysis results.

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
EUROCONTROL and IATA have agreed to provide European and global statistics for those areas which form part of the EVAIR monitoring process. These areas cover specific European action plans and projects such as: ACAS RAs, Call Sign Confusion, Level Bust, RWY Incursion, etc. Some of these areas also fall under EC Regulations 376/2014 and 1018/2015.

Within the two data repositories, three areas (‘Go-Around’, ‘TCAS RA’ and ‘Level Bust’) traditionally have a higher number of reports than the other two. ‘Go-Around’ in both data repositories recorded a decrease. A decrease at EVAIR was also recorded in ‘TCAS RAs’, while in IATA STEADES the trend in 2015 was the same as in 2014. The reverse trends were recorded in ‘Level Bust’ and ‘Call Sign Confusion’.

In addition to the five common areas of monitoring, at the request of our stakeholders, EVAIR provides trends for ‘Laser Beam’, ‘Wake Turbulence’, ‘Loss of air-ground communication’, and ‘Aborted/Interrupted approach’. Of these additional areas, ‘Laser Beam’ is the area with the highest number of reports.

More detailed statistical information for each of the nine types of events is presented later in this Bulletin. You can also find out more about each of the event types on SKYbrary:


To learn more about STEADES, go to:

www.iata.org/steades

Figure 3: European ATM events 2011 – 2015
Figure 4: ATM events 2011 – 2015

<table>
<thead>
<tr>
<th>Year</th>
<th>Altitude Deviation Reports</th>
<th>Runway Incursion Reports</th>
<th>Go-around Reports</th>
<th>TCAS Reports</th>
<th>Callsign Confusion Reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>0.35</td>
<td>0.35</td>
<td>0.30</td>
<td>0.45</td>
<td>0.51</td>
</tr>
<tr>
<td>2012</td>
<td>0.35</td>
<td>0.37</td>
<td>3.25</td>
<td>3.25</td>
<td>0.50</td>
</tr>
<tr>
<td>2013</td>
<td>0.37</td>
<td>0.42</td>
<td>3.16</td>
<td>3.11</td>
<td>0.49</td>
</tr>
<tr>
<td>2014</td>
<td>3.89</td>
<td>0.35</td>
<td>6.44</td>
<td>3.54</td>
<td>0.38</td>
</tr>
<tr>
<td>2015</td>
<td>4.16</td>
<td>0.37</td>
<td>6.95</td>
<td>3.89</td>
<td>0.49</td>
</tr>
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</table>

Reports per 10,000 flights

Figure 4: Figure 4 ATM events 2011 – 2015
CONTRIBUTORS TO ATM OCCURRENCES 2011-2015

The added value of the EVAIR data base and the taxonomy used during the analysis is the identification of the various levels of the causal factors and their trends. In this chapter we identify contributors which are common to the majority of the various types of occurrences and especially those presented in Figure 5. Later on in this document, we provide more in-depth observations for ‘Air-Ground Communication’.

In order to ensure that our readers understand the taxonomy we use, in Figure 5 we give the content for: ‘Mistakes’, ‘Traffic Information’ and ‘ATC clearance/Instructions’).

Mistakes, which recorded a significant decrease in 2015 in relation to 2014, cover areas such as: Judgment, Planning, Decision-making, Knowledge, Experience, Failure to monitor, Misread or insufficiently learned information, etc. Of these, ‘Planning’ and ‘Judgment’ have absolutely the highest trends and are apparently the contributory factor more often than the other areas. Of the seven contributory factors ‘Traffic Information’ and ‘ATC Clearance/Instructions’ were the only two contributors which recorded an increase in 2015.

Within ‘Traffic Information’ there are three areas: Incorrect, Late and No information provided. ‘Late’ information provision recorded more reports than the other two. Within ‘ATC Clearance/Instruction related items’ in the taxonomy used by EVAIR, there are the following areas: Wrong Runway, Runway excursion, Closed Runway, Occupied Runway, Turn direction, Rate of climb/descent, Assigned or specific speed, Assigned or specific track/heading, Climb/Descent conditional clearance, Approach clearance, etc. Three of these: Assigned route/track/heading, Approach clearance and Assigned or specific speed make up 70% of the total ‘ATC Clearance/Instruction’ related items.

In the feedback reports provided by Air Navigation Service Providers, ‘Training’ was very often cited as the mitigation measure for the majority of the aforementioned contributors.
GO-AROUND 2011-2015

Within this chapter, we always reiterate that although ‘Go-around’ is a normal phase of flight, EVAIR and IATA STEADES monitor these areas in order to identify safety issues associated with ‘Go-around’. It is encouraging to see that over the last two to three years, both data repositories, EVAIR and IATA STEADES, have recorded a decrease in the number of ‘Go-around’ reports.

The decrease in the number of reports at EVAIR coincides with the number of activities initiated by EUROCONTROL, FSF and ERAA. These activities are related to the Safety Forum dedicated to Go-arounds in 2013, (http://www.skybrary.aero/index.php/Portal:Go-Around_Safety_Forum_Presentations) and the delivery of the EUROCONTROL ‘Go-around Study’ produced together with the airlines and Air Navigation Service Providers’ safety experts.

Reports at EVAIR show that ‘Go-around’, with its associated safety issues, has never been a ‘local’ problem, but an event with a pan-European dimension.

In order to continue to improve safety aspects associated with ‘Go-around’, we would repeat our kind plea to our stakeholders to take into account (for their training arrangements and corrective actions) the outcomes agreed at the 2013 Safety Forum and the various activities and studies developed by EUROCONTROL.

In order to analyse and identify the main ‘Go-Around’ contributors, the EVAIR team applies different types of searches to identify such contributors as far as possible. Over a longer period, ‘Weather’, ‘Mistakes’, ‘Unstabilised’ and ‘Traffic and airspace problems’ account for two-thirds of the ‘Go-around’ contributors. ‘Weather’ covers: wind with wind gusts, wind shear, tail winds, head winds; low visibility, heavy rain and snow. ‘Traffic and airspace problems’ incorporates the following: Airspace design and procedures, pilot problems, traffic load and complexity; ‘Mistakes’ include Decision-making, Judgment, Planning and Workload.
Figure 8: Runway Incursion contributors 2011-2015

- Weather: 37.39%
- Traffic and Airspace problems: 16.11%
- Traffic information: 6.92%
- Lapses: 1.19%
- Spoken communication: 3.06%
- Operational communication issues: 1.99%
- Mistakes: 22.16%
- Runway incursion: 1.35%
- ATC clearance/instruction related item: 1.35%
- Airport data: 1.07%
- Est. hor. sep.: 1.19%
- Transferred traffic: 0.48%
- Procedure design issues: 0.08%
- Documentation and Procedures: 0.64%
- Runway configuration: 0.08%
- AIS: 0.08%
- Handling of unusual/emergency situations: 0.32%
- % Unauthorised penetration of airspace: 0.52%
- Aircraft deviation from applicable ATM regulation: 0.44%
- Failure of communication function: 0.32%
- Human – Equipment: 0.52%
Since 2012, EVAIR has recorded a continuous decrease in the number of runway incursions. As is shown in Figure 39, Runway Incursions in general do not make up a big proportion of EVAIR data. In 2015 they accounted for 0.9%. However, as is widely known, the risk of a serious incident or accident associated with runway incursions is much higher than with other types of occurrences. The most risky situations in 2015 contributing to the Runway Incursions recorded at EVAIR in 2015 were four landings without clearance.

Within the STEADES global data, unlike at EVAIR, there was the same level in 2015 as in 2014. An overall reduction in the number of reports recorded at EVAIR could have an impact on the reduction in runway incursions, although we should bear in mind that there are a number of ongoing European runway safety initiatives, including Airport Local Safety Teams, which could also have an impact on the improvement of the situation as regards runway incursions.

In order to provide a view of the spread of ‘Runway Incursions’, we show trends related to the number of locations and States where ‘Runway Incursions’ occurred (Figure 11). At the same time we provide the number of Air Operators participating in these types of occurrences. The idea is to check whether the problem is local or restricted to one airline. In 2015, eight States and seventeen locations were affected by ‘Runway Incursions’. Further searches in the data base showed that three out of eight States accounted for more than 70% and four locations for almost 50% of the Runway Incursion events. It is interesting also that of the 15 AOs who provided us with reports on ‘Runway Incursions’, four participated in more than 50% of the ‘Runway Incursions’. The data show also that in 2015, 20% of ‘Runway Incursions’ were associated with Go-Arounds, which complicated the situation even more. Our intention is to show that these data could be used to assist in identifying areas where further improvements could be sought. We believe that this approach is useful not only for safety experts but also for experts dealing with training.
Figure 11: Runway Incursions States, Locations & AOs 2011-2015

Figure 12 shows that one third of the problems are linked to ‘Air-ground Communication’ (Operational and Spoken). Another third of the problems fall within ‘Mistakes’, ‘Lapses’ and timely and full ‘Provision of the traffic information’. We believe that the inclusion of these topics in the refresher courses would contribute to the further improvement of Runway Safety.

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
LEVEL BUST 2011-2015

For the period 2011-2015, ‘Level bust’ occurrences accounted for 4.25% of the total EVAIR reports. In the EVAIR repository we recorded a slight increase on 2014, and we can see that the same trend was recorded in IATA STEADES.

Figure 13: Level Bust 2011-2015

Figure 14: Altitude Deviation 2011-2015

Figure 15: 15 Level Bust States, Locations & Air Operators 2011-2015
Of the 29 contributors, three (Hearback Omitted, Misunderstanding/Misinterpretation and Planning) contributed to almost 40% of the Level Bust events. We consider that this is a good indication that training is one of the areas where certain activities should be undertaken in order to improve the Level Bust situation.
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 on CSS/C events involving aircraft from non-CSST user airlines are also useful as this helps provide a performance comparison between the two sets of operators. What is more important, though, is the fact 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 not only concerns 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 proceedings. EVAIR monitoring results are also used, inter alia, for CSST safety assessment and as a decision-making element as to whether 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 standalone 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

The CSS User Group 14 meeting was held at EUROCONTROL HQ in Brussels on Tuesday 24 January 2017.

EVAIR SUPPORT TO CALL SIGN SIMILARITY IMPLEMENTATION PROJECT

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

One of the topics discussed at CSS UG14 was proposals for the next potential steps in the CSS Project. As previously agreed by the CSS UG, in order to facilitate a multi-AO dimension to the CSS Project, the next steps should be incremental and be based around the ‘clustering’ of AOs’ schedules supplemented by ad hoc in-season reporting and a possible additional mid-season ‘sanity check’ by the CSMC. The meeting discussed how this would work in practice and determined the make-up of the various clusters. Some technical (CSST) and operational enablers will also need to be put in place to move things forward, and these too were aired in the CSS UG. The aim is to try out some experimental clusters for the summer 2017 season and then build on the experience in the following winter 17/18 season.

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 if you would like to use the CSST then we would be delighted to hear from you. Please note that an NM token is required for access to the CSST. The service can be added to the existing token or an additional token can be purchased for just €200. This is a small price to pay in view of the time saved by using the CSST; once added, CSST access will be guaranteed for the remaining life of the token. We hope 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 the CSST is put in the Purpose of Request box. To extend an existing token, it will also be necessary to insert a 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) is also on hand to help AOs navigate the application process. The CSMC prepares the CSST for the forthcoming season and is available to discuss AO training requirements. Familiarisation sessions can be provided in Brussels or, if requested and subject to CSMC staff availability, may be provided on-site at the AO’s premises, but 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 or via callsign.similarity@eurocontrol.int

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

and find more information on the Call Sign Similarity Project at: http://www.eurocontrol.int/services/call-sign-similarity
EVAIR uses two tracks to monitor ‘Call Sign Similarities’ and ‘Confusion’, one from the airlines and the other from ANSPs. Reports from pilots are mainly related to confusion, while those from ANSPs concern similarities and confusion.

In EVAIR in 2015 there were fewer pilots’ reports than in 2014, when ‘Call Sign Confusion’ reached its highest level. The IATA STEADES global data shows the reverse trends. In European airspace, the ‘Call Sign Confusion’ trend in 2014 and 2015 was higher than in 2012, when the airlines started using the Call Sign Similarity de-confliction Tool. We think that one of the main reasons for the increase was the repeated invitations to air operators to report on CSS/C as an important input for monitoring the work of the Tool.

EVAIR is continuing its monitoring, and in this regard we are very grateful to our data providers, since their reports enable us to monitor the work of the CSST.

A search through the data base shows that ‘Hearback omitted’ and ‘Detection’ make up almost two thirds of all contributory elements. Both contributors are related to the work of air traffic controllers. In addition to the wider use of the Call Sign Similarity de-confliction Tool as the enabler for improvements, we are of the opinion that addressing these elements in the controllers’ refresher courses could help to further improve performance within the ‘Call Sign Similarity’ area.
**AIR NAVIGATION SERVICE PROVIDERS’ CALL SIGN SIMILARITIES AND CONFUSIONS**

For the period 2011-2015, EVAIR received almost 25,000 reports from 15 European Air Navigation Service Providers. The majority of the ANSPs provide their data on a monthly basis; however, a few of them provide the data on a daily basis, benefiting from the support of the EUROCONTROL Call Sign Management Cell Services. The EUROCONTROL Call Sign Management Cell Services help to resolve problems more quickly, at least in cases where AOs are willing to change their call signs on an ad-hoc basis and before the end of the season.

Figure 20 shows the situation with the number of AOs who had a problem with ‘Call Sign Similarities and Confusion’. After the increase in 2014, EVAIR recorded in 2015 a 25% decrease in the number of AOs with ‘Similar Call Signs’. As we already said in our previous bulletins, the identification of AOs with similar call signs is the first step towards de-conflicting similar call signs. We are continuing with the monitoring, and hope that with the current 37 users of the CSST, the new AOs will start using the CSST and contribute to the further improvement of the de-confliction of ‘Similar Call Signs’. In this regard, EVAIR received a number of requests and customised CSS/C analysis for a few AOs to help them decide whether or not to use the Tool.

Yearly trends as presented in Figure 21 show that the majority of CSSs occurred in the same AO non-CSST users. Non-CSST users recorded throughout the monitored period levels which were twice those of AO Tool users. We should point out that over the last three years, EVAIR has recorded an increase in CSS in the AO Tool users. We will continue with the monitoring and will try to gain a much better understanding.

As with CSS, in CSC we had similar trends in 2015. The majority of the CSC reports occurred in the same AO non-Tool users (Figure 22). Relative figures for CSC are much lower than for CSS. The number of CSC reports for different AO Tool-users is very low, confirming that the main problems still lie with the same AOs.
According to EUROCONTROL HEIDI taxonomy, ‘Air–ground communication’ covers two main areas: ‘Spoken’ and ‘Operational’ communication (see definitions on page 40).

Figure 23 shows that within the top seven contributors to ATM occurrences, ‘Air-Ground communication’ consisting of ‘Spoken’ and ‘Operational’ communication accounts for 32%, which is more than the other contributors. Within ‘Air-Ground communication’, ‘Spoken communication’ with 64% is much higher than ‘Operational communication’, with 36%, (Figure 24).

The most frequent types of occurrences where ‘Air-ground communication’ has been identified as one of the contributors are: ‘Runway and Taxiway Incursions’, ‘Level Busts’, ‘Call sign Confusion’, ‘ACAS RAs’, ‘Go-around’, etc.

Figure 25 shows the yearly trend for ‘Air Ground communication’. In 2015 we recorded the lowest level for ‘Air ground communication’. More in-depth analysis showed that the main contributors to the decrease in ‘Air Ground communication’ in 2015 were the significant decrease in ‘Call Sign Confusion’ and ‘Misunderstanding/Interpretation’. (Figure 26).

‘Spoken communication’ (Figure 26) shows that with the exception of ‘Pilots breach of R/T’, all other areas recorded a decrease in the number of reports in 2015. ‘Misunderstanding/Interpretation’, the area with the highest number of reports, also recorded a significant decrease in the number of reports in 2015. ‘Call Sign Confusion’ was the champion of all the ‘Spoken Communication’ contributors, with the most significant decrease recorded in 2015 compared with 2014.
Over the five-year period, ‘Operational Communication’ compared with ‘Spoken’ recorded an increase of 3%, which is a continuation of the increase which began seven to eight years ago.

Two out of five areas recorded an increase in the number of reports in 2015 compared with 2014. ‘Phraseology’ recorded a 32.6% increase and ‘R/T monitoring sector’ a 175% increase in 2015 compared with 2014. In accordance with HEIDI taxonomy, ‘R/T monitoring sector’ covers: monitoring of the sector frequency and timely handover of traffic to the neighbouring sectors and monitoring of the emergency frequency. Timely handover of traffic to the neighbouring sectors is one of the contributors to ‘Prolonged loss of Communication; TCAS RAs, infringement of separation minima, Go-arounds, etc.

Traditionally, ‘Handling of radio communication failure/unusual situations’ is the area with the highest level of reports. Over the last three years, there has been a decrease in this field. For a better understanding, ‘Handling of radio communication failure/unusual situations’ includes: pilots forgetting to turn on the loudspeakers after taking off their headsets; incorrect frequency selection; problems communicating with ATC; frequency blocked by other aircraft; frequency range of the ground stations and readability problems; use of the second transmitter and forgetting to change it back to the working frequency, etc.
LOSS OF COMMUNICATION 2011-2015

EVAIR performs ‘Loss of Communication’ analyses as a support to EUROCONTROL Agency projects.

For the period 2011–2015, EVAIR identified in the data base around 300 prolonged losses of communication. On a yearly basis on average, ‘Loss of Communication’ occurs at 28 different locations across Europe. In 2015 we recorded a decrease in the number of locations and a decrease in the number of States.

On average, 24-25 Air Operators were involved in ‘Loss of Communication’. Figure 28 shows the annual trends for all these areas.

EVAIR recorded that on average, 7% of ‘Loss of Communication’ incidents were followed by military interception.

The EVAIR and IATA STEADES ‘Loss of Communication’ trends show different directions. In EVAIR the trend for the last five years has shown an increase whereas in IATA STEADES, it has shown a decrease. However, in 2015 both data repositories recorded fewer reports than in the previous year.
The majority of ‘Loss of Communication’ incidents occur during the en-route phase (Figure 31). However, according to the data a much higher risk is posed when ‘Loss of Communication’ occurs within the approach phase.

In some instances we can see that when ‘Loss of Communication’ occurs within the approach phase, the flight ends with the landing without clearance, causing further problems on the ground (‘Runway Incursion’).

The most frequent cause of ‘Loss of Communication’ was forgetting to change the frequency when flying from one sector to another. In this regard the contributors are pilots and controllers. We would repeat that the problem with pilots is that they do not check the compulsory points, but wait for controllers to give them the frequency change and that on the other hand, controllers forget or fail to give the frequency change, either because of their workload or because they were speaking with other traffic at the point when the frequency change should have been given.

Figure 32 shows that in the majority of cases, ATM was not involved in the ‘Loss of Communication’ occurrences. The issues were on board. The explanation is partially given above. According to the data, the most frequent airside-related problems and the results were: incorrect selection of frequency, low speaker volume (especially after previous use of head-sets), microphones jammed and cross transmission during busy traffic so that the instruction was not heard. On some occasions, ‘Loss of Communication’ was connected with the loss of the transponder and disappearance of the a/c from the radar display. In this situation, the controller was not aware of the aircraft position and failed to instruct the pilot to change frequency. In some of the reports, we also found potential solutions for some of the ‘Loss of Communication’ incidents. These are the use of the Controller-Pilot Data Link Communications (CPDLC) and ACARS messages to warn the pilot to change frequency.
In the case of ‘Air-Ground Communication’ (Figure 34), ‘Handling of radio communication failure/unusual situation’ is the contributor with the highest percentage (54%).

‘Loss of Communication’ is never an isolated event, and very often it was associated with other types of ATM events such as: landings without clearance which were categorised as ‘Runway Incursions’, ‘Go-arounds’ and ‘Unauthorised penetration of airspace’.

**SPECIFIC EVENTS - LASER THREATS ACROSS EUROPE 2011-2015**

The yearly trend as presented in Figure 36 shows a falling trend in laser interference across Europe. At this point it is very difficult to say whether this is an accurate picture. This is voluntary reporting and from time to time we see a fall in the number of reports not because the problem has disappeared but because people stop reporting because there are no adequate measures to stop the problem.

At the EASA Network of Analysts meeting, a number of State representatives highlighted the problem of laser interference and the need for European legislation which should address, as a minimum, the manufacturing, distribution and use of laser equipment. It seems that in the coming years EASA will take a more active role regarding laser issues.

As usual, the phase of flight most affected by laser interference is the approach phase (Figure 37). According to the reports, busy airports are constantly affected, while other similar airports on the coast are more affected during the summer seasons.

**Laser interference versus total number of EVAIR reports**

Figure 38 shows in percentages the contribution of laser interference to the total number of EVAIR ATM reports.

On average over the last five years, laser interference accounted for 14.5% of the total number of EVAIR reports, which is one of the highest percentages compared with other types of events such as Go-arounds and TCAS RAs. In 2015 we recorded a total of 8 blue laser attacks and one laser attack at FL340.
Looking at the trend over the last five years (Figure 39), we can see that in the last two years EVAIR recorded a decrease in the number of locations and air carriers affected. As was said at the beginning of the analysis, it is very difficult to confirm whether the decrease is due to the actions taken to prevent laser attacks or to the lack of reporting.

In order to have a slightly better picture, we made additional searches in the data base and had a look at the situation of one of the most affected States where at the same time we traditionally have very good reporters. For this State we found that over the last four years there has been a steady decrease in the number of laser reports. We know reliably that this State undertook coordinated actions with stakeholders, the police, air carriers, air navigation service providers, manufacturers, the media, etc. to prevent laser abuse. It looks like they have been doing a good job and could be an example to others on how to combat this problem.

Our data providers can send reports to: Dragica.stankovic@eurocontrol.int

More information about lasers is available on the SKYbrary (www.skybrary.aero).
EUROCONTROL Voluntary ATM Incident Reporting (EVAIR) statistics for Drones are based on ATM incident data provided by commercial airspace users and European Air Navigation Service Providers (ANSPs), including a few from neighbouring regions.

For the period 2011-2015, EVAIR received a relatively small amount of reports, around 30. We recorded drone reports for the first time in our data base in 2011. Since then and until the end of 2014, there were literally just a few reports. The boom in drone reports started in 2015, when we recorded 24 reports. We suspect that a lot of reports have not been sent to EVAIR. We make regular cross-checks with open aviation forums and those published in the newspapers. We found that reports on the forums and those published in the newspapers were different from those reported to EVAIR. The situation with drones is very similar to the boom in laser interference, which started in 2010/2011. Our findings have been sent to EASA, the ANSPs and the airline associations. Drones which weigh up to 25kg (‘Open category’) were identified by EASA as a low risk and without the need for the involvement of the Aviation Authorities. The main Limitations within this category are related to the visual line of sight, maximum altitude, distance from airport and sensitive zones. We are now seeing a lot of activities within EASA and other aviation stakeholders not only on the UAVs/RPAS which were the subject of the regulation, but on drones, which are still outside aviation law. We were unable to find reports related to UAVs which were at the same time the subject of the regulation in terms of certification, pilot licensing, etc.

As shown in Figure 40, the most affected phase of flight is approach, with 80%. Only 4% occurred within en-route, which confirms that drone occurrences are at low level altitudes.

**Figure 40: RPAS Phases of flight 2011-2015**

Drones – States and Locations across Europe

For the monitored period, we identified drone problems in eight States. We suspect that there were far more than eight. For one of these eight States, we recorded almost 50% of the total occurrences we have in the EVAIR data base.
This high percentage for one State could be linked to the good reporting systems of the airlines that report to EVAIR and come from that State.

In a certain number of States where drone occurrences were recorded, we saw that activities were initiated to mitigate the situation. One of these was similar to the laser measures, viz. that in the absence of regulation, pilots are requested to report to the controllers, and controllers then inform the police. It is very important to have as precise as possible a location for the occurrence. In addition, pilots have been requested to stay vigilant and avoid flying objects. In VMC this request is OK, but in IMC conditions it is impossible. In a few cases we saw that flights made go-arounds after seeing the drone or after being informed by ATC that a drone had been reported within their approach.

For the period 2011-2015, we identified 13 locations where drones were recorded. The locations are around the busiest airports in Europe, which additionally increases the risk of serious incidents or accidents. At EVAIR we do not carry out severity risk analyses; we are therefore unable to provide a severity classification. However, we saw reports where vertical or horizontal separation was only a few metres.

As for the altitudes where the aircraft were located during their proximity to the drones, the lowest altitude was 300 feet and the highest was FL 135, which is quite high and proves that small drones do not fly only at low altitudes but could fly very high up.

EUROCONTROL is in close contact with all European aviation stakeholders and contributes to the ongoing activities. In this regard EUROCONTROL was one of the main contributors to the development of the European Remotely Piloted Aircraft Systems (RPAS) roadmap. In addition EUROCONTROL is involved in the ICAO RPAS Panel and is leading two working groups: ATM and C2 data link. More about EUROCONTROL involvement in the RPAS field can be found via this link http://www.eurocontrol.int/rpas

Here are a few more links where our readers can find RPAS/drone information published by various international organisations:


EC ‘Roadmap for the integration of civil RPAS into the European aviation system www.ec.europa.eu/transport/modes/airnews/2015-03-06-drones_en.htm;


GPS OUTAGES 2013-2015

The analysis and statistics provide a general overview of the ECAC airspace for the period 2013-October 2016. The analyses start from 2013 because the first GPS outage events were recorded in 2013.

For the aforementioned period, EVAIR received in total about 10,000 reports, of which 223 were GPS outages.

The yearly trend, as presented in Figure 43, is upwards across ECAC and the neighbouring airspace. At this point it is very difficult to say whether this is an accurate picture. Together with the airline associations, we raised awareness several times among Air Operators to provide us with their GPS outage reports, which they did. However, we suspect that there are far more reports than those provided to us. Simply, this has become a daily issue and people accept this as a normal situation, especially now that through the internal NOTAMs, pilots have been informed about the problem and are now much better prepared to cope with it.

Since 2013, when the first reports on GPS were recorded within the EVAIR data base, and up until March 2016, EVAIR has recorded a steady increase in the number of GPS outages. In just the first three months in 2016, EVAIR recorded more GPS outages than in the whole of 2015. The most affected phase of flight was en-route (more than 90% of the reports).

What is important is that currently, thanks to the collected data, various actions have been initiated. In addition to the Air Operators and their associations, we have reported the problem to the ANSPs, EASA, as the European regulator, and ICAO.

Analyses of the GPS outages identified 35 different FIRs where GPS problems occurred once or several times (Figure 44). In some FIRs, the problem was repeated more than 40 times. Some of the GPS events occurred on the boundary between two or three different FIRs. The majority of the reports are within areas with political disputes. In this regard, the Black Sea-Caspian Sea axis is the most affected. With this in mind, this leads us to conclude that one of the most likely reasons for the outages could be radio interference of the satellite signal, although there could be others, such as GPS on-board equipment failure, solar storms, military exercises, satellite constellations, etc. EUROCONTROL GNSS and NAV experts apply the elimination methodology to identify the likeliest cause of the outage.
As shown in Figure 45, the most affected phase of flight is the En-route phase.

Looking at the UTC time when the GPS outages occurred (Figure 46), we recorded that the highest number of them occurred during the night period, between 2200 and 0000 UTC. If we look at the percentage for the most affected period (Figure 46), it shows that within the night period between 2200 and 0000 UTC, almost 50% of all GPS outage events occurred then. One of the next tasks would be to investigate why the percentage for this time frame is so high.

For the analysis of the duration of GPS outages, we set the time spans for the lost signals at 1-5 min; 5-15 min; 15-30 min; and 30 min to 3 hours. As shown in Figure 47, the spread of the events across two of the four defined time spans is more or less similar, about 30% (5-30 min & 15-30 min), whereas in the other two it is slightly lower. Fortunately, the number of events when the signal was lost for three hours is the lowest. We found three to four of these in the data base.

The taxonomy used by pilots to address GPS equipment when the signal is lost is: GPS 1 lost, GPS 1 and 2 lost or both GPSs lost. In our analyses we used the taxonomy GPS 1 lost and Total loss.
Figure 48 shows that the largest number of reports indicated that both GPSs had been lost. A number of Air Operators sent internal NOTAMs to their pilots alerting them to the potential problem with the GPS signal and telling them to be prepared to use other navigational equipment.

Figure 49 shows the type of aircraft most affected. The B777 is the most affected, which is understandable bearing in mind that this is the most flown aircraft during the en-route phase within the affected area.

GPS geographical spread

Figure 50 shows the number of GPS reports within ECAC and in the non-ECAC States. For a certain number of GPS reports, it was not possible to identify the location of the GPS outage. The data say that the majority of the occurrences were within the neighbouring areas between ECAC and non-ECAC States. EVAIR data recorded also a trend towards the expansion of the area affected by GPS outages. Recently Turkey was forced to issue NOTAMs because within their airspace GPS outages have started increasing rapidly.

Figure 50: GPS geographical spread
ACAS REPORTING 2011-2015

In accordance with earlier agreements and requests from our stakeholders, EVAIR continues to monitor the operational, procedural and technical elements of ACAS. The activity forms part of the obligation taken over following the successful implementation of the mandatory carriage of ACAS II. The aim of the 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 Airborne Collision Avoidance Systems, of which TCAS II is the only implemented system to date. ACAS is intended 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 MTOW or 19 passenger seats as of December 2015 and EVAIR’s monitoring is focused on the performance of the new TCAS version.

In this Safety Bulletin we present statistics which are the outcome of the data provided by airlines’ and Air Navigation Service Providers’ (ANSP) safety managers.

We wish to point out that some of the ACAS/TCAS reports which have not been followed by feedback information provided by the ANSPs rely on pilots’ and air traffic controllers’ perceptions and memories of the events rather than measured or calculated values. A significant number of the ACAS RA reports are supported by ANSP feedback based on operational investigations, including radar and voice records.

In the last two years EVAIR recorded each year the decrease of the number of ACAS RAs per 10,000 flights. Last two years the decrease was not so high but it was still decreasing trend. Airlines association and some ANSPs together with EUROCONTROL made a lot of effort to contribute to the overall improvements.
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.

It is interesting to note that ‘Useful RAs’, traditionally the area with the largest number of reports, recorded a significant decrease in the last two years. Namely, in 2015 for the first time we recorded more ‘Unnecessary RAs’ than ‘Useful RAs’. We cannot determine what the real reason behind was, we believe that this increase is due to the pilot’s decision to report negative rather than positive things. We hope that this is linked with the overall decrease of the ACAS RAs rather than the pilots’ opinion that there is less and less ‘Useful RAs’. The fact that ‘Not followed RAs’ are very rare makes us to believe that pilots still have the confidence in ACAS.

Absolute figures for ACAS RAs by ‘Carrier,’ ‘State’ and ‘Location’ (Figure 53) show that in spite of the general decrease of the number of ACAS RAs, the number of states and locations where ACAS RAs occurred increased in 2015 versus 2014. For the same period the number of air carriers experiencing ACAS RAs slightly decreased.

Since the beginning of the monitoring of the ACAS RAs reported by pilots through their Safety Management Systems, en-route phase on the Pan-European level had more reports than other flight phases. However, we would like to highlight that within some states and their busy TMAs we recorded many more ACAS RAs during the approach phase rather than during the en-route. In general EVAIR recorded the decrease of the number of ACAS RA across all phases of flight. Within en-route and approach phase the decrease was recorded for the last three years. We will repeat that one of the most important contributors to the further improvements is strict adherence to the ICAO standards.

Figure 53: Airline ACAS RA occurrences per State, location & carrier 2011 – 2015

Figure 54: ACAS RA Classification seasons 2011 - 2015
‘Reduce/Adjust vertical speed RA’, which has been replaced with ‘Level off, level off’ RA in TCAS II version 7.1 traditionally has the highest number of reports, however last three years we recorded a decreasing trend. The highest decrease was in 2014 versus 2015. In 2015 ‘Climb RA’ was the only area with the increase versus 2014 and approached to ‘Reduce/Adjust Ra’ (Level off Level off). It looks that common work with the air operators, their associations and ANSPs and repeated requests to pay attention on the high vertical speed as the main contributor for the ‘Reduce/Adjust RA’ (Level off Level off) show the results.

FALSE RAs CAUSED BY HYBRID SURVEILLANCE TRACKING ANOMALY

in the last few years, the EUROCONTROL Network Manager Safety Unit through the work with ANSPs and air operators recorded the appearance of the false TCAS RAs that occurred in their airspace.

We repeat in this EVAIR bulletin that 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.

It is important to know that 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 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 has significantly diverged.

Since December 2012 through the end of November 2016 the total of 132 cases of false RAs have been reported. In all these, but one, 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.

\footnote{TCAS II MOPS (EUROCAE ED-143) define a false RA as an advisory caused by a false track or a TCAS malfunction.}
In one case when a loss of separation occurred an aircraft responding to a false RA climbed through a level of a third party aircraft causing a loss of separation but no RA as the horizontal spacing between the aircraft was large enough not to trigger an RA. Nevertheless, this event alerted the regulators to expedite the work on the introduction of a fix (which is not expected in the first half of 2017).

In the reported events an average vertical deviation from the cleared level was 650 ft and the maximum deviation was 3000 ft. On average, a false RA lasted 32 seconds with singular events lasting over 60 sec. The hybrid surveillance false RAs in 75% of cases happened to aircraft in level flight, 10% to climbing and 15% to descending aircraft. Two-third of the events occurred above FL360.

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 and is undertaking an action to address the problem with the relevant equipment manufacturers.

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.

ACAS bulletins can be found on:
http://www.eurocontrol.int/publications?title=&field_term_publication_type_tid=233&datefilter%5Bvalue%5D%5Byear%5D%5D

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

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 the 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).


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 the 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.


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.

http://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:


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


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

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<td>Airborne Collision Avoidance System</td>
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<td>AGC</td>
<td>Air Ground Communication</td>
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<tr>
<td>ANSP</td>
<td>Air Navigation Services Provider</td>
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<td>AO</td>
<td>Aircraft Operator</td>
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<td>ASMT</td>
<td>ATM Safety Monitoring Tool</td>
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<td>AUA</td>
<td>ATC Unit Airspace</td>
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<td>CPDLC</td>
<td>Controller-Pilot Data Link Communications</td>
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<td>Call Sign Similarity User Group</td>
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<td>European Aviation Safety Agency</td>
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<td>European Civil Aviation Conference</td>
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<td>EVAIR</td>
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<td>GADM</td>
<td>IATA’s Global Aviation Data Management</td>
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<td>GPS</td>
<td>Global Positioning System</td>
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<td>GNSS</td>
<td>Global Navigation Satellite System</td>
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<td>EAPRE</td>
<td>European Action Plan for Prevention of Runway Excursions</td>
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<td>EAPRI</td>
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<td>FL</td>
<td>Flight Level</td>
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<td>HEIDI</td>
<td>Harmonisation of European Incident Definitions Initiative for ATM</td>
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<td>HERA</td>
<td>Human Error in European Air Traffic Management</td>
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<td>ILS</td>
<td>Instrument Landing System</td>
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<td>IATA</td>
<td>International Air Transport Association</td>
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<td>ICAO</td>
<td>International Civil Aviation Organization</td>
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<td>LB</td>
<td>Level Bust</td>
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