ICAO

SAFETY

Regional Aviation Safety Group -

Middle East

(RASG –MID)

MID Region

Annual Safety Report

Fifth Edition

January 2017

Fifth Edition, January 2017
Regional Aviation Safety Group – Middle East (RASG-MID)

RASG-MID Annual Safety Report

Table of Contents

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 Annual Safety Report Team (ASRT), the Regional Aviation Safety Team (RAST), and the Safety Support Team (SST). The three Teams work together in a collaborative manner to identify and address safety risks in the MID Region as follows:

1. The Annual Safety Report Team (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).

2. The Regional Aviation Safety Team (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).

3. 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.

The Accidents and Incidents Analysis Working Group (AIA WG) was established 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.

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

2. Executive Summary

The RASG-MID Annual Safety Report (ASR) – Fifth 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 identify 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 and determination of contributing factors and root causes in order to support the development of mitigation measures.

The proactive safety information section is developed based on the results of the ICAO USOAP-CMA and IATA IOSA and ISAGO, as well as, other occurrences reported by stakeholders (States, airlines, etc), 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 an overview 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 32.9 million departures in 2015, compared to 30.7 million departures in 2011.
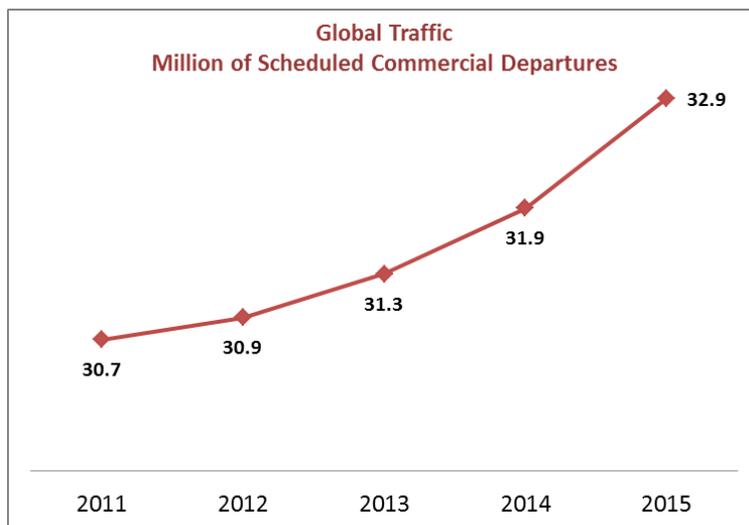
Source: ICAO-iSTARS, as of November 2016

The MID Region shows a stable growth in traffic volumes. Total scheduled commercial departures in 2015 accounted approximately for 1.22 million departures compared to 1.03 million departures in 2011.

MID Traffic
Million of Scheduled Commercial Departures

Year	Value
2011	1.03
2012	1.06
2013	1.08
2014	1.15
2015	1.22
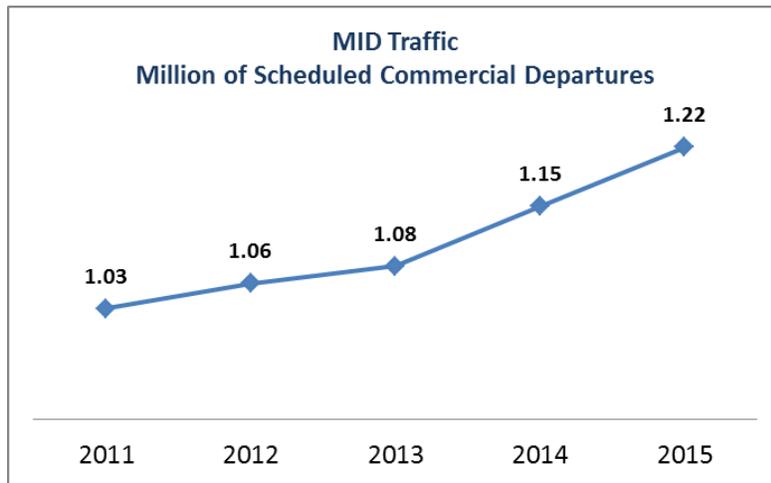
Source: ICAO-iSTARS, as of November 2016

2.2   Accidents Rate

Accident Rate
Scheduled Commercial above 5700 kg

Accidents per mill. dep.

Year	Accident Rate - World	Accident Rate - MID
2011	4.1	4.9
2012	1.9	3.2
2013	3.7	3.9
2014	3	4.3
2015	2.8	2.5
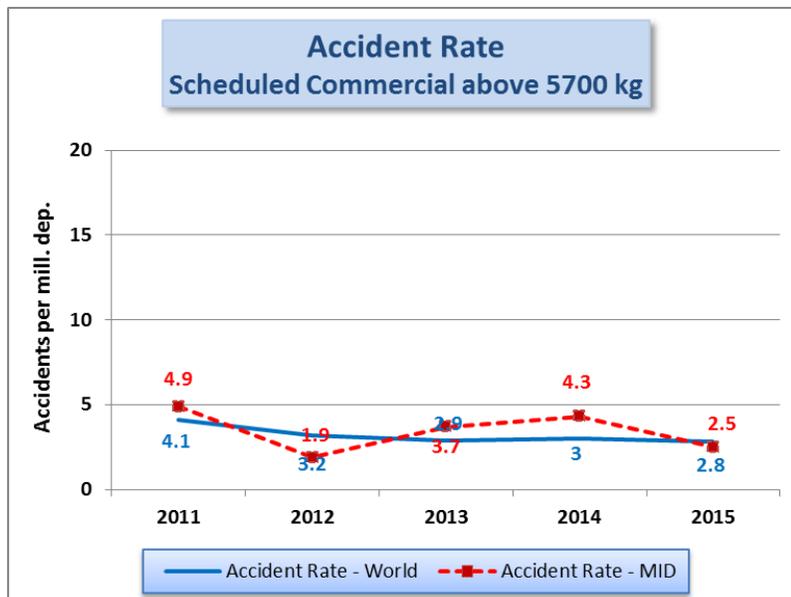
Source: ICAO-iSTARS, as of November 2016

The MID Region had an accident rate of 2.5 accidents per million departures in 2015 trending down.

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 (2011-2015) is 0.53 compared to 0.33 for the globe. The MID Region had no fatal accidents in 2012 and 2013. However, two fatal accidents occurred in 2014 and 2015, respectively. The 2015 accident caused 224 fatalities.
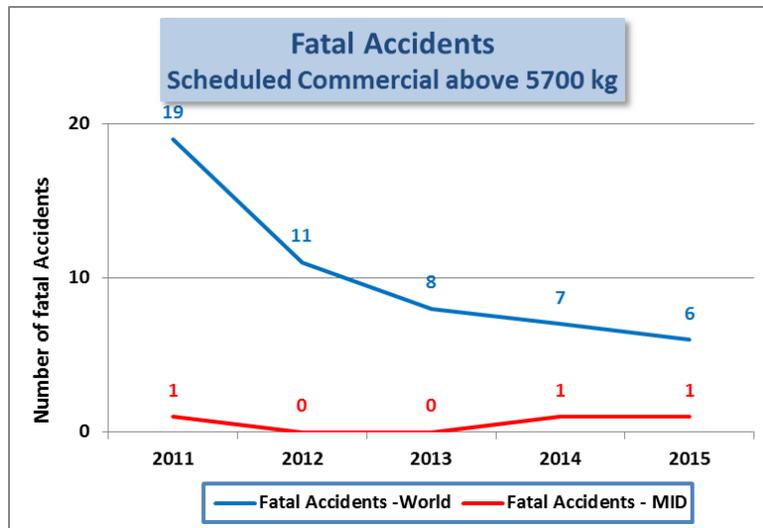
Source: ICAO-iSTARS, as of November 2016
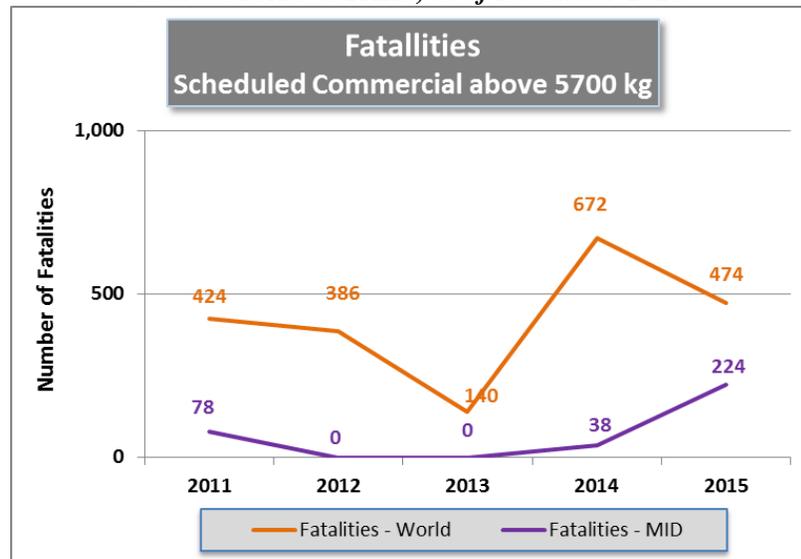
Source: ICAO-iSTARS, as of November 2016

2.4   *Bottom Line*

- Stable and continuous regional growth in the traffic volume.

- The MID Region had an accident rate of **2.5** accidents per million departures in 2015 trending down, which is below the global rate (**2.8**) for the same year.

- The 5-year average accident rate for 2011-2015 is **3.5**, which is slightly above the global rate (**3.2**).

- Although the MID Region had no fatal accidents in 2012 and 2013, two fatal accidents occurred in 2014 and 2015, respectively.

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 (2011-2015), 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)*

Accidents
Scheduled Commercial above 5700 kg
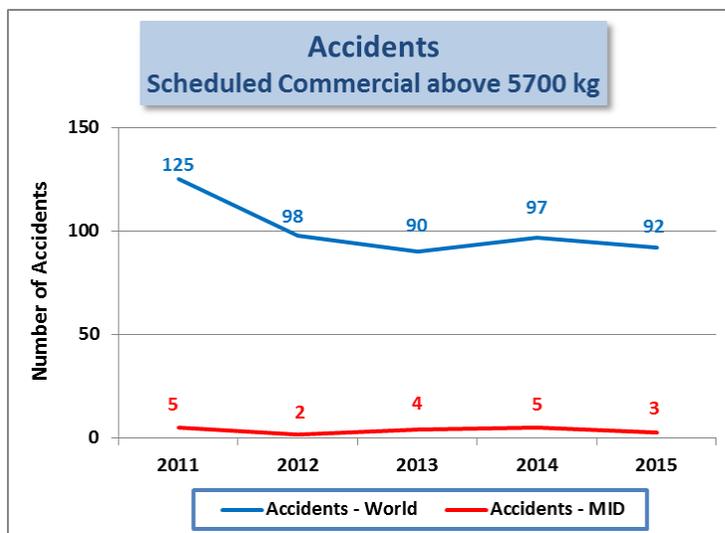
Source: ICAO-iSTARS, as of November 2015

The tables below provide the MID Region, as well as global accident numbers/rates and fatalities.

	Year	2011	2012	2013	2014	2015	Average
MID	**Accident Nr.**	5	2	4	5	3	3.8
	Accident rate	4.9	1.9	3.7	4.3	2.5	3.5
World	**Accident Nr.**	125	98	90	97	92	100.4
	Accident rate	4.1	3.2	2.9	3	2.8	3.2

Year	2011	2012	2013	2014	2015	Average
MID-Fatalities	78	0	0	38	224	68
World-Fatalities	424	386	140	672	474	419
Year	**2011**	**2012**	**2013**	**2014**	**2015**	**Average**
MID-Fatal Accident	1	0	0	1	1	0.6
MID Rate	0.97	0	0	0.87	0.82	0.53
World-Fatal Accident	19	11	8	7	6	10.2
World Rate	0.61	0.36	0.26	0.22	0.18	0.33

The chart below shows the total number of accidents and distribution of risk categories for each year during the period (2011-2015).

	2011	2012	2013	2014	2015
■ Total Number of Accidents	5	2	4	5	3
■ RS	2	0	2	3	0
■ LOC-I	1	0	0	0	0
■ CFIT	0	0	0	0	0
■ F-NI	1	0	0	0	0
■ SCF	0	1	2	1	1
■ TURB	0	0	0	0	1
■ UNK	0	0	0	0	1
■ OTH	1	1	0	1	0
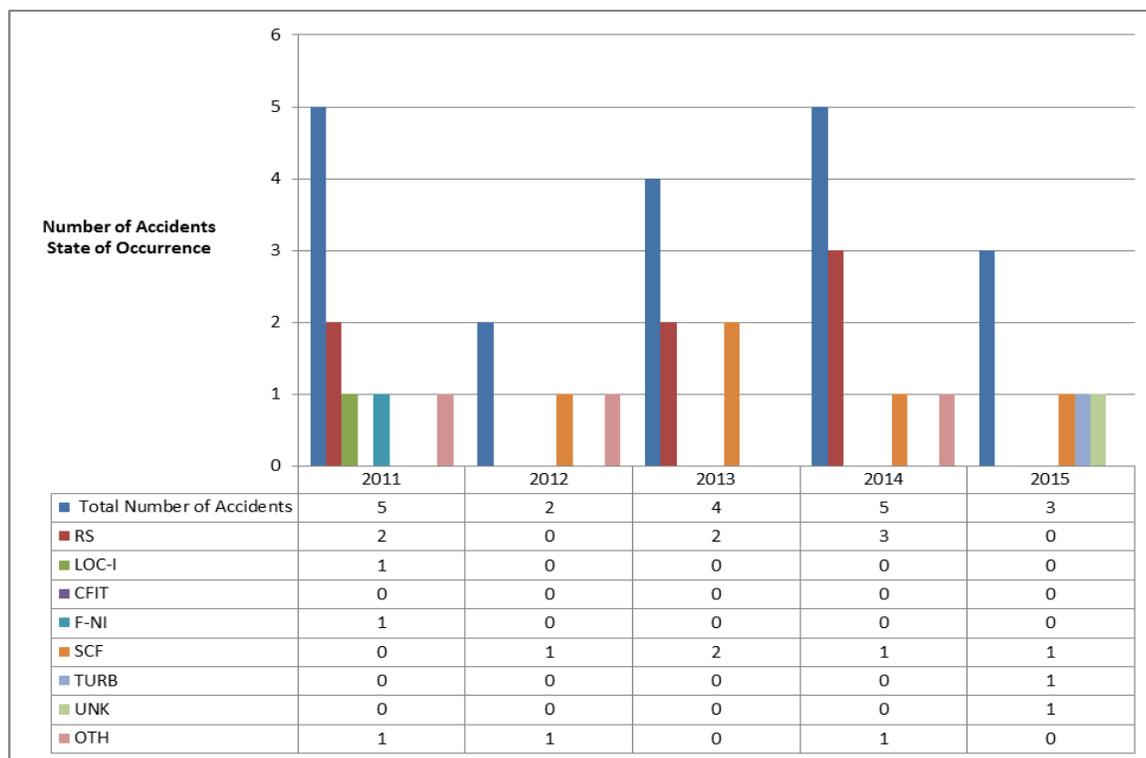
Source: ICAO-iSTARS, as of November 2015

In terms of frequency, the most frequent accidents in the MID Region for the period 2011- 2015 are:

1. Runway Safety (RS) -7 Accidents
2. System/Component Failure (SCF) - 5 Accidents
3. Loss of Control –Inflight (LOC-I) -1 Accident
4. Fire/Smoke, Non-Impact (F-NI) -1 Accident
5. Turbulence encounter - In-flight turbulence encounter (TURB) -1 Accident
6. Occurrence type that is not covered by any other category (OTHR)- 3 Accidents

The MID Region witnessed 3 fatal accidents in the period (2011-2015):

	Number of fatal Accidents	Risk Category	No of Fatalities	Aircraft registered in the MID Region	Air Operator in the MID Region
2011	1	LOC-I	78	Yes	Yes
2012	None				
2013	None				
2014	1	SCF	38	Yes	Yes
2015	1	UNK	224	No	No

In terms of fatality, the top fatal accident categories in the MID Region for the period (2011 – 2015) are:

1. UNK
2. LOC-I
3. SCF

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 (excluding UNK and OTHR).

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	3	3
LOC-I	3	2	6
SCF	2	2	4
F-NI	3	3	9
CFIT	3	3	9
TURB	3	3	9

Based on the above, the Focus Areas for the MID Region are as follows:

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

3.1.2 *Regional Accident Statistics (State of Registry)*

Numberof Accidents State of Registry

|	2011	2012	2013	2014	2015
Total Number of Accidents	5	2	4	3	4
RS	2	0	3	1	2
LOC-I	1	0	0	0	0
CFIT	0	0	0	0	0
F-NI	1	0	0	0	0
SCF	0	1	1	1	1
TURB	0	0	0	0	1
OTH	1	1	0	1	0
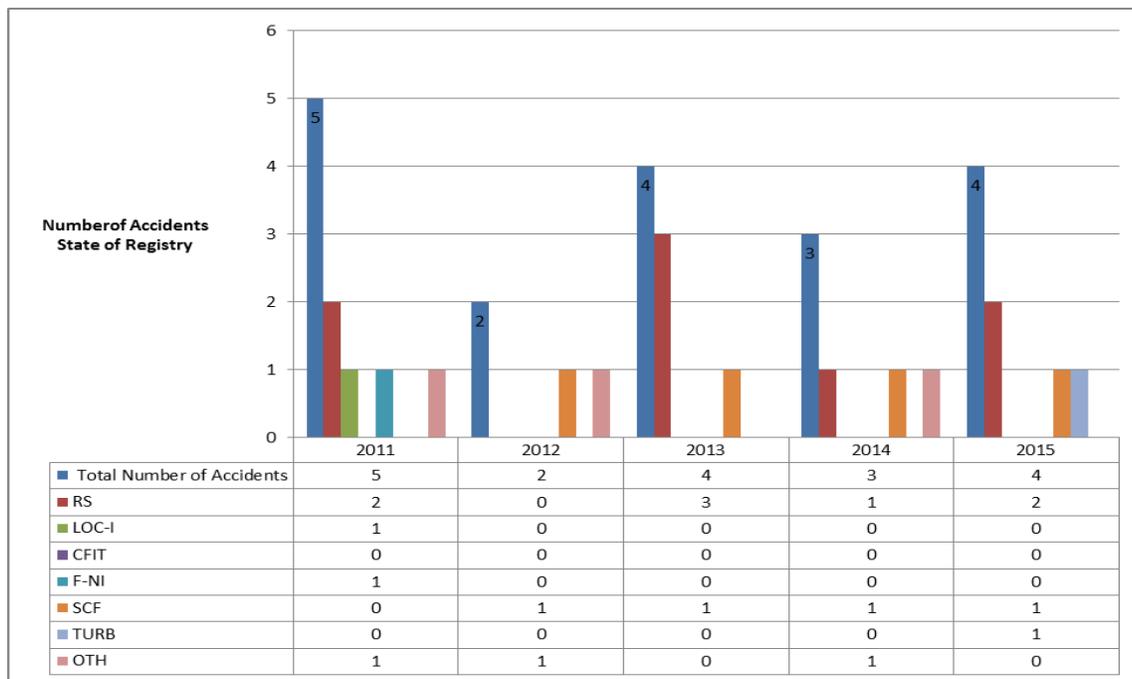
Source: ICAO-iSTARS, as of November 2015

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

Number of Accidents State Name Of Operator

|	2011	2012	2013	2014	2015
Total Number of Accidents	5	1	2	3	2
RS	2	0	2	0	1
LOC-I	1	0	0	0	0
CFIT	0	0	0	0	0
F-NI	1	0	0	0	0
SCF	0	0	0	1	1
TURB	0	0	0	1	0
OTH	1	1	0	1	0
UNK	0	0	0	0	0
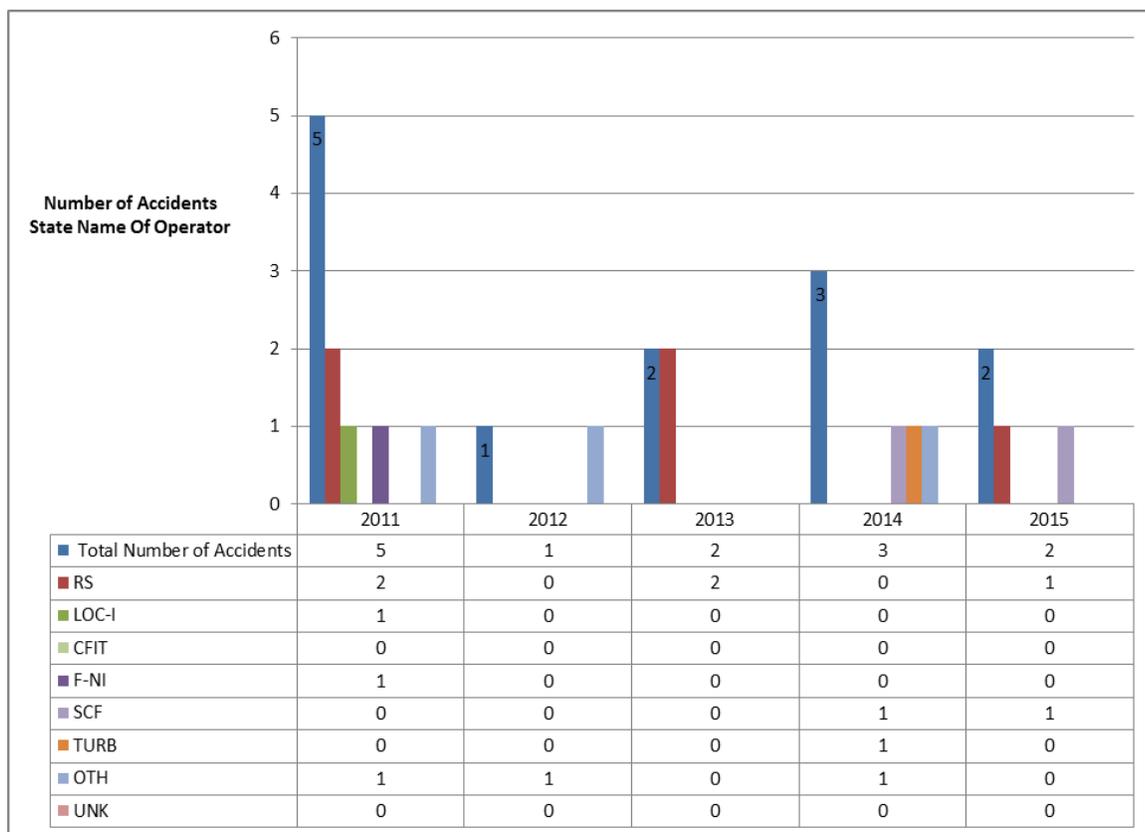
3.2   IATA Data

To calculate the regional accident rates, IATA determines the regional accidents 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 2011 – 2015 and is narrowed down to the MID States.

3.2.1   Regional Accidents Rates *(Per million departures)*
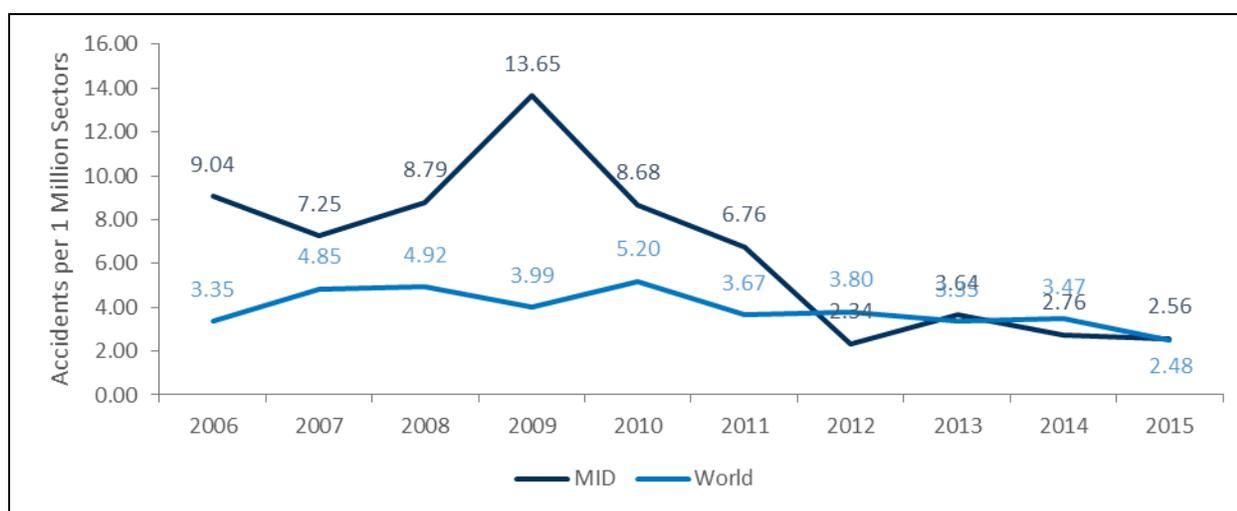
3.2.2   Regional Fatal Accident Rates *(Per million departures)*

|	**2011**	**2012**	**2013**	**2014**	**2015**
World	0.63	0.42	0.44	0.34	0.11
MID	0.85	0.78	0.00	0.69	0.64
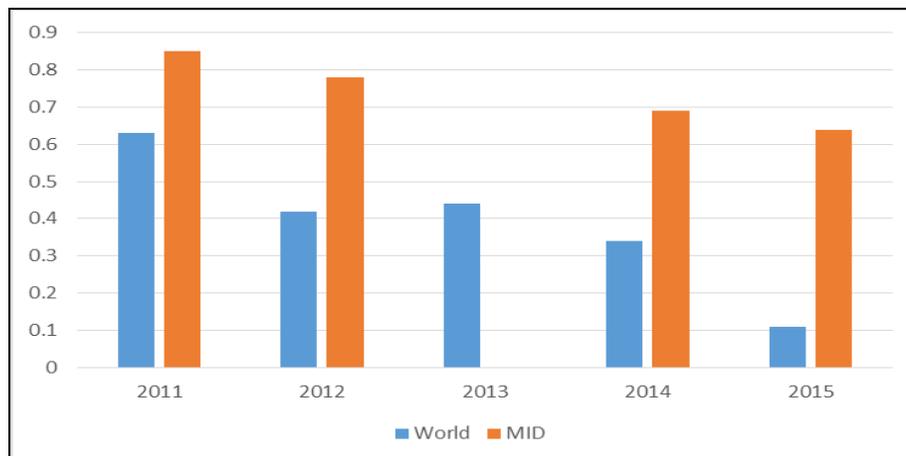
### 3.2.3 *Analysis of MID Accidents between 2011 and 2015*

This analysis provides an overview of the accidents between 01 Jan 2011 and 31 Dec 2015.

3.2.3.1 *Accidents categories and analysis*

(a) World Accident Categories: 2011-2015
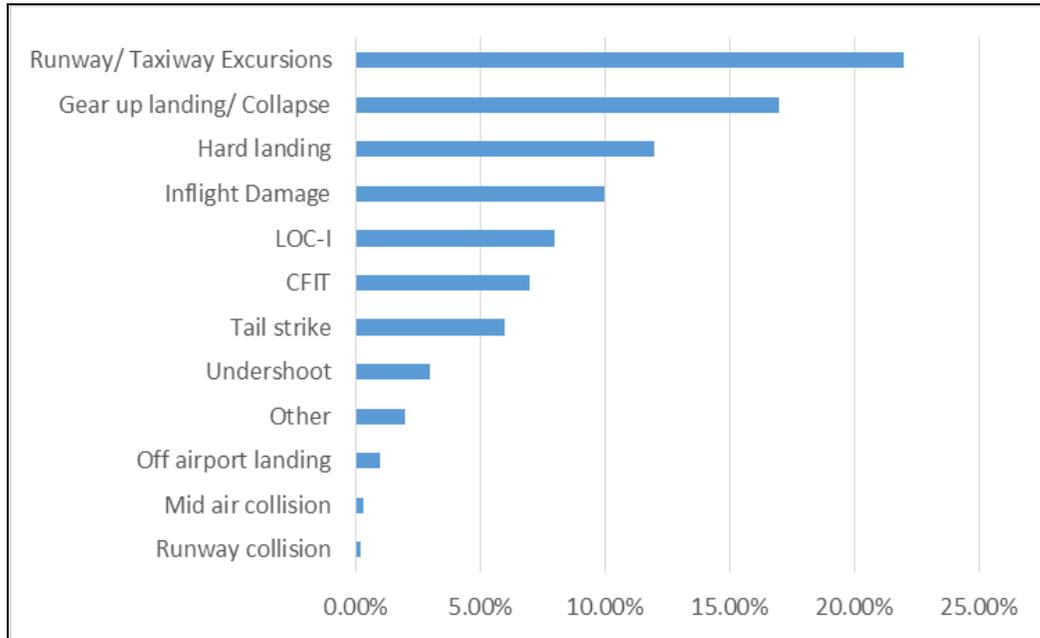
(b) MID Accident Categories: 2011-2015
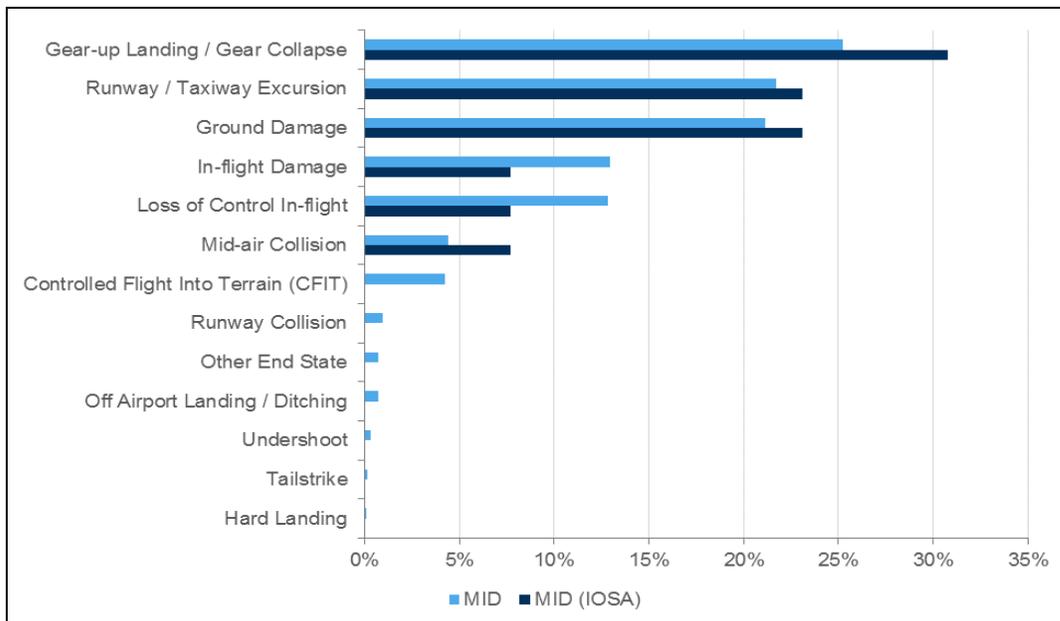
(c) World Fatal Accident Categories (2011 – 2015)
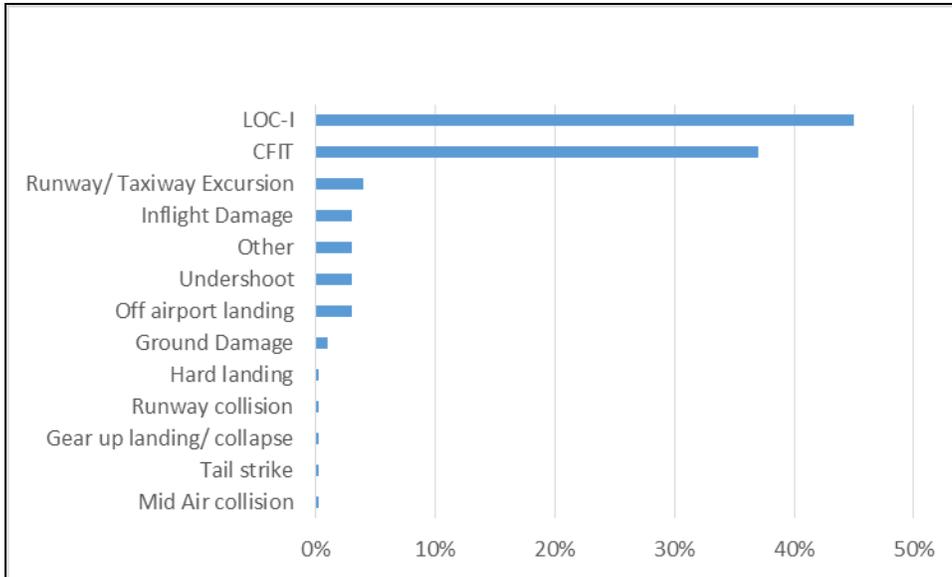
(d) MID Fatal Accident Categories (2011 - 2015)
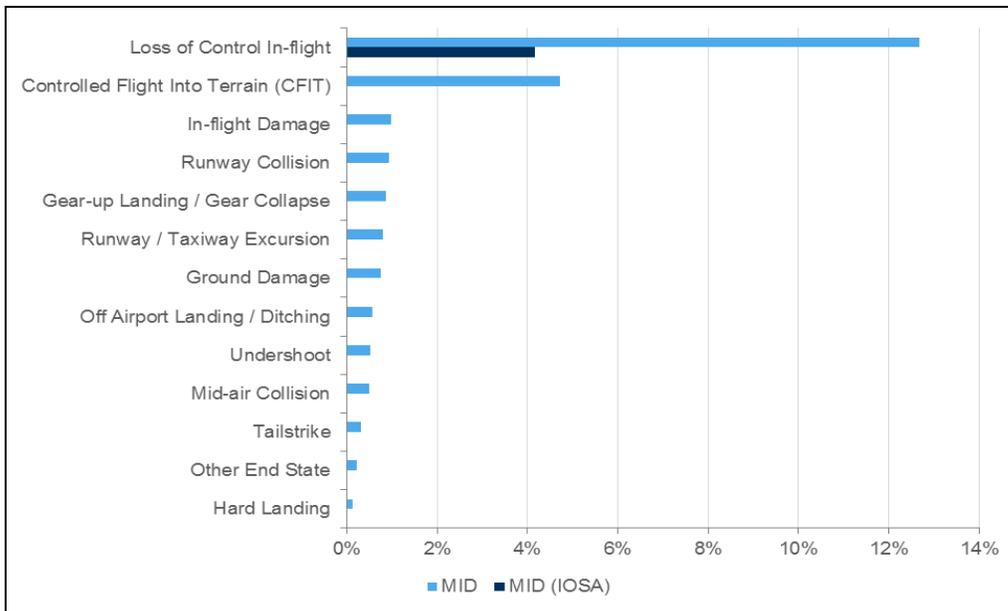
(e) IATA In-Depth Analysis of MID accidents

Taking a more in-depth look at the IATA accidents statistics for the MID Region (2011-2015), the following observations are made:

a) In terms of frequency, the most frequent accidents categories in the MID Region for the period 2011 – 2015 are:

   1. Gear-up Landing / Gear Collapse
   2. Ground Safety
   3. Runway/ Taxiway Excursions

b) In terms of fatality, the top three fatal accidents categories in the MID Region for the period 2011 – 2015 are:

    1. LOC-I
    2. CFIT
    3. Inflight Damage

c) Top three flight phases when fatal accidents occur in the MID Region are Go-around (GOA) and Initial Climb (ICL), and Take Off (TOF).

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	2*	3	6
Runway / Taxiway Excursion	2*	2	4
Loss of Control Inflight (LOC-I)	2*	1	2
Inflight Damage (IFD)	3	2	6
Mid Air Collision	4**	1	4
Controlled Flight into Terrain (CFIT)	4**	1	4

Note: Ground Safety, Runway Safety, and Loss of Control In Flight were rated the same because they had the same number of accidents throughout the period 2011 – 2015

**Note: Mid Air Collision and Controlled Flight into Terrain (CFIT) were rated the same because they had the same number of accidents throughout the period 2011 – 2015

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. Loss of Control In Flight (LOC-I)
    ii. Gear up landing/ Gear collapse
    iii. Runway/ Taxiway Excursion
    iv. Controlled Flight Into Terrain (CFIT)
    v. Mid Air Collision

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 three of the high risk categories identified for the MID Region covering the period 2011 till 2015:

Runway Excursion

1. Trend 2011 to 2015

		2011	2012	2013	2014	2015
MID	**Accident rate**	2.54	0.78	0.00	0.69	0
	# Accidents	3	1	0	1	0
World	**Accident rate**	0.56	0.64	0.52	0.45	0.40
	# Accidents	19	22	18	16	15

2. Severity of outcomes

Accident Fatal

Fatal	**0**
Non-Fatal	**5**

Total Fatalities	**0**

Level of Damage

Hull Loss	**2**
Substantial Damage	**3**

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 2011 to 2015

		2011	2012	2013	2014	2015
MID	**Accidents rate**	0.85	0.00	0.00	0.69	0.00
	# Accidents	1	0	0	1	0
World	**Accidents rate**	0.24	0.18	0.23	0.17	0.08
	# Accidents	8	6	8	6	3

2. Severity of outcomes

Accident Fatal

Fatal	**2**
Non Fatal	**0**

Total Fatalities	**126**

Level of Damage

Hull Loss	**2**
Substantial Damage	**0**

3. Contributing factors:

As per IATA's de-identification rule, the data is insufficient to produce analysis on contributing factors.

Controlled Flight into Terrain (CFIT)

1. Trend 2011 to 2015

		2011	2012	2013	2014	2015
MID	**Accidents rate**	0.00	0.87	0.00	0.00	0.00
	# Accidents	0	1	0	0	0
World	**Accidents rate**	0.30	0.18	0.14	0.17	0.03
	# Accidents	10	6	5	6	1

2. Severity of outcomes

Accident Fatal

Fatal	**1**
Non Fatal	**0**

Total Fatalities	**32**

Level of Damage

Hull Loss	**1**
Substantial Damage	**0**

3. Contributing factors:

As per IATA's de-identification rule, 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 (1987-2015)
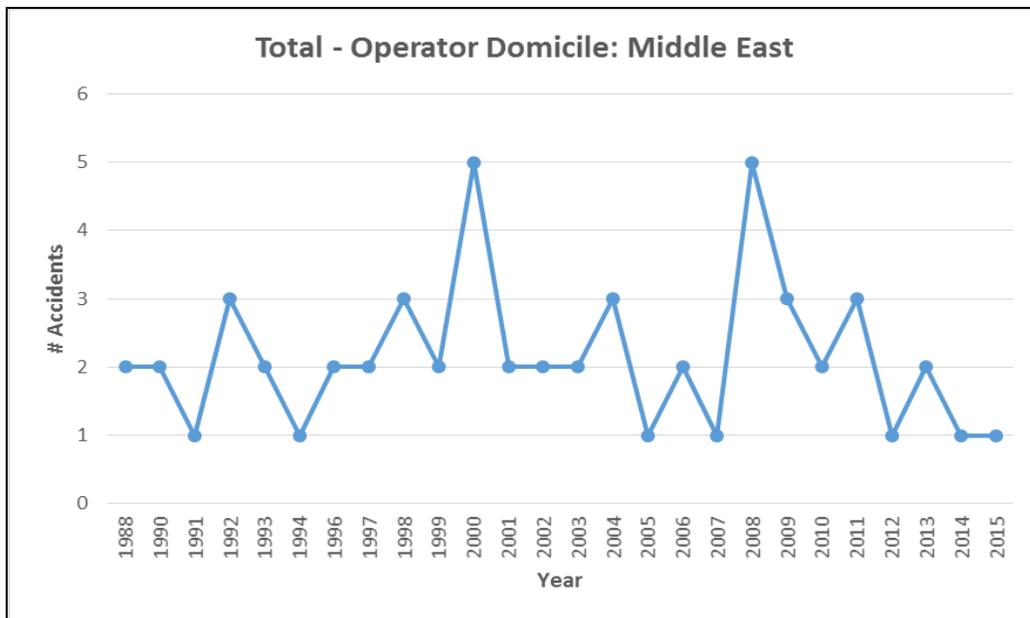
3.3.1.2 *Fatality Risk per Type of Accident:*

The chart below illustrated that in terms of frequency, the most frequent accidents in the MID Region for the period 1987 – 2015 are:

    i.   Runway Excursions (landing)
    ii.   LOC-I
    iii.   CFIT

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

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

1987 - 2015 Middle East Hull loss/Fatal Accidents
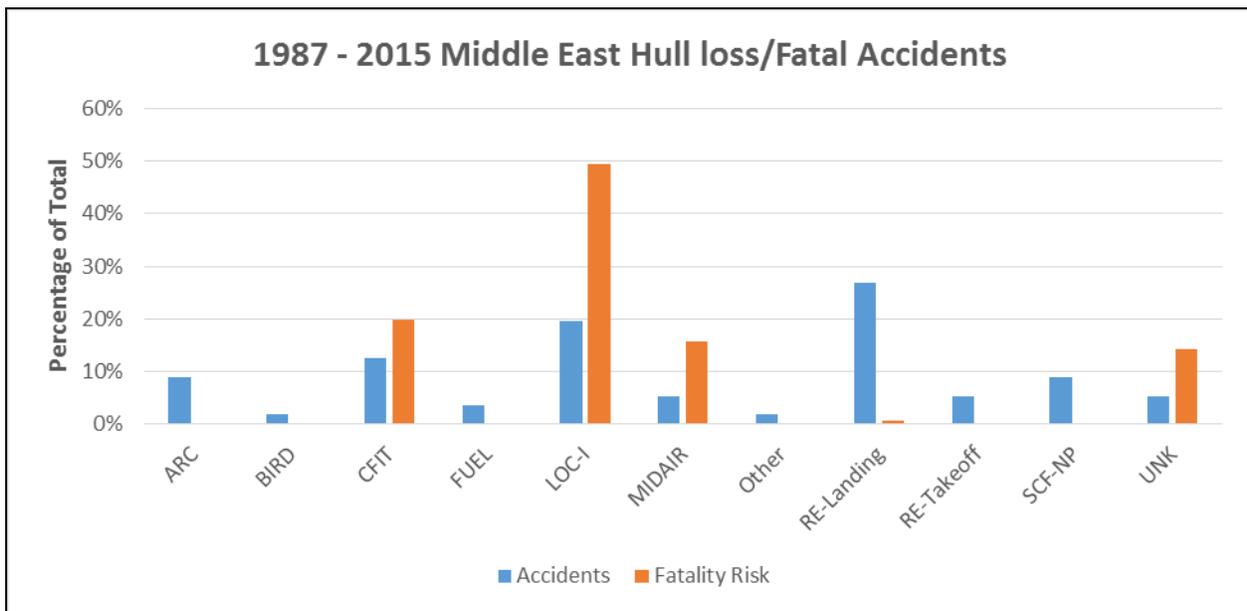
3.4 *Identification of Focus Areas for MID Region*

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) and Fire/smoke, post-impact (F-POST).

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

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

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

Safety Indicator	Safety Target	Average 2011-2015		2015	
		MID	Global	MID	Global
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	3.2	2.5	2.8
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**	0.53	0.33	0.82	0.18
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**	1.4	1.6	1.6	1
	Reduce/Maintain the Runway Safety related accidents to be less than 1 accident per million departures by **2016**	1.6			
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**.	0.19	0.09	0	0.1
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	0.8	0	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) in the MID Region (13 out of 15 States have been audited) is 66.17%, which is above the world average 63.54 %. Five (5) States (are below EI 60%). 61.54% of the States in RASG-MID have achieved the target of 60% EI, as suggested by the Global Aviation Safety Plan (GASP) and the MID Region Safety Strategy.
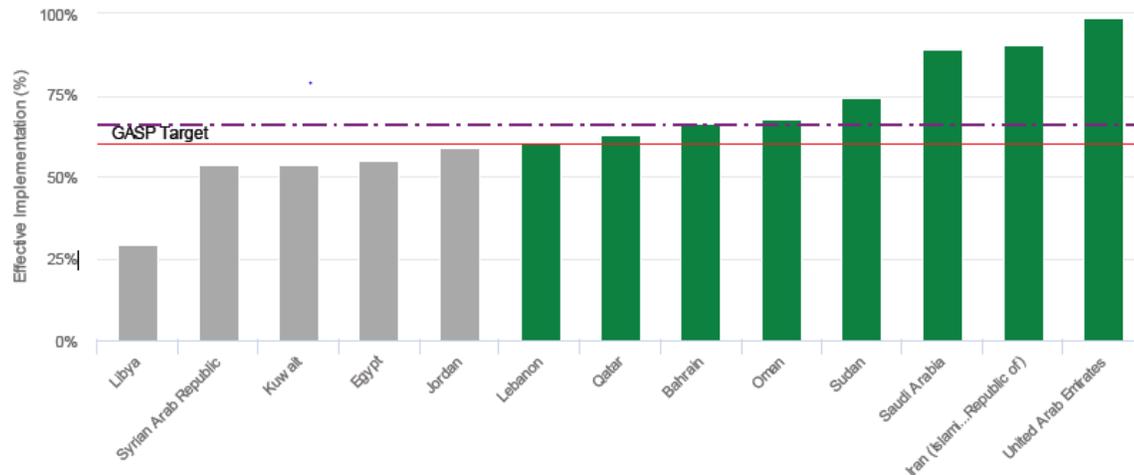
Source: ICAO-iSTARS, as of November 2015

The EI by Area (e.g. Operations, Airworthiness) shows that ANS is the only area below 60% EI. 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%.

7 areas and 5 critical elements are above the target of 60% EI
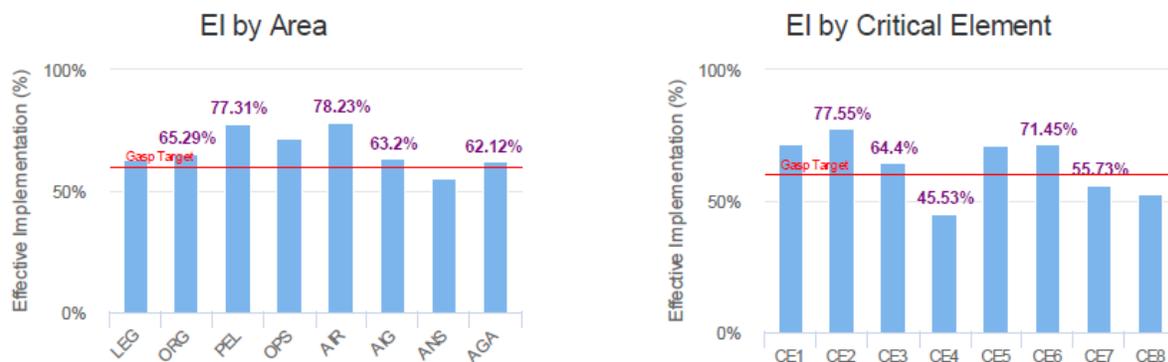
Source: ICAO-iSTARS, as of November 2015

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 for the period 2011- 2015, was above the world average by an average of 5.57.

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 2014 and May 2016. A summary of the IOSA audit findings is as follows:

1. 47 audits were performed in the MENA Region with an average of 6.5 findings per audit.

2. Findings were mainly in the areas of Flight Operations (FLT), Dispatch (DSP), Maintenance (MNT), Ground Handling Operations (GRH), and Organization Management (ORG). Top non-conformances can be summarized per area as follows:

#	Area	Top findings (ISARPS)
1	Flight Operations (FLT)	- Availability of a system for the management and control of flight operations documentation and/or data used directly in the conduct or support of operations, to include the operations manual (OM), training manual, onboard library and other documents referenced in the OM that contain information and/or guidance relevant to the flight crew. - 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.
2	Dispatch (DSP)	- Availability of a process to ensure course materials used in training programs for personnel responsible operational control are periodically evaluated to ensure compliance with the qualification and performance standards of the Operator and/or Authority. - Operators transporting dangerous goods as cargo ensuring the designated operational control personnel: (1) have access to the same information pertaining to dangerous goods carried as cargo onboard the aircraft that is provided to the PIC (Pilot in Command); and (2) are assigned the responsibility to provide detailed information without delay about dangerous goods carried as cargo to emergency services responding to an accident or serious incident involving the Operator's aircraft. - The availability of a system for the management and control of documentation and/or data used directly in the conduct or support of operational control, to include operational manual (OM) and other documents referenced in the OM that contain information and/or guidance relevant to operational control personnel. - The availability of information for immediate communication to rescue coordination centers that describes emergency and survival equipment on board of aircraft for Operators conducting international flights (this includes the number, color and type of lifesaving rafts and pyrotechnics, and details of emergency medical and water supplies, and the types and frequencies of the emergency portable radio equipment.)

3	Maintenance (MNT)	- Availability of a process for addressing findings that result from audits of maintenance management system functions which ensures: (1) Determination of the root causes of findings. (2) Development of corrective action, as appropriate, to address findings. (3) Implementation of corrective action in appropriate areas of maintenance operations. (4) Evaluation of corrective action to determine effectiveness. - The availability of a process to ensure that: (1) Aircraft parts and materials are only obtained from approved sources. (2) Certification documentation requirements are specified. (3) Traceability to the last certifying organization for used or surplus parts. (4) A statement of conformity or certification test results is retained for hardware and raw materials. (5) Inventory storage of consumable material is managed to ensure traceability of manufacture.
4	Ground Handling Operations (GRH)	- The availability of a process (for operators who do not transport dangerous goods as cargo) to ensure ground handling personnel receive dangerous goods training to include initial training and recurrent training covering passenger handling, baggage handling, aircraft loading, and load control.
5	Organization Management (ORG)	- The availability of a process to ensure having a system for the management and control of documentation and/or data used directly in the conduct or support of operations. - The availability of a flight data analysis program (FDA) that is non-punitive and contains adequate safeguards to protect data sources. - The availability of a process for addressing findings that result from audits conducted under the quality assurance program which ensures identification of root causes, development of corrective action, implementation and evaluation of the corrective action in appropriate operational areas.

### 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 7 sections including: Load control (LOD), Passenger & Baggage handling (PAB), 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 2015 and February 2016. A summary of the ISAGO findings is as follows:

1. A total of 12 audit reports (8 combined and 4 stations) have been included in the analysis covering the IATA MENA Region.

2. Findings were mainly in the areas of Passenger and Baggage Handling (BAP), Load Control (LOD), Aircraft Handling & Control (HDL), and Aircraft Ground Movement (AGM). Below is a graph that illustrates the distribution of findings per area:
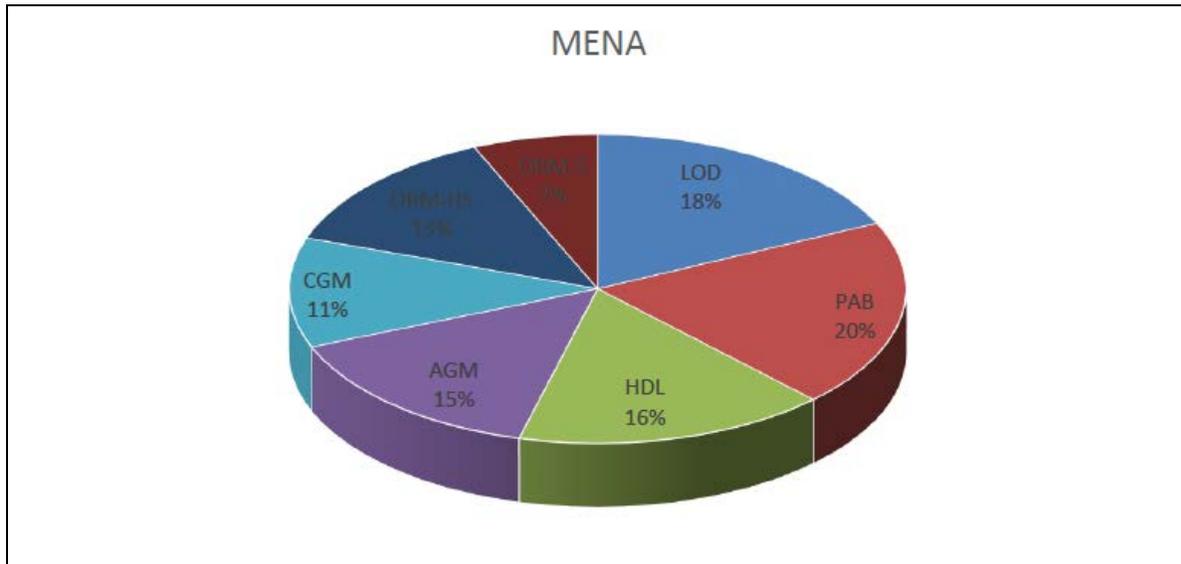
4.3   *Incidents and Occurrences*

4.3.1   Incidents Reported by States

Reporting of incidents is one of the challenges in the MID Region. The RASG-MID put efforts aiming at the enhancement of voluntary reporting systems and sharing of safety data at the national and regional levels.

In order to facilitate sharing of safety data, the RASG-MID Accidents and Incidents Analysis Working Group (AIA WG) is working with ICAO to develop a new application on iSTARS including an iSTARS ADREP Occurrence Data Form for the MID Region, which will be used as a prototype for other Regions. It's envisioned that more safety data related to incidents be shared using the new application. Safety data will be reviewed, validated and analyzed by the AIA WG.

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 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 2008 - 2015. 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 2015.
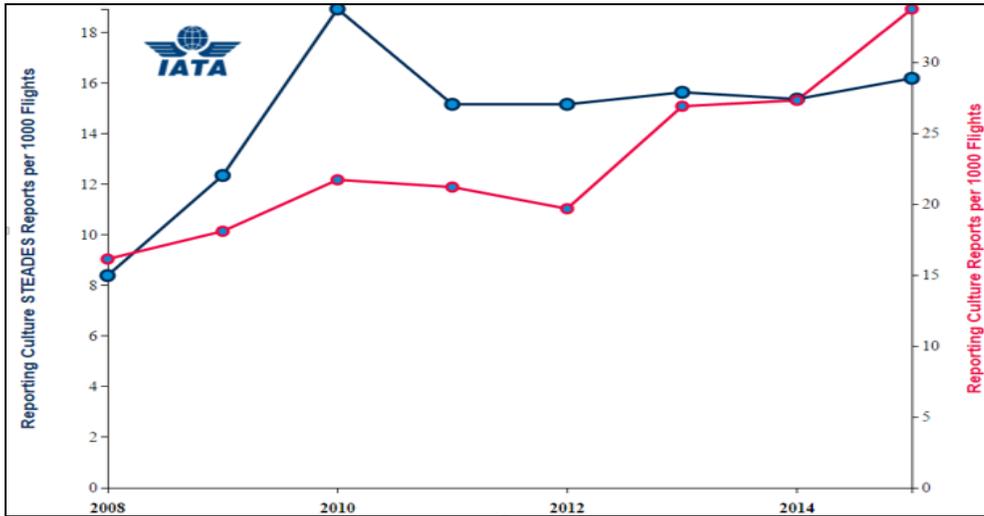
Birdstrikes

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.
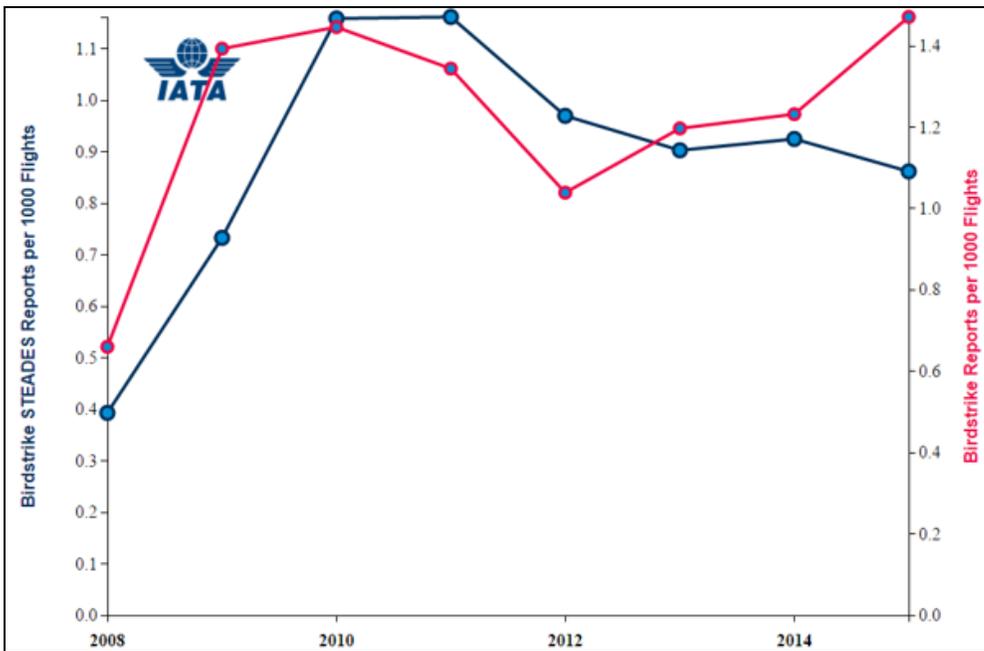
Runway/taxiway Incursions

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. Yet and in 2015, the regional performance has slightly improved compared to the global one.
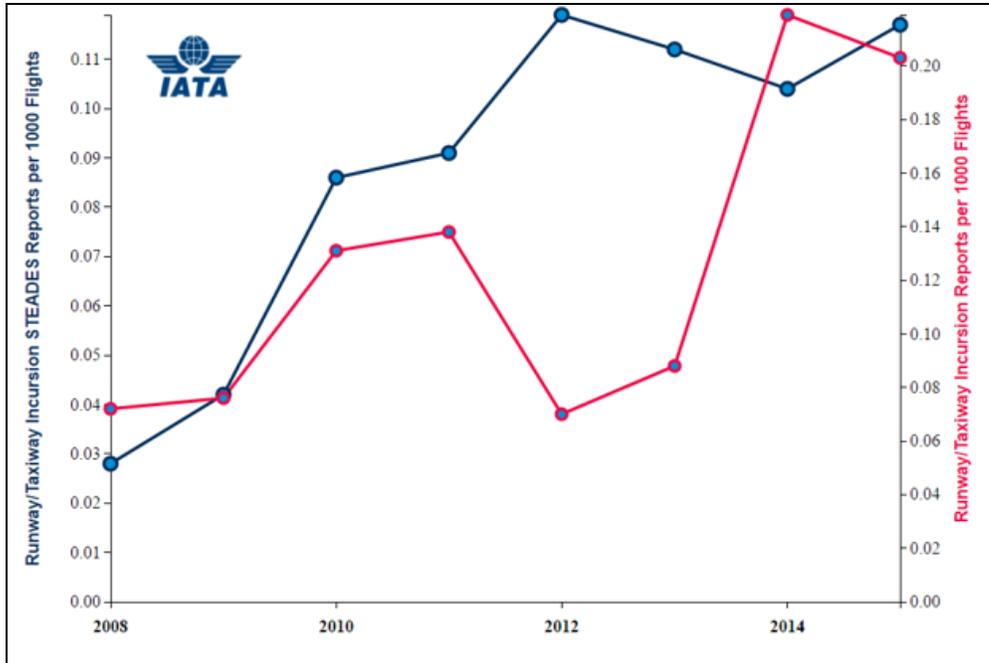
4.3.3 Region Safety Performance - Safety Indicators-Proactive

Safety Indicator	Safety Target	MID	Remark
Regional average EI	Increase the regional average EI to be above 70% by **2020**	66.17	Above the world average 63.54 %
Number of MID States with an overall EI over 60%.	11 MID States to have at least 60% EI by **2020**	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 **2017**	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 **2016**.	Nil	

Use of the IATA Operational Safety Audit (IOSA), to complement safety oversight activities.	a. Maintain at least 60% of eligible MID airlines to be certified IATA-IOSA at all times.	60%	
	b. All MID States with an EI of at least 60% use the IATA Operational Safety Audit (IOSA) to complement their safety oversight activities, by 2018.	50%	
Number of certified international aerodrome as a percentage of all international aerodromes in the MID Region	a. 50% of the international aerodromes certified by 2015.	56%	
	b. 75% of the international aerodromes certified by 2017.		
Number of established Runway Safety Team (RST) at MID International Aerodromes	50% of the International Aerodromes by 2020	42%	

5.   Predictive Safety Information

5.1   *State Safety Programme (SSP)*

SSP implementation in the MID Region is one of the main challenges faced by States, which is addressed within the RASG-MID framework, as one of the top Safety Enhancement Initiatives in the Region. Several Safety Management Workshops, trainings, Safety Summits and meetings 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. It is to be highlighted that during the Global Ministerial Aviation Summit (Riyadh, Saudi Arabia, 29 - 31 August 2016), Saudi Arabia re-confirmed the offer to host the MENA RSOO and provide financial and technical support for the first 2 years of operations.

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 2008-2015. The trend has been increasing at the 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 2015 with a slight increase in 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.
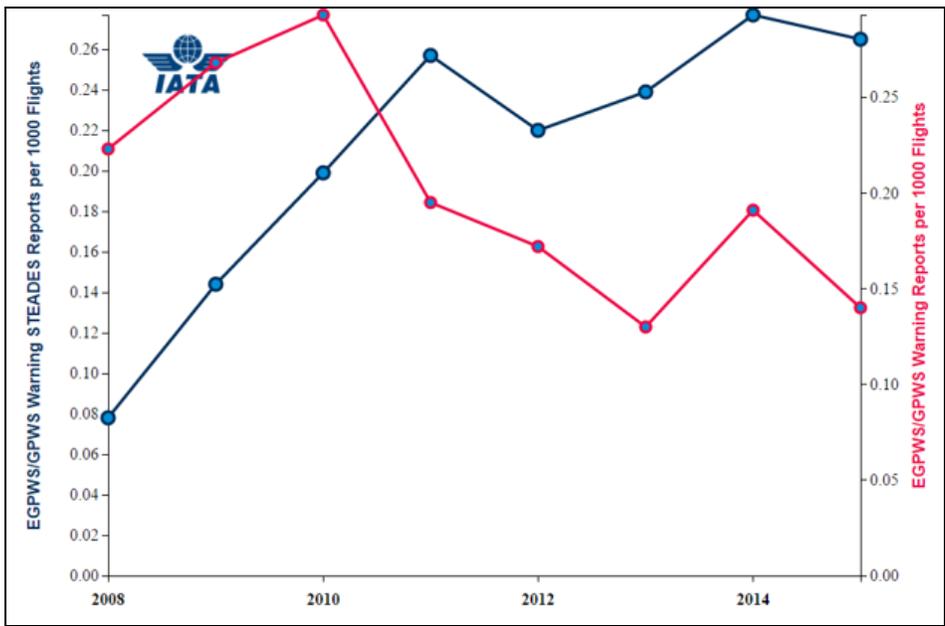

Stall warning:

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.
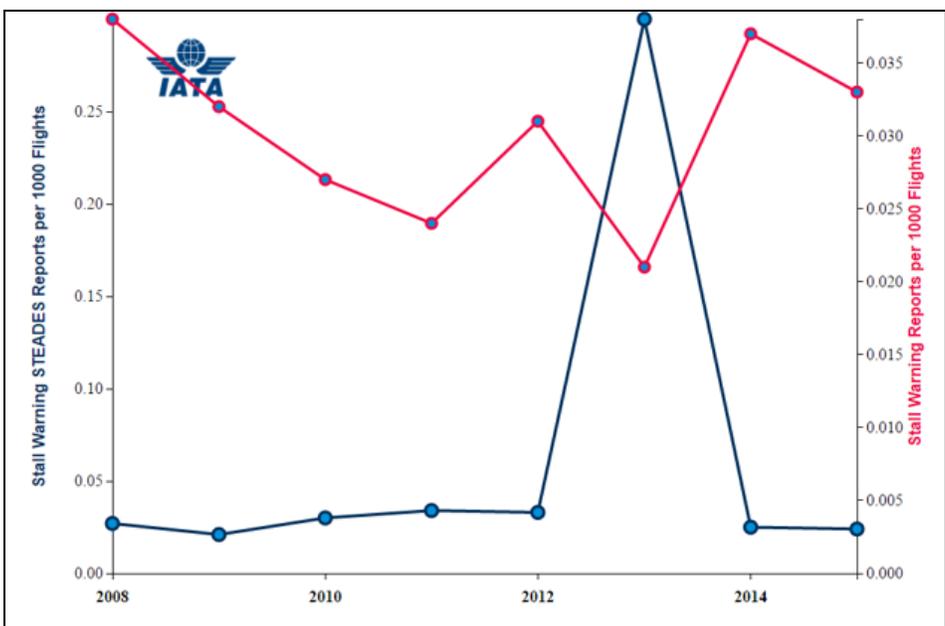
TCAS RA

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 directly linked to the Near midair collisions.
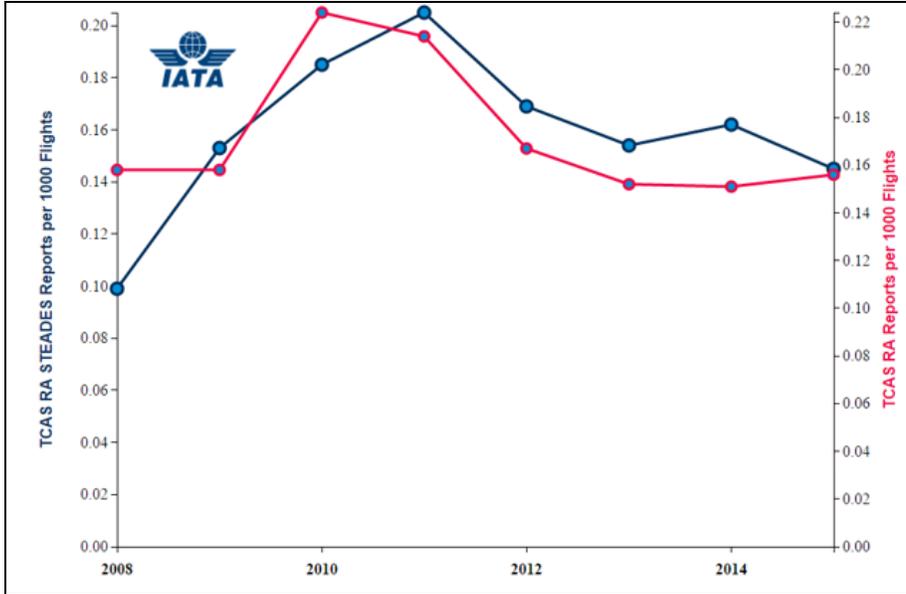
Unstable approaches:

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 have slightly increased again in 2014 and 2015. Unstable approaches are a major contributing factor for runway excursions.
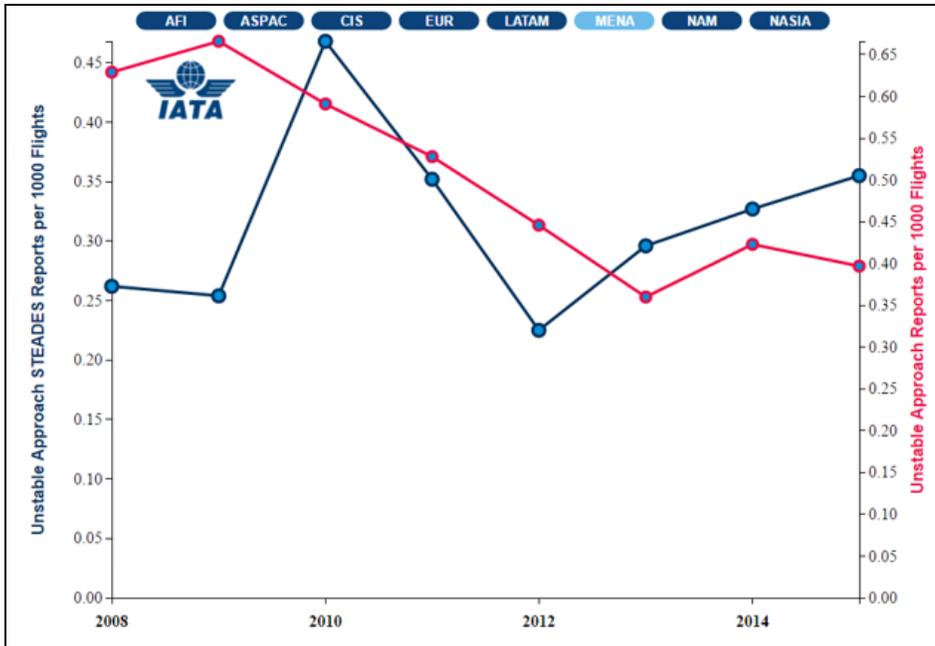
5.3 *MID Region Safety Performance – Safety Indicators – Predictive*

Safety Indicator	Safety Target	MID	Remark
Number of MID States, having completed the SSP gap analysis on iSTARS	10 MID States by 2015	**10 States**	
Number of MID States, that have developed an SSP implementation plan	10 MID States by 2015	**8 States**	
Number of MID States with EI>60%, having completed implementation of SSP Phase 1.	All MID States with EI>60% to complete phase 1 by **2016**.	**3 States** completed implementation of SSP Phase 1. **4 States** partially completed implementation of SSP Phase 1.	
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 **2017**.	**1 State** completed implementation of SSP Phase 2. **6 States** partially completed implementation of SSP Phase 2.	
Number of MID States with EI>60%, having completed implementation of SSP Phase 3.	All MID States with **EI>60%** to complete phase 3 by the end of **2018**.	**7 States** partially completed implementation of SSP Phase 3.	
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.	a. 30% of MID Stateswith EI>60% by 2015. b. 70% of MID Stateswith EI>60% by 2016. c. 100% of MID Stateswith EI>60% by 2017.	**76%** **6 States**	

6. Final Conclusions

Following the analysis of the reactive safety information provided by Boeing, IATA and ICAO for the period 2011 - 2015, it was concluded that the main Focus Areas for the MID Region continue to be:

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

It's to be highlighted that Boeing, Airbus and Embraer reported that based on their data SCF is not a concern for their type of aircraft.

The following are identified as the Emerging Risks in the MID Region:
1. Controlled Flight Into Terrain (CFIT);
2. Near Midair Collision (NMAC);
3. Laser attacks,
4. RPAS/Drones;
5. Wildlife and FOD; and
6. Birdstrike.

The following are the main challenges facing the ASRT in collecting and analyzing safety data:

1. reporting of incidents by States is very low;
2. identification of contributing factors due to lack of sufficient information for in-depth analysis;
3. unavailability of predictive safety information to be analysed in order to allow the identification and mitigation of safety concerns before accidents or incidents would even take place; and
4. differences in the safety information provided by the participating organizations due to the use of different criteria and classifications of accidents.

In order to foster and facilitate the reporting of incidents, a new tool on iSTARS "iSTARS ADREP Occurrence Data Form" is being developed by ICAO in coordination with the Accidents and Incidents Analysis Working Group (AIA WG). The AIA WG will also work on the identification of the main root causes and contributing factors of accidents and incidents.

With respect to ICAO USOAP-CMA, the average overall Effective Implementation (EI) in the MID Region is 66.17%, which is above the world average 63.54 %. The ANS is the only area below 60% EI. 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%. The common challenges/difficulties related to the USOAP CMA implementation in the MID Region include lack of sufficient human resources, ability to attract/recruit/retain technical personnel, training, separation of oversight functions and service providers/operators, and political/security situation/stability in some States.

The SSP implementation is still one of the main challenges in the Region which is addressed by the RASG-MID. Common challenges/difficulties related to SSP implementation include identification of a designated entity, establishment of an initial Acceptable Level of Safety Performance (ALoSP), allocation of resources to enable SSP implementation and lack of qualified and competent technical personnel.

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 Takrouri 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 -