



# Regional Aviation Safety Group

Middle East

(RASG-MID)

# MID Annual Safety Report

Fourth Edition  
May 2016



## MID Annual Safety Report – Fourth Edition

Fourth Edition, May 2016

**Regional Aviation Safety Group – Middle East (RASG-MID)**

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**MID Annual Safety Report**

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## 1. Foreword

The Regional Aviation Safety Group-Middle East (RASG-MID) was established in September 2011 to develop an integrated, data driven strategy and implement a work program that supports a regional performance framework for the management of safety.

RASG-MID supports the implementation of the ICAO Global Aviation Safety Plan (GASP) and addresses global aviation safety from a regional perspective. The RASG-MID membership includes representatives from ICAO, MID States, and international organizations.

RASG-MID consists of three main teams; the MID Annual Safety Report Team (MID-ASRT), the Regional Aviation Safety Team (MID-RAST), and the Safety Support Team (MID-SST). The three teams work together in a collaborative manner to identify and address safety risks and issues in the MID Region as follows:

- a. The Annual Safety Report Team (MID-ASRT) is in charge of collecting and analysing safety information. The team is also responsible for the identification of the safety focus areas and the production of the RASG-MID Annual Safety Report (ASR). The Accidents and Incidents Analysis Working Group (AIA WG) was recently established under the MID-ASRT to review, analyse and categorize on annual basis the accidents and incidents at the regional level and provide an agreed and harmonized regional dataset of accidents and incidents. The AIA WG would identify the main root causes and contributing factors of the reviewed accidents and incidents.
- b. The Regional Aviation Safety Team (MID-RAST) is in charge of developing Safety Enhancement Initiatives (SEIs) and Detailed Implementation Plans (DIPs) for the key safety focus areas identified by the Annual Safety Report Team (ASRT). The RGS WG was established under the MID-RAST to address runway and ground safety issues in the MID Region and support the MID-RAST in the development, implementation, and monitoring of SEIs related to the RGS.
- c. The Safety Support Team (SST) is in charge of supporting the Regional Aviation Safety Team (RAST) with safety enhancement initiatives that are not directly related to safety focus areas such as implementation of SSP/SMS, safety oversight and accidents and incidents investigation.

The diagram below illustrates the framework adopted by RASG-MID to identify and address safety risks in the MID Region:



## 2. Executive Summary

The MID Annual Safety Report (ASR) – Fourth Edition presents analysis performed by the RASG-MID Annual Safety Report Team (ASRT). The safety information presented in this report is based on the compilation and analysis of data provided by Boeing, IATA, and ICAO. The ASR includes the following three main sections:

1. Reactive safety information
2. Proactive safety information
3. Predictive safety information

The reactive safety information section represents the largest portion of the report. It contains analysis of accident data provided from different sources Boeing, IATA and ICAO, in order to conclude the Focus Areas (main killers) in the MID Region. For harmonization purpose (with the ICAO Global and Regional Safety Reports), ICAO accident statistics have been used as the main source of data to calculate accident rates and monitor the progress of achieving the Regional Safety Targets as outlined in the MID Region Safety Strategy. However, safety data collected from other sources including Boeing and IATA was used also for the identification of Focus Areas, determination of contributing factors and root causes in order to support the development of mitigation measures.

The proactive safety information is based on the results of the ICAO USOAP-CMA and IATA IOSA and ISAGO, as well as, other occurrences (Incidents) reported by States or airlines in order to identify emerging risks in the Region.

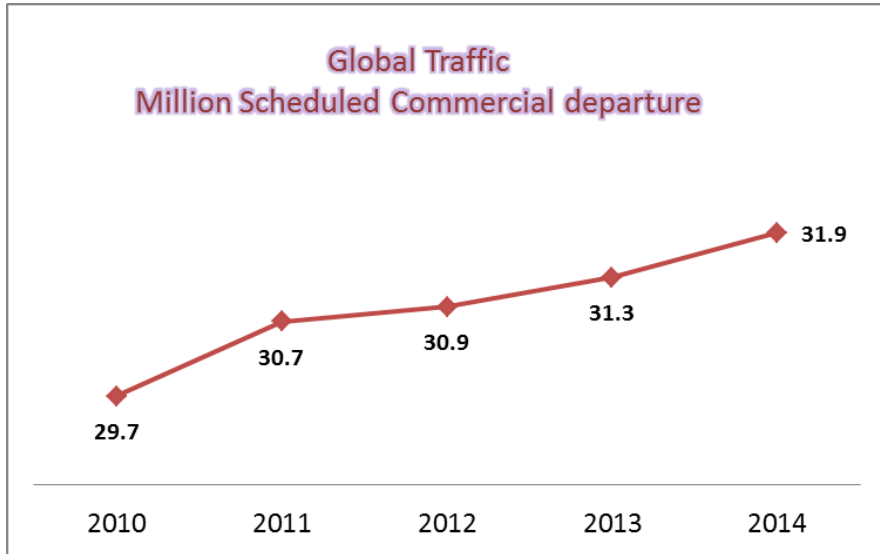
The aim of the predictive safety information is to collect and analyse safety data to proactively identify safety concerns before accidents or incidents occur, to develop timely mitigation and prevention measures. This section provides analysis of the implementation status of State Safety Programme (SSP) in the MID Region.

### 2.1 Traffic Volumes

The global scheduled commercial international operations accounted for approximately 31.9 million departures in 2014, compared to 29.7 million departures in 2010.

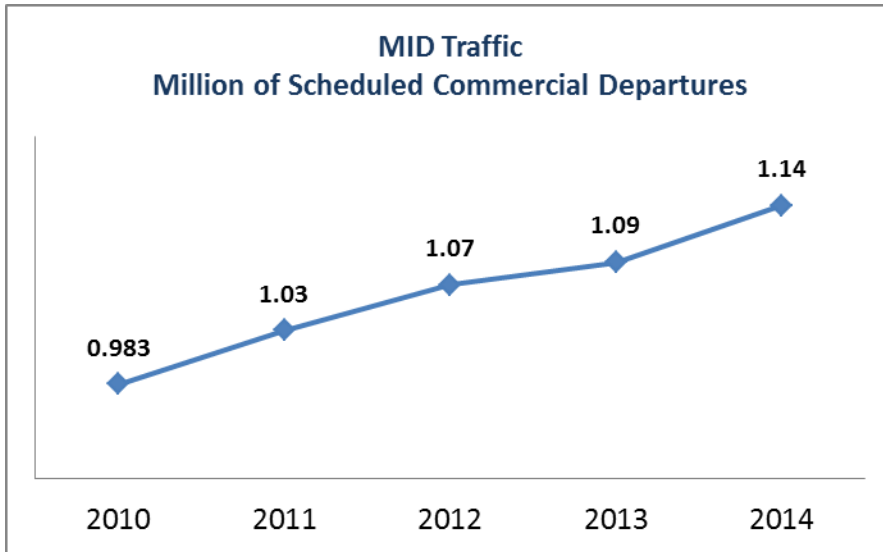
**Note:**

*The traffic data presented here is used by ICAO when estimating exposure to risk or when calculating accident rates.*



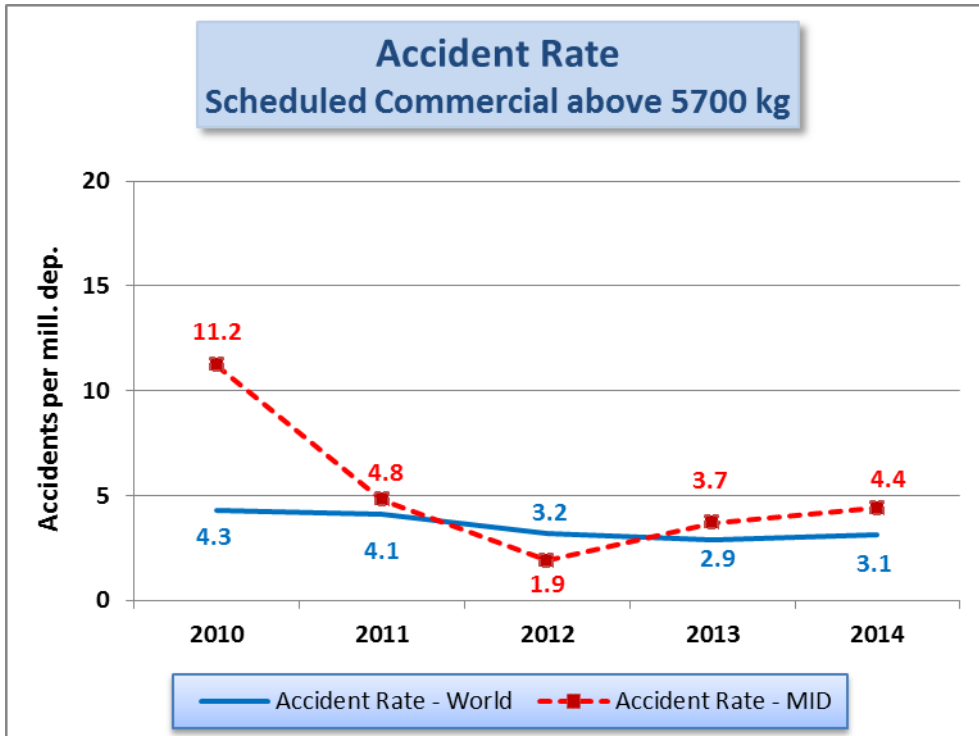
Source: ICAO-iSTARS, as of 1 December 2015

The MID Region shows a stable growth in traffic volumes. Total scheduled commercial departures in 2014 included approximately 1.14 million departures compared to 0.983 million departures in 2010.



Source: ICAO-iSTARS, as of 1 December 2015

2.2 *Accidents Rate*



Source: ICAO-iSTARS, as of 1 December 2015

Although the MID Region average accidents rates are slightly above the global rates, the regional average rates for the period (2010-2014) show good improvement with 5.2 compared to 7.28 for the period (2009-2013).

**Note:**

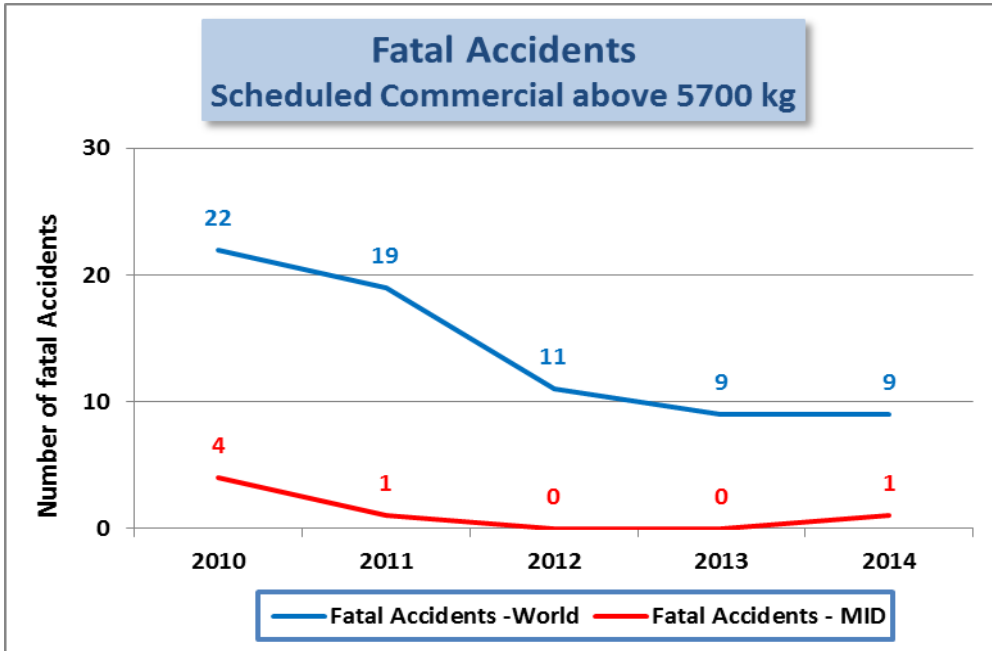
*The accident data presented here is the official ICAO accident statistics, used for the development of the ICAO safety reports. The data is based on scheduled commercial operations involving aircraft having a Maximum Take-off Weight (MTOW) above 5700 kg (validated or under validation by ICAO).*

2.3 *Fatalities*

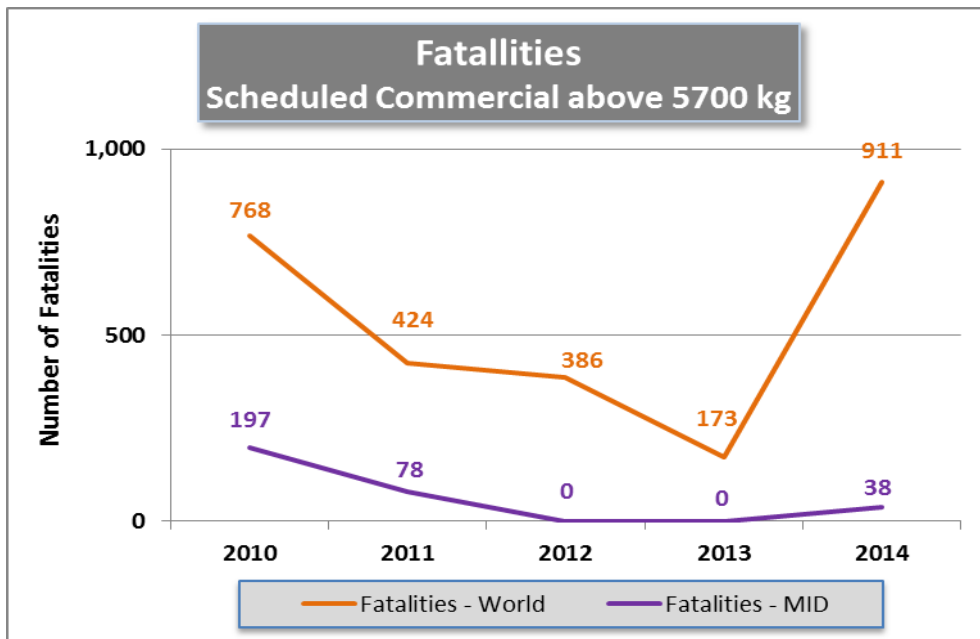
The average number of fatal accidents in the MID Region for the period (2010-2014) is 1.2 compared to 14 for the globe. The MID Region had no fatal accidents in 2012 and 2013. However, one fatal accident occurred in 2014.

In terms of fatalities, the 911 fatalities in 2014 represent the highest global number of fatalities in commercial scheduled air transport in the last five years. In the MID Region, the 38 fatalities were the result of one accident in 2014.





Source: ICAO-iSTARS, as of 1 December 2015



Source: ICAO-iSTARS, as of 1 December 2015

#### 2.4 Bottom Line

- The MID Region witnessed a stable and continuous growth in traffic volumes (0.983 million departures in 2010 to 1.14 million departures in 2014).
- Although the MID Region average accidents rates are slightly above the global rates, the regional average rates for the period (2010-2014) show a good improvement compared to (2009-2013):

	Average Rate (2009-2013)	Average Rate (2010-2014)
Accidents per million departures	7.28	5.2
Fatal accidents per million departures	1.69	1.2
Runway Safety related accidents per million departures	3.98	2.68
LOC-I related accidents per million departures	0.61	0.39
CFIT related accidents per million departures	0.42	0.2

- The MID Region had no fatal accident in 2012 and 2013; however, one fatal accident occurred in 2014 with 38 fatalities.

### 3. Reactive Safety Information

The ICAO accident statistics, which are used for the development of the ICAO Safety Reports, is used also to calculate accident rates and monitor the progress of achieving the Safety Targets outlined in the MID Region Safety Strategy.

The analysis of safety data collected from other sources including Boeing and IATA was taken into consideration for the identification of Focus Areas, determination of contributing factors and root causes in order to support the development of appropriate mitigation measures.

As part of the reactive safety information, statistical data related to serious incidents that occurred in the MID Region, is provided in this section.

This section also provides the progress of achieving the Safety Targets included in the MID Region Safety Strategy.

#### 3.1 ICAO Data

ICAO's primary indicator of safety in the global air transport sector is the accident rate based on scheduled commercial operations involving aircraft having a Maximum Take-off Weight (MTOW) above 5700 kg. Exposure data is comprised of scheduled commercial operations that involve the transportation of passengers, cargo and mail for remuneration or hire, and is a preliminary estimate solely for the calculation of the accident rates.

ICAO iSTARS (ADREP et al.) application contains an aggregation of different accident and incident data sources including ADREP, Aviation Safety Network and Aviation Herald. This application provides the ICAO accident statistics used for the development of the ICAO Safety Reports.

The main part of this section provides analysis of the accidents that occurred in the MID Region (State of Occurrence) for the period (2010-2014), which are used for monitoring the progress of achieving the Safety Targets in the MID Region Safety Strategy.

In addition, it provides statistical information concerning accidents of aircraft registered in the MID Region (State of Registry) as well as for the MID air operators (State of the Operator) using the same criteria mentioned above.

**Note:**

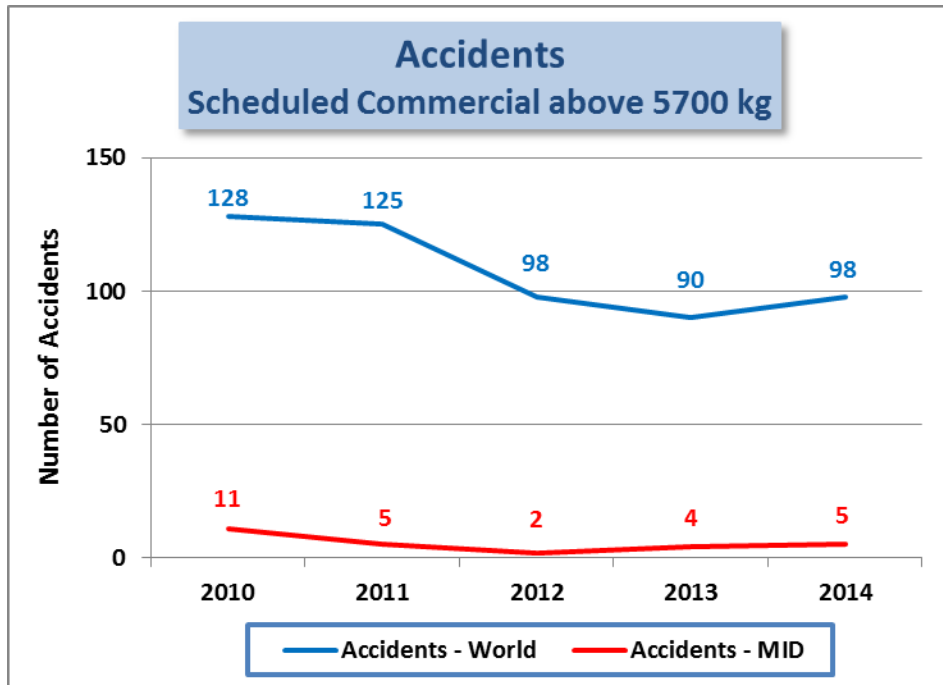
According to ICAO Annex 13 (Aircraft Accident and Incident Investigation):

**State of Occurrence** is the State in the territory of which an accident or incident occurs.

**State of the Operator** is the State in which the operator’s principal place of business is located or, if there is no such place of business, the operator’s permanent residence.

**State of Registry** is the State on whose register the aircraft is entered

**3.1.1 Regional Accident Statistics (State of Occurrence)**



Source: ICAO-iSTARS, as of 1 December 2015

The tables below provide a comparison of the accident numbers and rates as well as the fatalities between the world and the MID Region.

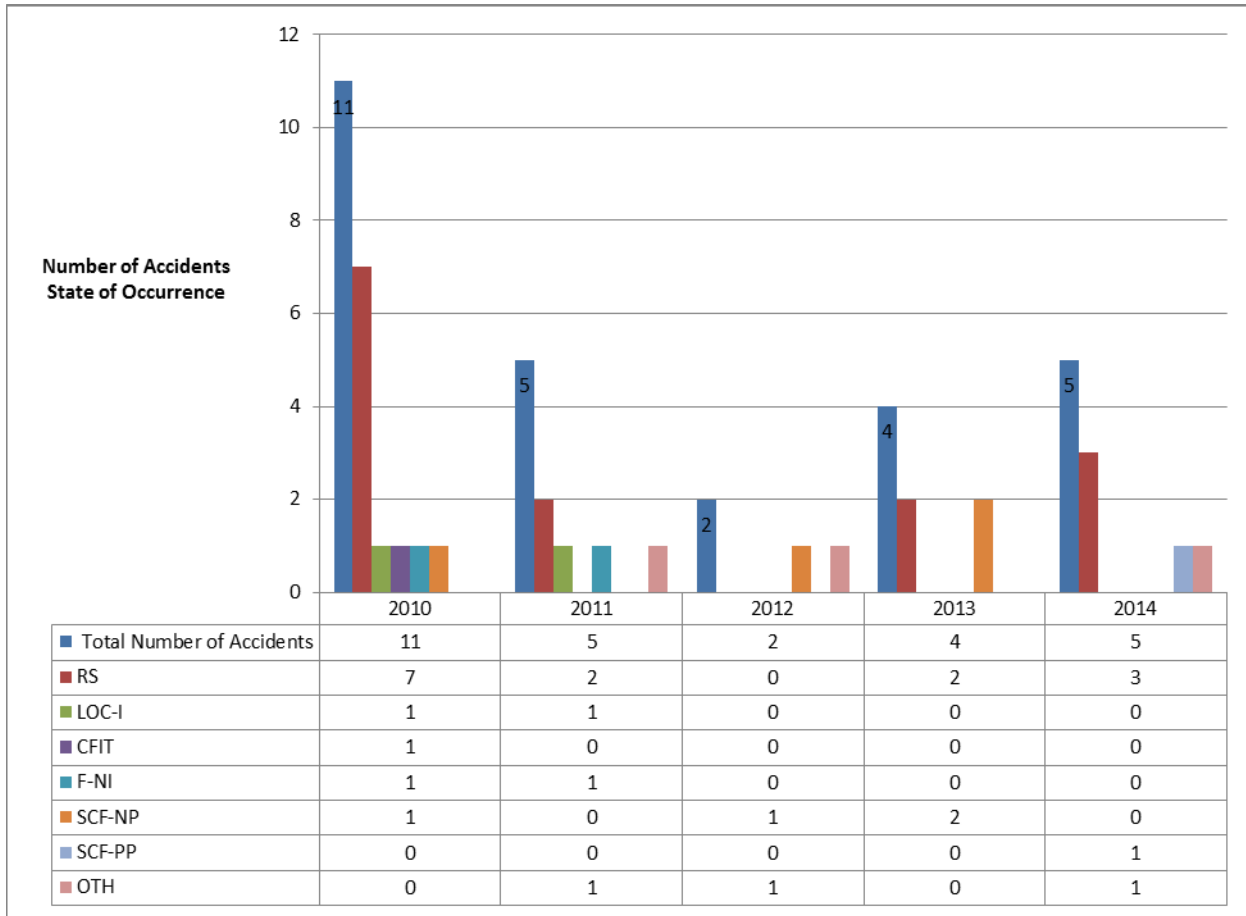
Year		2010	2011	2012	2013	2014	Average
MID	Accident Nr.	11	5	2	4	5	5.4
	Accident rate	11.2	4.8	1.9	3.7	4.4	5.2
World	Accident Nr.	128	125	98	90	98	107.8
	Accident rate	4.3	4.1	3.2	2.9	3.1	3.5

Year	2010	2011	2012	2013	2014	Average
MID-Fatalities	197	78	0	0	38	63
World-Fatalities	768	424	386	173	911	532

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Year	2010	2011	2012	2013	2014	Average
<b>MID-Fatal Accident</b>	4	1	0	0	1	1.2
<b>MID Rate</b>	4.1	0.97	0	0	0.88	1.2
<b>World-Fatal Accident</b>	22	19	11	9	9	14
<b>World Rate</b>	0.74	0.62	0.36	0.29	0.29	0.46

The chart below shows the total number of accidents and distribution of risk categories for each year during the period (2010-2014).



Source: ICAO-iSTARS, as of 1 December 2015

In terms of frequency, the most frequent accidents in the MID Region for the period 2010- 2014 are:

1. Runway Safety (RS) -14 Accidents
2. System/Component Failure-Non-Power plant (SCF-NP) - 4 Accidents
3. Loss of Control –Inflight (LOC-I) -2 Accidents
4. Fire/Smoke, Non-Impact (F-NI) -2 Accidents
5. System/Component Failure or Malfunction -Powerplant (SCF-PP) -1 Accident
6. Controlled Flight Into Terrain (CFIT) -1 Accident
7. Occurrence type that is not covered by any other category (OTHR)- 2 Accidents

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The MID Region witnessed 6 fatal accidents in the period (2010-2014). No fatal accident occurred in the MID Region in 2012 and 2013; however, one fatal accident occurred in 2014:

	Number of fatal Accidents	Risk Category	No of Fatalities	Aircraft registered in the MID Region	Air Operator in the MID Region
2010	4	1 LOC-I	90	No	No
		1 CFIT	103	Yes	Yes
		1 F-NI	2	No	No
		1 RS	2	Yes	Yes
2011	1	1 LOC-I	78	Yes	Yes
2012	None				
2013	None				
2014	1	SCF-PP	38	Yes	Yes

In terms of fatality, the top fatal accident categories in the MID Region for the period (2010 – 2014) are:

1. LOC-I
2. CFIT
3. SCF-PP
4. RS
5. F-NI

In order to facilitate the identification and prioritization of the main Regional Focus Areas (FAs), accidents are categorized in terms of frequency and severity. The severity assessment is based on the fatalities, injuries and damage to aircraft, property and equipment. The level of severity is categorized as follows:

1. Catastrophic: multiple deaths; serious damage to aircraft/equipment (destroyed)
2. Major: serious injury/fatalities; major aircraft/equipment damage
3. Minor: little consequences.

Accordingly, the following matrix shows the assessment for the top accidents categories.

Frequency \ Severity	1	2	3	4	5	6
1	1	2	3	4	5	6
2	2	4	6	8	10	12
3	3	6	9	12	15	18

Accident Category	Frequency	Severity	Frequency x Severity
RS	1	2	2
SCF-NP	2	3	6
LOC-I	3	1	3
F-NI	4	2	8
SCF-PP	5	1	5
CFIT	6	1	6

In accordance with the matrix above and based on the analysis of the ICAO data, the priorities in the MID Region should be:

1. RS
2. LOC-I
3. SCF-PP
4. CFIT
5. SCF-NP

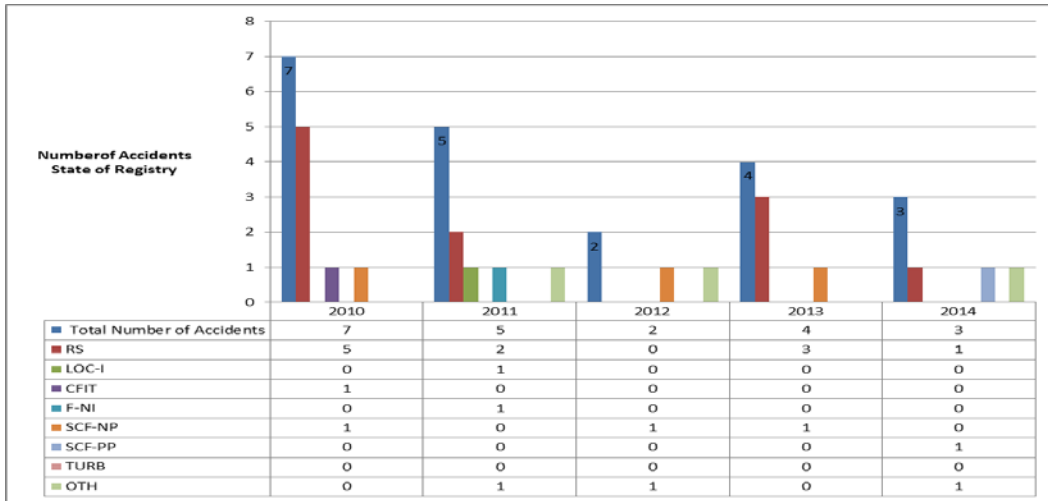
It's to be highlighted that according to the previous MID-ASR, the regional priorities were (RS, LOC-I and CFIT) in line with the global priorities as outlined in the ICAO Global Aviation Safety Plan (GASP). However, in accordance with the above analysis, SCF-PP is considered one of the top priorities after RS and LOC-I, followed by CFIT and SCF-NP. In addition, according to five years moving target and taking into consideration that the only CFIT accident in the MID Region occurred in 2010, CFIT would not be considered anymore as one of the focus areas but rather as an emerging risk.

As for the System Component Failure (SCF), it was decided as per the feedback provided by the States in the RSC/4 meeting, to combine both categories (PP and NP) into one group which is SCF. Therefore, and as a result, the Focus Areas for the MID Region become as follows:

1. Runway Safety (RS);
2. Loss of Control In Flight (LOC-I); and
3. System Component Failure (SCF).

### 3.1.2 Regional Accident Statistics (State of Registry)

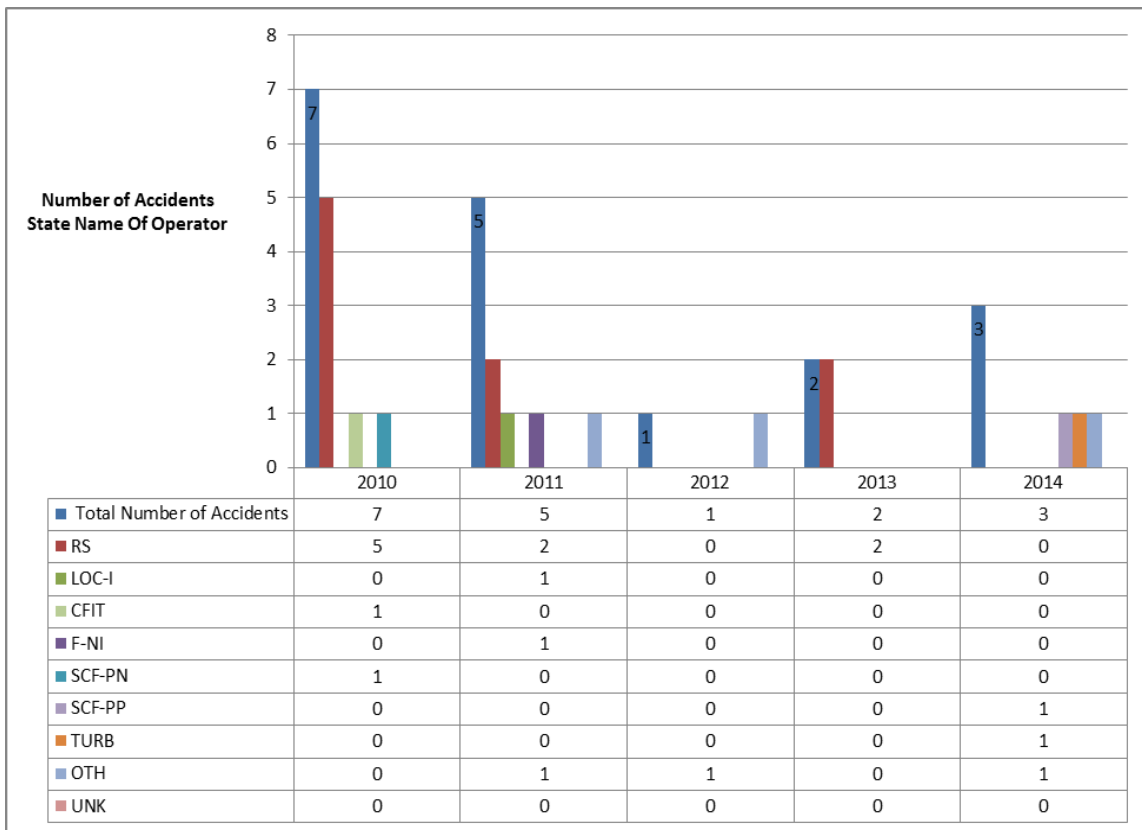
21 accidents involved aircraft registered in the MID States for the period (2010-2014). All accidents occurred in the MID Region except for one RS related accident which occurred outside the MID Region in 2013.



Source: ICAO-iSTARS, as of 1 December 2015

### 3.1.3 Regional Accident Statistics (State of the Operator)

18 accidents involved aircraft belonging to Air Operators in the MID Region for the period 2010-2014. 3 out of the 18 accidents occurred outside the MID Region. The chart below shows the distribution of risk categories based on accidents involving MID Air Operators:



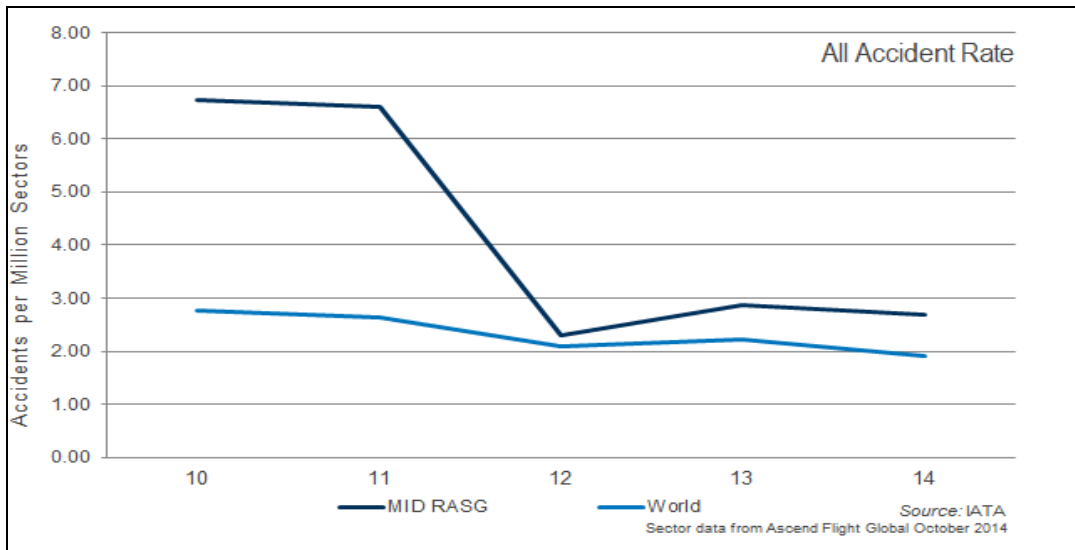
Source: ICAO-iSTARS, as of 1 December 2015

### 3.2 IATA Data

To calculate the regional accident rates, IATA determines the accident Region based on the operators country. Moreover, the operator’s country is specified in the operator’s Air Operator Certificate (AOC). For example, if a French-registered operator has an accident in the MID Region, this accident is counted as “European” accident as far as regional accident rates are concerned.

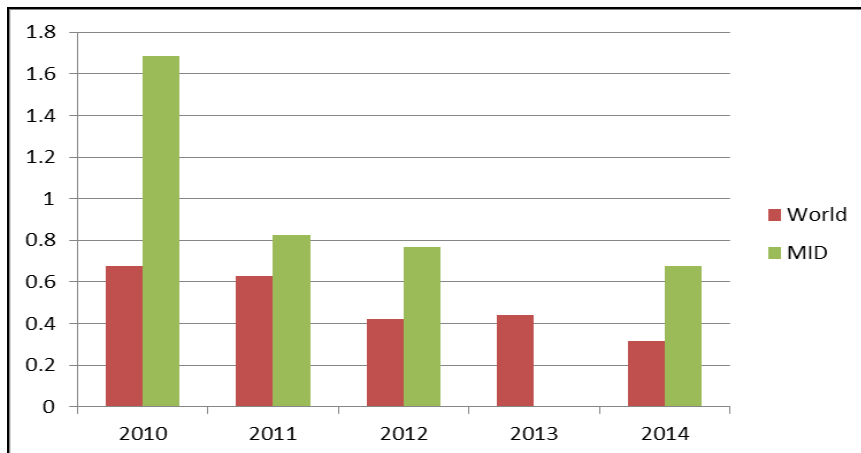
Moreover, the IATA accidents database captures operational accidents for aircraft with maximum take-off weight (MTOF) 5,700 KG which happen during a commercial operation – operation including flights listed as a scheduled or unscheduled passenger or cargo flight, or positioning flights). Non-operational accidents are excluded (military, human relief, test flights, training, etc). The data below captures accident information for the time period 2010 – 2014 and is narrowed down to the MID States.

#### 3.2.1 Regional Accidents Rates (Per million departures)



#### 3.2.2 Regional Fatal Accident Rates (Per million departures)

	2010	2011	2012	2013	2014
<b>World</b>	0.68	0.63	0.42	0.44	0.32
<b>MID</b>	1.69	0.83	0.77	0.00	0.68



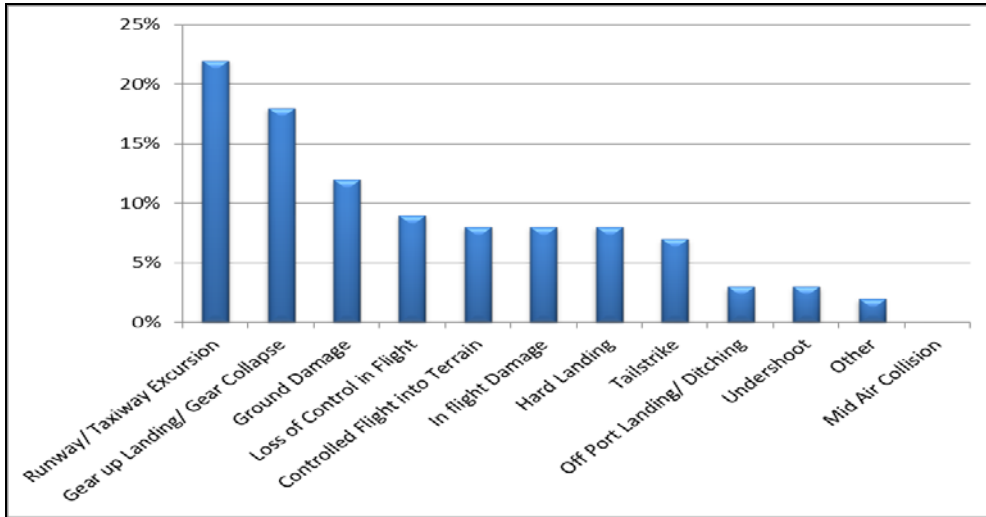


### 3.2.3 Analysis of MID Accidents between 2010 and 2014

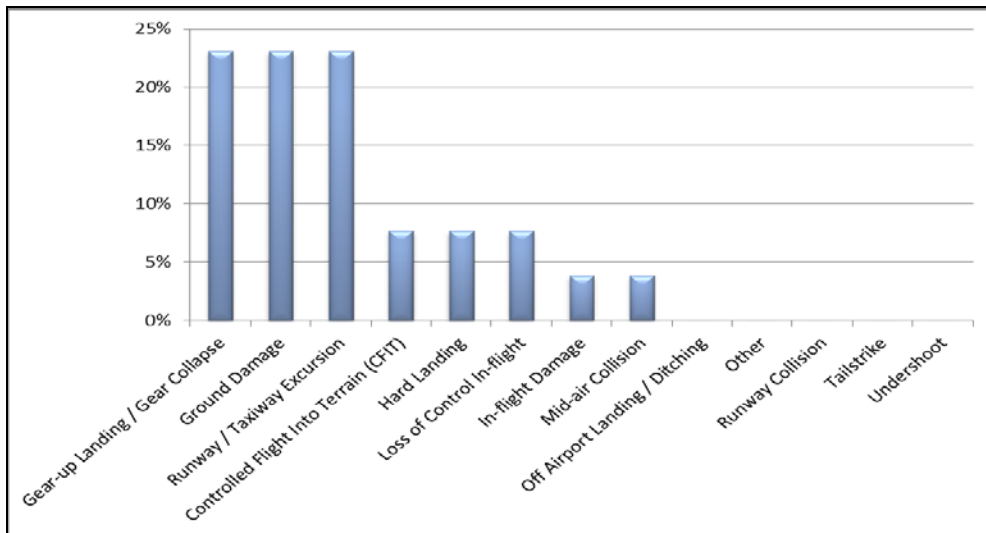
This analysis provides an overview of the accidents between 01 Jan 2010 and 31 Dec 2014.

#### 3.2.3.1 Accidents categories and analysis

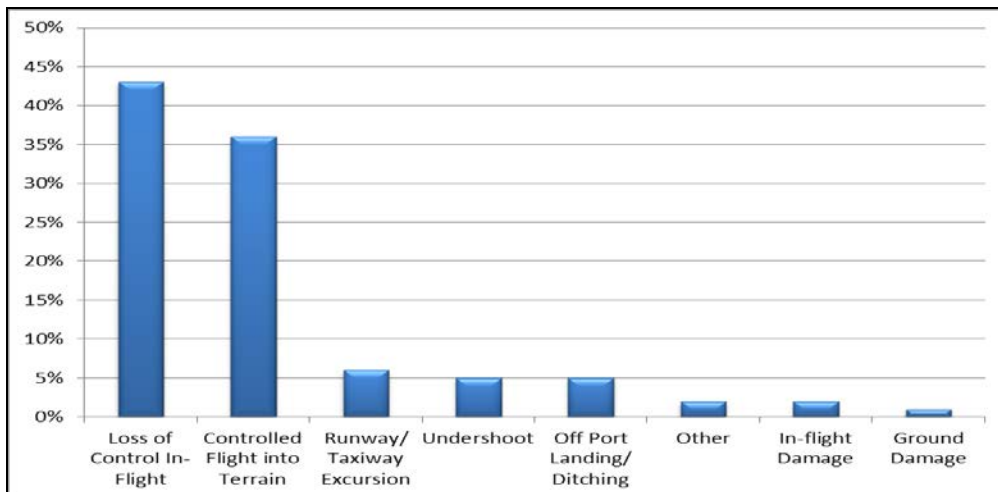
##### (a) World Accident Categories: 2010-2014



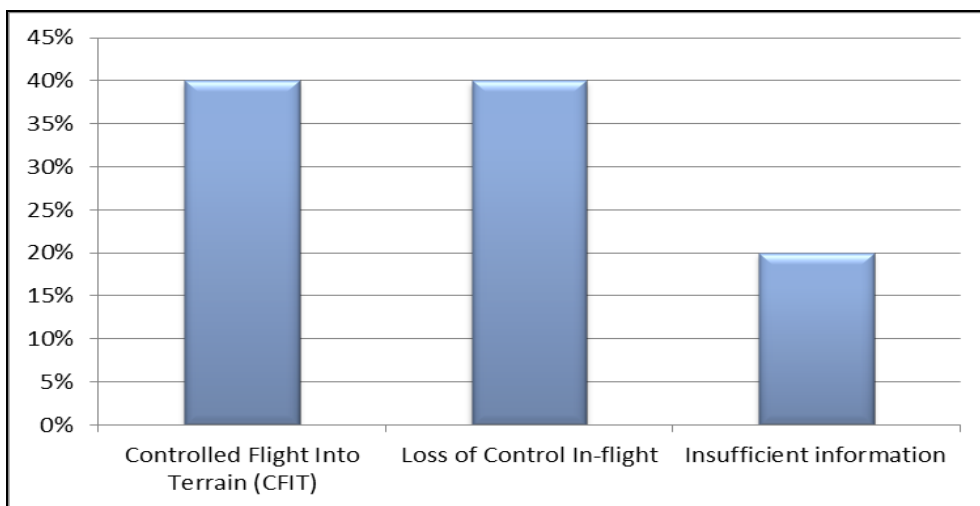
##### (b) MID Accident Categories: 2010-2014



**(c) World Fatal Accident Categories (2010 – 2014)**



**(d) MID Fatal Accident Categories (2010 - 2014)**



**(e) IATA In-Depth Analysis of MID accidents**

Taking a more in-depth look at the IATA accidents statistics for the MID Region (2010-2014), the following observations are made:

- a) In terms of frequency, the most frequent accidents categories in the MID Region for the period 2010 – 2014 are:
  1. Gear-up Landing / Gear Collapse
  2. Ground Safety
  3. Runway/ Taxiway Excursions

- b) In terms of fatality, the top fatal accidents categories in the MID Region for the period 2010 – 2014 are:
1. LOC-I
  2. CFIT
- c) Top two flight phases when fatal accidents occur in the MID Region are Go-around (GOA) and Landing (LND).
- d) To facilitate the identification of the safety priority areas; the accidents data has been analysed in terms of frequency and severity using the below risk matrix (for Frequency rating: 1 is the most frequent and 6 is the least frequent. For Severity: 1 is the most severe and 3 is the least severe):

Accident Category	Frequency	Severity	Frequency*Severity
Gear-up Landing / Gear Collapse	1*	3	3
Ground Safety	1*	3	3
Runway / Taxiway Excursion	1*	2	2
Controlled Flight Into Terrain (CFIT)	2**	1	2
Hard Landing	2**	3	6
Loss of Control In-flight	2**	1	2

*\* Note: Gear-up Landing/Gear Collapse, Ground Safety, and Runway Safety were rated the same because they had the same number of accidents throughout the period 2010 – 2014*

*\*\*Note: Controlled Flight into Terrain (CFIT), Hard landing, and Loss of Control in Flight (LOC-I) were rated the same because they had the same number of accidents throughout the period 2010-2014*

- e) Based on the above risk matrix, priority was given to the categories which scored below 6. Therefore, the safety priority areas according to IATA's accidents data are:
- i. Runway/ Taxiway Excursion
  - ii. Loss of Control In Flight (LOC-I)
  - iii. Controlled Flight Into Terrain (CFIT)
  - iv. Gear up landing/ Gear collapse
  - v. Ground Safety

It is worth mentioning here that according to the ICAO classification, Gear up landing/ Gear collapse and Ground safety fall under Runway safety.

- f) Below is an in-depth analysis for each of the priority areas identified by IATA for the MID Region covering the period 2010 till 2014:

**Runway Excursion**

1. Trend 2010 to 2014

		2010	2011	2012	2013	2014
<b>MID</b>	<b>Accident rate</b>	0.86	2.57	0.79	0.00	0.68
	<b># Accidents</b>	1	3	1	0	1
<b>World</b>	<b>Accident rate</b>	0.59	0.49	0.60	0.47	0.39
	<b># Accidents</b>	20	17	21	17	15

2. Severity of outcomes

**Accident Fatal**

Fatal	<b>0</b>
Non-Fatal	<b>6</b>

Total Fatalities	<b>0</b>
------------------	----------

**Level of Damage**

Hull Loss	<b>2</b>
Substantial Damage	<b>4</b>

3. Contributing factors:

- i. Airport facilities
- ii. Metrology
- iii. Poor/Faint markings/signs or runway/taxiway closure
- iv. Aircraft malfunction
- v. Contained engine failure/power plant malfunction
- vi. Errors related to Manual Handling/ Flight controls
- vii. Errors related to ground navigation
- viii. Errors related to SOP adherence/ SOP cross verification
- ix. Continued landing after unstable approach
- x. Long/floated/bounced/firm/off-center/crabbed landing
- xi. Unstable approach
- xii. Overall crew performance
- xiii. Runway/taxiway management

**Loss of Control In-flight (LOC-I)**

1. Trend 2010 to 2014

		2010	2011	2012	2013	2014
<b>MID</b>	<b>Accidents rate</b>	0.00	0.86	0.00	0.00	0.68
	<b># Accidents</b>	0	1	0	0	1
<b>World</b>	<b>Accidents rate</b>	0.30	0.23	0.17	0.22	0.16
	<b># Accidents</b>	10	8	6	8	6

## 2. Severity of outcomes

**Accident Fatal**

Fatal	<b>2</b>
Non Fatal	<b>0</b>

Total Fatalities	<b>126</b>
------------------	------------

**Level of Damage**

Hull Loss	<b>2</b>
Substantial Damage	<b>0</b>

## 3. Contributing factors:

As per IATA's de-identification rule, there needs to be at least 3 accidents to be able to publish information on the contributing factors. In this case, and since only two accidents are reported in the MID Region, the data is insufficient to produce analysis on contributing factors.

***Controlled Flight into Terrain (CFIT)***

## 1. Trend 2010 to 2014

		2010	2011	2012	2013	2014
<b>MID</b>	<b>Accidents rate</b>	0.86	0.00	0.79	0.00	0
	<b># Accidents</b>	1	0	1	0	0
<b>World</b>	<b>Accidents rate</b>	0.21	0.29	0.17	0.17	0.13
	<b># Accidents</b>	7	10	6	6	5

## 2. Severity of outcomes

**Accident Fatal**

Fatal	<b>2</b>
Non Fatal	<b>0</b>

Total Fatalities	<b>135</b>
------------------	------------

**Level of Damage**

Hull Loss	<b>2</b>
Substantial Damage	<b>0</b>

## 3. Contributing factors:

As per IATA's de-identification rule, there needs to be at least 3 accidents to be able to publish information on the contributing factors. In this case, and since only two accidents are reported in the MID Region, the data is insufficient to produce analysis on contributing factors.

**3.3 Other Data**

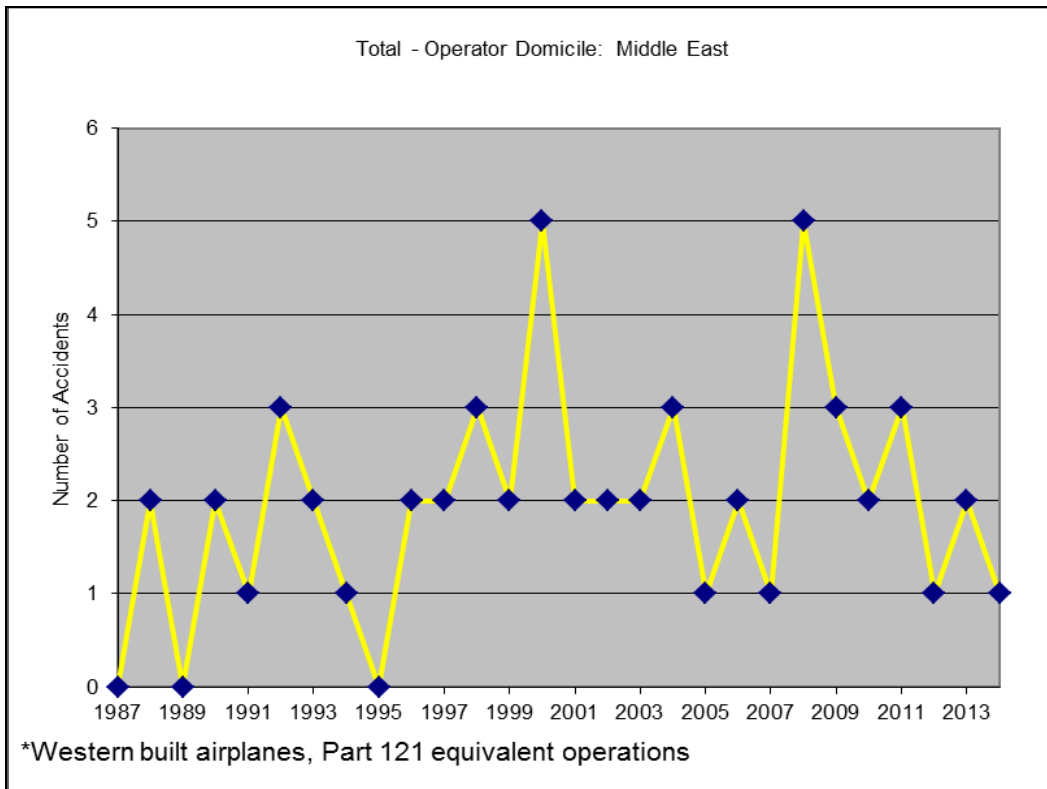
**3.3.1 Boeing Data**

Boeing safety data comes from the accident set which CAST (Commercial Aviation Safety Team) compiles each year. The accident set includes the following:

- a) Worldwide hull loss of Western Built airplanes
- b) Accidents are grouped per state of registry as per the ICAO MID Region
- c) Operations covered in the analysis includes the below criteria:
  - i. All commercial passenger operations (scheduled or non-scheduled) as long as the number of passenger seats exceeds 9
  - ii. Cargo operations are included (assuming the plane meets the 7500lb requirement)
  - iii. Military-operated planes are excluded. Contracted military cargo flights (i.e. on a commercial operator) are included)
  - iv. Transport of military/paramilitary/peacekeeping forces and workers on non-military planes are included as part of the 121 equivalent (>9 passengers)
  - v. Company owned planes transporting their own employees are not included
  - vi. Chartered planes are included.

**3.3.1.1 Number of accidents:**

The Chart below shows the total number of accidents for the period (1987-2014)



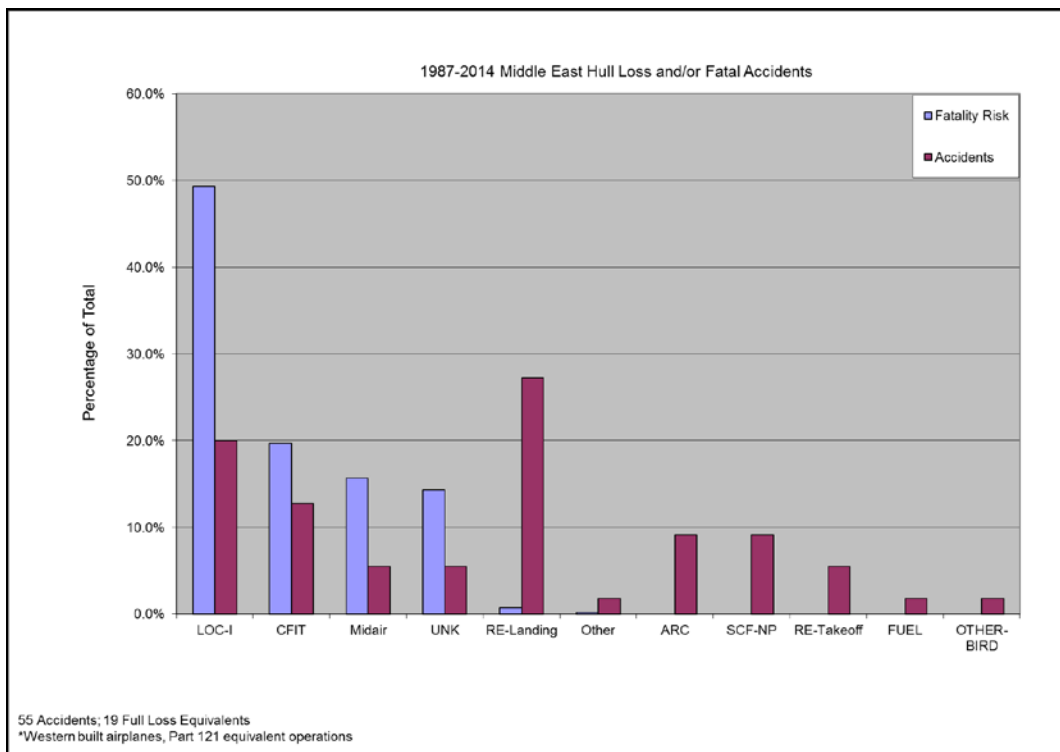
**3.3.1.2 Fatality risk per type of accident:**

The chart below illustrated that in terms of frequency, the most frequent accidents in the MID Region for the period are:

- i. Runway Excursions (landing)
- ii. LOC-I
- iii. CFIT
- iv. Mid-air collision

In terms of fatality, the top three fatal accidents categories are:

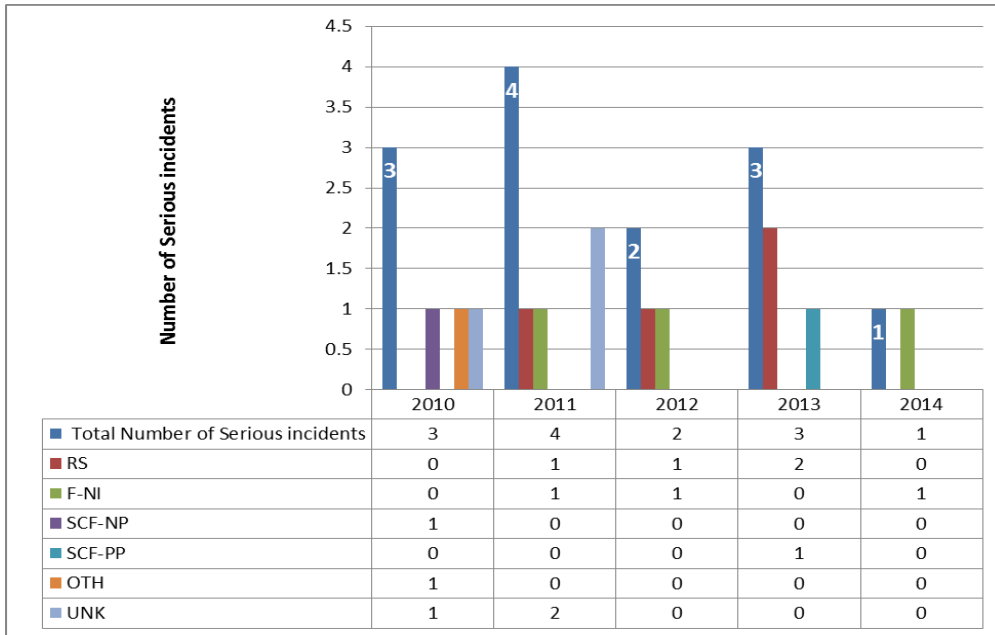
- 1. LOC-I
- 2. CFIT
- 3. Mid-air collision



**3.3.2 Serious Incidents**

Serious Incident is defined in ICAO Annex 13 as an incident involving circumstances indicating that an accident nearly occurred (examples of serious incidents can be found in Attachment C of ICAO Annex 13)

According to ICAO iSTARS (ADREP et al.), 13 Serious Incidents were reported during the period (2010-2014). The following chart shows the risk distribution for each year:



### 3.4 Identification of Focus Areas for MID Region

The identification of the Focus Areas takes into account the global priorities in addition to the regional specific needs arising from the analysis of the regional safety data provided by the different organizations (Boeing, IATA and ICAO).

It should be noted that some differences have been identified between the safety information provided by the participating organizations (Boeing, IATA and ICAO) due to the use of different criteria and classifications of accidents.

There were two discrepancies identified between ICAO and IATA data sets, as follows:

1. IATA data shows one CFIT accident in 2012; however, this accident is not included in ICAO data since it is related to unscheduled operation (ICAO criteria is based on scheduled commercial operations).
2. One accident in 2014 was classified as LOC-I according to IATA’s data while it was classified by ICAO as Power plant failure or malfunction (SCF-PP).

Based on the analyses of all accident data, and taking into account that ICAO data is the main source in case of discrepancies, it is concluded that the Focus Areas for the MID Region are as follows:

1. Runway Safety (RS)
2. Loss of Control Inflight (LOC-I)
3. System Component Failure -(SCF)



### 3.5 MID Region Safety Performance - Safety Indicators-Reactive

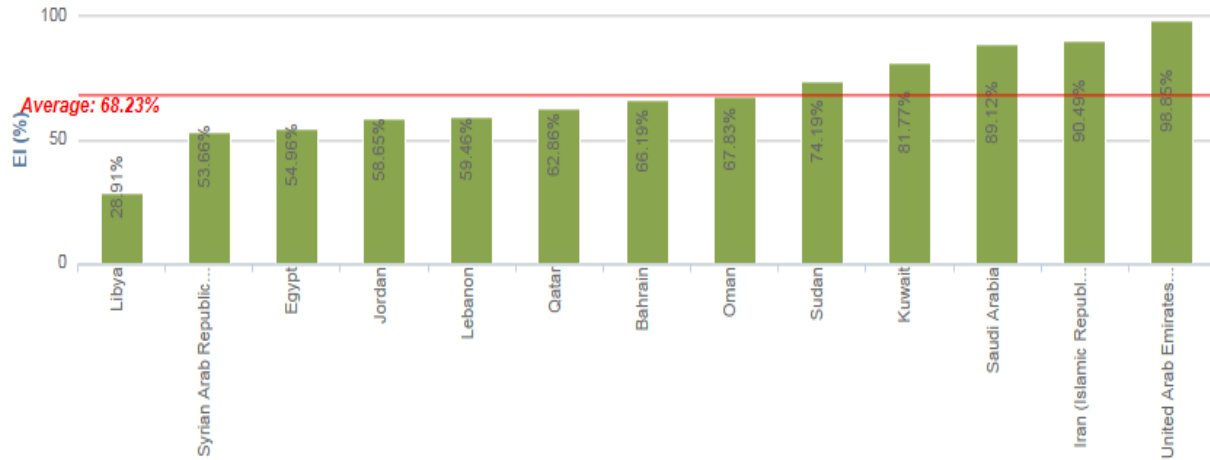
		Average 2010-2014		2014	
Safety Indicator	Safety Target	Global	MID	Global	MID
Number of accidents per million departures	Reduce/Maintain the regional average rate of accidents to be in line with the global average rate by 2016.	3.5	5.2	3.1	4.4
Number of fatal accidents per million departures	Reduce/Maintain the regional average rate of fatal accidents to be in line with the global average rate by 2016.	0.46	1.2	0.29	0.88
Number of Runway Safety related accidents per million departures	Reduce/Maintain the regional average rate of Runway Safety related accidents to be below the global average rate by 2016.	2.05	2.68	2.45	2.6
	Reduce/Maintain the Runway Safety related accidents to be less than 1 accident per million departures by 2016.	N/A			2.6
Number of LOC-I related accidents per million departures	Reduce/Maintain the regional average rate of LOC-I related accidents to be below the global rate by 2016.	0.07	0.39	0.06	0
Number of CFIT related accidents per million departures	Reduce/Maintain the regional average rate of CFIT related accidents to be below the global rate by 2016.	0.11	0.2	0.06	0

#### 4. Proactive Safety Information

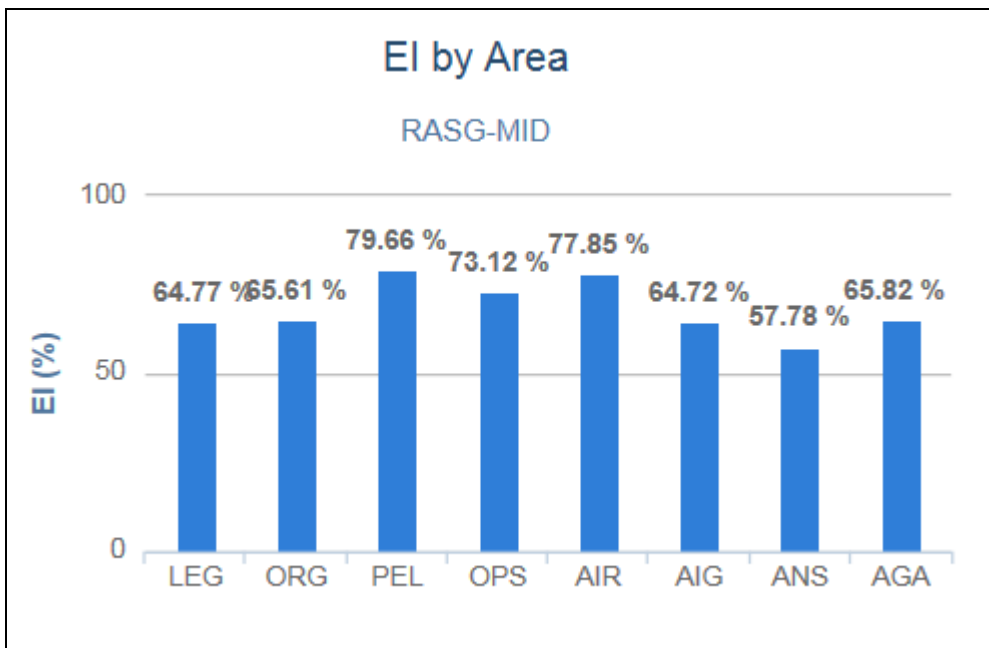
A mature safety management system requires the integration of reactive, proactive and predictive safety data. This section of the Annual Safety Report focuses on proactive safety data analysis to identify additional focus areas that form the basis for the development of SEIs and DIPs for Emerging Risks under RASG-MID.

4.1 ICAO USOAP-CMA

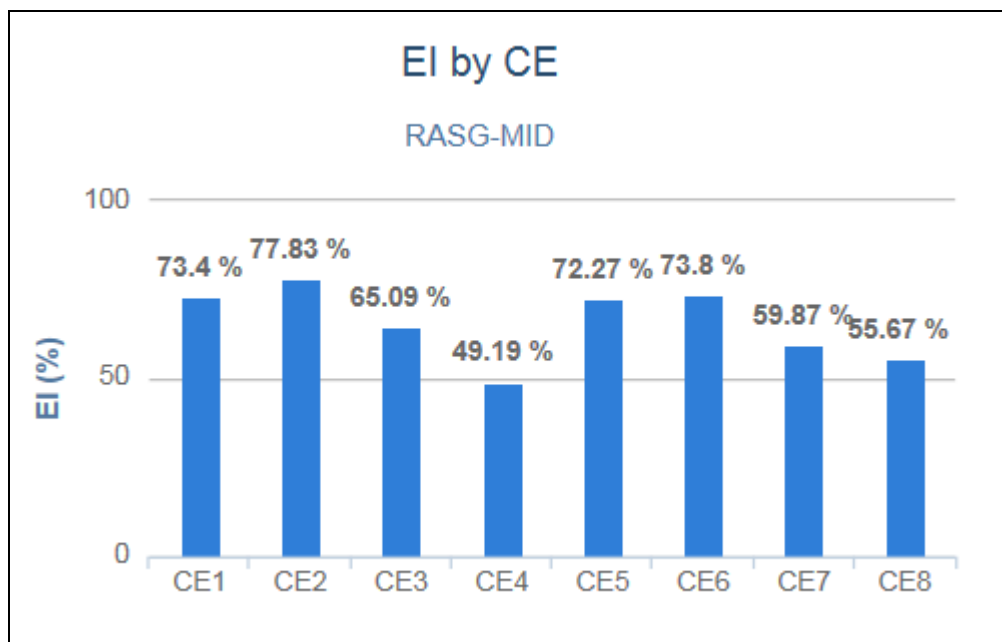
The average overall Effective Implementation (EI) of the audited States (13 out of 15 States have been audited) in the MID Region is 68.23%, which is above the world average 62.62 %. Five (5) States (Egypt, Jordan, Lebanon, Libya and Syria) are below EI 60%.



The EI by Area (e.g. Operations, Airworthiness) shows that ANS is below 60% EI, and areas of LEG, ORG, AIG, ANS and AGA still need to be enhanced:



With respect to the Critical Elements (CEs), CE4 (Qualified technical personnel) still represents the lowest EI, whereas CE7 (surveillance obligations) and CE8 (resolution of safety issues) are below EI 60% and need improvement.



There is one Significant Safety Concern (SSC) in the MID Region (Lebanon) in the area of aircraft operations (OPS) related to the certification of air operators.

## 4.2 IATA IOSA and ISAGO

### 4.2.1 IATA Operational Safety Audit (IOSA)

IOSA is an internationally recognized and accepted evaluation system designed to assess the operational management and control systems of an airline. It is worth mentioning that all MID accidents rate among non-IOSA registered operators was above the world average by an average of 5.66.

The IOSA program covers 8 areas including: Organization and Management System (ORG), Maintenance (MNT), Cargo (CGO), Security (SEC), Flight Operations (FLT), Dispatch (DSP), Cabin Safety (CAB) and Ground Handling Operations (GRH).

The IOSA audit results analysis captured under this section cover the period between January 2013 and October 2015. A summary of the IOSA audit findings is as follows:

1. 39 audits were performed in the MENA Region with an average of 6 findings per audit.
2. Findings were mainly in the areas of Flight Operations (FLT), Maintenance (MNT), Dispatch (DSP), Ground Handling Operations (GRH), and Cargo (CGO). Top non-conformances can be summarized per area as follows:

#	Area	Top findings (ISARPS)
1	Flight Operations (FLT)	<ul style="list-style-type: none"> <li>- Availability of a process, performed by Operations Engineering, to ensure completion of an analysis that addresses relevant operational factors prior to operating over any new route or into any new airport.</li> <li>- Availability of a policy that assigns responsibility to the pilot in command (PIC) to notify the local authorities in cases of emergency and to file an occurrence report (if required).</li> <li>- Training of flight crew in all aspects of aircraft performance during initial ground training (including Weight Mass &amp; balance, take off, climb, cruise, approach, landing performance, obstacle clearance, fuel planning, diversion planning...etc).</li> </ul>
2	Maintenance (MNT)	<ul style="list-style-type: none"> <li>- Availability of a service level agreement with any contracted maintenance organization which specifies measurable maintenance safety and quality standards required to be fulfilled by the respective external maintenance organization.</li> <li>- Availability of a process to ensure that Aircraft parts and material are obtained from approved sources, certification documentation specified, surplus parts are traceable...etc.</li> </ul>
3	Dispatch (DSP)	<ul style="list-style-type: none"> <li>- Availability of a process to control flights to isolated destination airports (designation of a point of safe return)</li> <li>- Control of Dangerous Goods transportation as cargo (availability and access to information pertaining to the Dangerous Goods on board of the aircraft)</li> </ul>
4	Ground Handling Operations (GRH)	<ul style="list-style-type: none"> <li>- Availability of a process to ensure training (initial and recurrent) of ground handling personnel on dangerous goods</li> <li>- Availability of the Operational Manual in usable format at each location where ground handling is conducted</li> </ul>
5	Cargo	<ul style="list-style-type: none"> <li>- Availability of a service level agreement for any outsourced cargo handling operations which specifies the safety and security requirements that should be fulfilled by the service provider.</li> <li>- Availability of the most updated IATA Dangerous Goods Manual (DGR) and ICAO Technical Instructions at each location where dangerous goods are handled.</li> <li>- Availability of a process to ensure training (initial and recurrent) of cargo handling operations.</li> </ul>

#### 4.2.2 IATA Safety Audit for Ground Operations (ISAGO)

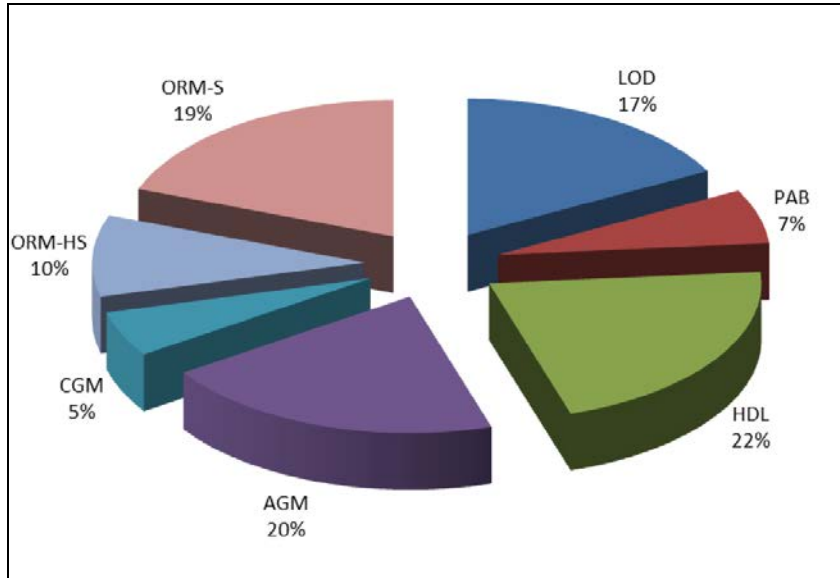
ISAGO implementation aims at improving ground safety and cutting the airlines' costs by drastically reducing the ground accidents and injuries.

The ISAGO program has 9 sections including: Load control (LOD), Passenger handling (PAX), Baggage handling (BAG), Aircraft Handling & Loading (HDL), Aircraft Ground Movement (AGM), Cargo &

Mail Handling (CGM), Organization & Management – Corporate (ORM-H), Organization & Management – Co-located (ORM-HS) and Organization & Management – Station (ORM-S).

The ISAGO audit results analysis captured under this section cover the period between January 2014 and April 2015. A summary of the ISAGO findings is as follows:

1. A total of 26 audit reports (1 corporate, 8 combined and 17 station) have been included in the analysis covering the IATA MENA Region.
2. Findings were mainly in the areas of Aircraft Handling & Loading (HDL), Aircraft Ground Movement (AGM), Organization & Management-Station (ORM-S), and Load Control (LOD). Below is a graph that illustrates the distribution of findings per area:



3. Top non-conformances for key areas can be summarized as follows:

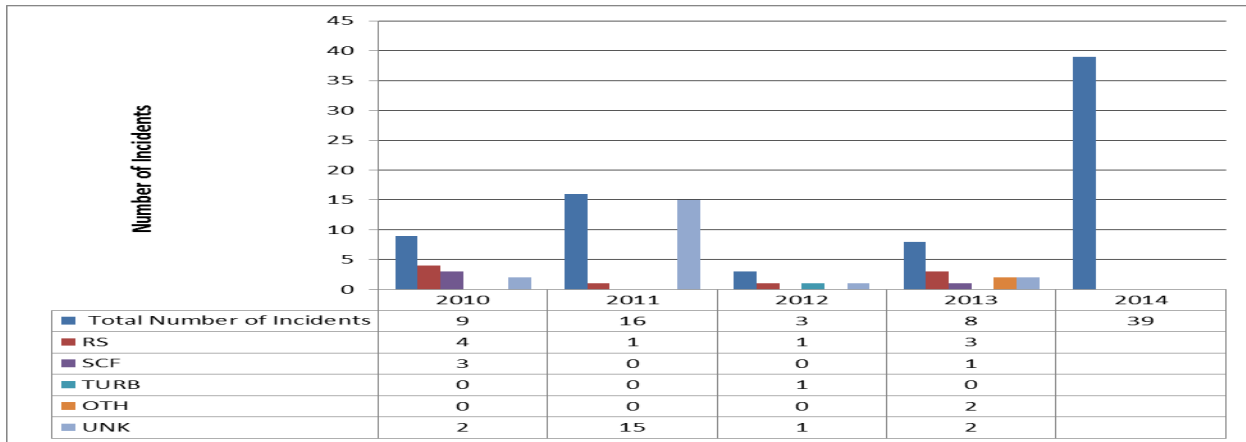
#	Area	Top findings (GOSARPS)
1	Organization & Management-Station (ORM-S)	Management & control Documentation & records Safety & quality management Training & qualification Station airside supervision & safety
2	Organization & Management-Combined (ORM-HS)	Management & control Documentation & records Safety & quality management Training & qualification Ground Support Equipment (GSE) management Station airside supervision & safety
3	Aircraft Handling & Loading (HDL)	Aircraft handling & servicing operations Aircraft loading operations
4	Aircraft Ground Movement (AGM)	Aircraft ground movement operations Aircraft nose gear controlled pushback and towing operations Aircraft power back operations
5	Load Control (LOD)	Load control process

### 4.3 Incidents and Occurrences

#### 4.3.1 Incidents Reported by States

Incident is defined in ICAO Annex 13 as an occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation.

According to ICAO iSTARS (ADREP et al.), 36 incidents were reported during the period (2010-2013). In 2014, 39 incidents were reported by States, which reflect improvement in reporting systems of incidents. However, the reported incidents in 2014 will need to be analysed and categorized.



Source: ICAO-iSTARS, as of 1 December 2015

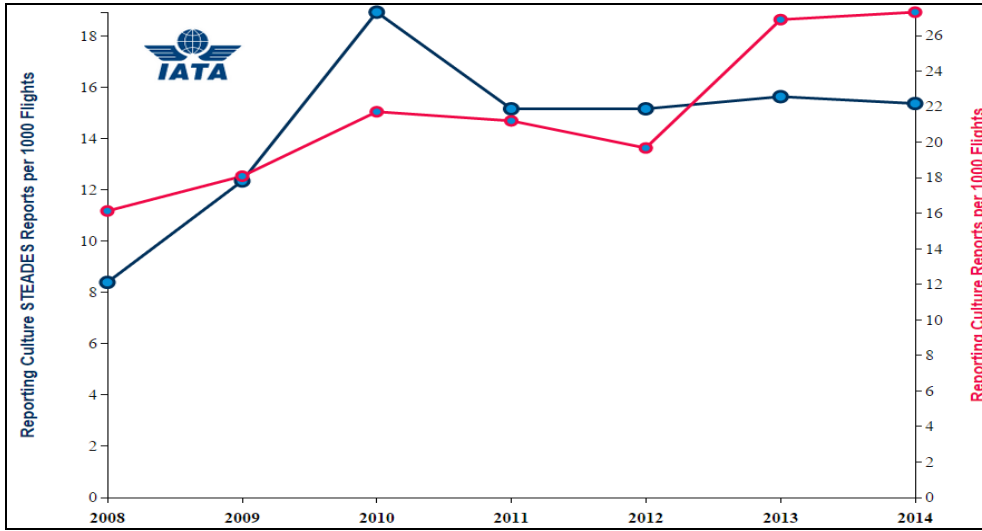
#### 4.3.2 Incidents and Occurrences Reported by Airlines - STEADES Data

The Safety Trend Evaluation, Analysis & Data Exchange System (STEADES) is IATA’s aviation safety incident data management and analysis program. It is a database of de-identified airline incident reports. Safety trend analysis using STEADES is included in this report allows proactive safety mitigation, provides rates on key safety performance indicators, and helps to continuously assess and establish safety performance targets.

The scope of analysis captured in this report covers the period 2009 - 2014. Some events are captured to complement the analysis under different sections of the report and show trends that can support the work of RASG-MID.

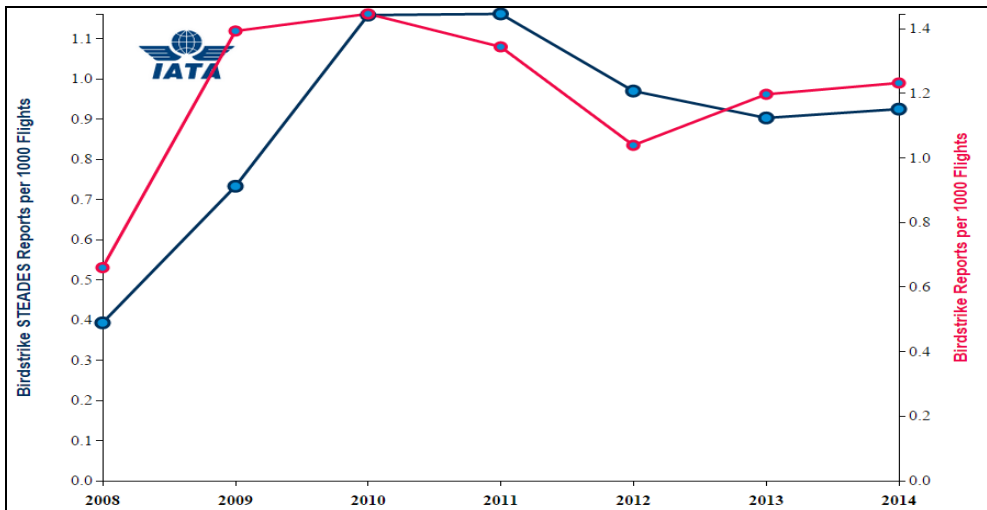
Reporting Culture

Below figure indicates a better reporting culture for the airlines in the MENA Region (in red) compared to the global rate (in blue). A significant improvement has been noticed for the year 2014.



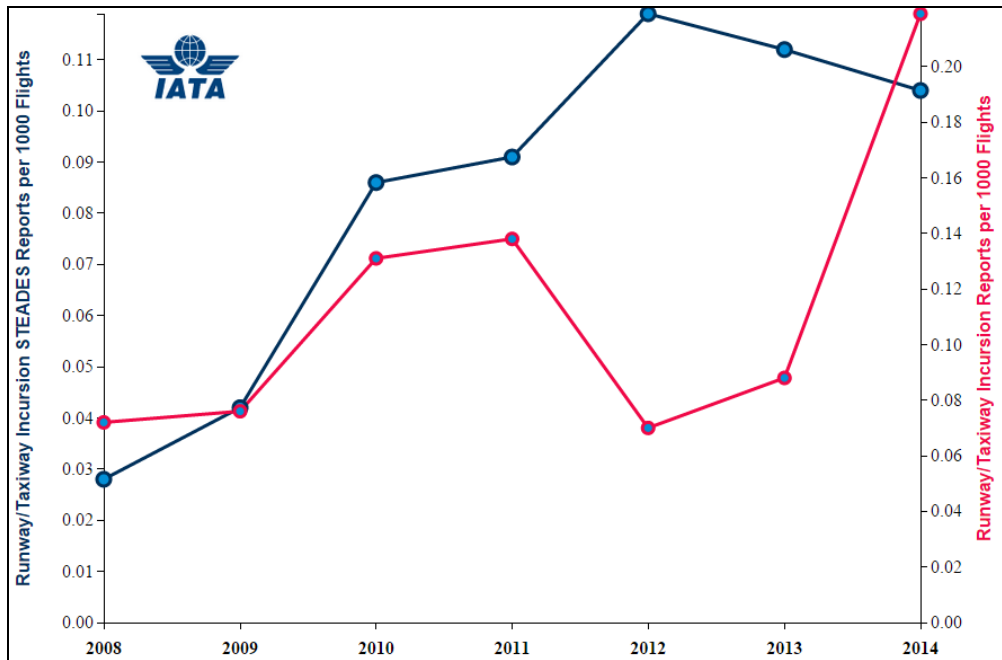
Birdstrikes

While the birdstrikes trend has been decreasing at a global level (in blue) since 2011, it has been showing an increase in MENA (in Red) since 2012.



Runway/taxiway Incursions

It can be noted from the figure below that despite the good performance of the MENA Region (in Red) compared to the global one (in Blue) for 2012 - 2013, there has been a spike in the number of runway/taxiway incursions in 2014 for MENA which exceeded the global one.



**4.3.3 MID Region Safety Performance - Safety Indicators-Proactive**

Safety Indicator	Safety Target	MID	Remark
Regional average EI	Increase the regional average EI to be above 70% by <b>2020</b>	68.23	
Number of MID States with an overall EI over 60%.	11 MID States to have at least 60% EI by <b>2020</b>	8 States	
Number of MID States with an EI score less than 60% for more than 2 areas (LEG, ORG, PEL, OPS, AIR, AIG, ANS and AGA).	Max 3 MID States with an EI score less than 60% for more than 2 areas by <b>2017</b>	6 States	
Number of Significant Safety Concerns	MID States resolve identified Significant Safety Concerns as a matter of urgency and in any case within 12 months from their identification.  No significant Safety Concern by <b>2016</b> .	1 SSC	



## MID Annual Safety Report – Fourth Edition

Use of the IATA Operational Safety Audit (IOSA), to complement safety oversight activities	<ul style="list-style-type: none"> <li>a. Maintain at least 60% of eligible MID airlines to be certified IATA-IOSA by the end of 2015 at all times</li> <li>b. All MID States with an EI of at least 60% accept the IATA Operational Safety Audit (IOSA) as an acceptable Means of Compliance (AMC) by 2015 to complement their safety oversight activities.</li> </ul>	<ul style="list-style-type: none"> <li>a. 68%</li> <li>b. 4 out of 9 countries (Bahrain, Egypt, Lebanon, &amp; Syria) have IOSA as AMC</li> </ul>	<ul style="list-style-type: none"> <li>a. As of 20 July 2015</li> <li>b. Remaining countries to work with are Iran, Kuwait, Oman, Qatar, SA, Sudan, UAE</li> </ul>
Number of Ground Handling service providers in the MID Region having the IATA Safety Audit for Ground Operations (ISAGO) certification, as a percentage of all Ground Handling service providers	<ul style="list-style-type: none"> <li>a. 75% of the Ground Handling service providers to be certified IATA-ISAGO by the end of 2017</li> <li>b. The IATA Ground Handling Manual (IGOM) endorsed as a reference for ground handling safety standards by all MID States with an EI above 60% by end of 2017.</li> </ul>		
Number of certified international aerodrome as a percentage of all international aerodromes in the MID Region	<ul style="list-style-type: none"> <li>a. 50% of the international aerodromes certified by 2015.</li> <li>b. 75% of the international aerodromes certified by 2017.</li> </ul>	<ul style="list-style-type: none"> <li>(53%)</li> <li>31 out of 59</li> </ul>	

### 5. Predictive Safety Information

#### 5.1 State Safety Programme (SSP)

SSP implementation in the MID Region is one of the main challenges faced by the State, which is addressed within the RASG-MID framework, as one of the top Safety Enhancement Initiatives in the Region. Several Safety Management Workshops, Safety Summits and meeting have been organized to support the implementation of SSP/SMS and address the challenges and difficulties, as well as sharing of experiences and best practices.

The RASG-MID supported the establishment of the MENA RSOO, with a primary objective to assist member States to develop and implement SSP (core service) as well as assist States to resolve safety oversight deficiencies.

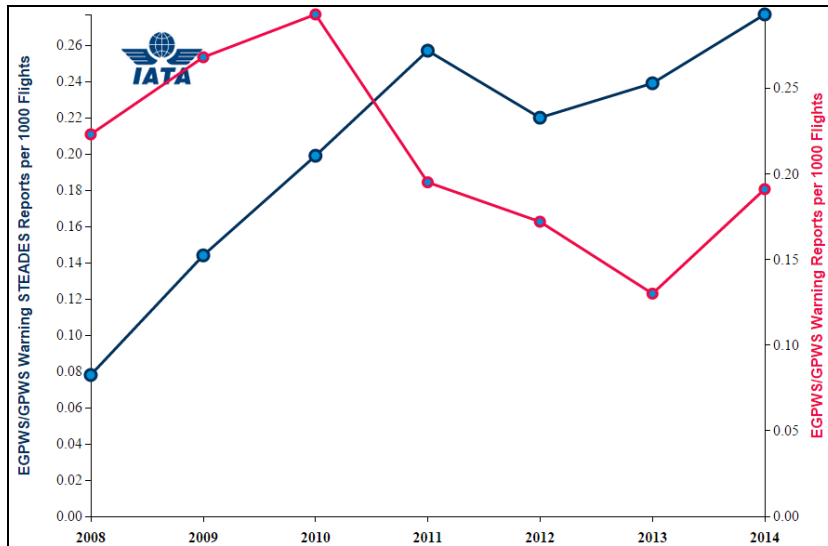
#### 5.2 IATA Safety Data

IATA's main database for collecting predictive safety information is Flight Data Exchange (FDX). It is an aggregated de-identified database of FDA/FOQA type events that allows the user to proactively identify safety hazards.

Unfortunately and due to the low levels of participation by the MID Region carriers in the tool, no useful information could be extracted. Alternatively, information was extracted from the IATA STEADES database which consists of reports coming from pilots in the form of ASRs (Air Safety reports). Information was collected for the top contributing factors that would results in aircraft accidents as follows:

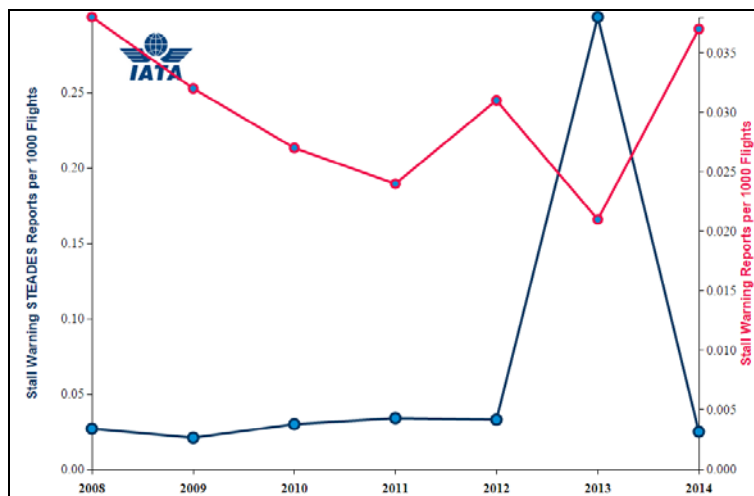
EGPWS/ GPWS warning:

Below figure demonstrates the trend for ground proximity warning system reports over the period 2008-2014. The trend has been increasing at a global level (in Blue) for the past five years while there has been a decrease in the reports for the MID Region (in red) for 2010 through 2013 with a slight increase for 2014. EGPWS/ GPWS is a major contributing factor for CFIT and LOC-I accidents. It can also result in a serious accident on the runway if the aircraft was landing.



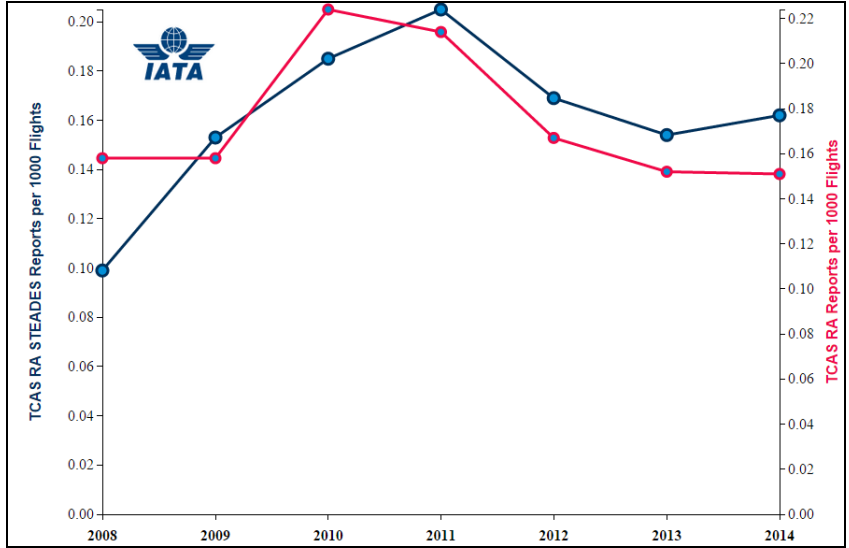
Stall warning:

Below figure demonstrates a higher rate of stall warnings for the MID Region (in Red) than the global rate (in Blue). Stall warning is a major contributing factor to LOC-I accidents.



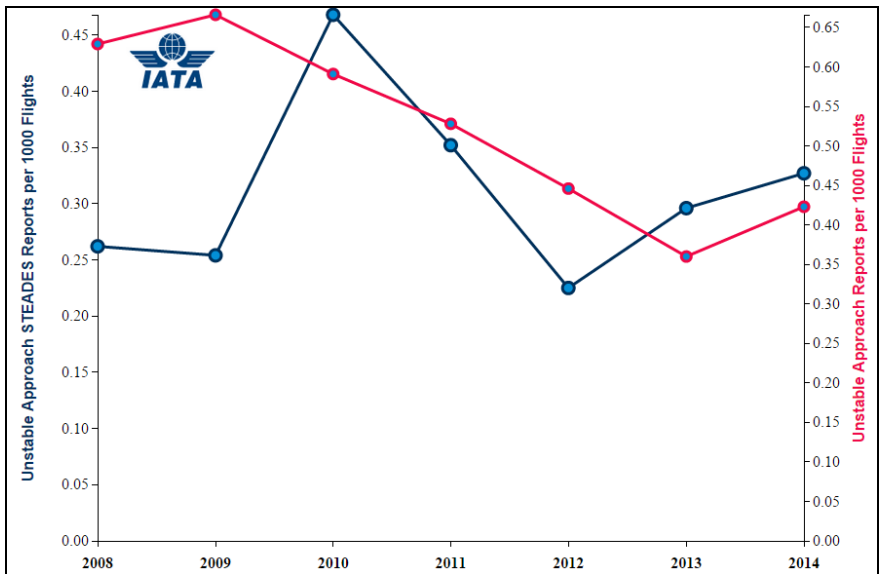
TCAS RA

Below figure demonstrates a lower rate of TCAS RA for the MID Region (in Red) compared to the global rate (in Blue). Incidents have been decreasing since 2011. TCAS RA are a major contributing factor for MID Air Collisions.



Unstable approaches:

Below figure demonstrates a lower rate of unstable approaches for the MID Region (in Red) compared to the global level (in Blue). The rate has been decreasing for the MID Region since 2009 and had only increased in 2014. Unstable approaches are a major contributing factor for runway excursions.



5.3 *MID Region Safety Performance – Safety Indicators – Predictive*

Safety Indicator	Safety Target	MID	Remark
Number of MID States, having completed the SSP gap analysis on iSTARS	10 MID States by 2015	<p><b>10 States</b> completed the SSP gap analysis on iSTARS (Bahrain, Egypt, Iran, Kuwait, Lebanon, Qatar, Saudi Arabia, Sudan, Syrian Arab Republic and UAE)</p> <p><b>2 States</b> started the SSP gap analysis on iSTARS (Iraq and Oman) <i>According to the SSP Gap Analysis on iSTARS.</i></p>	
Number of MID States, that have developed an SSP implementation plan	10 MID States by 2015	<p><b>8 States</b> (Bahrain, Egypt, Kuwait, Lebanon, Qatar, Saudi Arabia, Sudan and UAE) <i>According to the SSP Gap Analysis on iSTARS.</i></p>	
Number of MID States with EI>60%, having completed implementation of SSP Phase 1.	All MID States with <b>EI&gt;60%</b> to complete phase 1 by the end of <b>2015</b> .	<p><b>3 States</b> (Bahrain, Saudi Arabia and UAE) completed implementation of SSP Phase 1.</p> <p><b>4 States</b> (Egypt, Iran, Kuwait and Qatar) partially completed implementation of SSP Phase 1.</p>	
Number of MID States with EI>60%, having completed implementation of SSP Phase 2.	All MID States with EI>60% to complete phase 2 by the end of 2016.	<p><b>1 State</b> (UAE) completed implementation of SSP Phase 2.</p> <p><b>6 States</b> (Bahrain, Egypt, Iran, Kuwait, Qatar and Saudi Arabia) partially completed implementation of SSP Phase 2.</p>	
Number of MID States with EI>60%, having completed implementation of SSP Phase 3.	All MID States with <b>EI&gt;60%</b> to complete phase 3 by the end of <b>2017</b> .	<p><b>7 States</b> (Bahrain, Egypt, Iran, Kuwait, Qatar, Saudi Arabia and UAE) partially completed implementation of SSP Phase 3.</p>	

Number of MID States with EI>60%, having completed implementation of SSP	All MID States with EI>60% to complete SSP implementation by 2020	None	
Number of MID States with EI>60% that have established a process for acceptance of individual service providers' SMS.	<p>a. 30% of MID States with EI&gt;60% by 2015.</p> <p>b. 70% of MID States with EI&gt;60% by 2016.</p> <p>c. 100% of MID States with EI&gt;60% by 2017.</p>	<p><b>66%</b></p> <p><b>6 States</b> (Bahrain, Egypt, Iran, Kuwait, Saudi Arabia and UAE) established a process for acceptance of individual service providers' SMS.</p>	

## 6. Final Conclusions

Following the analysis of the reactive safety information provided by Boeing, IATA and ICAO for the period 2010 - 2014, it was concluded that the main Focus Areas for the MID Region are Runway Safety (RS), Loss of Control In Flight (LOC-I) and System Component Failure (SCF).

Major contributing factors for those accident categories include:

1. Airport facilities
2. Metrology
3. Poor/Faint markings/signs or runway/taxiway closure
4. Aircraft malfunction
5. Contained engine failure/power plant malfunction
6. Errors related to Manual Handling/ Flight controls
7. Errors related to ground navigation
8. Errors related to SOP adherence/ SOP cross verification
9. Continued landing after unstable approach
10. Long/floated/bounced/firm/off-center/crabbed landing

It is worth mentioning that there has been a change in the Focus Areas for the MID Region in this report compared to previous Editions. Controlled Flight Into Terrain (CFIT), which was one of the top Focus Areas in the Region for the past three Editions of the Annual Safety Report, gets a lower priority compared to System Component Failure (SCF) as per the ICAO data. This is also taking into account the moving average of five years where the last CFIT accident took place in 2010.

It should be highlighted that reporting of incidents is still low in the MID Region, which underlines the need for regional cooperation to enhance reporting culture.

With regard to the proactive part, the regional average USOAP-CMA Effective Implementation (EI) is 68.23, where the target is to achieve 70% in 2020. Currently, eight (8) States out of thirteen (13) audited States have EI above 60% and the target is to have eleven (11) States by 2020. The MID Region has one Significant Safety Concern (SSC) related to Aircraft Operations (Air Operator Certificates-AOC).

Areas of LEG, ORG, AIG, ANS and AGA need to be enhanced. With respect to the Critical Elements (CEs), CE4 (Qualified technical personnel) still represents the lowest EI and CE7 (surveillance obligations) and CE8 (resolution of safety issues) are below EI 60% and need improvement.

The SSP implementation is still one of the main challenges in the Region. States with EI above 60%, are required to implement SSP. They are encouraged to share experience and best practices in order to expedite the SSP implementation at the regional level.

Additional efforts should be put in place by the Annual Safety Report Team for collecting and analysing predictive safety information. This is necessary to allow the identification and mitigation of safety concerns before accidents or incidents would even take place.

The RASG-MID Annual Safety Report is a timely, unbiased and transparent source of safety related information essential for all aviation stakeholders interested in having a tool to enable sound decision-making on safety related matters.

## Appendix A: List of Acronyms

ARC	Abnormal Runway Contact
ADRM	Aerodrome
ANSP	Air Navigation Service Provider
ATC	Air Traffic Control
ATS	Air Traffic Services
ASRT	Annual Safety Report Team
BIRD	Birdstrike
CTOL	Collisions with Obstacles during Take Off or Landing
CFIT	Controlled flight into terrain
DIP	Detailed Implementation Plan
F-IN	Fire/Smoke (Non-Impact)
FDA	Flight Data Analysis
FOQA	Flight Operations Quality Assurance
GCOL	Ground Collision
RAMP	Ground Handling
GASP	ICAO Global Aviation Safety Plan
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
LOC-G	Loss of Control - Ground
LOC-I	Loss of control - inflight
MTOW	Maximum Take-off Weight
MENA	Middle East & North Africa (IATA Region)
MID	Middle East Region (ICAO Region)
RAST	Regional Aviation Safety Group
RE	Runway Excursion (departure or landing)
RI	Runway Incursion
RS	Runway Safety
SEI	Safety Enhancement Initiative
SMS	Safety Management System
SOP	Standard Operating Procedure
SSP	State Safety Programme
USOS	Undershoot/Overshoot
UAS	Undesirable Aircraft State
USOAP	Universal Safety Oversight Audit Program
WILD	Wildlife

**CREDITS**

The Coordinator of the MID Annual Safety Report Team (MID-ASRT), Capt. Adnan Takroui on behalf of the Team and RASG-MID thanks all those who contributed to the elaboration of this RASG-MID Annual Safety Report and provided necessary support and information.

Special thanks to Mr. Mohamed Smaoui, ICAO Deputy Regional Director, Mr. Mashhor Alblowi, Regional Officer FLS and Ms. Rose Al Osta, Regional SFO Manager, IATA, for their outstanding efforts and contributions.

- END -