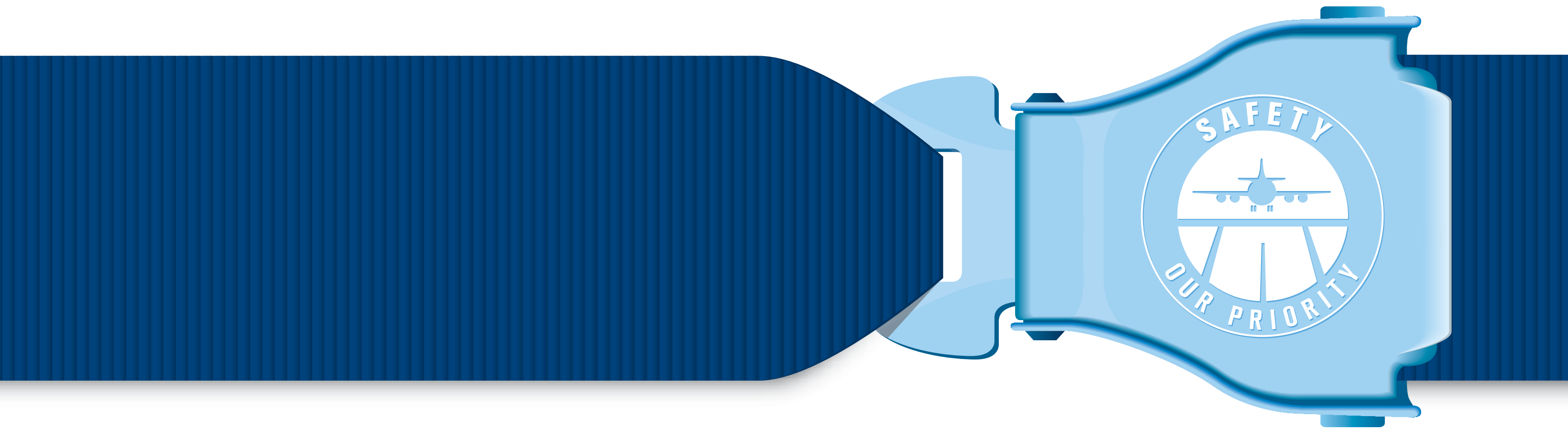
IATA

Safety Report

Issued April 2007



2006 Edition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Safety Report

Issued April 2007

International Air Transport Association
Montreal – Geneva

2006 Edition

NOTICE

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“IATA continues to pursue its mission to promote safe, secure, efficient and economical air transport in the years to come.”

Foreword

Dear Colleagues,

2006 was the safest year ever in commercial aviation and IATA achieved its goal of reducing the accident rate by 25% to 0.65 Western-built Jet hull losses per million flights. IATA members surpassed the industry in terms of Safety. They experienced 0.48 Western-built Jet hull losses per million flights in 2006.

IATA's new goal is a further 25% reduction in the accident rate by 2008 and we trust the IATA Six-point Safety Programme, which includes the IATA Operational Safety Audit (IOSA), the first global airline standard for airline safety management audits, will help achieve this. During 2006, IOSA's continued growth, as well as IATA's other safety solutions, such as the Flight Data Analysis (FDA) Service and the Safety Trend Evaluation, Analysis & Data Exchange System (STEADES) Programme, served as proactive tools that enabled IATA to contribute to the global effort of continuously enhancing Safety.

I hope you will take note of the information contained in this 43rd edition of the IATA Safety Report that has been completely redesigned based on the feedback we received from our member airlines. The report contains valuable information that can be distributed widely across your organisation to raise awareness and promote safe operations. I wish to thank the IATA Safety Group (SG) and its Accident Classification Task Force (ACTF) for all their efforts and shared expertise.

The Safety Report is essential for the communication of Safety information throughout the industry and will help us achieve our goal to improve Safety worldwide.

Günther Matschnigg
Senior Vice President
Safety, Operations & Infrastructure

Safety Report 2006 - Executive Summary

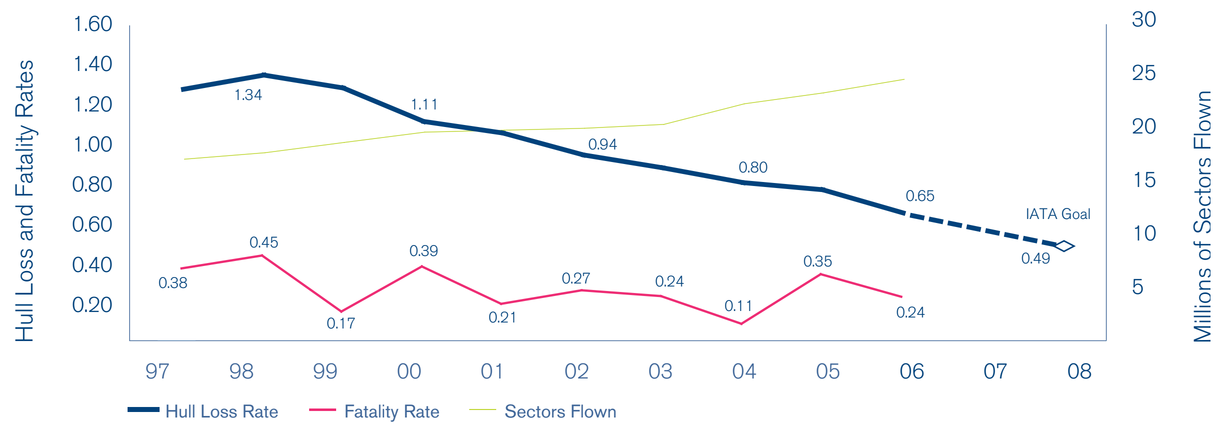
The goal of the IATA Safety Report is to present prevention strategies in order to enhance Safety of the air transport industry. These strategies are based on the analytical findings of accidents that occurred in the year 2006.

The Western-built Jet Hull Loss rate showed a continued decrease to 0.65 Hull Losses per million sectors flown, making 2006 the safest year on record. The fatality rate also dropped in comparison to the previous year.

In total, 77 accidents occurred in 2006. Compared to the previous year, the breakdown is as follows:

	Jet	Turboprop	Western-built Jet Hull Loss Rate	Fatal Accidents	Fatalities
2005	58	53	0.76	26	1035
2006	46	31	0.65	20	855

Western-built Jet Traffic, Hull Loss & Passenger Fatality Rates 1997-2006



Based on the findings from accident analysis, IATA has developed the following prevention strategies to address the top safety issues:

Lack of Flight Crew Training & Proficiency:

Almost a third of the year's accidents involved lack of fight crew proficiency. Over ¾ of these cases were linked to deficient flight crew training by the operator.

Prevention Strategy: IATA has mandated all members to be IOSA accredited by the end of 2007. IOSA Flight Operations section enables all types of operators to implement internationally recognised standards to assess their operational management and control systems and enhance operations and training.

Go-around Decision-making:

Over a third of the year's accidents took place during approach or landing. Many of these accidents could have been prevented by a timely go-around. Crews require additional training to improve the go-around decision-making process and the execution of the go-around itself.

Prevention Strategy**:** IATA to develop training standards for the decision-making process and execution of go-arounds, working with member airlines.

Runway Incursions & Runway Mis-identification:

With an increasing trend in some locations, runway safety-related issues resulted in several serious incidents in 2006 and the only fatal passenger accident to occur in North America. Human error, increase in traffic and miscommunication all played a contributing role in most of the runway incursion or runway misidentification events of the year.

Prevention Strategy**:** IATA is working with ATS providers, airports and airlines to gather and analyse data on issues that are a concern to the airlines, including runway incursion prevention at specific airports.

Mid-air Collisions:

Although these are of low probability, mid-air collisions are of high severity, resulting in significant loss of life and destruction of aircraft. The accuracy of navigation systems makes it necessary to ensure that aircraft are always flying at the appropriate altitude. Contributing factors, such as level busts and ATC-pilot communication issues must be actively mitigated.

Prevention Strategy**:** IATA to work with airlines, equipment manufacturers and ATS providers on level busts analysis and lateral offset procedures to prevent mid-air collisions.

Lack of Readily Available & Accurate Meteorological / Surface Contamination Data:

Adverse weather was cited as a contributing factor in a third of the year's accidents. In many of these cases, flight crews did not have access to updated weather information or accurate runway condition reports, which could have prevented the accident.

Prevention Strategy**:** Operators should implement revised dispatch criteria to ensure timely and accurate information is provided to their flight crews.

Also based on the findings from accident analysis, IATA has determined the following regional priorities for 2007:

Safety in Russia:

Accidents in Russia and other countries belonging to the Commonwealth of Independent States (CIS) have raised concern over the levels of safety in this area. CIS had the highest accident rate of all the regions in 2006, with 8.6 Western-built Jet Hull Losses per million sectors flown, versus the 0.65 world average.

Prevention Strategy**:** IATA to work with Russian carriers, Civil Aviation Authorities and ICAO to implement Safety Management Systems amongst airlines in Russia.

Safety in Africa:

The accident rate in terms of Western-built Hull Losses in this region was the second highest in the world, following CIS. Poor regulatory oversight, the lack of safety management and deficient flight crew training are amongst the top contributing factors to the accidents in the region.

Prevention Strategy**:** IATA to continue supporting airlines in Africa to help them reach IOSA standards via the Partnership for Safety (PfS) programme, which provides practical and targeted support via seminars, gap audits and training.

Additionally, the use of available technologies could have prevented several accidents in 2006. Airlines should ensure that aircraft are fitted with proper equipment and that software databases are kept up to date. Section 6 in this report covers technology and accident prevention.

In 2007, IATA continues to work with its member airlines, as well as stakeholders and regulators, to align its strategy and develop solutions to meet the needs of the industry and enhance operational Safety.

Ground damage costs the airline industry over US$4 billion per year. To assist with this important issue, the IATA Safety Audit for Ground Operators (ISAGO) is now under development and will help airlines enhance safety and operational efficiency.

Through its well-established Six-point Safety Programme, widely implemented IOSA Programme and new and innovative initiatives, such as the Integrated Airline Management System, IATA pursues its mission to promote safe, secure, efficient and economical air transport in the years to come.


IT ALL ADDS
UP
What's up at Bombardier? In a word, everything. Eighteen new aircraft programs since 1989. A broad portfolio of stellar business jets, regional jets, turboprops and amphibious firefighters. Each celebrated for reliable, superlative performance. And all supported by world-class Bombardier services on a global scale. So go ahead and add it all up. The bottom line is Bombardier.
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The MTU Maintenance group is renowned for excellent-value engine maintenance. For a quarter of a century, the company has been a reliable partner of many airlines, offering a compelling choice of customized service packages.
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MTU Maintenance

Section 1

IATA Annual Safety Report

Founded in 1945, The International Air Transport Association (IATA) represents, leads and serves the airline industry. IATA's membership includes some 250 airlines comprising approximately 94% of all international scheduled traffic. IATA's global reach extends to 115 nations through 78 offices in 72 countries.

IATA calls upon the vast and representative expertise of its Member Airlines, industry stakeholders and offices worldwide when determining the lessons learned from accidents.

The Safety Report is created immediately following the year under review. Alongside accident statistics and trends examined, the Report presents contributing factors to the year's accidents with the goal of developing prevention strategies to enhance safety.

Purpose of the Safety Report

The purpose of the Safety Report is fully described in **Appendix A** on the CD-ROM. Its primary purpose is to assist with maintaining safety vigilance by identifying the areas of greatest risk apparent from the experience of aircraft accidents. It aims to offer practical advice to airlines in accident prevention against the backdrop of accidents that have occurred in 2006.

Safety Report Format

In addition to presenting areas of concern and prevention strategies, the Safety Report also provides tools for safety management. There is a CD-ROM included in the report, which is divided into the following sections:

- **Safety Report**, containing the Report, Appendices and PowerPoint slide support package;
- **Supporting Documents**, containing additional material supporting discussions in the report;
- **Safety Toolkit**, containing useful and practical material for use at airlines;
- **CEO Brief**, containing executive summary and PowerPoint presentation.

Image courtesy of Bombardier

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Accident Classification Task Force

The IATA Safety Group (SG) created the Accident Classification Task Force (ACTF) in order to analyse accidents and identity contributing factors, determine trends and matters of concern in aviation safety worldwide from the accident database available and to develop prevention strategies related thereto, which are incorporated into the annual IATA Safety Report.

The ACTF is composed of airline safety experts from IATA Member Airlines and representatives from the aeronautical industry and regulatory boards. The group is instrumental in the analysis process, in order to produce a safety review based on subjective evaluations for the classification of accidents. The data analysed and presented in this report comes from a variety of sources, including Airclaims Ltd., government accident reports and other sources. Once assembled, the ACTF validates each accident report with their expertise to develop as accurate a picture as possible of the events.

IATA Regions

At the time of writing the 2006 Safety Report, regions are delineated using the definition set out by IATA. Further information can be found in **Appendix B** of the CD-ROM.

Appendix A on the CD-ROM further describes the role of the ACTF in more detail. Representation at the ACTF is as follows:

Dr. Dieter Reisinger AUSTRIAN AIRLINES (Chair)	Mr. Serge Larue IATA
Captain Georges Merkovic AIR FRANCE	Mr. Martin Maurino IATA (ACTF Secretary)
Captain Jean-Lucien Tarrillon AIR FRANCE RÉGIONAL	Captain Karel Mündel IFALPA
Mr. Jean Daney AIRBUS INDUSTRIE	Mr. Bert Ruitenberg IFATCA
Captain Angelo Ledda ALITALIA LINEE AEREE ITALIANE	Captain Keiji Kushino JAPAN AIRLINES INTERNATIONAL
Captain David C. Carbaugh BOEING COMPANY	Mr. Richard Fosnot JEPPESEN
Mr. Jim Donnelly BOMBARDIER	Mr. Willem Diederichs LUFTHANSA GERMAN AIRLINES
Mr. Alan Rohl BRITISH AIRWAYS	Captain Abdulhameed S. Al-Ghamdi SAUDI ARABIAN AIRLINES
Mr. Luis Savio dos Santos EMBRAER AVIATION INTERNATIONAL	Captain Marco Müller SWISS INTERNATIONAL AIR LINES
Mr. Don Bateman HONEYWELL	Captain Carlos dos Santos Nunes TAP AIR PORTUGAL

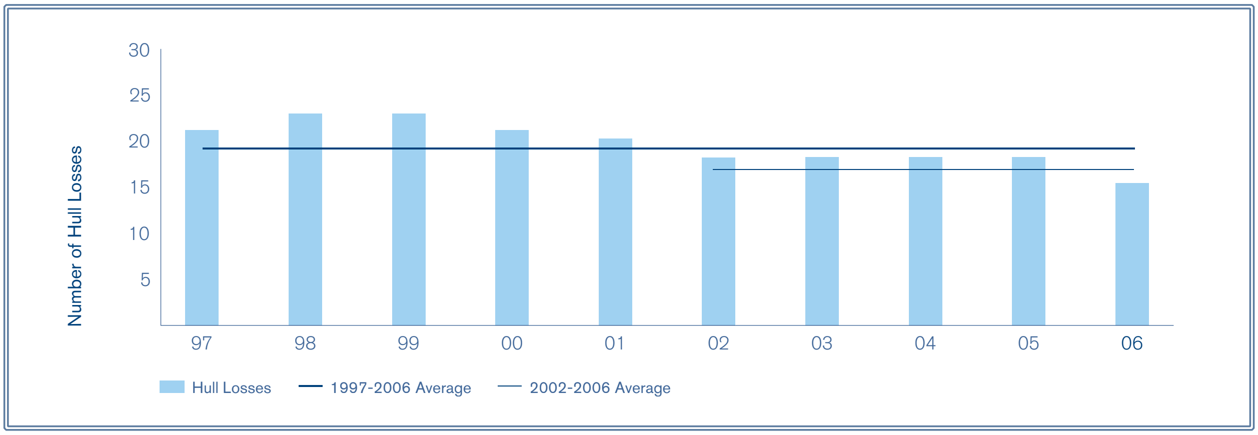
Section 2

2

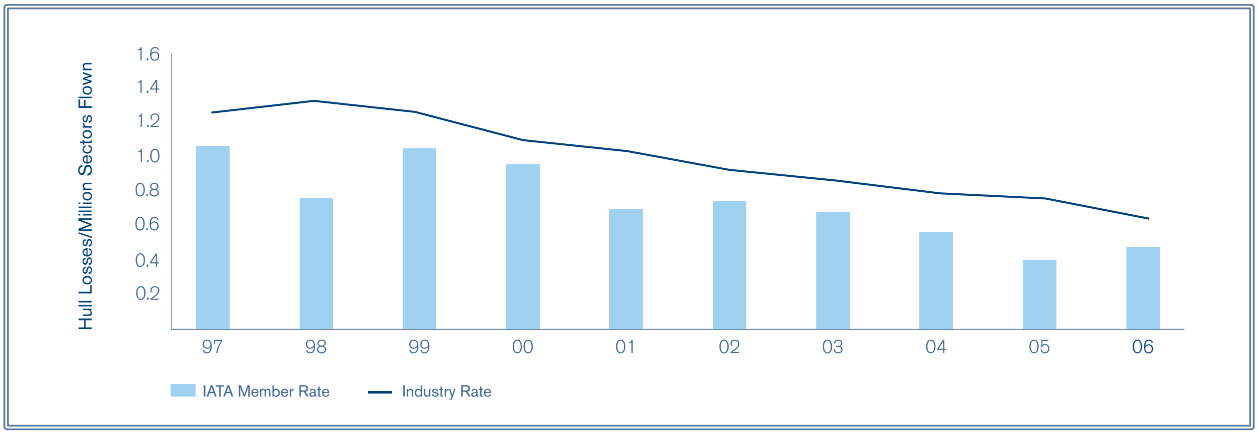
Decade in Review

ACCIDENT / FATALITY STATISTICS AND RATES

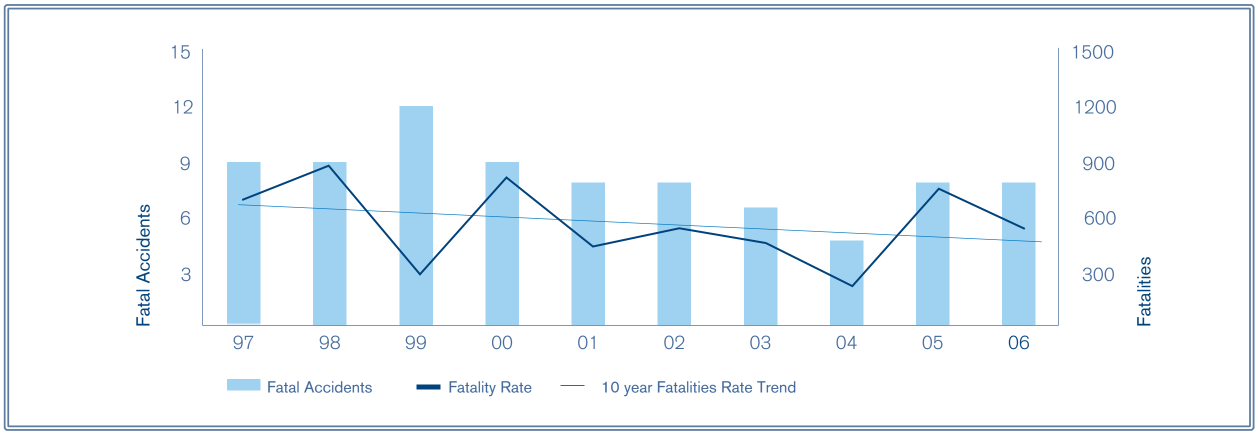
Western-built Jet Aircraft Hull Losses (1997-2006)



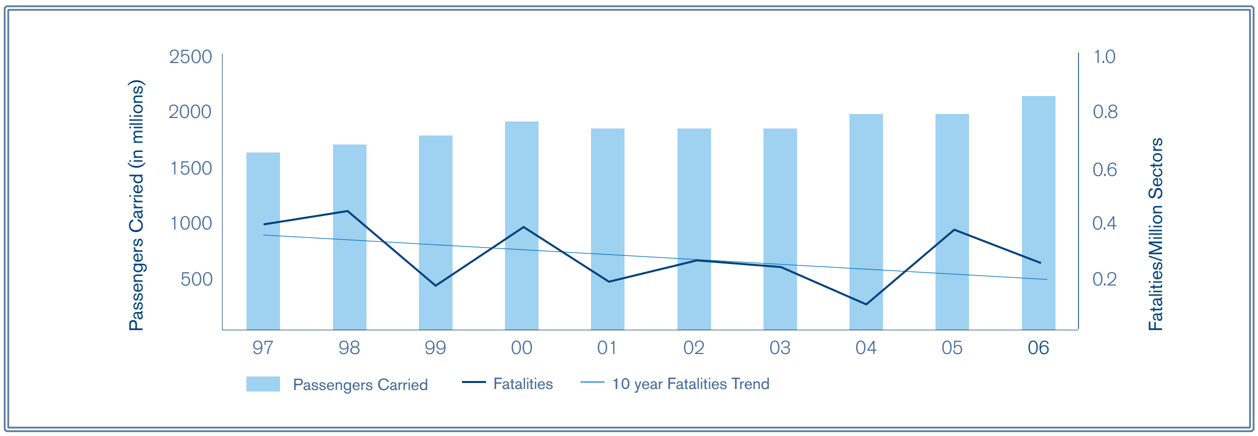
Western-built Jet Aircraft Hull Loss Rate: IATA Member Airlines vs. Industry (1997-2006)



Western-built Jet Aircraft: Fatal Accidents & Fatalities (1997-2006)

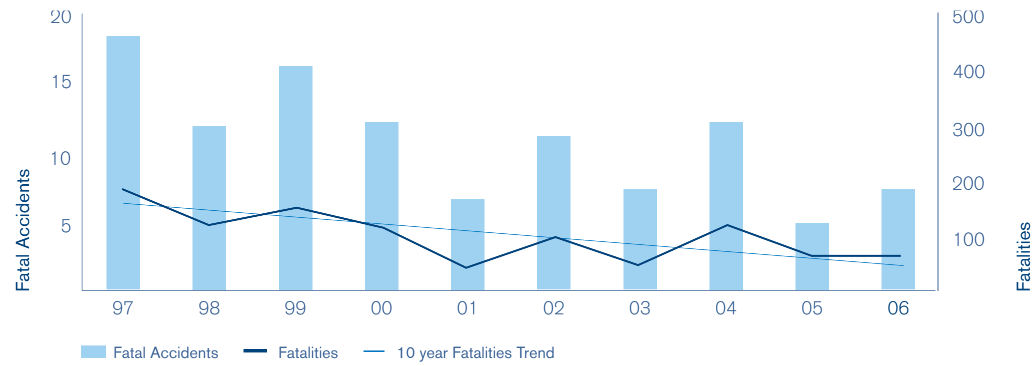


Western-built Jet Aircraft: Passengers Carried & Passenger Fatality Rate (1997-2006)



Western-built Turboprop Aircraft Hull Losses & Accident Rate (1997-2006)

Western-built Turboprop Aircraft: Fatal Accidents & Fatalities (1997-2006)

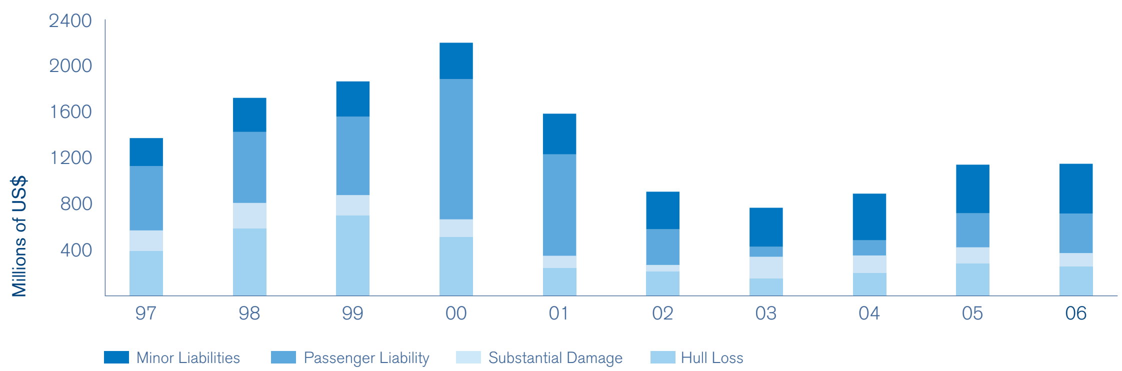


ACCIDENT COSTS

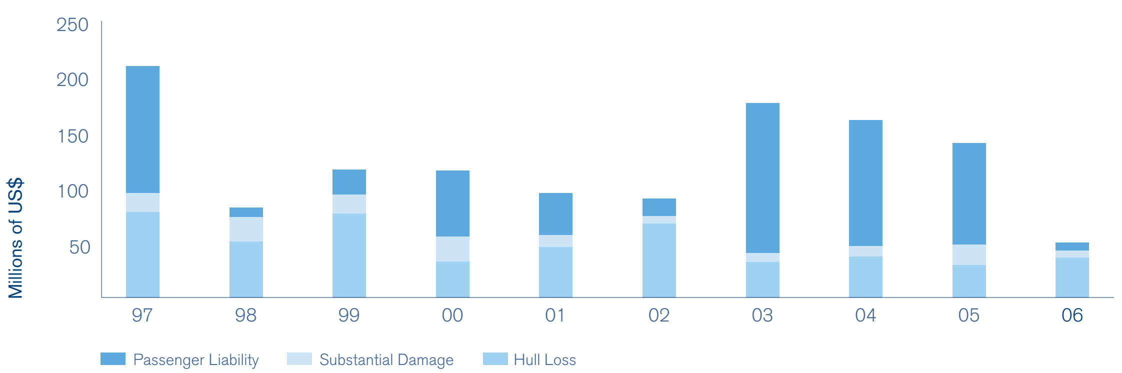
IATA has obtained the estimated costs for all losses involving Western-built aircraft over the last 10 years, as well as current year estimates for the Eastern-built fleet.

The figures presented in this section are operational accidents excluding security-related events and acts of violence. All amounts are expressed in US dollars.

Western-built Jet Aircraft: Accident Costs (1997-2006)



Western-built Turboprop Aircraft: Accident Costs (1997-2006)



“IOSA enables all types of operators to implement internationally recognised standards.”

Section 3

3

Year 2006 in Review

AIRCRAFT ACCIDENTS

There were a total of 77 accidents in 2006. Descriptions of all the year's accidents are presented in **Annex 2**.

Fleet Size, Hours and Sectors Flown

	Western-built Aircraft		Eastern-built Aircraft	
	Jet	Turboprop	Jet	Turboprop
World Fleet (end of year)	18114	4624	1626	1593
Hours Flown (millions)	44.33	6.78	1.35	0.66
Sectors (landings) (millions)	24.79	8.03	0.61	0.46

Operational Accidents

	Western-built Aircraft		Eastern-built Aircraft	
	Jet	Turboprop	Jet	Turboprop
Hull Loss (HL):	16	12	2	4
Substantial Damage (SD):	26	14	2	1
Total Accidents:	**42**	**26**	**4**	**5**

3

Operational Hull Loss Rates

	Western-built Aircraft		Eastern-built Aircraft	
	Jet	Turboprop	Jet	Turboprop
Hull Losses per million sectors:	0.65	1.49	3.26	8.61
Hull Losses per million hours:	0.34	1.82	1.56	5.85

Passengers Carried

	Western-built Aircraft		Eastern-built Aircraft	
	Jet	Turboprop	Jet	Turboprop
Passengers Carried (millions):	2,136	122	38	7
Estimated Change in Passengers Carried Since the Previous Year	+6%	0%	+3%	0

2006 Western-built Jet Aircraft Fatal vs. Non-fatal Accidents

	AFI	EUR	ASPAC	LATCAR	MENA	NAM	NASIA	CIS
Total Accidents:	5	14	15	15	6	17	1	4
Total Fatal Accidents:	2	2	3	4	1	5	0	3
Total Fatalities (crew and passengers):	113	7	66	180	28	54	0	407

Fatalities by Aircraft Type

	Western-built Aircraft		Eastern-built Aircraft	
	Jet	Turboprop	Jet	Turboprop
Passenger Fatalities:	517	57	188	31
Crew Fatalities:	30	17	10	5
Total Fatalities:	547	74	198	36

Accidents by Phase of Flight

	Hull loss	Substantial damage
FLP	0	0
PRF	0	0
ESD	0	5
TXO	0	3
TOF	3	6
ICL	1	0
ECL	1	1
CRZ	6	1
APR	4	1
LND	15	26
GOA	4	0
TXI	0	0
AES	0	0
PSF	0	0
FLC	0	0
GDS	0	0

Fatal Accidents and Fatalities by Phase of Flight

	Fatal Accidents	Fatalities
FLP	0	0
PRF	0	0
ESD	1	1
TXO	0	0
TOF	2	145
ICL	1	45
ECL	1	1
CRZ	6	361
APR	2	22
LND	4	157
GOA	3	123
TXI	0	0
AES	0	0
PSF	0	0
FLC	0	0
GDS	0	0

3

Phase of flight definitions

FLP Flight Planning
PRF Pre-flight
ESD Engine Start/Depart
TXO Taxi-out
TOF Take-off
RTO Rejected Take-off
ICL Initial Climb
ECL En Route Climb
CRZ Cruise
APR Approach
LND Landing
GOA Go-around
TXI Taxi-in
AES Arrival/Engine Shutdown
PSF Post-flight
FLC Flight Close
GDS Ground Servicing

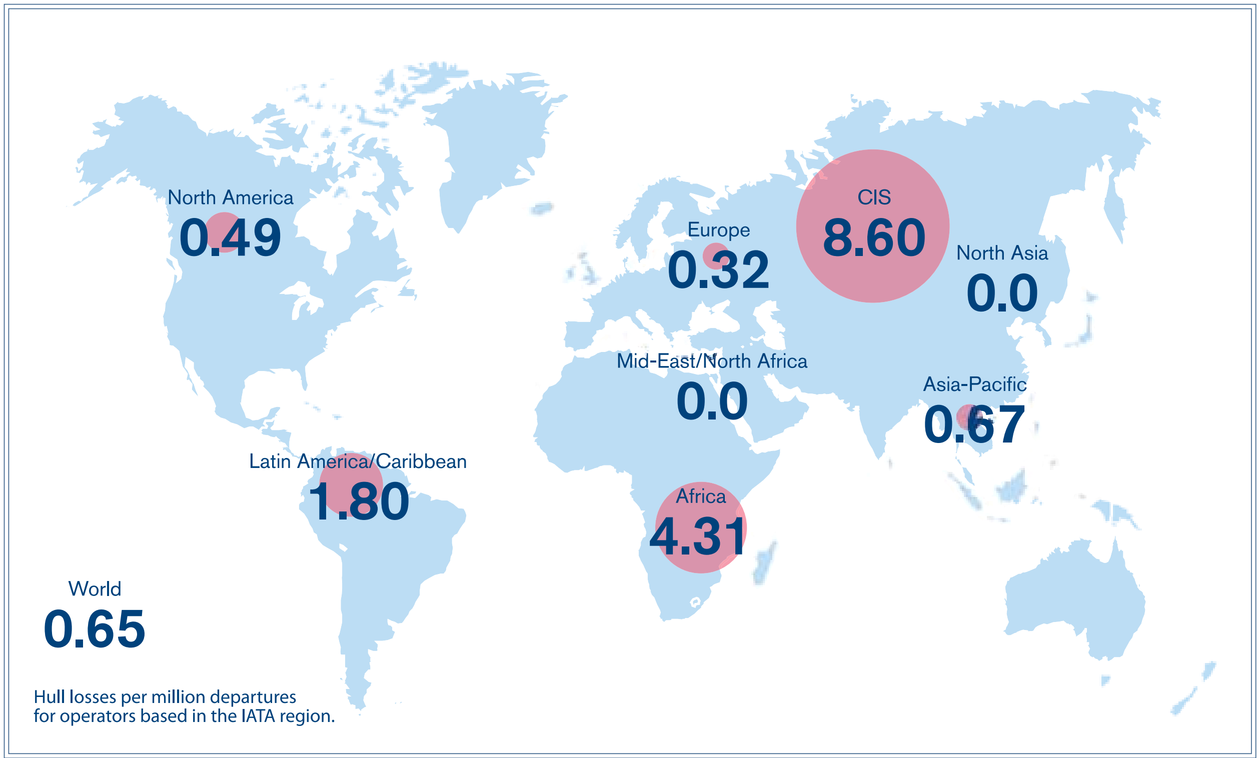
3

AIRCRAFT ACCIDENTS BY REGION

Western-built Aircraft Accidents By Operator Region

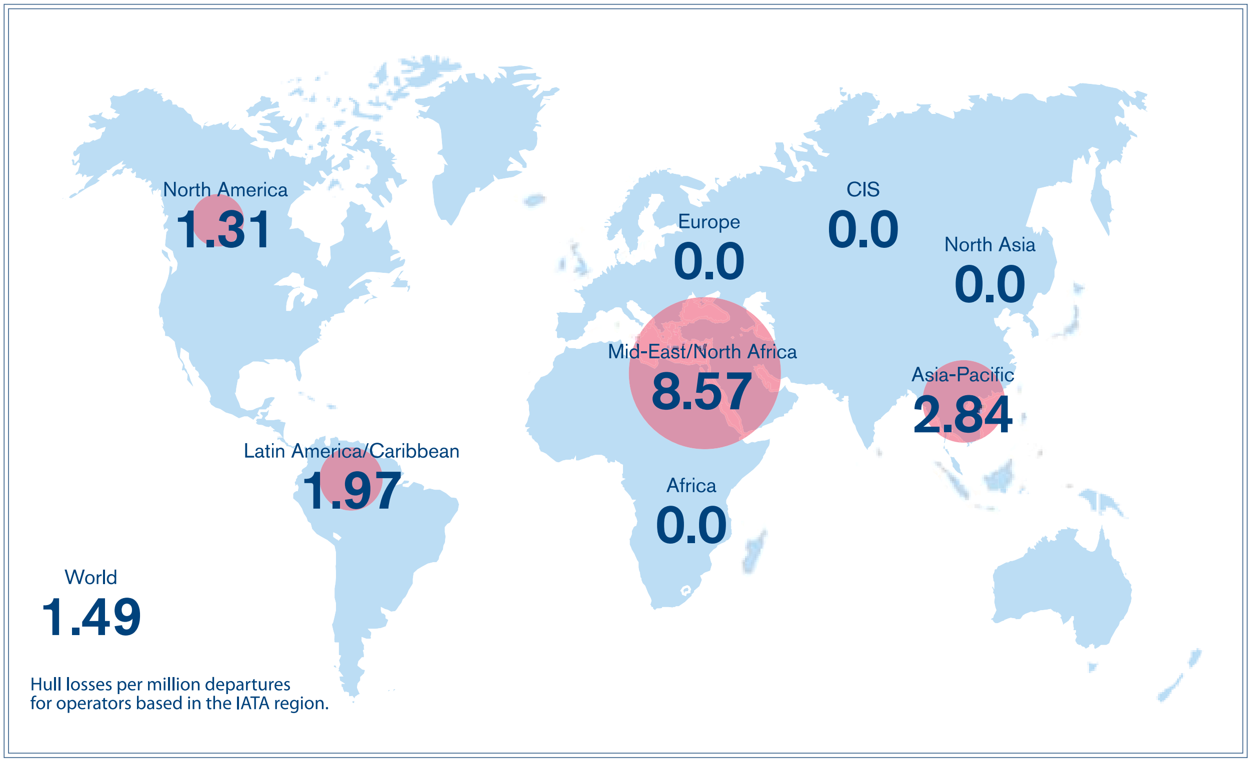
Sectors are calculated on a regional basis using the operator's country of AOC to determine what region they belong in. Accordingly, the rates presented below are by operator region and not by occurrence region as presented above in previous graphs.

Western-built Jet Aircraft Hull Loss Rate by Operator Region



- The world map above illustrates regional accident rates for Western-built Jet aircraft.
- Russia / CIS had the highest accident rate in 2006.
- Africa had the second highest accident rate, followed by the Latin American / Caribbean region.
- There were no accidents resulting in Western-built Jet aircraft Hull Losses in the Middle East / North African region nor in North Asia during 2006.
- The accident rates in CIS and Africa are affected by the relatively low number of sectors flown by Western-built Jet aircraft in these regions, when compared to the others.

Western-built Turboprop Aircraft Hull Loss Rate by Operator Region



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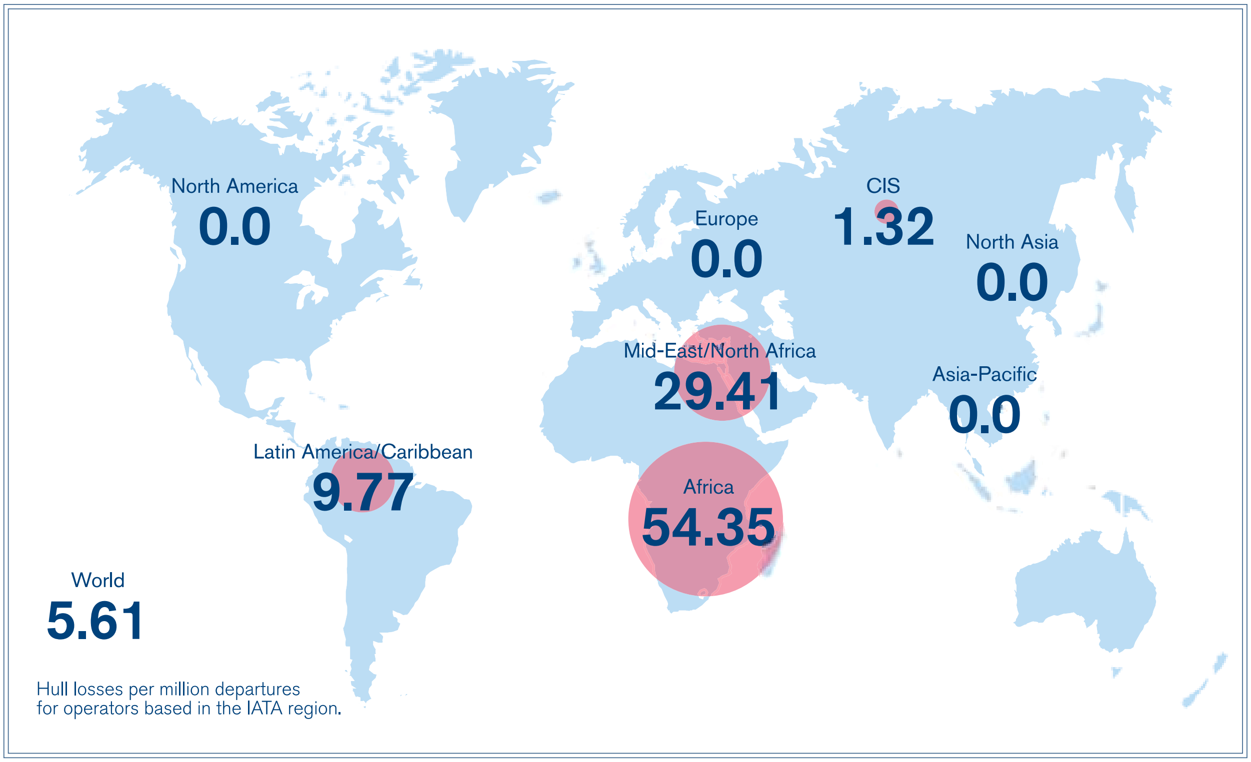
- The world map above illustrates the Western-built Turboprop aircraft accident rates by region of operator.
- Contrary to the Western-built Jet statistics, the Middle East/ North African region had the highest accident rate in this category.
- This rate can be affected by the relatively low number of Western-built Turboprop aircraft sectors flown in this region, when compared to the others.
- Asia Pacific and Latin America / the Caribbean also had accident rates above the world average.

Eastern-built Aircraft Accidents By Operator Region

IATA has also obtained exposure data for the Eastern-built fleets. The regional accident loss rate breakdown by operator region is presented below.

Eastern-built Aircraft (All Types) Hull Loss Rate by Operator Region



- Africa had the highest accident rate for Eastern-built aircraft in 2006.
- The Middle East / North African region had the second highest regional accident rate followed by the Latin American / Caribbean region.
- These accident rates can be associated to the relatively high number of sectors flown by Eastern-built aircraft in these regions in comparison to other parts of the world.
- Russia / CIS had a relatively low accident rate for Eastern-built aircraft in comparison to the Western-built Jet aircraft rate. This can be associated to the higher number of sectors flown by Eastern-built aircraft in this area, in comparison the Western-built fleets.

Section 4

In-Depth Accident Analysis 2006

DATA COLLECTION AND CLASSIFICATION

Overview of How Events are Classified

- IATA has developed an accident classification system.
- It has four broad categories of contributing factors:
  - Human
  - Organisational
  - Environmental
  - Technical
- Each of these categories is subdivided into more concise contributing factors.
- Accidents are generally the result of a combination of factors.
- Therefore, one accident may be attributed several factors from various categories.
- Reports, which contain little or no information, are coded as “insufficient data”.
- Analysis of contributing factors only takes into account events that contained sufficient data.
- Definitions of contributing factors categories are presented in Annex 1.

Note: The assignment of classifications is based on a subjective assessment of the contributing factors that are believed to have played a role in an accident.

Application of the TEM Framework

- The Threat and Error Management (TEM) framework helps to underline the classification system used by IATA to determine contributing factors.
- Contribution factors can be viewed as threats or as errors (also referred to as “crew actions”).
- Threats are situations external to the flight deck that must be managed by flight crew in everyday operations. These threats can endanger flight safety and increase the complexity of operations.
  - They include organisation, environmental or technical factors.
- Errors are actions taken by the operating flight crew, or lack thereof, which lead to deviations from their expectations or intentions or from those of the organisation.
  - They are the human factors category.
- An undesired aircraft state occurs when the flight crew’s actions or inactions place the aircraft in a situation in which margins of safety are reduced.
- Figure 4.1 illustrates the TEM framework.

Fig. 4.1 Threat and Error Management Framework

4

IN-DEPTH ANALYSIS OF EVENTS BY ACCIDENT CATEGORY

- This section presents an in-depth analysis of the 2006 events by accident categories, as illustrated in figure 4.2.
- A focus is also placed on topics of particular interest for the year 2006.
- The term “accident categories” refers to a generic classification of accidents.
- Definitions of these categories can be found on the Safety Report CD-ROM, file entitled: “Accident Categories Definitions”.
- Table 4.3 illustrates the breakdown of categories in accordance to severity and probability of occurrence:

Fig 4.2 Accident Categories

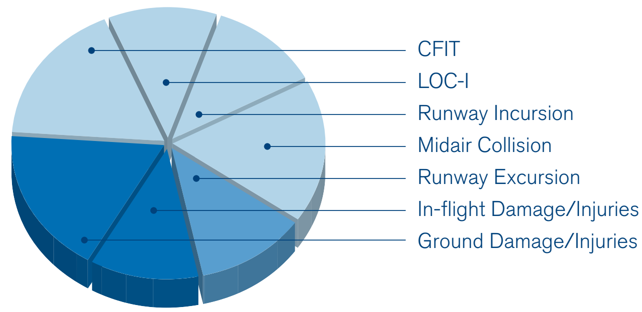


TABLE 4.3 Classification of accident categories

Accident Category	Description
Controlled Flight into Terrain (CFIT) Loss of Control In-flight (LOC-I) Runway Incursion Midair Collision	Generally a Total Loss (aircraft & occupants) • Maximum severity • Low probability
Runway Excursion	Possible Hull Loss and historically few fatalities • Low severity • Higher probability
In-flight Damage / Injuries Ground Damage / Injuries	High costs (remote fatalities) • Low (high) severity • Higher probability

- Referring to these categories helps an operator to
  - Structure its safety activities and set priorities.
  - Avoid “forgetting” key risk areas, when a type of accident does not occur in a given year.
  - Provide resources for well-identified prevention strategies.
  - Address systematically and continuously these categories in the airline’s SMS.

Note: Only one event corresponding to the mid-air collision category and one event relating to the runway incursion category occurred in 2006. Despite few events in these categories, accident precursors have been identified and discussed among IATA member airlines. Analysis of these issues, and prevention strategies to mitigate the risks associated with them, are addressed in Section 8 of this report.

Year 2006 Aircraft Accidents

77 Accidents

IATA Members **40%**

Jet 60%

IATA MEMBERS 59%

39%	61%	76%	24%
Hull loss	Substantial damage	Passenger	Cargo

Turboprop 40%

IATA MEMBERS 13%

52%	48%	77%	23%
Hull loss	Substantial damage	Passenger	Cargo

Jet Aircraft

Top Threats

- 43% Adverse weather
- 33% Training issues
- 24% Airport facilities
- 21% ATC
- 19% Deficient SMS

Top Flight Crew Actions

- 38% Communication issues
- 31% Proficiency issues
- 29% Procedural errors

Correlations of Interest*

- 75% of **H4** had **E1**
- 69% of **H2** had **O2** & **E1**
- 38% of **H3** had **E2**

Note: 9% of accidents not classified (insufficient data)

- The majority of procedural flight crew errors on Jet aircraft occurred in adverse weather.
- There is a correlation between accidents involving flight crew proficiency issues, crew training deficiencies by the operator and cases where adverse weather played a role.
- 2/3 of the communications issues noted as contributing factors were between flight crewmembers and the remaining 1/3 were between flight crew and ATC.

*See Annex 1 for Code Definition

Turboprop Aircraft

Top Threats

- 42% Adverse weather
- 42% Training issues
- 42% Deficient SMS
- 26% Poor regulatory oversight
- 21% Engine failure

Top Flight Crew Actions

- 47% Proficiency issues
- 32% Procedural errors
- 26% Communication issues

Correlations of Interest*

- 60% of **H3** had **O2**
- 56% of **H2** had **E1**
- 36% of **O1** had **E7**

Note: 39% of accidents not classified (insufficient data)

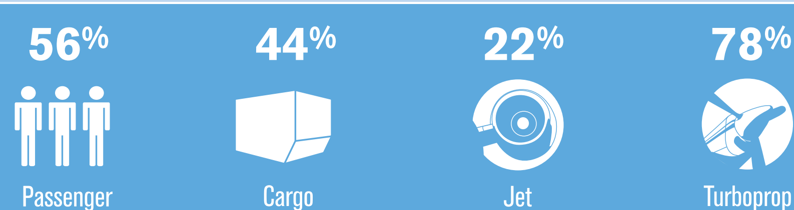
- Communication errors and CRM issues were linked to inadequate flight crew training in the majority of Turboprop accidents involving these as contributing factors.
- As with Jet aircraft accidents, proficiency errors occurring in adverse weather were also noted here.
- Over a third of accidents involving inadequate or absent SMS were linked to poor regulatory oversight by the State of the Operator

4

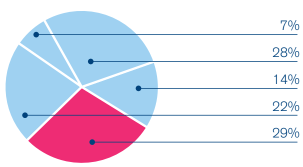
Controlled Flight Into Terrain (CFIT)

9 Accidents

IATA Members **1 case**



CFITs per Million Sectors Flown



CFITs by Phase of Flight

Top Threats

100% Deficient SMS
83% Training issues
83% Adverse weather

Top Flight Crew Actions

67% Proficiency issues
50% Communication issues
50% Procedural issues

Correlations of Interest**

All **H4** had **O1 & O2**
75% of **H2** had **O1 & O2**
67% of **H3** had **E1** & **O1**
50% of **H2** had **E1** & **O2**

- All the accidents involving procedural errors by flight crew also involved training issues and lack of SMS.
- Three quarters of the proficiency issues were also linked to deficiencies in training and SMS.
- The majority of accidents involving communication issues also cited training deficiencies and adverse weather as contributing factors in the CFIT.
- Half of the accidents where flight crew proficiency played a role were also attributed to training issues and adverse weather.
- A third of CFIT accidents occurred during the execution of a go-around. This will be addressed in detail later in the report.
- One CFIT accident involved an aircraft equipped with E-GPWS: the aircraft impacted water with the flight crew suffering from spatial disorientation. E-GPWS provided 15 seconds of warning.

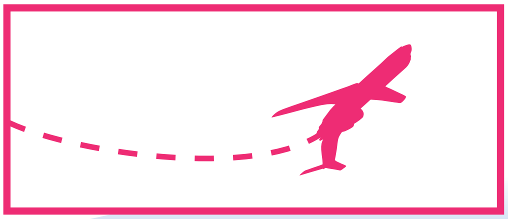
Note: 33% of accidents not classified (insufficient data)

* Accidents per Million Sectors Flown for all aircraft types
** See Annex 1 for Code Definition

Loss of Control In-flight (LOC-I)

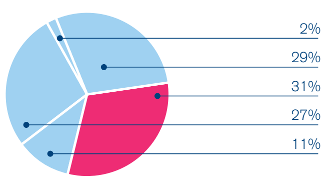
5 Accidents

IATA Members **40%**



60%	40%	60%	40%
Passenger	Cargo	Jet	Turboprop

LOC-I per Million Sectors Flown



LOC-I by Phase of Flight

Top Threats

80% Training issues
60% Adverse weather
40% Technical issues

Top Flight Crew Actions

60% Proficiency issues
40% Procedural errors
40% Communication issues

Correlations of Interest**

All **H3** had **E2**
All **H2** had **O2** & **E1**

- All the accidents involving communication issues as contributing factors related to pilot–ATC communications.
- In all accidents involving flight crew proficiency issues, training deficiencies and adverse weather were also noted as contributing factors.

Note: all accidents classified

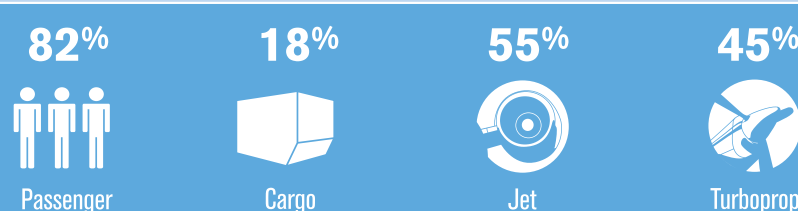
* Accidents per Million Sectors Flown for all aircraft types
** See Annex 1 for Code Definition

4

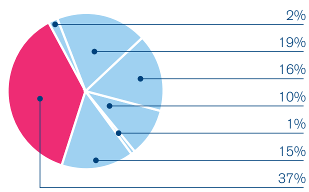
Runway Excursion (RE)

22 Accidents

IATA Members **27%**



RE per Million Sectors Flown



Top Threats

- 69% Adverse weather
- 25% Airport facilities
- 25% Dispatch

Top Flight Crew Actions

- 50% Communication issues
- 38% Proficiency issues
- 25% Procedural errors

Correlations of Interest**

- 75% of **H3** had **E1**
- 50% of **O12** had **E1**
- 33% of **H2** had **O2** & **E1**

- All accidents were on Landing
- The majority of accidents involving pilot-to-pilot communication/CRM issues occurred in adverse weather.
- A correlation was also noted between adverse weather and dispatch-related issues.
- In many of these cases, flight crews did not have access to updated weather information or accurate runway condition reports, which could have prevented the accident.
- Lack of readily available & accurate meteorological / surface contamination data will be discussed later in this report.
- Infrastructure deficiencies such as unsuitable overrun areas and threats, due to structures in close proximity to runways increased the severity of some runway excursions.
- A correlation between flight crew proficiency issues, deficient training and operations in adverse weather was also noted in a third of accidents.

Note: 27% of accidents not classified (insufficient data)

* Accidents per Million Sectors Flown for all aircraft types

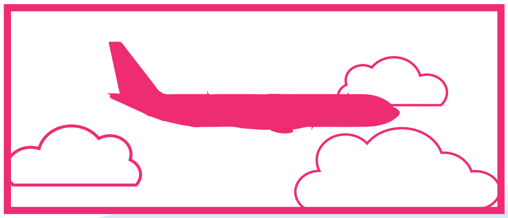
** See Annex 1 for Code Definition

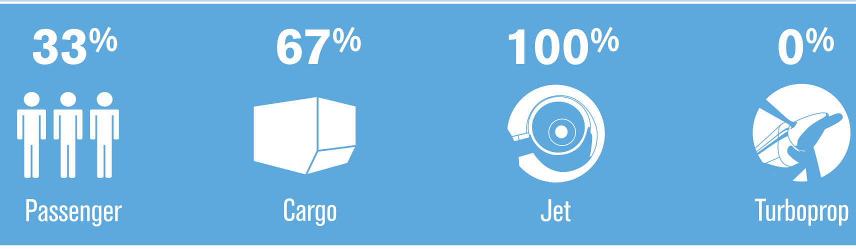
In-flight Damage / Injuries (IFLT)

4

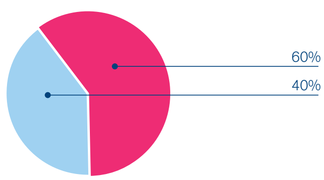
3 Accidents

IATA Members **100%**





In-flight damage per million sector flown.



IFLT Accidents by Phase of flight

Top Threats

33% Uncontained engine failure
33% In-flight fire
33% Adverse weather

Top Flight Crew Actions

33% Proficiency issues
33% Procedural errors

Correlations of Interest**

1 case - **H2** had **O2** – **O6** – **E1**

- Few accidents involving in-flight damage or injuries occurred in 2006.
- Flight crew proficiency and training issues in the use of weather radar are key elements to prevent damage resulting from adverse weather.

Note: all accidents classified

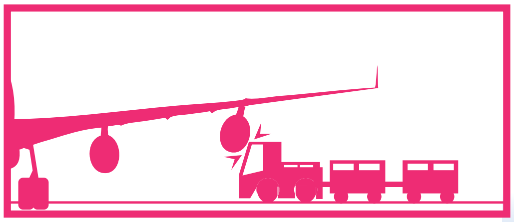
* Accidents per Million Sectors Flown for all aircraft types
** See Annex 1 for Code Definition

4

Ground Damage / Injuries (GND)

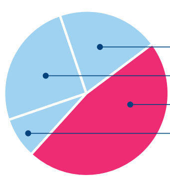
7 Accidents

IATA Members **71%**

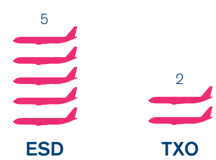


100%	0%	86%	14%
Passenger	Cargo	Jet	Turboprop

Ground Damage per Million Sectors Flown



Ground Damage by Phase of Flight



Top Threats

33% Airport facilities
33% Maintenance
17% Ground ops

Top Flight Crew Actions

17% Communication issues
17% Procedural errors

Correlations of Interest**

No significant correlations

57% of events = Ground Collision between aircraft

43% of events = Ramp damage

- IATA members were severely affected in this accident category.
- The majority of accidents (57%) involved collisions between aircraft during the taxi phase.
- The remaining 43 % of accidents involved damage on the ramp during preflight.
- The lack of standardized ground handling procedures contributed to ramp damage.

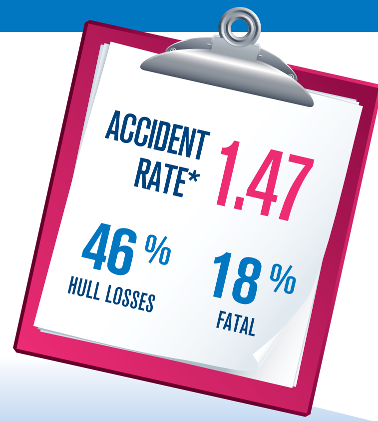
Note: 1 accident not classified (insufficient data)

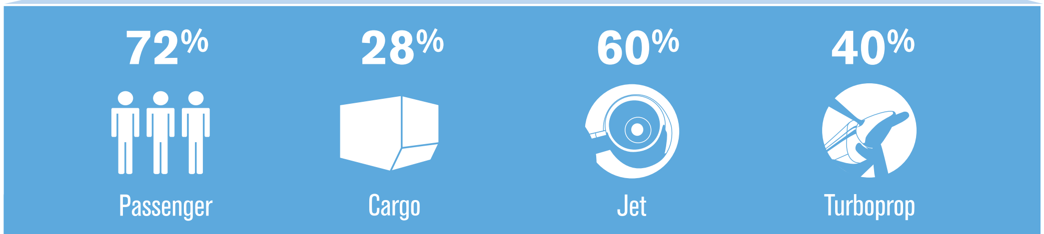
* Accidents per Million Sectors Flown for all aircraft types
** See Annex 1 for Code Definition

Approach & Landing Accidents (ALA)

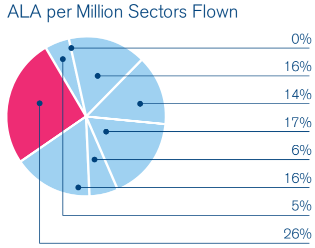
50 Accidents

IATA Members **36%**

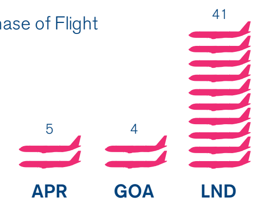




ALA per Million Sectors Flown



ALA by Phase of Flight



Top Threats

- 49% Adverse weather
- 36% Training issues
- 28% Deficient SMS
- 26% Poor checking & standards
- 18% Airport facilities

Top Flight Crew Actions

- 38% Communication issues
- 36% Proficiency issues
- 28% Procedural errors

Correlations of Interest**

- 60% of **H3** had **E1**
- 43% of **H2** had **O2 & E1**
- 20% of **H3** had **E2**

- The majority of accidents involving communication/CRM issues as contributing factors occurred in adverse weather.
- The majority of the communication/CRM issues related to pilot-to-pilot interactions and 20% related to miscommunication between pilots and ATC.
- A correlation between flight crew proficiency issues, deficient training and operations in adverse weather was also noted in almost half of the approach and landing accidents.

Note: 22% of accidents not classified (insufficient data)

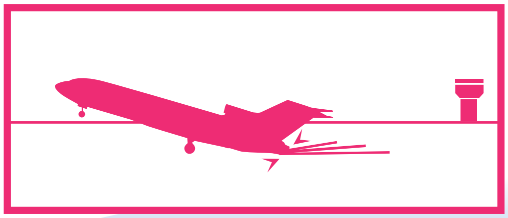
* Accidents per Million Sectors Flown for All Aircraft types
** See Annex 1 for Code Definition

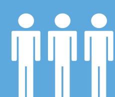
4

Tailstrikes

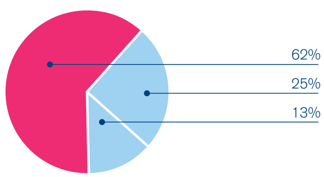
8 Accidents

IATA Members **1 case**

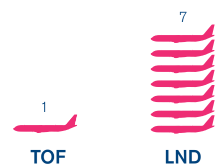


88%	12%	75%	25%
			
Passenger	Cargo	Jet	Turboprop

Tailstrikes per Million Sectors Flown



Tailstrikes by Phase of flight



Top Threats

67% Training issues
33% Poor Checking & Standards

Top Flight Crew Actions

67% Proficiency issues
50% Communication issues

Correlations of Interest**

75% of **H2** had **O2**
67% of **H3** had **O2**

- Flight crew training issues and proficiency played a major role in the occurrence of tailstrikes.
- CRM issues in the flight deck also contributed to half of the tailstrikes and the majority of these accidents also cited poor training as a factor.
- Tailstrikes were predominant in the landing phase.
- Prevention measures are discussed later on in this report.

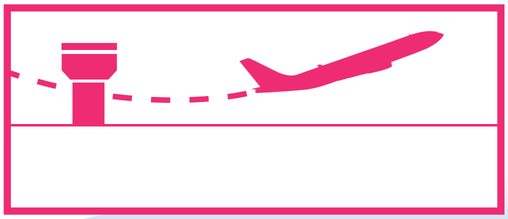
Note: 2 accidents not classified (insufficient data)

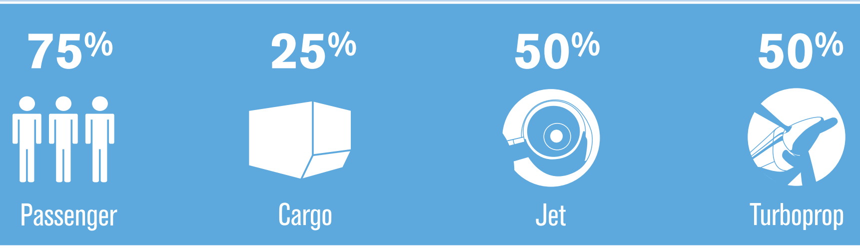
* Accidents per Million Sectors Flown for all aircraft types
** See Annex 1 for Code Definition

Accidents on Go-around

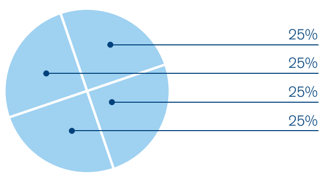
4 Accidents

IATA Members **50%**





GOA accident per million sector flown



Top Threats

100% Training issues
100% Adverse weather
67% Deficient SMS

Top Flight Crew Actions

100% Proficiency issues
33% Communication issues

Correlations of Interest**

All **H2** had **O2** & **E1**

- 3/4 of accidents during a go-around were fatal.
- All accidents involved flight crew proficiency issues, poor training and operations in adverse weather.
- Communication/CRM issues between flight crew and ATC were noted in one accident that occurred in adverse weather.

Note: 1 accident not classified (insufficient data)

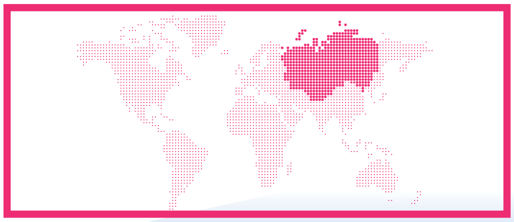
* Accidents per Million Sectors Flown for all aircraft types
** See Annex 1 for Code Definition

4

Russia & CIS

5 Accidents

IATA Members **80%**



80%	20%	80%	20%
Passenger	Cargo	Jet	Turboprop

Russian/CIS Operators Accidents by Phase of Flight

Top Threats

- 60% Adverse weather
- 40% ATC
- 40% Dispatch
- 40% Airport facilities
- 40% Maintenance

Top Flight Crew Actions

- 60% Communication issues
- 40% Proficiency issues
- 20% Procedural errors

Correlations of Interest**

All **H2** had **O2** & **E1**

- 67% of **E1** had **O12**
- 67% of **H3** had **E2** & **E1**

- All the accidents that involved flight crew proficiency issues also involved deficient training by the operator and occurred in adverse weather conditions.
- A correlation was also noted between adverse weather and dispatch-related issues.
- The majority of communication /CRM issues were related to pilot-ATC interactions and occurred in adverse weather conditions.
- Airport facilities and issues such as inadequate overrun areas and structures in proximity to the runways/ taxiways were also deemed to be a problem.
- 60% of accidents involved Western-built Jet Aircraft
- On average, aircraft involved in accidents were 18.6 years old
- 60% of accidents involved a technical failure.

Note: all accidents classified

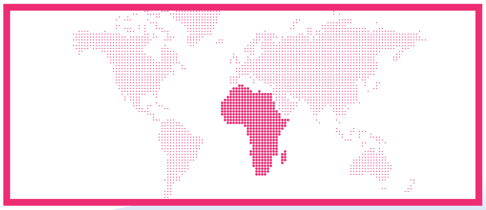
* Accidents per Million Sectors Flown for Western-built Jet Aicraft only

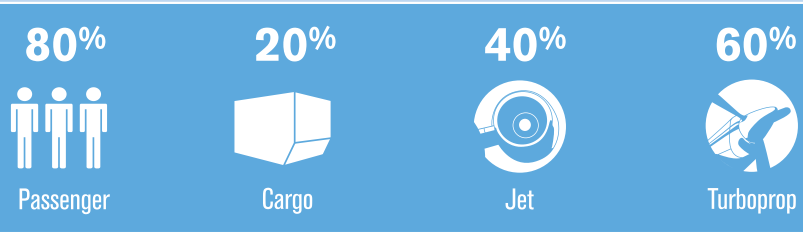
** See Annex 1 for Code Definition

Africa

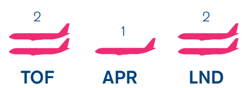
5 Accidents

IATA Members **20%**





African Operators Accidents by Phase of Flight



Top Threats

- 60% Poor regulatory oversight
- 50% Deficient SMS
- 50% Training issues
- 50% Adverse weather
- 50% Dispatch

Top Flight Crew Actions

- 50% Intentional non-compliance
- 50% Communication issues
- 50% Proficiency issues

Correlations of Interest**

- 67% of **E7** had **O1**, **O2** & **H2**
- 50% of **H1** had **O1** & **E7**

- The majority of accidents that occurred in States where the regulatory oversight was deemed inadequate also involved deficiencies in SMS, flight crew training and proficiency.
- Half of the accidents where intentional non-compliance was cited as a contributing factor also involved inadequate SMS on behalf of the operator and poor regulatory oversight on the part of the State.
- The majority (60%) of accidents in Africa involved Eastern-built Turboprop aircraft.
- On average, aircraft involved in accidents were 20.8 years old.

Note: 1 accident not classified (insufficient data)

* Accidents per Million Sectors Flown for Western-built Jet Aircraft only.
** See Annex 1 for Code Definition

"IATA continues to support airlines in developing nations via the Partnership for Safety programme, which provides practical and targeted support."

Section 5

Cargo Operations Safety

YEAR 2006 IN REVIEW FOR CARGO OPERATORS

Cargo versus Passenger Operations for Western-built Jet Aircraft

	Fleet Size End of 2005	HL	HL per 1000 Aircraft	SD	Total	Operational Accidents per 1000 Aircraft
Cargo	1890	8	4.23	3	11	5.82
Passenger	16224	8	0.49	23	31	1.91
Total	18114	16	0.88	26	42	2.32

Cargo versus Passenger Operations for Western-built Turboprop Aircraft

	Fleet Size End of 2005	HL	HL per 1000 Aircraft	SD	Total	Operational Accidents per 1000 Aircraft
Cargo	839	5	5.96	1	6	7.15
Passenger	3785	7	1.85	13	20	5.28
Total	4624	12	2.60	14	26	5.62

5

Cargo Operations

The overall operational conditions of cargo flights are very different from passenger flights: with more night flights, single pilot operations, a large number of cargo charter flights and non-IATA operators.

Only accidents involving cargo commercial flights have been analysed in this report. Contributing factors to cargo accidents are not generally related to the mishandling of shipments or cargo loading issues, but rather to aircraft handling and/or environmental factors, similar to those found in accidents involving passenger aircraft.

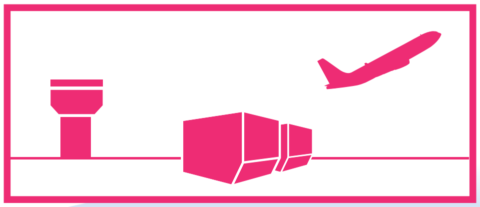
Operators and civil aviation authorities must be conscious of the importance of safety in cargo transport:

- Safety measures taken in passenger transport should be implemented in cargo operations as well.
- The industry should aim for a unique level of safety across the board, applicable to both cargo and passenger air transport. It is necessary to understand the entire aspects specific to air cargo operations to promote adequate decision-making with respect to staff training, improved working environment, upgrading of small airport infrastructure and aircraft maintenance issues.
- Thus, measures must be taken in agreement with governments, airports and airlines.

With the view of constantly improving safety for the industry, the IATA cargo division must continue to develop a stronger industry voice in air cargo safety and security issues. The cargo division of IATA is working closely with the IATA Safety Department and the cargo airline community to implement the following initiatives:

- Education of cargo operators on the benefits of IATA Operational Safety Audit (IOSA) Programme and to broaden the scope of IOSA standards and recommended practices applicable to air cargo operations;
- Conduct awareness seminars for cargo operators and invited airlines on industry best practices in operational safety, as embodied in the standards of IOSA;
- Integrate provisions specific to cargo operations into the Global Roadmap for Aviation Safety being developed by IATA in conjunction with leading industry and regulatory stakeholders.

Cargo Accidents



18 Accidents

IATA Members **39%**

44% Scheduled

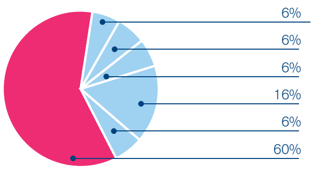
50% Non-Scheduled

6% Ferry

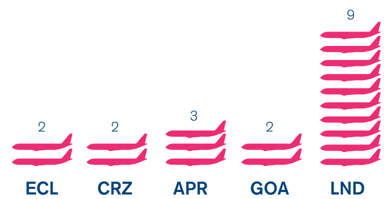
61% Jet

39% Turboprop

Cargo accidents by Region of Operator (raw numbers)



Cargo Accidents by Phase of flight



Top Threats

- 50% Adverse weather
- 50% Training issues
- 44% Deficient SMS
- 31% Poor checking & standards
- 25% Poor regulatory oversight

Top Flight Crew Actions

- 38% Proficiency issues
- 38% Procedural errors
- 25% Communication issues

Correlations of Interest*

57% of **O1** had **E7**
50% of **H2** had **O2** & **E1**
50% of **H4** had **O3** & **O1**

- The majority of accidents involving deficient airline SMS also involved poor regulatory oversight.
- A correlation between flight crew proficiency issues, deficient training and operations in adverse weather was noted in half of the approach and landing accidents.
- In half of the accidents where flight crew procedural errors were cited, inadequate standard operating procedures & checking as well as lack of SMS were also noted.

Note: 2 accidents not classified (insufficient data)

* See Annex 1 for Code Definition

5

2007 Cargo Safety Objectives

In collaboration with the Cargo Committee and the IATA Safety department, the following objectives have been defined and will be implemented in 2007:

- Target eight (8) non-IATA cargo operators to sign-on for the IOSA programme
- Enrol five (5) cargo operators on each IOSA Partnership for Safety (PfS) seminar
- Target six (6) cargo operators to sign up for the Flight Data Analysis programme (FDA)
- Develop substantive material to implement a cargo section within the Integrated Airline Management System (integrated-AMS).

IATA Dangerous Goods Regulations

The IATA Dangerous Goods Board (DGB) supported by the IATA Secretariat ensures that the IATA Dangerous Goods Regulations (DGR) accurately reflects the international regulations governing transport of dangerous goods by air and also incorporates additional operational requirements to facilitate that transport.

The 48th edition of the DGR (2007) incorporates provisions from the 14th revised edition of the UN Model Regulations. This is to ensure that the air transport regulations are aligned with those for the surface modes, which support multi-modal harmonisation in the transport of dangerous goods.

In addition to the production of the DGR, other initiatives in 2006 were:

- A free 1-day dangerous goods awareness seminar conducted in February in Shanghai in conjunction with Cargo Week: speakers at the seminar included representatives from the Civil Aviation Administration of China (CAAC), FAA and Air China;
- Development and launch of a DVD titled "Shipping Medical Radioactives by Air", to promote the safe transport and overcome the barriers of transporting of radioactive materials. The objective is to provide an understanding of the processes that ensure that packages of radioactive materials meet the required safety standards;
- Provided resources to support the Dangerous Goods Hotline: In 2006, the team responded to in excess of 5,000 e-mails and telephone enquiries from shippers, freight forwarders, operators and other industry groups on the application of the DGR, Live Animals Regulations, perishable cargo and aircraft Unit Load Devices (ULDs).

For more information on IATA's Cargo Operations, Cargo Safety and DG initiatives, visit:

www.iata.org/whatwedo/cargo

Image courtesy of Boeing

Section 6

6

IATA Safety Strategy

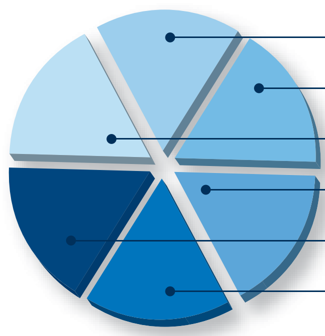
2006 IATA Safety Priorities and Achievements

Segment	2006 OPC Safety Objectives	Key Achievements
Industry Safety Strategy	Lead Airline Industry in the implementation of the Aviation Safety Roadmap.	• Led part 1 to completion. Gained ICAO commitment to the initiative. • Part 2 was delivered to ICAO Dec 2006.
Accident Rate Reduction	Further reduce accident rate to 0.65 western built jet hull losses per 1 million sectors.	• Goal was reached for the industry. • IATA member airlines had an accident rate of 0.49.
Safety Management Systems	Develop and implement a Safety Management System for all airlines.	• Integrated Airline Management System developed as tool for safety, quality, risk and security management.· Interactive tool released in April 2007.
Flying Operations Safety	Integrate Flying Operations sector into the Six Point Safety Programme.	• Analysis completed, focusing on threats and operational errors contributing to accidents and incidents during the approach and landing phases.
Safety Data Management and Analysis	Continue to make IATA Safety data driven.	• STEADES - Currently 56 subscribers. • FDA – Addition of 4 airlines to FDA Service brings total participants to 15.
Cargo Operations	Improve operational safety of Cargo Operations.	• 2005 Cargo Safety analysis completed.
Safety and Operational Efficiency	Reduce ground damage to aircraft costs by 10%.	• Savings in 2006 equal to approximately USD 92 million.

6

2005 Safety Report Findings: Status of IATA's Action Plan

Finding	Issue	Prevention Strategy	Status
Passenger fatalities	• Less than a quarter of all the year's accidents accounted for the majority of all the fatalities. • Flight crew proficiency issues relating to inadequate training and standards / checking were highlighted in many accidents.	• From 2006 onward, any airline wanting to join IATA will pass an IOSA audit first; all IATA existing members will have to be IOSA accredited by the end of 2007 to maintain IATA membership.	• 132 airlines are now IOSA registered. As of December 2006, 92% of the membership had committed to undergoing IOSA.
Approach and landing accidents (ALA)	• Over half of all the accidents in 2005 occurred during the approach and landing phases of flight. • Flight crew proficiency issues, deficient training and adverse weather all played a contributing role in the majority of events.	• IATA and its Safety Group have created a new section of the Six-point Safety Programme that will address flying operations issues, including approach and landing accidents.	• Analysis completed, focusing on threats and operational errors contributing to accidents and incidents during the approach and landing phases. Results will be presented at Ops Forum 2007 and distributed industry wide.
Cargo operations	• Cargo operations represented almost 20% of the year's accidents. • Flight crew proficiency issues, linked to deficient training and adverse weather, played a contributing role.	• IATA will launch IOSA for dedicated cargo carriers to ensure they meet international safety standards.	• All IATA Member Cargo Airlines have completed IOSA. It is now being promoted amongst non-members.
Safety in Africa	• In 2005, 18% of the accidents occurred in the African region, of which almost half were fatal. • Lack of safety culture and the poor regulation of the operating environment were among the factors cited.	• IATA will continue to implement the Partnership for Safety Programme to enable operators to improve their operational safety through the use of internationally recognized quality audit principles.	• 17 gap analyses were conducted in Africa in 2006, under PfS, to help airlines meet IOSA standards.
Ground damage	• Resulted in significant costs to the industry and affected particularly IATA member airlines, which were involved in over half of these events. • The majority of ground damage accidents related to deficient ground operations.	• IATA will continue to implement its Ground Damage Prevention Programme to reduce ground accidents and their associated costs by 10% in 2006.	• Savings in 2006 equal to approximately USD 92 million. IATA is now developing the IATA Safety Audit Ground Operations (ISAGO) in order to establish a worldwide ground operational safety benchmark and standard.



6

2007 Safety Priorities and OPC Objectives

Goal: Reduce the accident rate for Western built jets in terms of hull losses per million sectors flown to achieve a further 25% reduction by the end of 2008 (from 0.65 to 0.49 Western-built Jet Hull Losses/Million sectors flown) through the IATA Six-point Safety Programme.

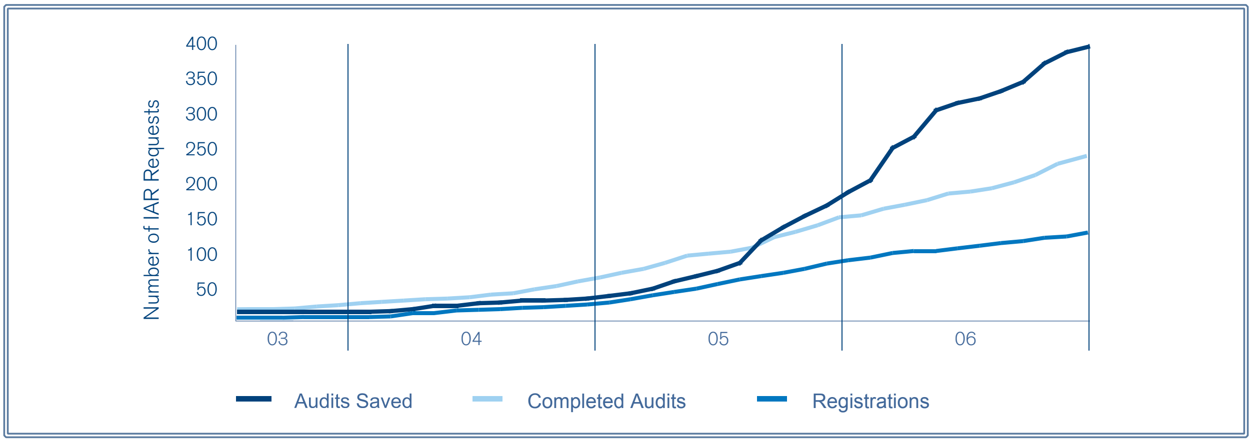
Safety Auditing: The IATA Operational Safety Audit (IOSA)

- The IATA Operational Safety Audit (IOSA) is an internationally recognised evaluation programme designed to assess an airline's operational management and control systems.
- When IOSA was launched in 2003, it had two fundamental aims:
  - Improve airline operational safety
  - Promote audit efficiency

In 2006 the IOSA team was charged with extending and improving the IOSA program worldwide. The following key objectives were achieved.

Goal	Achievement
Ensure 90% of IATA Members commit to an IOSA audit	• As of December 2006, the member committal rate was 92%
Extend the Partnership for Safety (PfS) Programme in Africa, Latin America and South Pacific	• PfS successfully extended into LATAM and Asia/Pacific as well as Eastern Europe/CIS
Develop and publish comprehensive analysis of de-identified data extracted from IOSA audits, coordinated with data from STEADES, FDA and the Safety Report	• Benchmarking of information from already existing databases and related projects has begun • IOSA audits data has been used in some STEADES reports as supporting data
Encourage states to mandate IOSA for their airlines	• IOSA is now being implemented on a worldwide basis • Authorities recognise IOSA as an extremely useful complementary tool to be used in the assessment of local and foreign operators • Certain proactive Regulatory Authorities require their local operators to implement IOSA

Audits Completed & Audits Saved



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For 2007, the IOSA team has been given two primary objectives:

- Ensure all IATA Members are audited under IOSA by year end 2007
- Complete project development and launch IATA Ground Service Provider Audit by early 2008
  - Launch Standards task forces.
  - Develop Standards Manual for Ground Service Provider Audit

Integrated Airline Management Systems

In order to assist airlines in meeting the ICAO requirement that all airlines implement a Safety Management System (SMS) by January 1, 2009, the SMS task force has developed an integrated SMS tool under the project name Integrated-Airline Management System (integrated-AMS). The purpose of this tool is to provide airlines with a resource for integrating all aspects of airline management; safety, quality, risk and security, into a single system as smoothly as possible.

With the principle development of the integrated-AMS tool completed in 2006, the primary objective for the coming year is to follow through with the launch of the integrated-AMS product. Toward this end the following three tasks have been set for 2007:

- Publish the *Integrated*-Airline Safety Management System reference manual
- Provide regional workshops, including training courses, in conjunction with the Partnership for Safety programme
- Develop “how to” course material to implement Integrated-AMS with a focus on SMS

For more information on IATA’s Integrated AMS, visit:
www.iata.org/whatwedo/safety_security/safety

Safety Data Management and Analysis

As part of the Six-point Safety Programme, Safety Data Management and Analysis activities (SDMA) focus primarily on data driven trend identification and analysis designed to cover the full spectrum of safety data analysis.

The SDMA programme currently consists of three separate elements, each designed to provide specific feedback to airlines and industry on emerging trends:

- Safety Report. Published annually as an overview of the past year’s accidents and initiatives and an outlook forecast for the year to come.
- STEADES (Safety Trend Evaluation, Analysis and Data Exchange System). An international repository of Air Safety Reports (ASRs) submitted by subscribers, STEADES publishes a quarterly report investigating known problem areas and emerging trends.
- Flight Data Analysis (FDA) Service. Launched in 2005, IATA’s FDA is a web based service utilising airlines’ in-flight data in a proactive and non-punitive system to identify and isolate flight safety issues before they result in a major incident.

In addition to the continuation of the three existing programmes listed above, the SDMA programme will be developing and implementing a number of new initiatives in the coming year:

- Develop and implement an interactive data query tool for STEADES members.
- Further advance the FDA Service to medium and small airlines worldwide.
- Develop and begin implementation of a new initiative for safety data management, Safety.Net, to expand the capabilities of the existing STEADES programme.

Flying Operations Safety

- In 2006, Flying Operations Safety was created, targeting safety issues relating to flight operations.
- In the coming year IATA looks to continue this initiative by placing particular emphasis on approach and landing accident reduction.
- Specifically, the focus of the Flying Operations Safety segment will be on developing and implementing operational risk analysis methods and tools to help reduce and mitigate runway incursion and level bust threats.

Infrastructure Safety

The air transport industry operates in a broad safety environment that encompasses Air Navigation Service Providers (ANSPs). Sharing of safety information between ANSPs, regulators, and operators is a key component of reducing incidents such as runway incursions, level busts, communication misunderstandings and clearance errors.

- Past initiatives include the Aviation English Language Solution to develop and improve English language proficiency within the industry and the automated ground based Air Traffic Control (ATC) safety net toolkits.
- Most recently, the infrastructure safety team, working in conjunction with ICAO representatives, has developed and distributed the runway incursion prevention toolkit.
- For 2007, the infrastructure safety team will be focusing on data driven analysis of infrastructure safety related issues.
- In collaboration with ANSPs and airlines they will be conducting two in-depth information-sharing analyses to address the ongoing threat of ground and midair collisions.

Cargo Safety

See Chapter 5 for details.

More information on IATA's safety initiatives can be found on the IATA website at:

www.iata.org/whatwedo/safety_security

Image courtesy of Embraer

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2007 SO&I PRIORITIES & OPC OBJECTIVES

Security and Facilitation

In today's aviation industry the security and safety of all passengers and aviation employees is the first and foremost priority. On behalf of its Members and the entire aviation industry, IATA's Security department works to ensure that new and enhanced security measures are effective, internationally harmonised and minimise disruption to passengers and shippers. To do this, IATA collects, analyses and disseminates information about international civil aviation security to its Members. It also assists in developing industry policies and procedures to combat unlawful acts against civil aviation.

In conjunction with the Security team, the Facilitation team is dedicated to reducing unnecessary regulation and improving inspection procedures to expedite the movement of people and goods over international boundaries. More information regarding prior initiatives and on-going work by the Security and Facilitation teams can be accessed through IATA's website:

www.iata.org/whatwedo/safety_security.

The primary objectives for the Security and Facilitation team during 2007 are as follows.

Areas	2007 Objectives
Industry	• Guide the implementation of Security Management Systems (SeMS) through industry best practice and training.
Government	• Align a minimum of one state regulatory regime with SeMS. • Articulate benefits of introducing SeMS for governments and industry.
Security Measures (Harmonisation)	• Establish a baseline for security and immigration processing times. • Ensure at least 5% improvements in security infrastructure and passenger throughput at five key airports.
Funding	• Develop and communicate updated position on aviation security funding.
Aircraft Security	• Develop industry position on incorporating security into future aircraft design.
Passenger Data Exchange	• Ensure the World Customs Organisation (WCO) adoption of new Guidelines to reflect new data exchange requirements.
Cargo	• Develop and promote globally harmonised supply chain security principles and priorities.

Operations

The IATA Operations department is tasked with developing solutions to industry problems related to flight operations. Their initiatives range from jet fuel management, to airworthiness, aircraft engineering and maintenance issues. Further information on Operations activities can be found through the corporate website at

www.iata.org/whatwedo/aircraft_operations/.

2007 objectives for the Operations Department are as follows:

- Achieve completion of ICAO working paper on Operations Specifications in agreement with EASA and the FAA.
- Ensure completion of an industry standard document for accessibility and quality of aeronautical data (AIS).
- Implement industry standards based on IATA Specifications for Refuel Procedures and Quality Control including training and qualification of suppliers.
- Complete update of Spec 2000 for Engineering and Maintenance.
- Expand contribution to "IATA Cost Benchmark Tool and Report" to more than 50 participating airlines.
- Identify USD 1.5 billion in savings through extension of the Fuel Efficiency campaign, including:
  - Route and TMA improvements
  - Save One Minute campaign
  - OPS efficiency
  - Globalisation of IFQP
  - Alternative Fuel
  - Regulatory framework (Annex 6)

Infrastructure

The Infrastructure Strategy mandate is to establish and maintain a global infrastructure plan that addresses long-term strategy and near-term issues, including lobbying for harmonised regional development.

As an integral part of its daily work, Infrastructure Strategy interfaces with the International Civil Aviation Organisation (ICAO), Civil Air Navigation Services Organisation (CANSO), Air Transport Action Group (ATAG) and other organisations involved in developing and promoting infrastructure improvements. Infrastructure policies supporting the global infrastructure plan are developed and incorporated into IATA's Technical Operations Policy Manual (TOPM).

In addition to the above mentioned development work, Infrastructure Strategy also represents IATA on certain ICAO technical panels that deal with communications, navigation, surveillance, air traffic management and related infrastructure issues.

The primary objectives for the Infrastructure Strategy group for 2007 are as follows:

- Coordinate IATA's Joint Planning and Development - Next Generation Air Transport System (JPDO/NGATS) and Single European Sky ATM Research (SESAR) activities, in order to facilitate harmonisation within the two projects.
- Introduce actions and dates during the lifecycle of the projects to ensure synergy of Air Traffic Management (ATM) aims and concepts.
- Establish Infrastructure requirements for each continent based on IATA assessments of future capacity requirements for airports and Air Navigation Service Providers and an agreed "total efficiency" concept.
- Provide strategy to enhance Area Control Center (ACC) operations.
- Raise awareness of global capital expenditure (CAPEX) and potential for cost avoidance through diligent Master Plan analysis (development to be conducted where currently not available).
- Ensure all global infrastructure changes and enhancements are in accordance with ICAO Global Plan. Work closely with ICAO to ensure Global Plan methodology of "gap analysis" is adhered to.

Further information on Infrastructure activities can be found through the corporate website at

www.iata.org/whatwedo/airport-ans

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Environment

Air travel affects many areas of the environment, from global emissions to noise pollution. As a leader in the aviation industry IATA's environment department is charged with identifying environmental impacts and developing and leading global initiatives to minimise their effect on the industry.

The environmental objectives for 2007 are described below. Further information on IATA's environment group and strategy can be found on the IATA website:

www.iata.org/whatwedo/environment

Areas	2007 Objectives
Global Emissions	• In cooperation with the IATA Industry Affairs Committee (IAC) – further develop and communicate the IATA position on climate change and emissions trading. • Promote voluntary actions on global emissions as environmentally efficient and cost effective alternatives to regulatory measures. • Support regional and local efforts aimed at proactively communicating industry environmental achievements and commitments. • Intensify lobbying efforts with the European Commission, the European Parliament and the EU Member States in order to: - Ensure basic industry conditions are fully reflected if aviation is included in the EU Emissions Trading Scheme (ETS). - Prevent the introduction of taxes or charges as additional means prior to or during ETS application to aviation.
Local Emissions	• Actively contribute to the early adoption and distribution of ICAO guidance to States with regard to local air quality assessment and the use of local emissions (NOx) charges. • Ensure that future ICAO certification standards for NOx emissions takes airline views into account.
Noise	• Preserve the ICAO Balanced Approach to aircraft noise management and promote its application in regional and national airport levels. • Promote the use of IATA's consolidated policy on night flight restrictions. • Ensure future ICAO noise certifications take airline views into account. • Assess usefulness to recognise an industry wide and/or ICAO noise index.
Industry Initiatives	• Further develop the IATA environmental best practice database. • Continue to monitor and report on progress toward the new IATA fuel efficiency goal and support IATA fuel conservation efforts. • Complete a study exploring the possibility of combining accelerated technology improvement, additional operational efficiencies, full ATM implementation and possible use of alternative fuels to contribute to further decoupling of aviation emissions from traffic growth. • Work with regulators to obtain commitments to give credit for early action and voluntary initiatives. • Prepare and distribute the IATA Environmental Review 2006. • Finalise IATA assessment for environmental consultancy services. • Deliver new IATA Training and Development Institute (ITDI) environmental courses in IATA offices and in the field.

Global Aviation Safety Roadmap

In May 2005 representatives from ICAO's Air Navigation Commission and industry acknowledged that further enhancements to worldwide aviation safety would require a more streamlined alignment of strategies and a coordinated effort from all stakeholders. From this acknowledgement, the Global Aviation Safety Roadmap initiative, to be coordinated by IATA, was created to provide the required framework for this action.

In the interest of establishing a single level of aviation safety worldwide the Roadmap was produced and developed by the Industry Safety Strategy Group (ISSG), comprised of; the International Air Transport Association (IATA), Airbus, Boeing, Airports Council International (ACI), the Civil Air Navigation Services Organisation (CANSO), the Flight Safety Foundation (FS) and the International Federation of Air Line Pilots Associations (IFALPA).

Part 1 of the Roadmap – A Strategic Action Plan for Future Aviation Safety was developed to provide the basic framework for correcting inconsistencies and areas of weakness in 12 focus areas. These areas included international standards implementation, regulatory oversight, incident and accident investigation and Safety Management Systems.

Part 2 of the Roadmap – Implementing the Global Aviation Safety Roadmap was developed to prioritise and define specific coordinated actions to be undertaken by industry in order to reduce risk and improve safety worldwide. Additionally, recommendations on existing and proven technologies to further enhance safety in flight operations, airport operations and air traffic control, as well as all associated training programmes, are provided in a series of Annexes to the document itself.

Part one of the roadmap was delivered in December 2005, and in December of 2006, the second and final part of the Roadmap was delivered to the International Civil Aviation Organisation. The completed Global Aviation Safety Roadmap marks the first unified and coordinated accident reduction initiative developed by both governments and industry.

For more information, the Global Aviation Safety Roadmap can be accessed through the ICAO website.

www.icao.int/fsix

THE USE OF TECHNOLOGY FOR ACCIDENT PREVENTION

Technology & CFIT Accident Prevention

In 2006, 12% of all accidents involved a Controlled Flight Into Terrain (CFIT). In total, 8 out of 9 were fatal and all events resulted in a Hull Loss. The majority of CFIT accidents involved aircraft without adequate technology / equipment, such as E-GPWS.

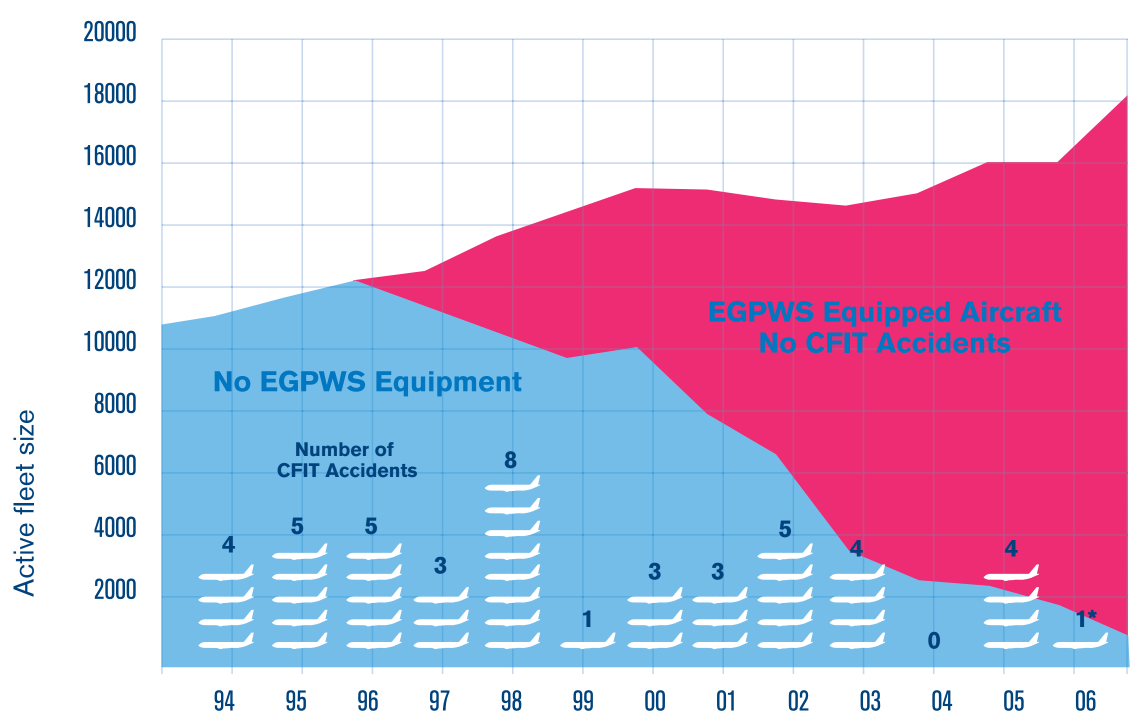
Ground Proximity Warning System (GPWS)

- Ground Proximity Warning Systems (GPWS) have been widely fitted on commercial transport aircraft for a considerable time and are successful in preventing many Controlled Flight Into Terrain (CFIT) accidents.
- A major drawback of GPWS is that it is based on aircraft radio altimeters and gives very little warning of approaching terrain
- Furthermore, it is inhibited in the landing configuration (i.e. gear down and flaps selected)

Enhanced-Ground Proximity Warning System (E-GPWS) / TAWS

- Since E-GPWS equipment was first installed in 1996, the World's Western-built large commercial jet fleet fitted with E-GPWS / TAWS has grown to 95% of the fleet with over 300,000,000 departures and no CFIT accident yet.
- Since 1996, approximately 30 large commercial jet aircraft have been involved in CFIT accidents, none fitted with E-GPWS, as shown in Figure 6.1.
- E-GPWS / TAWS has been designed to overcome these limitations providing flight crews with more warning of approaching terrain in time for them to take corrective action.
- The system consists of a global terrain database; a data feed from the aircraft air data computers, a Global Positioning System (GPS) input from the aircraft GPS, or an internal GPS in the E-GPWS computer itself.
- An inferior choice is to use data from the Flight Management System (FMS)

TABLE 6.1 GPWS Versus E-GPWS Active World's Large Commercial Jet Fleet



* One aircraft was flown into the water with the pilot suffering from spatial disorientation. E-GPWS provided 15 seconds of warning.

Image courtesy of Honeywell

Enhanced-Ground Proximity Warning System (E-GPWS) / TAWS (Cont'd.)

- Unfortunately the FMS can be subject to Map Shift, or faulty ground navigation position updating and AIP coordinates that may not agree to WGS-84 coordinates used by E-GPWS / TAWS terrain, obstacle, and runway end position.
- E-GPWS / TAWS units combine the aircraft current position with the terrain database and present the information to the crew on the navigation display, giving a picture of terrain relative to the aircraft.
- GPS track, ground speed, with data from the aircraft air data computers, and roll attitude is used to predict the aircraft flight path in terms of horizontal and vertical profile.

E-GPWS / TAWS gives the flight crew visual and aural warnings of proximity to terrain. When a hazardous condition occurs, a nominal of 60 seconds of alert is given by an aural "terrain" message, followed with a nominal 30 seconds of warning to "pull up" en-route, but with shorter times as the runway is approached.

Figure 6.1 indicates the increase in the number of aircraft fitted with E-GPWS /TAWS and the related decrease in the number of CFIT accidents. E-GPWS has been hailed as one of the greatest CFIT prevention tools that the industry has seen, but it will only be reliable if the software and database is kept up to date. This is leading to a growing concern that there may eventually be a CFIT accident to an aircraft capable of avoiding a CFIT accident because an E-GPWS with outdated information provides a misleading sense of comfort.

There was one accident in 2006 where the aircraft impacted power lines some 1200 meters short of the runway. There was no E-GPWS warning because the E-GPWS computer software had not been updated and there was no GPS data direct to the E-GPWS. With the latest software and GPS data direct to E-GPWS there would have been more than 30 seconds of warning prior to impacting the power lines. To get the most CFIT risk reduction from E-GPWS, the airline needs to provide GPS position directly to the E-GPWS unit, and use the latest software and database.

The advantages of using GPS direct to the E-GPWS are independence from the FMS, independence to altimetry errors, setting error or various setting standards used such QNE / QFE / QNH. Unwanted warnings are significantly reduced.

GPS

There are approximately 7,000 large aircraft using a GPS engine internal to E-GPWS. Unfortunately, there remain some 5,500 large commercial jet aircraft without GPS direct to E-GPWS. The operator needs to pin up by means of a rear jumper Geometric Altitude (Airbus only) obstacles, and peaks. Every E-GPWS has these safety functions built-in and they are available free from Honeywell. The use of GPS direct, with geometric altitude enabled, provides earlier warnings when needed near the runway, gives less risk of unwanted warnings, and provides compatibility with QFE operations and independence from barometric altimeter setting errors or altimeter errors.

Software

The software is also free, but needs to be updated by a PCMCIA card. If the E-GPWS was type certified by Airbus or Boeing, they may have to coordinate with them; otherwise if the airline can use an E-GPWS / TAWS that was installed themselves or by others using an Amended Supplemental Type Certificates.

Database

Many airlines have never updated their E-GPWS database since they first installed the E-GPWS equipment. It is important to keep the Terrain / Obstacle / Runway WGS-84 database current. It is provided free of charge from Honeywell and can be downloaded from their website:

http://www.honeywell.com/sites/aero/Egpws-Home.htm

With a simple arrangement or on a PCMCIA card from Honeywell, airlines can also sign up to receive email notifications when new databases are released. The PCMCIA card is inserted into the front of the E-GPWS computer (power on) installed on the aircraft and the front panel button pressed and the database is loaded within 30 minutes.

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Technology and Runway Misidentification Prevention

Runway incursions, wrong runway take-offs, wrong runway landing, take-off and landing on taxiway are a continuing risk leading to a possible runway accident. In 2006, two accidents occurred that involved runway misidentification, one of which was fatal.

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- The risk can be reduced by tools for the Controller such as radar
- Runway traffic lighting and other monitoring sensors can help
- The use of SOPs that can help increase awareness.
- Tools can also reduce the risk for the pilot such as:
  - A Moving Map displaying runway / taxiway / aircraft position with ATC Clearances and taxi guidance
  - Aural advisories

"RAAS" (Runway Awareness and Advisory System) is a software function that can be hosted on existing E-GPWS equipment. No new hardware, or aircraft wiring or change to the cockpit is necessary.

- RAAS uses the E-GPWS world's runway database, aural advisories and GPS position that exist in the present E-GPWS equipment
- A "virtual box" is placed around the complete runway in software
- The aircraft's position related to the runway box and runway itself can give awareness advisories
- RAAS will aurally advise the pilots that they are about to enter a runway (the virtual box approximates the ICAO holding line and expands with ground speed as the runway box is approached)
- The second advisory occurs when the aircraft is aligned on the runway (runway heading ± 20 degrees)
- These two advisories are the only advisories the pilots should ever hear
- There purpose is to encourage runway awareness
- See Figure 6.2
- There are other advisories given if there is something possibly wrong, advisories based on aircraft type can be given for:
- Advisories that tell the pilot that the runway length is possibly short for the aircraft type (E-GPWS knows what type of aircraft it is in) for either take-off, or an intersection take-off or landing
- Advisory for speeds in excess of 40 KTS and not on a runway such as taking off inadvertently on a taxiway
- Advisory for being left on a runway for take-off for over a minute
- Advisory for back taxiing and the end of the runway is less than 30 meters or 100 feet.
- Advisories for distances remaining are getting very short and the aircraft is still above 40 KTS

These advisories should rarely, if ever, be heard in the career of the pilots. The operator selects the actual advisories, distance remaining. Male or female voice, runway distances in Meters or Feet and in increments typically 300 meters (1,000 feet) and the last is typically 150 meters (500 feet) when greater that 40 KTS before running off the runway.

- Some operators use very few advisories, others many
- Business aircraft most often use many or all, as their operations may take them to strange airfields

Figure 6.2 Runway Awareness and Advisory System

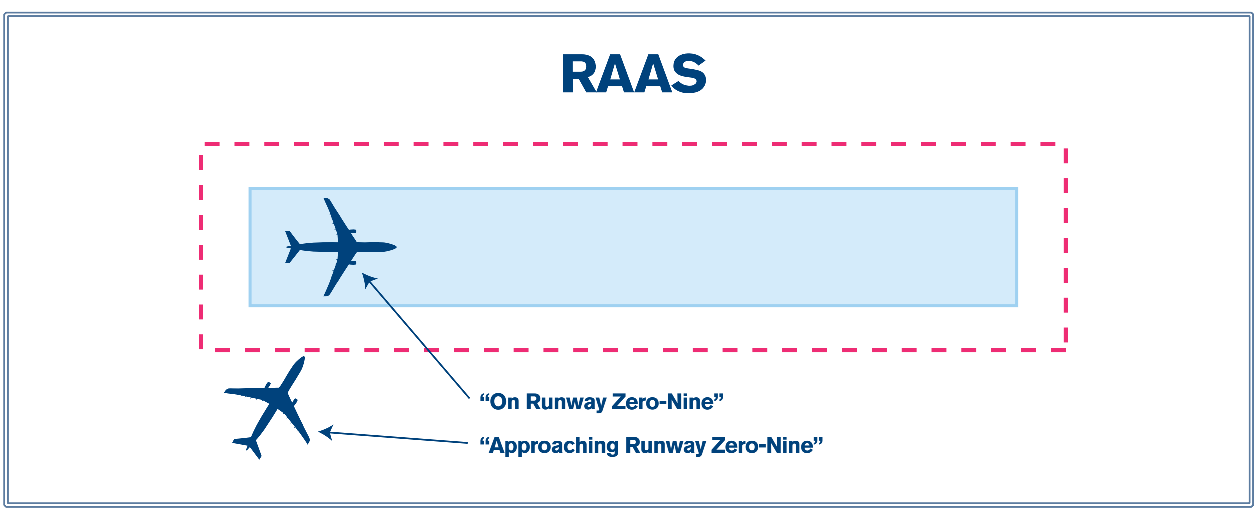

Image courtesy of Honeywell

Section 7

IATA Regional Safety Strategies

The global picture of the accident scene for 2006 was presented in chapter 4. IATA has formulated regional strategies and plans to prevent accidents with a programme that is fully aligned with the Six-point Safety Programme.

AFRICA

Area	Goal
Safety	• Develop a strategy to ensure IOSA compliance with the 2007 scheduled audits • Provide Gap Analysis to four African-based Member Airlines • Conduct safety courses for 2006/2007 post Gap Analysis airlines • Conduct IOSA Workshops in Africa • Africa Safety Enhancement Team: Coordinate the implementation of the Global Aviation Safety Roadmap in Africa in close cooperation with ASET
Operations	• Improve terminal operations through "Save 1 Minute" campaign
Infrastructure	• Complete technical missions and operational assessments • Implement Area Navigation (RNAV) / Required Navigation Performance (RNP) /Global Navigation Satellite System (GNSS) Terminal Procedures • Improve Surveillance through: - Four terminal radars at Dakar, Abidjan, Niamey, Brazzaville - Multi-lateration and Automatic Dependent Surveillance-Broadcast (ADS/B) in Nigeria - Automatic Dependent Surveillance-Contract (ADS/C) in Luanda Oceanic • Communication: Implementation of both Southern African Development Community (SADC) VISAT 2 and North Eastern AFI VSAT (NAFISAT) networks • Reduced Vertical Separation Minimum: Partial Implementation of Reduced Vertical Separation Minimum (RVSM) along Red Carpet Routes For more information on the African Regional Accident Prevention Programme, please visit the regional website: www.iata.org/worldwide/africa

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ASIA / PACIFIC

Area	Goal
Safety	• Finalise and formally roll out the Asia Pacific Shortcoming & Deficiency (SaD) Programme
Operations	• Establish a collecting mechanism with India and Sri Lanka to fund Boeing as central reporting agency for Bay of Bengal and Arabian Sea
Infrastructure	• In collaboration with IATA Regional Coordination Group (RCG) revise the User Driven Plan for Asia Pacific into a document that can be distributed to ICAO, States and financial institutions. Include specific User Requirement Statements for sub-regional areas and traffic flows • Cordinate work with Russia/United States to continue with the Russian American Coordinating Group for Air Traffic Control (RACGAT) or a suitable replacement forum • Establish an informal bilateral airspace-planning forum with India that addresses airline requirements for air traffic services • Automatic Dependent Surveillance-Broadcast: - Support the implementation of ADS-B OUT (Automatic Dependent - Surveillance-Broadcast transmissions) in Australia and ensure that airline requirements and expectations are met - Monitor and provide IATA expertise on airline requirements for the Indonesia ADS-B OUT trials • In collaboration with RCG identify other regional areas where ADS-B OUT would benefit member airlines and pursue a plan for implementation • Identify airborne equipment specification or certification issues and assist as required • In collaboration with RCG develop and propose new routes and/or route enhancements for South China Sea and present to affected States and appropriate airspace planning forums (South East Asia Country Group (SEACG) & South East Asia RNP Implementation Task Force (RNP-SEA TF)) • Continue to participate in the development of the Bay of Bengal Cooperative Air Traffic Flow Management Advisory System (BOBCAT) to ensure that airline requirements are met • In collaboration with RCG, identify and target an airport or terminal whereby revised infrastructure or procedures can provide significant fuel savings • Support the trials of Programmed Time of Landing (PTL) to Sydney to ensure airline requirements are met. Strategy will aim to develop the Sydney PTL as a textbook example to be implemented (as required) at other airports in Asia Pacific • Progress implementation of planned routes (BUTOP - Dera Ismail Khan with new India/Pakistan border crossing point; Philippines/Japan route: Cabanatuan - MEVIN) • Ensure continuation of the Australian Organised Track Structure (AUSOTS) trials (Singapore/Jakarta to Sydney and Melbourne portion). Work with AirServices Australia to further enhance airline requirements and ensure permanent implementation • Pursue a westbound Pacific Organized Track System (PACOTS) option that crosses the Northern Pacific (NOPAC) and joins Russian Far East (RFE) tracks for South East Asia destinations For more information on the Asia Pacific Regional Accident Prevention Programme, please visit the regional website: www.iata.org/worldwide/asia_pacific

EUROPE

Area	Goal
Safety	• Provision of awareness material on Runway Safety preventive measures, accompanied by on-site visits to Local Runway Safety Teams at key airports to brief on runway incursion prevention. • Continued awareness campaign for the implementation of the Action Plan for the Prevention of Level Busts, including the monitoring of submitted Level Bust incident reports for the purpose of effectiveness of the Action Plan and the identification of corrective action where deemed necessary. A working relationship with United Kingdom National Air Traffic Services (NATS) has been established to reduce the number of Level Busts • Publication of the Action Plan for Air-Ground Communications Safety (AGCS), circulated to IATA Member airlines. A workshop was organised in September attended by 54 airlines. IATA is assisting Eurocontrol in the development of an AGCS tool kit • Finalisation of the Eurocontrol SAFREP activities, including guidelines regarding actions to be undertaken to address impediments to incident reporting, trend analysis and data-driven action plans • Joint initiative with ICAO EUR, Eurocontrol and the European Commission to address the safety concerns that persist in the Nicosia FIR. Operational solutions to be implemented by the Turkish and Cypriot authorities • Taken on the co-chair of the EASA European Strategic Safety Initiative (ESSI), which will aim to reduce safety risk associated with aviation related accidents and incidents. This initiative will work in parallel to inter alia the United States Commercial Aviation Safety Team (CAST) and ICAO Cooperative development of Operational Safety and continuing Airworthiness Programme (COSCAP)
Operations & Infrastructure	• Liaison with the Member airlines regarding the mandated introduction and installation of en-route surveillance tools (Mode-S ELS/EHS). The mandated implementation date is 31 March 2007 • Initiated the implementation of P-RNAV at 50 key airports in cooperation with Eurocontrol, with a target date of end-October 2007 for finalisation. In a similar vein IATA has pressed for the implementation of BaroNAV procedures by ANSPs to enhance stable approaches (CFIT prevention) • Continued efforts pursued with AENA to address significant safety and operational concerns associated with MAD and BCN airports. Pilot/controller forum established to improve knowledge of the respective working environments and increase operational safety. A 'Best Practice' has been developed to handle SID deviations For more information on the European Regional Accident Prevention Programme, please visit the regional website: www.iata.org/worldwide/europe

7

LATIN AMERICA & THE CARIBBEAN

Area	Goal
Safety	• Implement the Six-point Safety Programme to assist in achieving a 25% reduction in the accident rate • Initiate cooperative investigation of air traffic service incidents through analysis of shared safety data from airlines, Air Navigation Service Providers (ANSP) and Civil Aviation Authorities (CAA) • Obtain commitment from at least three CAAs to implement the IATA Air Traffic Control Flight Management Computer cd-rom as part of controller training • Ensure the implementation of the aviation safety roadmap with CAAs • Implement the Cabin Operations Safety Toolkit • Evaluate and address the severity of runway incursions
Security/ Facilitation	• Ensure that new security and facilitation procedures are operationally effective, globally coordinated and meet throughput performance targets at three airports • Assess infrastructure security and security procedures and resolve deficiencies identified • Promote performance based regulations and management systems for States and ensure implementation of efficient and cost effective security measures
Operations	• Airline Operational Request (AORs): Coordinate work with civil aviation authorities and air navigation providers to resolve problems affecting the basic air navigation services (ATC, MET, AGA/AOP, AIS, COM and AVSEC). Ensure that 90% of AORs are successfully resolved
Infrastructure	• Area Navigation (RNAV) / Required Navigation Performance (RNP) Terminal Procedures: Facilitate, coordinate and implement RNAV/RNP procedures • Resolve regional deficiencies and shortcoming: Develop action plans with States & ICAO to address and reduce urgent deficiencies/ shortcoming by 20% in the AGA/AOP, MET, AIS, ATC, AVSEC and COM fields • Foster Air Traffic Management and Airport Facility and service improvements: Improve, upgrade and correct services that impede operational efficiency and safety • Technical Missions / Airport Operational Assessments: Conduct technical missions and airport operational assessments as directed by the RCG to assess that air navigation services are in compliance with ICAO Annexes For more information on the Latin American & Caribbean Regional Accident Prevention Programme, please visit the regional website: www.iata.org/worldwide/latin_america

MIDDLE EAST & NORTH AFRICA

Area	Goal
Safety	• Continue the efforts on the implementation of the Six-point Safety Programme: • Assist in ensuring that the 32 MENA Based member airlines are audited under the IOSA programme by end of 2007 • Reduce Regional Deficiencies: Coordinate with States and ICAO Middle East Regional Office in rectifying deficiencies to improve operational efficiency and safety • Continue aligning safety activities with Arab Air Carriers Organization (AACO) and Arab Civil Aviation Commission (ACAC) • Conduct Analysis of MENA reporting Incidents • To ensure that safety occurrence on ATS incidents are investigated by CAAs • Contribute to ACAC Safety Committee and ICAO CNS/ATM/IC sub-group meetings
Security & Facilitation	• Identify Security issues in 2 key airports • Identify security regulations in 2 States • Identify States with non-standard API
Operations	• Promote “Save One Minute” campaign • Implement 5 air traffic service routes • Development of Area Navigation (RNAV) terminal procedures for 4 airports • Implement 30 nautical mile longitudinal separation along trunk routes (Gulf –East Mediterranean) • Promote implementation of flexible use of airspace: Organize one civil / military coordination seminar
Infrastructure	• Evaluation of Middle East Initial Flight Plan Processing System (IFPS) feasibility study • Automatic Dependent Surveillance (ADS) in Arabian Sea, start operational trials • Conduct two technical missions: airport operational assessments For more information on the Middle East and North African Regional Accident Prevention Programme, please visit the regional website: www. iata.org/worldwide/middle_east

7

NORTH ATLANTIC / NORTH AMERICA

Area	Goal
Safety	• Initiate cooperative investigation of air traffic service incidents through analysis of shared safety data from airlines, air navigation service providers (ANSP) and Civil Aviation Authorities (CAA). Ensure at least 80% response rate • Implement risk mitigation strategies to reduce Gross Navigational Errors (GNE) in the North Atlantic by 30% for Member Airlines • Reduce Large Height Deviations (LHD) in the North Atlantic by 30% for Member Airlines • Assist the FAA in raising awareness and establish a strategy to reduce the number of runway incursions
Operations	• Airline Operational Request (AORs): Coordinate work with civil aviation authorities and air navigation providers to resolve problems affecting the basic air navigation services (ATC, MET, AGA/AOP, AIS, COM and AVSEC). Ensure that 90% of AORs are successfully resolved • Lobby the FAA for a clear policy on obstruction evaluation at United States airports that aligns with airline planning methodology and protects airspace for efficient use by airlines • Identify and implement activities designated to streamline and improve the notice to airman (NOTAM) process
Infrastructure	• Technical Missions/ Airport Operational Assessments: Conduct three technical missions and four airport operational visits as directed by the Regional Coordination Group (RCG) • Foster Air Traffic Management and Airport Facility and service improvements: - Improve, upgrade and correct services that impede operational efficiency and safety at three facilities - Work towards reduced horizontal separation in the North Atlantic to RNP-4 - Support the redesign and implementation of RNP-10 in Western Atlantic Route System (WATRS) - Actively promote the High Frequency (HF) regression plan - Develop action plan to address communication/ surveillance void in the Gulf of Mexico For more information on the North Atlantic and North American Regional Accident Prevention Programme, please visit the regional website: www.iata.org/worldwide/north_america

NORTH ASIA

Area	Goal
Infrastructure	• Provide the technical assistance where possible, including the report/recommendations of IATA Pearl River Delta (PRD) Airspace Phase II Study, to the authorities for the early implementation of the PRD Resolution • Cooperate with the authorities for the implementation of the Reduced Vertical Separation Minimum (RVSM) • Continue the endeavor for more flexible entry/exit points to be implemented • Become involved with the civil/military coordination processes and the Olympic 2008 airspace preparation for having more flexible use of the airspace, and the optimisation of the airspace and air route structure in Beijing Terminal • Achieve the implementation of the air route SYX—DAN, which could save 739 nautical miles / 93 minutes, the fuel savings would be 4,412 tones annually For more information on the North Asia Regional Accident Prevention Programme, please visit the regional website: www.iata.org/worldwide/north_asia

Image courtesy of Airbus

"In 2007, IATA will continue to work with its member airlines, as well as stakeholders and regulators, to develop solutions and enhance operational Safety."

Section 8

8

Report Findings and IATA Prevention Strategies

This chapter of the Safety Report presents the outcomes of the discussions held at the Accident Classification Task Force (ACTF) meeting and the top findings based on the analysis of the accidents that occurred in the year 2006.

The prevention strategies developed by IATA and the ACTF are presented in this section of the Report.

Top 3	Jet	Turboprop
Threats	• Adverse weather • Flight crew training deficiencies • Airport-related issues	• Adverse weather • Inadequate flight crew training • Inadequate Safety Management System (SMS)
Crew Actions	• Deficient flight crew communication • Flight crew proficiency issues • Procedural errors by flight crew	• Flight crew proficiency issues • Procedural errors by flight crew • Deficient flight crew communication
Correlations	• The majority of procedural flight crew errors occurred in adverse weather • There is a correlation between accidents involving flight crew proficiency issues, crew training deficiencies by the operator and cases where adverse weather played a role • 2/3 of the communications issues noted as contributing factors were between flight crewmembers and the remaining 1/3 were between flight crew and air traffic control (ATC)	• Communication errors and Crew Resource Management (CRM) issues were linked to inadequate flight crew training in the majority of accidents involving these as contributing factors • As with Jet aircraft accidents, proficiency errors occurring in adverse weather were also noted here • Over a third of accidents involving inadequate or absent SMS were linked to poor regulatory oversight by the State of the Operator

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ACTF DISCUSSION & STRATEGIES FOR OPERATORS

The following section presents the issues discussed at the January 2007 ACTF meeting, following the classification of the year's accidents. The ACTF felt that the following topics stood out as issues arising from the accidents.

Adapt Briefing to the Situation which You Expect

Background:

- Flight crews tend to brief at length on standard operating procedures, despite knowing that the actual approach or departure path is likely to differ from that which is published.

  Objective:

- Brief expected revised routings, and anticipated shortcuts in addition to all standard approach and arrival procedures, and have a strategy to safely amend FMS flight plans.

  Discussion: Tailored Briefing

- Briefing should not only include published procedures, but should include anticipated threats such as:

  - Runway changes
  - Rejected landings and Go-around instructions
  - Visual approaches
  - Airport construction affecting standard taxi routes
  - Special considerations due to adverse weather and airport conditions

Go-around – Training & Awareness Raising Issues

Background:

- During the execution of certain go-arounds, it is necessary for flight crews to deviate from published procedures to accommodate ATC requirements.
- Level busts are a concern due to ATC requests requiring flight crew to level off at an altitude below that which is published in the go-around procedure.
- For certain aircraft types, go-arounds initiated with TOGA thrust result in a high rate of climb, creating potential for configuration exceedences.
- Due to the infrequent execution of the go-around procedure, flight crew proficiency may be a factor in mitigating the threats identified in these situations.

  Objective:

- Train flight crews to improve the go-around decision-making process and increase proficiency with respect to execution of non-standard go-around procedures.

  Discussion: Enhanced Simulator Training

- Instructors should not limit training simulations to the initiation of a go-around at approach minimum or missed approach point.
- Create unexpected go-around scenarios at intermediate altitudes with instructions that deviate from the published procedure
- Also include training on go-around execution where all engines are operational
- Introduce destabilised approach simulator training scenarios, which emphasise that deviations from the stabilised approach profile at low altitudes should require execution of a go-around.

Rejected Landing Training

Background:

- Level of flight crew proficiency when executing a rejected landing can vary amongst pilots

  Objective:

- Training for rejected landing

  Discussion: Practice Rejected Landings

- Train crews on scenarios when a rejected landing should be performed and practice its execution in the simulator
- Familiarise crews so that they feel comfortable executing a rejected landing
- Simulator training: focus on low-level go-arounds (below Decision Height (DH) / Minimum Descent Altitude (MDA)) and rejected landings
- Airlines must promote the execution of a rejected landing as a standard operating procedure.

Runway Incursion & Runway Mis-identification

Background:

- The IATA Safety Group raised concern over serious incidents involving both runway incursions and runway misidentification in 2006.
- At their request, ACTF looked into this issue

  Objective:

- Provide airlines with specific information to mitigate risks associated with runway incursion / misidentification.

  Discussion: Investigate runway incursion threats

- Use of non-standard phraseology or of different languages on the same frequency.
- Distractions on the ground, such as calls from the cabin, communications with ramp personnel or calling the company for gate assignments or passenger service requests. Some airlines installed a Sterile Cockpit light to avoid distraction from cabin calls for non-safety related issues. The "call-to-gate" policy has been eliminated by some airlines and ACARS used instead.
- Workload on the ground: Some airlines have minimised taxi checklists, enabling both pilots to monitor ground instructions.

Level Busts & Mid-air Collisions

Background:

- Level busts are a predominant hazard, which increases the risk of mid-air collisions.

  Objective:

- In order to determine areas where Safety can be improved, IATA conducted analysis of level bust events reported to the STEADES database covering the years 2004 and 2005. This was discussed by the ACTF.

Discussion:

Findings from STEADES data presented in this study included:

- Flight crew procedures played a contributing role in 51% of cases
- ATC issues, such as late re-clearance, were identified in 25% of all level bust events
- Flight crews detected the level bust prior to altitude alert sounding in 46% of cases
- The full study, entitled "STEADES Level Busts Analysis" is available on the Safety Report 2006 CD-ROM

Tailstrike Prevention

Background:

- Tailstrike damage can cause pressure bulkhead failure
- Short-term risks include structural failure if the flight is continued once damage has occurred during takeoff if repairs are not properly made.
- Long-term risk of structural failure will result if repairs do not properly correct damage sustained during a tailstrike event.

  Objective:

- Prevent tailstrikes by raising awareness through training and pilot self-assessments

  Discussion:

- Tailstrikes are preventable
- Training is key to prevention.
- Standard recommendations when followed are successful
- Strong and gusty winds provide additional challenges and solutions
- Technology developed by the manufacturers provides an effective mitigation strategy.

Documentation on tailstrike preventive measures from the Boeing Company is available on the Safety Report 2006 CD-ROM. The document is entitled "Boeing Tailstrike Prevention".

8

SUMMARY OF MAIN FINDINGS AND IATA PREVENTION STRATEGIES

Despite an increase in traffic, the Western-built Jet Hull Loss rate showed a continued decrease to 0.65 Hull Losses per million sectors flown, making 2006 the safest year on record. The fatality rate also dropped in comparison to the previous year.

Based on the findings from accident analysis, IATA has developed the following prevention strategies to address the top safety issues:

Flight Crew Training & Proficiency

- Almost a third (29%) of the year's accident involved lack of fight crew proficiency
- Over ¾ (77%) of these cases were linked to deficient flight crew training by the operator

Prevention Strategy: IATA has mandated all members be IOSA audited by the end of 2007. IOSA Standards and Recommended Practices (ISARPs) require operators to implement internationally recognised processes and procedures to assess operational management and control systems and enhance operations and training.

Go-around Decision-making

- Over a third (36%) of the year's accidents took place during approach or landing
- Many of these accidents could have been prevented by initiation of a timely go-around
- Crews require additional training to improve the go-around decision-making process throughout all phases of the approach as well as to improve execution of the go-around itself
- In addition, airline cultures and SOPs should encourage execution of a go-around once the risk of an approach and landing incident has been identified

Prevention Strategy: IATA to develop training standards for the decision-making process and execution of go-arounds, working with member airlines.

Runway Incursions & Runway Mis-identification

- With an increasing trend in some locations, runway safety-related issues resulted in several serious incidents in 2006 and the only fatal passenger accident in North America
- Human error, increase in traffic and miscommunication played a contributing role in most of the runway incursion or runway misidentification events of the year
- The implications of a runway incursion can be severe

Prevention Strategy: IATA is working with ATS providers, airports and airlines to gather and analyse data on issues that are a concern to the airlines, including runway incursion prevention strategies at specific airports.

Mid-air Collisions

- Although these are of low probability (one accident of this kind occurred in 2006), mid-air collisions are of high severity, resulting in significant loss of life and destruction of aircraft.
- The accuracy of satellite based navigation systems makes it critical to ensure that aircraft are always flying at the appropriate altitude.
- Contributing factors, such as level busts and ATC/pilot communication issues must be actively mitigated

Prevention Strategy: IATA to work with airlines, equipment manufacturers and ATS providers on level busts analysis and increased implementation of Strategic Lateral Offset Procedures where appropriate to reduce the risk of mid-air collisions.

Lack of Readily Available & Accurate Meteorological / Surface Contamination Data

- Adverse weather was cited as a contributing factor in a third of the year's accidents
- Operations on contaminated runways and the decision to dispatch flights to destinations having deteriorating weather conditions were also contributors in these accidents.
- In many of these cases, flight crews did not have access to updated weather information or accurate runway condition reports, which could have prevented the accident

Prevention Strategy: Operators should implement revised dispatch criteria to ensure accurate and up to date information is provided to their flight crews.

Also based on the findings from accident analysis, IATA has determined the following regional priorities for 2007:

Safety in Russia

- Accidents in Russia and other countries belonging to the Commonwealth of Independent States (CIS) have raised concern over the levels of safety in this area
- CIS had the highest accident rate of all the regions in 2006, with 8.6 Western-built Jet Hull Losses per million sectors flown, versus the 0.65 world average

Prevention Strategy: IATA to work with Russian carriers, Civil Aviation Authorities and ICAO to implement Safety Management Systems amongst airlines in Russia.

Safety in Africa

- The accident rate in terms of Western-built Hull Losses in this region was the second highest in the world, following CIS
- Poor regulatory oversight, the lack of safety management and deficient flight crew training are amongst the top contributing factors to the accidents in the region

Prevention Strategy: IATA to continue supporting airlines in Africa to help them reach IOSA standards via the Partnership for Safety (PfS) programme, which provides practical and targeted support via seminars, gap analysis audits and training.

In 2007, IATA continues to work with its member airlines, as well as airports, air navigation service providers and regulators, to align its strategy and develop solutions to meet the needs of the industry and enhance operational Safety.

"Integrated Airline Management Systems, including SMS, are a key part of our Safety strategy."

Annex1

A1

Definitions

Aircraft-years: means, for purposes of the Safety Report, the average fleet in service during the year. The figure is calculated by counting the number of days each aircraft is in the airline fleet during the year and then dividing by 365. Periods during which the aircraft is out of service (for repair, storage, parked, etc.) are then excluded.

Accident: an occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, in which:

- a person is fatally or seriously injured as a result of:
  - (a) being in the aircraft;
  - (b) direct contact with any part of the aircraft, including parts which have become detached from the aircraft; or
  - (c) direct exposure to Jet blast,

except when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew;

- the aircraft sustains damage or structural failure which:
  - (a) adversely affects the structural strength, performance or flight characteristics of the aircraft; and
  - (b) would normally require major repair or replacement of the affected component,

except for engine failure or damage, when the damage is limited to the engine, its cowlings or accessories; or for damage limited to propellers, wing tips, antennae, tires, brakes, fairings, small dents or puncture holes in the aircraft skin; or

- the aircraft is still missing or is completely inaccessible.

Notes

1. For statistical uniformity only, an injury resulting in death within thirty days of the date of the accident is classified as a fatal injury by ICAO.

2. An aircraft is considered to be missing when the official search has been terminated and the wreckage has not been located.

For purposes of this Safety Report, accidents are classified as either operational or non-operational.

Accident classification: means the process by which actions, omissions, events, conditions, or a combination thereof, which led to the accident, or incident are identified and categorised.

Aerodrome manager: means an aerodrome manager as defined in applicable regulations; and includes the owner of aerodrome.

Air Traffic Service unit: means an involved Air Traffic Service (ATS) unit, as defined in applicable ATS, Search and Rescue, and overflight regulations.

Aircraft: means the involved aircraft, used interchangeably with aeroplane(s).

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Captain: means the involved pilot responsible for operation and safety of the aeroplane during flight time.

Commander: means the involved pilot, in an augmented crew, responsible for operation and safety of the aeroplane during flight time.

Controlled Flight into Terrain (CFIT): (From CAST-ICAO Common Taxonomy Team Occurrence Categories, refer to supporting documents on CD-ROM).

In-flight collision or near collision with terrain, water, or obstacle without indication of loss of control:

- CFIT is used only for occurrences during airborne phases of flight;
- CFIT includes collisions with those objects extending above the surface (for example: towers);
- CFIT can occur during either Instrument Meteorological Conditions (IMC) or Visual Meteorological Conditions (VMC);
- This category includes instances when the cockpit crew is affected by visual illusions (e.g. black hole approaches) that result in the aircraft being flown under control into terrain, water, or obstacles;
- If control of the aircraft is lost (induced by crew, weather or equipment failure), do not use this category; use Loss of Control — In-flight (LOC-I) instead;
- For an occurrence involving intentional low altitude operations (e.g. crop dusting) use the Low Altitude Operations (LALT) code instead of CFIT;
- Do not use this category for occurrences involving intentional flight into / toward terrain. Code all suicides under Security Related (SEC) events;
- Do not use this category for occurrences involving runway undershoot / overshoot, which are classified as Undershoot / Overshoot (USOS).

Crewmember: means anyone on board a flight who has duties connected with the sector of the flight during which the accident happened. It excludes positioning or relief crew, security staff, etc. (see definition of "passenger" below).

Eastern-built Jet aircraft: The main types in current service and considered in this Safety Report are the An-72, Il-62, Il-76, Il-86, Tu-134, Tu-154, Yak-40 and Yak-42.

Eastern-built Turboprop aircraft: The main types in current service and considered in this Safety Report are An-12, An-24, An-26, An-28, An-32, L-410 and Y-12.

Fatal accident: A fatal accident is one where at least one passenger or crewmember is killed or later dies of their injuries as a result of an "operational" accident. Events such as slips and falls, food poisoning, turbulence or accidents involving on board equipment, which may involve fatalities but where the aircraft sustains minor or no damage, are excluded.

Most fatal accidents also result in the aircraft becoming a hull loss but this is not necessarily always the case and there have been a number of substantial damage accidents where deaths have occurred.

Fatality: A fatality is a passenger or crewmember who is killed or later dies of their injuries resulting from an operational accident. Injured persons who die more than 30 days after the accident are generally excluded, however, one or two cases where death came later but could reasonably be shown to have been a direct result of injuries sustained in the original accident, are included (this does not conform to the ICAO Annex 13 definition but, in this context, is thought to be more meaningful).

Hull loss: An accident in which the aircraft is destroyed or substantially damaged and is not subsequently repaired for whatever reason including a financial decision of the owner.

IATA accident classification system: IATA's accident classification system comprises five categories: human, technical, environmental, organisational, and insufficient data. Each category (excepting the last) is further subdivided into detailed contributing factors.

Human Factors (HUM): The human factors category relates only to the involved flight crew.

CODE	DESCRIPTION	EXAMPLE EVENT(S)
H1	Intentional non-compliance	Deliberate and premeditated deviation from operator procedures and/or regulations. Examples include intentional disregard of operational limitations or SOPs.
H2	Proficiency	Flight crew performance failures due to deficient knowledge or skills. This may be exacerbated by lack of experience, knowledge or training. Examples include inappropriate handling of the aircraft, such as flying within established approach parameters, or of systems, such as the inability to correctly programme a flight management computer.
H3	Communication	Miscommunication, misinterpretation or failure to communicate pertinent information within the flight crew or between the flight crew and an external agent (e.g. ATC or ground operations). CRM issues typically fall under this category. Examples include: failures in monitoring and cross-checking, misunderstanding a clearance or failure to convey relevant operational information.
H4	Procedural	Unintentional deviation in the execution of operator procedures and/or regulations. The flight crew has the necessary knowledge and skills, the intention is correct, but the execution is flawed. It may also include situations where flight crews forget or omit relevant appropriate action. Examples include a flight crew dialling a wrong altitude into a mode control panel or a flight crew failing to dial an altitude in a mode control panel.
H5	Incapacitation / Fatigue	Flight crewmember unable to perform duties due to physical or psychological impairment.

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Technical Factors (TEC): The technical factors category relates specifically to systems and components of the involved aircraft and their airworthiness and/or serviceability.

CODE	DESCRIPTION	EXAMPLE EVENT(S)
T1	Extensive engine failure, uncontained engine fire	Damage due to non-containment.
T2	Extensive engine failure, uncontained engine fire	Engine overheat, propeller failure.
T3	Gear and tire	Failure affecting parking, taxi, take-off and landing.
T4	Flight controls	Failure affecting aircraft controllability.
T5	Structural failure	Failure due to flutter, overload, corrosion / fatigue; engine separation.
T6	Fire, smoke (cockpit, cabin, cargo)	Post-crash fire, fire due to aircraft systems, fire other cause(s).
T7	Unapproved modification / bogus parts	Self-explanatory.
T8	Avionics	All avionics except autopilot and FMS.
T9	Design, manufacturer	Design shortcomings, manufacturing defect.
T10	Autopilot / FMS	Self-explanatory.
T11	Hydraulic system failure	Self-explanatory.
T12	Other	Not clearly falling within another technical category.

Environmental Factors (ENV): The environmental factors category relates to the physical world in which the involved aircraft operated and the infrastructural resources (excluding corporate) required for successful performance.

CODE	DESCRIPTION	EXAMPLE EVENT(S)
E1	Meteorology (MET)	Windshear, jet upset, atmospheric turbulence, icing, wake turbulence (aircraft spacing), volcanic ash, sand, precipitation, lightning. Poor visibility, poor runway condition reporting.
E2	Air Traffic Services (ATS) / Communications (COM) / conflicting traffic	Incorrect, inadequate or misleading instruction or advice, misunderstood / missed communication, failure to provide separation (air), failure to provide separation (ground).
E3	Birds / Foreign Object Damage (FOD)	Self-explanatory.
E4	Airport facilities	Inadequate aerodrome support (crash, rescue capability, snow removal, sanding); failure to eliminate runway hazards; inadequate, improper, or misleading airport marking or information.
E5	Navaids	Ground navigation aid malfunction, lack or unavailability.
E6	Security	Inadequate security measures; breach of security procedures.
E7	Regulatory oversight	Failure by cognisant authority to exercise regulatory oversight or lack thereof.
E8	Other	Not clearly falling within another environmental category.

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Organisational Factors (ORG): The organisational factors category relates to the corporate environment in which flight crews operate, including management aspects.

CODE	DESCRIPTION	EXAMPLE EVENT(S)
O1	Safety management	Inadequate or absent SMS such as: ineffective or absent safety officer, inadequate or absent accident/incident prevention programme, inadequate or absent voluntary confidential reporting system.
O2	Training systems	Omitted or inadequate training; language skills deficiencies; qualifications and experience of flight crews, operational needs leading to training reductions, insufficient assessment of training, inadequate training resources such as manuals or CBT devices.
O3	Standards and checking	Inadequate, incorrect, unclear or absent: (1) Standard Operating Procedures (SOPs), (2) operational instructions and/or policies, (3) company regulations, (4) controls to assess compliance with regulations and SOPs.
O4	Cabin operations	The management of cabin operations. Examples include: unruly passenger management, failure to perform by cabin crew.
O5	Ground operations	The management of ground operations. Examples include: ground support procedures and training, loading errors, incorrect pushback procedures, failure in ground tug, de-icing, or marshalling.
O6	Technology and equipment	Available safety equipment not installed (EGPWS, predictive wind-shear, TCAS / ACAS, etc.).
O7	Operational planning and scheduling	Crew rostering and staffing practices, flight and duty time limitations, health and welfare issues.
O8	Change management	Inadequate oversight of change. Failure to address operational needs created by, for example: expansion, or downsising. Failure to evaluate, integrate and/or monitor changes to established organisational practices or procedures. Consequences of mergers and acquisitions.
O9	Selection systems	Inadequate or absent selection standards.
O10	Maintenance operations	The management of maintenance activities. Examples include failure to complete maintenance, maintenance or repair error / oversight / inadequacy, unrecorded maintenance, deficiencies in technical documentation, deficiencies in trouble shooting.
O11	Dangerous goods	Carriage of articles or substances capable of posing a significant risk to health, safety or property when transported by air.
O12	Dispatch	Self-explanatory.
O13	Other	Not clearly falling within another organisational category.

Insufficient Data (I): The insufficient data category is used to describe accidents for which classification is not possible without further information.

CODE	DESCRIPTION	EXAMPLE EVENT(S)
I	Insufficient data to make any classification	Self-explanatory.

A1

Incident: An occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation.

In-flight Security Personnel: An individual who is trained, authorised and armed by the state and is carried on board an aircraft and whose intention is to prevent acts of unlawful interference.

Investigation: A process conducted for the purpose of accident prevention which includes the gathering and analysis of information, the drawing of conclusions, including the determination of causes and, when appropriate, the making of safety recommendations.

Investigator in charge: A person charged, on the basis of his or her qualifications, with the responsibility for the organisation, conduct and control of an investigation.

Involved: means directly concerned, or designated to be concerned, with an accident or incident.

Level of safety: means how far a level of safety is to be pursued in a given context, assessed with reference to an acceptable risk, based on the current values of society.

Major repair: means a repair which, if improperly done, might appreciably affect mass, balance, structural strength, performance, powerplant operation, flight characteristics, or other qualities affecting airworthiness.

Non-operational accident: This definition includes acts of deliberate violence such as sabotage, war, etc., and (an IATA constraint) accidents which occur during crew training, demonstration and test flights (sabotage, etc., is believed to be a matter of security rather than flight safety, and crew training, demonstration and test flying are considered to involve special risks inherent to these types of operation).

Also included in this category are:

- Non-airline operated aircraft (e.g. military or government operated, survey, aerial work or parachuting flights);
- Accidents where there has been no intention of flight.

Occurrence: means any unusual or abnormal event involving an aircraft, including but not limited to an incident.

Operator: A person, organisation or enterprise engaged in or offering to engage in aircraft operation.

Operational accident: means an accident is one which is believed to represent the risks of normal commercial operation, generally accidents which occur during normal revenue operations or positioning flights.

Passenger: means anyone on board a flight who, as far as may be determined, is not a crewmember. Apart from normal revenue passengers this includes off-duty staff members, positioning and relief flight crew members etc., who have no duties connected with the sector of the flight during which the accident happened. Security staff are included as passengers as their duties are not concerned with the operation of the flight.

Person: means any involved individual, including an aerodrome manager and/or a member of an air traffic services unit.

Phase of flight: The “phase of flight” definitions were, and continue to be, developed by the ATA Flight Operations Working Group. The following is an excerpt from the Flight Operations Information Data Interchange — Phase of Flight Specification, ATA iSpec2200 (ATA POF Spec). Further information on iSpec2200 may be obtained from

www.airlines.org.

A1

Flight Planning (FLP) This phase begins when the flight crew initiates the use of flight planning information facilities and becomes dedicated to a flight based upon a route and an airplane; it ends when the crew arrives at the aircraft for the purpose of the planned flight or the crew initiates a “Flight Close” phase.

Pre-flight (PRF) This phase begins with the arrival of the flight crew at an aircraft for the purpose of flight; it ends when a dedication is made to depart the parking position and/or start the engine(s). It may also end by the crew initiating a “Post- flight” phase.

NOTE: The Pre-flight phase assumes the aircraft is sitting at the point at which the aircraft will be loaded or boarded, with the primary engine(s) not operating. If boarding occurs in this phase, it is done without any engines operating. Boarding with any engine operating is covered under Engine Start/Depart.

Engine Start/Depart (ESD) This phase begins when the flight crew take action to have the aircraft moved from the parked position and/or take switch action to energize the engine(s); it ends when the aircraft begins to move forward under its own power or the crew initiates an “Arrival/Engine Shutdown” phase.

NOTE: The Engine Start/Depart phase includes: the aircraft engine(s) start-up whether assisted or not and whether the aircraft is stationary with more than one engine shutdown prior to Taxi-out, i.e., boarding of persons or baggage with engines running. It includes all actions of power back for the purpose of positioning the aircraft for Taxi-out.

Taxi-out (TXO) This phase begins when the crew moves the aircraft forward under its own power; it ends when thrust is increased for the purpose of Take-off or the crew initiates a “Taxi-in” phase.

NOTE: This phase includes taxi from the point of moving under its own power, up to and including entering the runway and reaching the Take-off position.

Take-off (TOF) This phase begins when the crew increases the thrust for the purpose of lift-off; it ends when an Initial Climb is established or the crew initiates a “Rejected Take-off” phase.

Rejected Take-off (RTO) This phase begins when the crew reduces thrust for the purpose of stopping the aircraft prior to the end of the Take-off phase; it ends when the aircraft is taxied off the runway for a “Taxi-in” phase or when the aircraft is stopped and engines shutdown.

Initial Climb (ICL) This phase begins at 35 ft above the runway elevation; it ends after the speed and configuration are established at a defined maneuvering altitude or to continue the climb for the purpose of cruise. It may also end by the crew initiating an “Approach” phase.

NOTE: Maneuvering altitude is based upon such an altitude to safely maneuver the aircraft after an engine failure occurs, or pre-defined as an obstacle clearance altitude. Initial Climb includes such procedures applied to meet the requirements of noise abatement climb, or best angle/rate of climb.

En Route Climb (ECL) This phase begins when the crew establishes the aircraft at a defined speed and configuration enabling the aircraft to increase altitude for the purpose of cruise; it ends with the aircraft established at a predetermined constant initial cruise altitude at a defined speed or by the crew initiating an “Descent” phase.

Cruise (CRZ) The cruise phase begins when the crew establishes the aircraft at a defined speed and predetermined constant initial cruise altitude and proceeds in the direction of a destination; it ends with the beginning of Descent for the purpose of an approach or by the crew initiating an “En Route Climb” phase.

Descent (DST) This phase begins when the crew departs the cruise altitude for the purpose of an approach at a particular destination; it ends when the crew initiates changes in aircraft configuration and /or speeds to facilitate a landing on a particular runway. It may also end by the crew initiating an “En Route Climb” or “Cruise” phase.

Approach (APR) This phase begins when the crew initiates changes in aircraft configuration and /or speeds enabling the aircraft to maneuver for the purpose of landing on a particular runway; it ends when the aircraft is in the landing configuration and the crew is dedicated to land on a specific runway. It may also end by the crew initiating an “Initial Climb” or “Go-around” phase.

Go-around (GOA) This phase begins when the crew aborts the descent to the planned landing runway during the Approach phase, it ends after speed and configuration are established at a defined maneuvering altitude or to continue the climb for the purpose of cruise(Same as end of “Initial Climb”).

Landing (LND) This phase begins when the aircraft is in the landing configuration and the crew is dedicated to touch down on a specific runway; it ends when the speed permits the aircraft to be maneuvered by means of taxiing for the purpose of arriving at a parking area. It may also end by the crew initiating an "Go-around" phase.

Taxi-in (TXI) This phase begins when the crew begins to maneuver the aircraft under its own power to an arrival area for the purpose of parking; it ends when the aircraft ceases moving under its own power with a commitment to shut down the engine(s). It may also end by the crew initiating a "Taxi-out" phase.

Arrival/Engine Shutdown (AES) This phase begins when the crew ceases to move the aircraft under its own power and a commitment is made to shutdown the engine(s); it ends with a dedication to shutting down ancillary systems for the purpose of securing the aircraft. It may also end by the crew initiating an "Engine Start/Depart" phase.

NOTE: The Arrival/Engine Shutdown phase includes actions required during a time when the aircraft is stationary with one or more engines operating while ground servicing may be taking place, i.e., deplaning persons or baggage with engine(s) running, and or refueling with engine(s) running.

Post-flight (PSF) This phase begins when the crew commences the shutdown of ancillary systems of the aircraft for the purpose of leaving the flight deck; it ends when the cockpit and cabin crew leaves the aircraft. It may also end by the crew initiating a "Pre-flight" phase.

Flight Close (FLC) This phase begins when the crew initiates a message to the flight-following authorities that the aircraft is secure, and the crew is finished with the duties of the past flight; it ends when the crew has completed these duties or begins to plan for another flight by initiating a "Flight Planning" phase.

Ground Servicing (GDS) This phase begins when the aircraft is stopped and available to be safely approached by ground personnel for the purpose of securing the aircraft and performing the duties applicable to the arrival of the aircraft, aircraft maintenance, etc.; it ends with completion of the duties applicable to the departure of the aircraft or when the aircraft is no longer safe to approach for the purpose of ground servicing. e.g. Prior to crew initiating the "Taxi-out" phase.

NOTE: This phase was identified by the need of information that may not directly require the input of cockpit or cabin crew. It is acknowledged as an entity to allow placement of the tasks required of personnel assigned to service the aircraft.

A1

Sky Marshal: see In-flight Security Personnel.

Products: refer, in terms of accident costs, to those liabilities which fall on parties other than the involved airline.

Risk: means the combination of the probability, or frequency of occurrence of a defined hazard and the magnitude of the consequences of the occurrence.

Safety: means freedom from unacceptable risk of harm.

Sector: the operation of an aircraft between takeoff at one location and landing at another (other than a diversion).

Serious Incident: An incident involving circumstances indicating that an accident nearly occurred (note the difference between an accident and a serious incident lies only in the result).

Serious injury: An injury which is sustained by a person in an accident and which:

- Requires hospitalisation for more than 48 hours, commencing within seven days from the date the injury was received;
- Results in a fracture of any bone (except simple fractures of fingers, toes or nose);
- Involves lacerations which cause severe haemorrhage, or nerve, muscle or tendon damage;
- Involves injury to any internal organ; or
- Involves second or third-degree burns, or any burns affecting more than five percent of the surface of the body; or
- Involves verified exposure to infectious substances or injurious radiation.

Substantial Damage: means damage or structural failure which adversely affects the structural strength, performance or flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component.

Notes

1. Engine failure (damage limited to an engine), bent fairing or cowling, dented skin, small punctured holes in the skin or fabric, ground damage to rotor or propeller blades, minor damage to landing gear, wheels, tires, flaps, engine accessories, brakes, or wing tips are not considered "substantial damage" for purpose of this Safety Report.

2. The ICAO Annex 13 definition is unrelated to cost and includes many incidents in which the financial consequences are minimal.

Threat and Error Management (TEM) Framework: This section presents definitions for the components of the TEM Framework and illustrates examples for the classifications used for Integrated Threat Analysis (ITA). Lists of examples are not exhaustive.

A1

THREATS

Events that occur **outside the influence of the flight crew**, or errors by **others than the flight crew**, that increase complexity of the flight, and require flight crew attention and management to maintain the margins of safety.

Mismanaged Threat A threat that is linked to, or induces flight crew error.

Environmental Threats

- Weather: thunderstorms, turbulence, icing, wind shear, cross/tailwind, very low/high temperatures.
- ATC: traffic congestion, TCAS RA / TA, ATC command, ATC error, ATC language difficulty, ATC non-standard phraseology, ATC runway change, ATIS communication, units of measurement (QFE/meters).
- Airport: contaminated / short runway, contaminated taxiway, lack of / confusing / faded signage / markings, birds, aids U/S, complex surface navigation procedures, airport constructions.
- Terrain: High ground, slope, lack of references, “black hole”, volcano.
- Other: similar call-signs.

Airline Threats

- Airline operational pressure: delays, late arrivals, equipment changes.
- Aircraft: aircraft malfunction, automation event / anomaly, MEL/CDL.
- Cabin: cabin crew error, cabin event distraction, interruption, cabin door security.
- Maintenance: maintenance event / error.
- Ground: ground handling event, de-icing, ground crew error.
- Dispatch: dispatch paperwork event / error.
- Documentation: manual error, chart error.
- Other: crew scheduling event.

ERRORS

Observed actions or inactions by the flight crew, that lead to a deviation from flight crew or organisational intentions or expectations.

Mismanaged Error

An error that is linked to or induces additional errors, or an undesired aircraft state.

Proficiency Errors

- Manual handling / flight controls: vertical / lateral and/or speed deviations, incorrect flaps / speedbrakes, thrust reverser or power settings.
- Automation: incorrect altitude, speed, heading, autothrottle settings, incorrect mode executed, or incorrect entries.
- Systems / radio / instruments: incorrect packs, incorrect anti-icing, incorrect altimeter, incorrect fuel switches settings, incorrect speed bug, incorrect radio frequency dialled.
- Ground navigation: attempting to turn down wrong taxiway/runway, taxi too fast, failure to hold short, missed taxiway/runway.

Procedural Errors

- SOPs: failure to cross-verify automation inputs.
- Checklists: wrong challenge and response; items missed, checklist performed late or at the wrong time.
- Callouts: omitted / incorrect callouts.
- Briefings: omitted briefings; items missed.
- Documentation: wrong weight and balance, fuel information, ATIS, or clearance information recorded, misinterpreted items on paperwork, incorrect logbook entries, incorrect application of MEL procedures.

Communication Errors

Crew to external: missed calls, misinterpretations of instructions, incorrect read-back, wrong clearance, taxiway, gate or runway communicated.

Pilot to pilot: within crew miscommunication or misinterpretation.

Intentional Non-compliance

Wilful deviation from rules, regulation, SOPs.

A2

Undesired Aircraft States

Flightcrew-induced aircraft states (deviations or incorrect configurations) associated with a clear reduction in safety margins; a safety-compromising situation that results from ineffective error management.

Mismanaged Undesired Aircraft State An Undesired Aircraft State that is linked to, or induces additional error / Undesired Aircraft State, an incident or accident.

Aircraft Handling

- Aircraft control (attitude).
- Vertical, lateral or speed deviations.
- Unnecessary weather penetration.
- Unauthorised airspace penetration.
- Operation outside aircraft limitations.
- Unstable approach.
- Continued landing after unstable approach.
- Long, floated, firm or off-centreline landing.

Ground Navigation

- Proceeding towards wrong taxiway / runway.
- Wrong taxiway, ramp, gate or hold spot.
- Incorrect Aircraft Configurations
- Incorrect systems configuration.
- Incorrect flight controls configuration.
- Incorrect automation configuration.
- Incorrect engine configuration.
- Incorrect weight and balance configuration.

Western-built Jet: Commercial Jet transport aeroplane with a maximum certificated takeoff mass of more than 15,000 kg, designed and manufactured in the western world countries.

Western-built Turboprop: Commercial Turboprop transport aeroplane with a maximum certificated takeoff mass of more than 3900 kg, designed and manufactured in the western world countries.

Annex2 2006 Accident Summary

DATE	MANUFACTURER	AIRCRAFT	OPERATOR	LOCATION	PHASE	SERVICE	ORIGIN	JET/TURBOPROP	SEVERITY	SUMMARY
09-Jan-06	Boeing	MD-83	Spanair	Barcelona AP, Spain	LND	DSP	Western-built	Jet	Substantial Damage	Undercarriage caught fire on landing after tyre failure.
10-Jan-06	Bombardier	DHC-6	Nature Air	Puerto Jiminez AP, Costa Rica	TOF	DSP	Western-built	Turboprop	Substantial Damage	Loss of directional control during take-off.
16-Jan-06	Boeing	737-500	Continental Airlines	El Paso, Texas, United States	ESD	DSP	Western-built	Jet	Substantial Damage	A mechanic was fatally injured while performing a maintenance trouble shooting procedure.
26-Jan-06	Let	L-410 Turbolet	United Airlines Kenya	Padak AP, Sudan	LND	DNP	Eastern-built	Turboprop	Hull Loss	Destroyed during runway excursion on landing.
07-Feb-06	Boeing	DC-8-71F	United Parcel Service-UPS	Philadelphia Intl AP, United States	APR	DSC	Western-built	Jet	Hull Loss	Emergency landing due to cargo fire warning.
08-Feb-06	Fairchild	Metro II	TriCoastal Air	near Paris, TN, United States	ECL	DNC	Western-built	Turboprop	Hull Loss	Crashed in wooded area after loss of control.
04-Mar-06	Boeing	MD-82	Lion Air	Surabaya Intl AP, Indonesia, Indonesia	LND	DSP	Western-built	Jet	Hull Loss	Runway overrun on landing in gusty conditions.
05-Mar-06	Bombardier	DHC-6	Transwest Air	Barbaer Field, La Ronge, Canada	ESD	DSP	Western-built	Turboprop	Substantial Damage	Collided with another aircraft after loss of control on engine start up.
09-Mar-06	Boeing	B767-300ER	Transaero	Domodedovo AP, Moscow, Russia	TXO	DSP	Western-built	Jet	Substantial Damage	Damaged by undecarriage failure on taxi-out.
11-Mar-06	ATR	ATR-72-500	Air Deccan	Hindustan AP, Bangalore, India	LND	DSP	Western-built	Turboprop	Substantial Damage	Tailstrike on bounced landing.
18-Mar-06	Boeing	B737-600	Air Algérie	Sevilla Airport (SVQ) (Spain), Spain	LND	INP	Western-built	Jet	Substantial Damage	Hard landing followed by runway excursion.
18-Mar-06	Raytheon	Beechcraft 99	Ameriflight	near Butte, MT (United States of America), United States	CRZ	DSC	Western-built	Turboprop	Hull Loss	Crashed en route to destination, wreckage found.
31-Mar-06	Let	L-410 Turbolet	TEAM Transportes Aéreos	Saquarema area Rio de Janeiro Prov, Brazil	CRZ	DSP	Eastern-built	Turboprop	Hull Loss	Crashed in mountainous area.
04-Apr-06	Boeing	DC-10	Fedex	over Walnut Ridge, AR, United States	ECL	DSC	Western-built	Jet	Substantial Damage	Uncontained engine failure during cruise.
13-Apr-06	Antonov	An-26	Ukraine Air Alliance	Tshikapa, ZR, Congo, Republic of the	LND	DNC	Eastern-built	Turboprop	Substantial Damage	Substantially damaged during a hard landing following bird strike.
16-Apr-06	Fokker	F-27	TAM - Transportes Aero Militar	Guayamerin-Intl AP (SLGY), Bolivia	LND	DSP	Western-built	Turboprop	Hull Loss	Runway excurision on landing.
18-Apr-06	Boeing	B737-400	Sky Airlines	Antalya, Turkey, Turkey	LND	ISP	Western-built	Jet	Substantial Damage	Tailstrike on landing.
03-May-06	Airbus	A320	Armavia	Black Sea, off Sochi, RU, Russia	GOA	ISP	Western-built	Jet	Hull Loss	CFIT into sea during attempted go-around in adverse weather.

DATE	MANUFACTURER	AIRCRAFT	OPERATOR	LOCATION	PHASE	SERVICE	ORIGIN	JET/TURBOPROP	SEVERITY	SUMMARY
18-May-06	Bombardier	Shorts 330	Air Cargo Carriers	Myrtle Beach int AP, United States	LND	DNC	Western-built	Turboprop	Substantial Damage	Damaged during gear-up landing.
19-May-06	ATR	ATR-72-200	Vietnam Airlines	Nha Trang, VN, Viet Nam	LND	DNP	Western-built	Turboprop	Substantial Damage	Runway excursion on landing.
21-May-06	Raytheon	B1900	Gulfstream International Airlines	Fort Lauderdale, US, United States	LND	ISP	Western-built	Turboprop	Substantial Damage	Right main undercarriage collapsed following gear extension problem on approach.
30-May-06	Embraer	EMB-170	Shuttle America	Dulles Intl AP, Washington, United States	LND	DSP	Western-built	Jet	Substantial Damage	Damaged during a nose gear retracted, emergency landing following gear extension problem.
01-Jun-06	Bae	Jetstream 31	Air Panama	Bocas de Toro, PA, Panama	LND	DSP	Western-built	Turboprop	Hull Loss	Runway excursion on landing.
02-Jun-06	ATR	ATR-72-500	Air Deccan	Hyderabad, IN, India	LND	DSP	Western-built	Turboprop	Substantial Damage	Tailstrike on landing.
04-Jun-06	Boeing	DC-10	Arrow Cargo	Augusto C Sandino Airport, Nicaragua	LND	ISC	Western-built	Jet	Hull Loss	Runway excursion on landing.
05-Jun-06	Indonesian Aerospace	NC-212	Merpati Nusantara Airlines	Bandanaira, ID, Indonesia	LND	DSP	Western-built	Turboprop	Hull Loss	Runway excursion on landing.
07-Jun-06	Boeing	B747-200F	TradeWinds Airlines	Rio Negro AP, Medellin, CO, Colombia	LND	INC	Western-built	Jet	Hull Loss	Runway excursion after rejected take-off.
09-Jun-06	Airbus	A321	Asiana Airlines	80km S of Seoul, KR, Korea (Democratic Republic)	CRZ	DSP	Western-built	Jet	Substantial Damage	Aircraft damaged in hail storm.
15-Jun-06	Boeing	B737-300SF	TNT Airways	Birmingham, GB, United Kingdom	GOA	INC	Western-built	Jet	Hull Loss	Damaged during hard landing while attempting a go-around.
16-Jun-06	Boeing	MD-11	Varig Brasil	Brasilia International Airport (Brazil), Brazil	LND	DSP	Western-built	Jet	Substantial Damage	Damaged by undercarriage failure on landing.
21-Jun-06	Bombardier	DHC-6	Yeti Airlines	near Jumla Airport (JUM) (Nepal), Nepal	GOA	DSP	Western-built	Turboprop	Hull Loss	CFIT during go-around.
23-Jun-06	Boeing	MD-83	AMC Aviation	Juba Airport (JUB / HSSJ), Sudan	LND	DSP	Western-built	Jet	Substantial Damage	Runway excursion on landing.
25-Jun-06	Tupolev	Tu-154	Kish Air	DBX, UAE, United Arab Emirates	LND	ISP	Eastern-built	Jet	Substantial Damage	Damaged after landing on closed runway.
01-Jul-06	Fairchild	Metro III	Corporate Air	Canberra, Australia	LND	DNP	Western-built	Turboprop	Substantial Damage	Hard landing.
09-Jul-06	Airbus	A310	S7 Airlines	Irkutsk Intl Airport (UIII), Russia	LND	DSP	Western-built	Jet	Hull Loss	Runway excrusion on landing.
10-Jul-06	Fokker	F-27	Pakistan International Airlines	near Multan Airport (OPMT), Pakistan	ICL	DSP	Western-built	Turboprop	Hull Loss	Crashed shortly after take-off.
14-Jul-06	Boeing	B707-320C	Skymaster Air Lines	Manaus, BR, Brazil	LND	DSC	Western-built	Jet	Substantial Damage	Damaged while landing with its nose undercarriage retracted following extension problem.

Annex2 2006 Accident Summary (Cont'd)

DATE	MANUFACTURER	AIRCRAFT	OPERATOR	LOCATION	PHASE	SERVICE	ORIGIN	JET/TURBOPROP	SEVERITY	SUMMARY
16-Jul-06	Airbus	A340-600	Virgin Atlantic Airways	Hong Kong intl AP, United Kingdom	TOF	ISP	Western-built	Jet	Substantial Damage	Tailstrike on take-off.
18-Jul-06	Airbus	A321	Onur Air	Rotterdam Airport (EHRD), Netherlands	LND	INP	Western-built	Jet	Substantial Damage	Tailstrike on landing.
28-Jul-06	Boeing	MD-10	Fedex	Memphis Intl AP, USA, United States	LND	DSC	Western-built	Jet	Hull Loss	Undercarriage collapsed on landing
01-Aug-06	Boeing	MD-82	Dubrovnik Airline	Tel Aviv Intl AP, Israel	TOF	ISP	Western-built	Jet	Substantial Damage	Birdstrike on take-off.
02-Aug-06	Boeing	B737-300	Slovak Airlines	Corfu intl AP. Greece, Greece	LND	ISP	Western-built	Jet	Substantial Damage	Tailstrike on landing.
03-Aug-06	Antonov	An-28	Trasept Congo	near Bukavu, Rwandese Republic	APR	DNP	Eastern-built	Turboprop	Hull Loss	Collided with terrain on approach in adverse weather.
04-Aug-06	Embraer	EMB-110 Bandeirante	AirNow	near Bennington AP, VT, USA, United States	GOA	DNC	Western-built	Turboprop	Hull Loss	CFIT in attempted go-around.
13-Aug-06	Lockheed	L-100-10	Air Algerie	near Piacenza Airport, Italy, Italy	CRZ	INC	Western-built	Turboprop	Hull Loss	Crashed after a loss of control in flight.
22-Aug-06	Tupolev	Tu-154	Pulkovo Aviation Enterprise	45 km north of Donetsk, Russia	CRZ	DSP	Eastern-built	Jet	Hull Loss	Crashed after loss of control in-flight.
24-Aug-06	Boeing	B737-300	KLM Royal Dutch Airlines	Nice, France, France	ESD	ISP	Western-built	Jet	Substantial Damage	Aircraft's nose undercarriage was damaged during pushback
27-Aug-06	Bombardier	CRJ	Comair	Lexington, USA, United States	TOF	DSP	Western-built	Jet	Hull Loss	Crashed into wooded area after take-off from wrong runway.
27-Aug-06	Airbus	A320	China Eastern Airlines	Beijing AP, China	ESD	DSP	Western-built	Jet	Substantial Damage	Ground collision during taxi.
28-Aug-06	GAF/ASTA	Nomad	Paraguay Air Service	near Salta Airport, Paraguay (SASA), Argentina	LND	INP	Western-built	Turboprop	Substantial Damage	Runway excursion during emergency landing.
01-Sep-06	Tupolev	Tu-154	Iran Air Tours	Mashhad Airport (IOMM), Iran, Iran	LND	DSP	Eastern-built	Jet	Hull Loss	Runway excurison on landing.
07-Sep-06	Boeing	727-200	DHL Aviation	Lagos Intl Apt, Nigeria	LND	INC	Western-built	Jet	Hull Loss	Overran while landing in heavy rain.
09-Sep-06	Boeing	MD-11	KLM Royal Dutch Airlines	AMS, Netherlands	LND	ISP	Western-built	Jet	Substantial Damage	Sustained engine damaged after FOD.
10-Sep-06	Boeing	B737-500	Royal Air Maroc	Brussels Int AP, Belgium	TXO	ISP	Western-built	Jet	Substantial Damage	Ground collision during taxi.
14-Sep-06	Boeing	MD-11	Fedex	Subic Bay International Airport, United States	LND	DSC	Western-built	Jet	Substantial Damage	Tailstrike on landing

DATE	MANUFACTURER	AIRCRAFT	OPERATOR	LOCATION	PHASE	SERVICE	ORIGIN	JET/TURBOPROP	SEVERITY	SUMMARY
26-Sep-06	Tupolev	Tu-154	Altyn Air	Bishkek Airport, Kyrgyz Republic	TOF	ISP	Eastern-built	Jet	Substantial Damage	Impacted another aircraft during take-off roll.
28-Sep-06	Airbus	A340-600	Iberia	Quito, Ecuador	LND	ISP	Western-built	Jet	Substantial Damage	Tailstrike on landing.
29-Sep-06	Boeing	B737-800	GOL Linhas Aereas	Peixoto de Azevedo / Mato Grosso, Brazil	CRZ	DSP	Western-built	Jet	Hull Loss	Mid-air collision with a business jet.
03-Oct-06	Boeing	B737-200	Mandala Airlines	Tarakan, ID, Indonesia	LND	DSP	Western-built	Jet	Hull Loss	Runway excursion on landing.
10-Oct-06	Bae	BAe-146	Atlantic Airways (Faroe Islands)	Stord, Norway	LND	DSP	Western-built	Jet	Hull Loss	Runway excursion during landing.
12-Oct-06	Airbus	A340-300	Iberia	ORD - Chicago, USA, United States	LND	ISP	Western-built	Jet	Substantial Damage	Hard landing.
29-Oct-06	Boeing	B737-200	Aviation Development Corporation (ADC)	Abuja International Airport (ABV), Nigeria	TOF	DSP	Western-built	Jet	Hull Loss	Crashed shortly after take-off in adverse weather.
06-Nov-06	Bombardier	DHC-6 Twin Otter	Innu Mikun Airlines	Goose Bay, CA, Canada	TOF	DNP	Western-built	Turboprop	Substantial Damage	Gear collpase on landing.
08-Nov-06	Fairchild	Metro II	Perimeter Airlines	Norway House, Manitoba, Canada	LND	DSP	Western-built	Turboprop	Substantial Damage	Runway excursion on landing.
09-Nov-06	Let	L-410	Doren Air Congo	Kilambo Airstrip, Congo, Republic of the	TOF	DNP	Eastern-built	Turboprop	Hull Loss	Impacted vehicles during forced landing on road after engine problems.
16-Nov-06	NAMC	YS-11	Aboitiz Air Transport	Manila-Intl AP (RPLL), Philippines	LND	DSP	Western-built	Turboprop	Substantial Damage	Runway excursion on landing.
17-Nov-06	Boeing	DC-10-30AF	Cielos Airlines	Barranquilla, Colombia	LND	ISC	Western-built	Jet	Hull Loss	Runway excursion on landing.
17-Nov-06	Bombardier	DHC-6 Twin Otter	Kal Star Trigana Air	Gergaji Mountain / Puncak Jaya, Indonesia	CRZ	DNP	Western-built	Turboprop	Hull Loss	CFIT into a mountain during cruise in adverse weather.
18-Nov-06	Boeing	B727	Aerosucre Colombia	Leticia area, Colombia	APR	DNC	Western-built	Jet	Hull Loss	CFIT.
28-Nov-06	ATR	ATR 72-202	Hansung Airlines	Jeju-Intl AP (RKPC), Korea (Democratic Republic)	LND	DSP	Western-built	Turboprop	Substantial Damage	Runway excursion on landing.
12-Dec-06	Fokker	F-50	Sudan Airways	Heglig, Sudan, Sudan	LND	DNP	Western-built	Turboprop	Hull Loss	Runway excursion on landing.
15-Dec-06	Fairchild	Metro III	Baires Fly	Buenos Aires - Ezeiza Int'l AP, Argentina	TOF	DNP	Western-built	Turboprop	Substantial Damage	Loss of control on ground after wing struck runway on take-off.
25-Dec-06	Boeing	B737-400	Lion Airlines	Makassar-Intl AP (WAAA) / Sulawesi, Indonesia	LND	DSP	Western-built	Jet	Substantial Damage	Runway excursion on landing.

LIST OF ACRONYMS

AACO	Arab Air Carriers Organization
ACAS	Airborne Collision Avoidance Systems
ACTF	IATA Accident Classification Task Force
ACI	Airports Council International
AENA	Spanish Aviation Authority
AES	Arrival/Engine Shutdown (ATA Phase of Flight)
AFI	Africa (IATA Regions)
AGAS	European Action Group for ATM Safety
AIP	Aeronautical Information Publication
ALA	Approach and Landing Accidents
ALAR	Approach and Landing Accident Reduction
ANSP	Aviation Navigation and Satellite Programs
APR	Approach (ATA Phase of Flight)
ASPAC	Asia/Pacific
ASC	Airports Services Committee
ASG	IATA Airside Safety Group
ASR	Air Safety Reports
ATA	Air Transport Association
ATC	Air Traffic Control
ATOS	Air Transportation Oversight System (FAA)
ATSP	Air Traffic Service Provider
BASIS	British Airways Safety Information System
CAP	UK Civil Aviation Publication
CASA	Civil Aviation Safety Authority
CAST	Commercial Aviation Safety Team
CBT	Computer Based Training
CFIT	Controlled Flight Into Terrain
COSCAP	Co-operative Development Of Operational Safety and Continuing Airworthiness Programmes
CRM	Crew Resource Management
CRZ	Cruise (ATA Phase of Flight)
CSTF	IATA Cabin Safety Task Force
CVR	Cockpit Voice Recorder
DFDR	Digital Flight Data Recorder
DGAC	Dominican Republic CAA
DGB	IATA Dangerous Goods Board
DGR	Dangerous Goods Regulations
DST	Descent (ATA Phase of Flight)
EAGOSH	The European Ground Safety Council
ECL	En Route Climb (ATA Phase of Flight)
EGPWS	Enhanced Ground Proximity Warning System
ERPTF	IATA Emergency Response Planning Task Force
ESD	Engine Start/Depart (ATA Phase of Flight)
ETOPS	Extended-Range Twin-Engine Operations
FAA	Federal Aviation Authority
FDA	Flight Data Analysis

FDR	Flight Data Recording
FLC	Flight Close (ATA Phase of Flight)
FLP	Flight Planning (ATA Phase of Flight)
FO	First Officer
FOG	IATA Flight Operations Group
FOQA	Flight Operations Quality Assurance
FPA	Flight Procedure Authorizations
FSF	Flight Safety Foundation
GASAG	Global Aviation Security Action Group
GDS	Ground Servicing (ATA Phase of Flight)
GOA	Go-around (ATA Phase of Flight)
GPWS	Ground Proximity Warning System
HL	Hull Loss
IACA	International Air Carriers Association
ICAEA	International Civil Aviation English Association
ICAO	International Civil Aviation Organization
ICL	Initial Climb (ATA Phase of Flight)
IFALPA	International Federation of Air Line Pilots' Associations
IFATCA	International Federation of Air Traffic Controllers' Associations
IFSP	In Flight Security Personnel
IGHC	IATA Ground Handling Council
INTERPOL	International Criminal Police Organization
IOSA	IATA Operational Safety Audit
IRTF	Incident Review Task Force
ISASI	International Society of Air Safety Investigators
ITATF	Integrated Threat Analysis Task Force
ITDI	IATA Training and Development Institute
ITF	International Transport Workers Federation
LAHSO	Land-and-Hold Short Operations
LATCAR	Latin America and the Caribbean (IATA Regions).
LND	Landing (ATA Phase of Flight)
LOC	Loss of Control
LOSA	Line Operations Safety Audit
MANPADS	Man Portable Air Defense Systems
MENA	Middle East and North Africa (IATA Regions)
MSTF	IATA Multidivisional Safety Task Force
NAM	North America and North Atlantic (IATA Region)
NASP	National Aviation Security Programme
NBIA	New Bangkok International Airport
NLR	National Aerospace Laboratory NLR, The Netherlands
NOTAM	Notices to Airmen
OPC	IATA Operations Committee
OQS	Operational Quality Standards
PA	Public Announcement
PAAST	Pan American Aviation Safety Team
PED	Portable Electronic Device
PFS	IATA Partnership for Safety Programme

PRF	Pre-Flight (ATA Phase of Flight)
PRIOR	Programme for International Operator Readiness
PSF	Post-flight (ATA Phase of Flight)
QAR	Quick Access Recorder
RA	Resolution Advisory
RDPS	Radar Data Processing System
RIPP	Runway Incursion Prevention Programme
RTC/RCG	Regional Technical Conference
RTL	Regional Team Leaders
RTO	Rejected Take-off (ATA Phase of Flight)
SG	IATA Safety Group
SAFA	Safety Assessment of Foreign Aircraft
SARAST	South Asia Regional Aviation Safety Teams
SBS	Safety Bulletin System
SCCM	Senior Cabin Crew Member
SD	Substantial Damage
SEARAST	Southeast Asia Regional Aviation Safety Teams
SISG	Safety Improvement Sub Group
SMS	Safety Management System
SOP	Standard Operating Procedures
SRC	Safety Regulation Commission
STEADES	Safety Trend Evaluation, Analysis and Data Exchange System
SWAP	Safety With Answers Provided
TAWS	Terrain Awareness Warning System
TCAS	Traffic Alert and Collision Avoidance System
TCAS RA	Traffic Alert and Collision Avoidance System Resolution Advisory
TEM	Threat and Error Management
TIPH	Taxy into Position and Hold
TOF	Taxi-off (ATA Phase of Flight)
TOPM	Technical Operations Policy Manual
TXI	Taxi-in (ATA Phase of Flight)
TXO	Taxi-out (ATA Phase of Flight)
UK CAA	UK Civil Aviation Authority
UKFSC	UK Flight Safety Committee
V/S	Vertical Speed
VNAV	Vertical Navigation
WMO — AMDAR	The World Meteorological Organisation — Aircraft Meteorological Data Reporting Associations