Welcome and Introduction

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Draft MID Safety Summit

Enjoy the coffee break

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HOW TO ENHANCE RUNWAY SAFETY?

MID Safety Summit

Bahrain

28-29 April 2013

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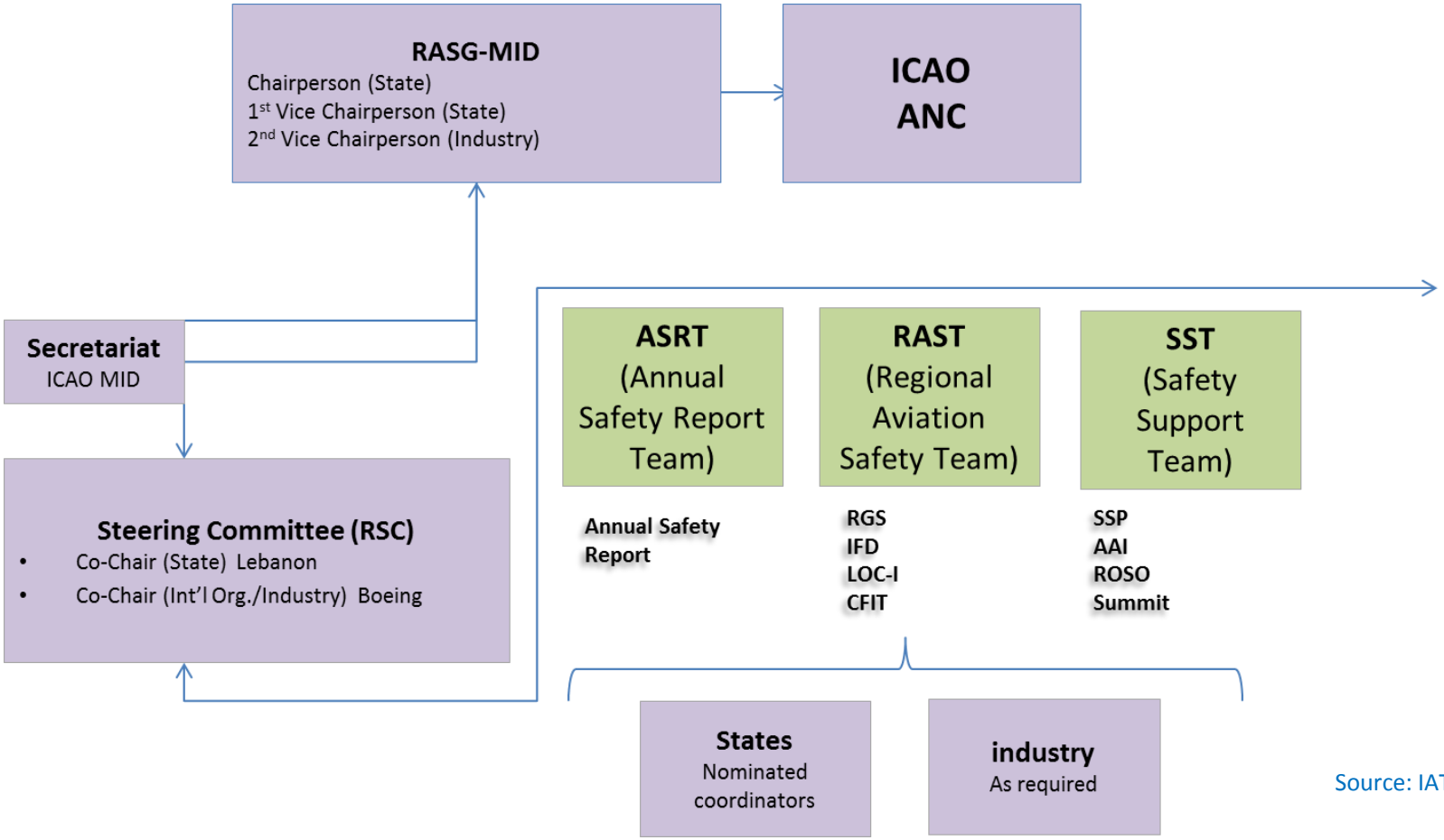
RASG-MID: Working Arrangements



Source: IATA GSIC

MIDDLE EAST REGIONAL RUNWAY SAFETY SEMINAR (MID-RRSS)
(AMMAN, JORDAN, 2012)

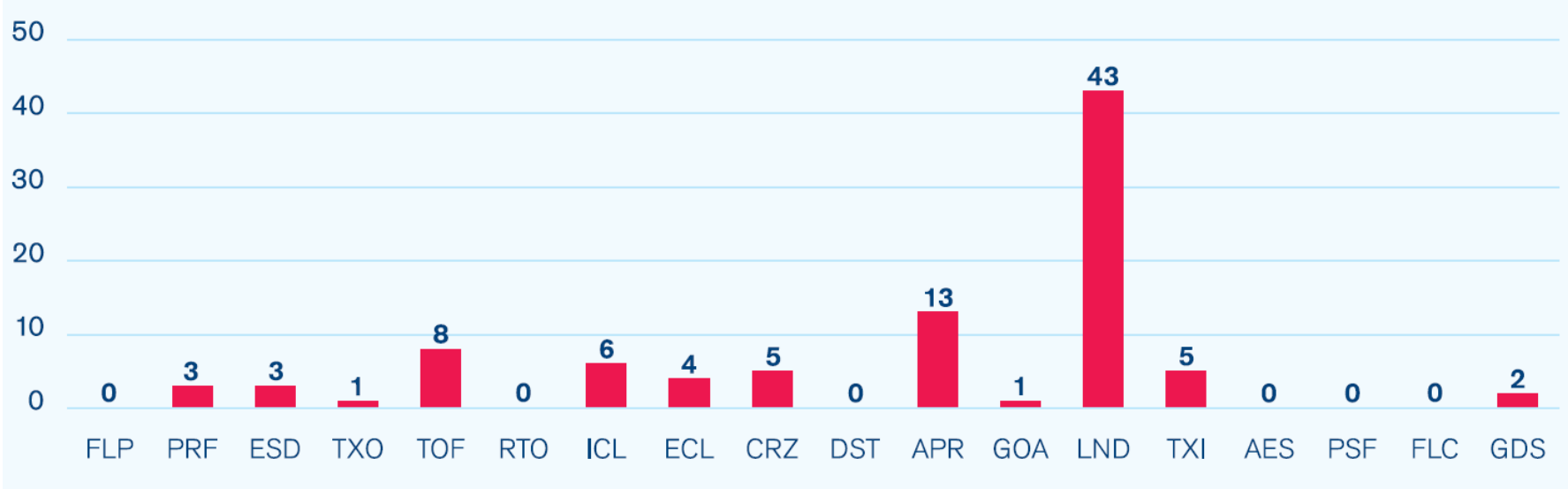
ICAO Global Runway Safety Symposium (GRSS 2011)

Runway Safety Group

Runway Safety Teams (RSTs)

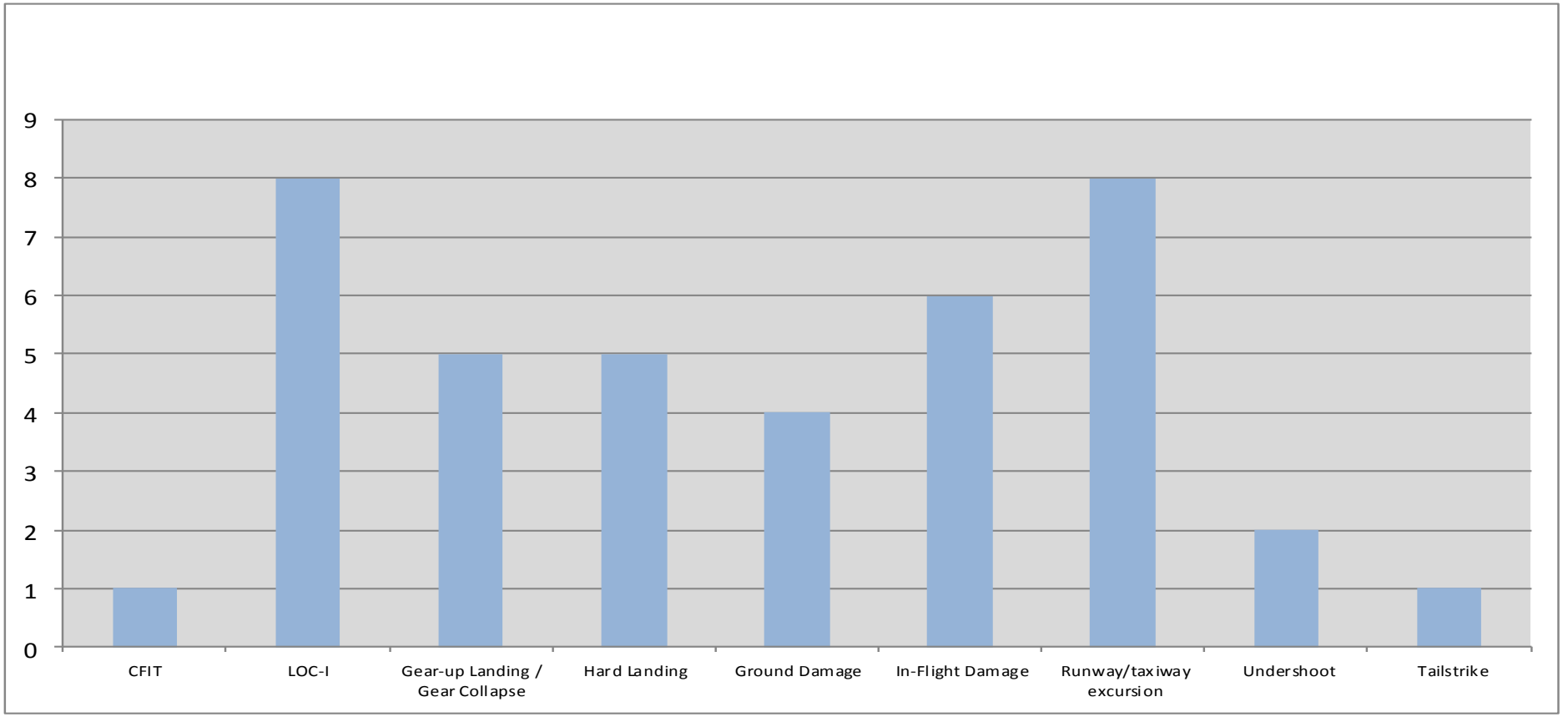
ICAO RST Go Teams

Accidents by Phase of Flight



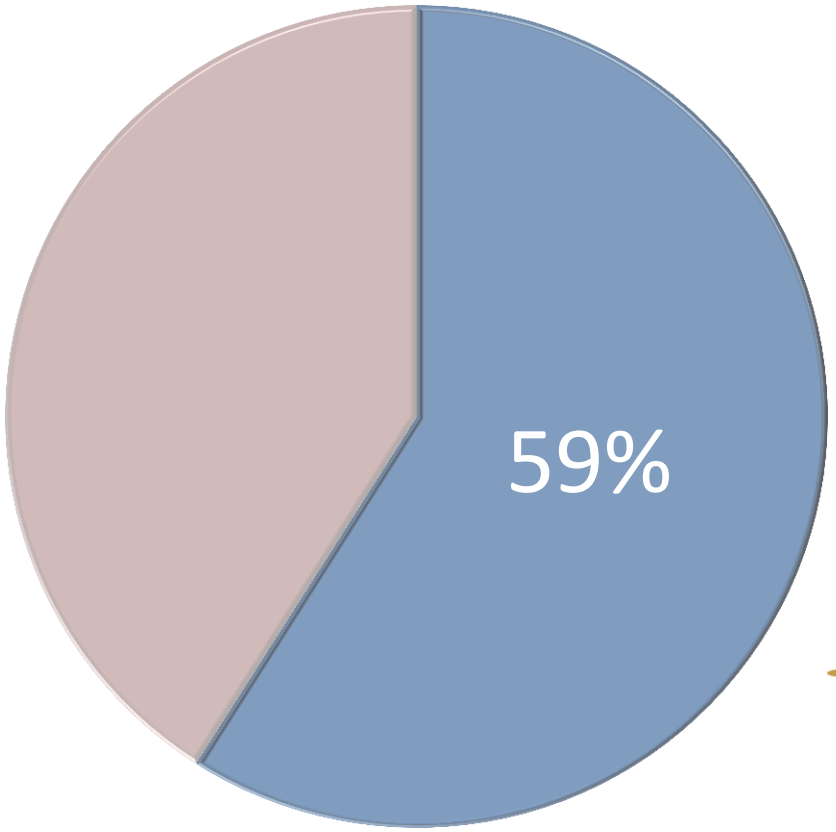
Source: IATA GSIC

Accident Category Breakdown for MID Operators



Source: RASG-MID Annual Safety Report – First Edition 2012

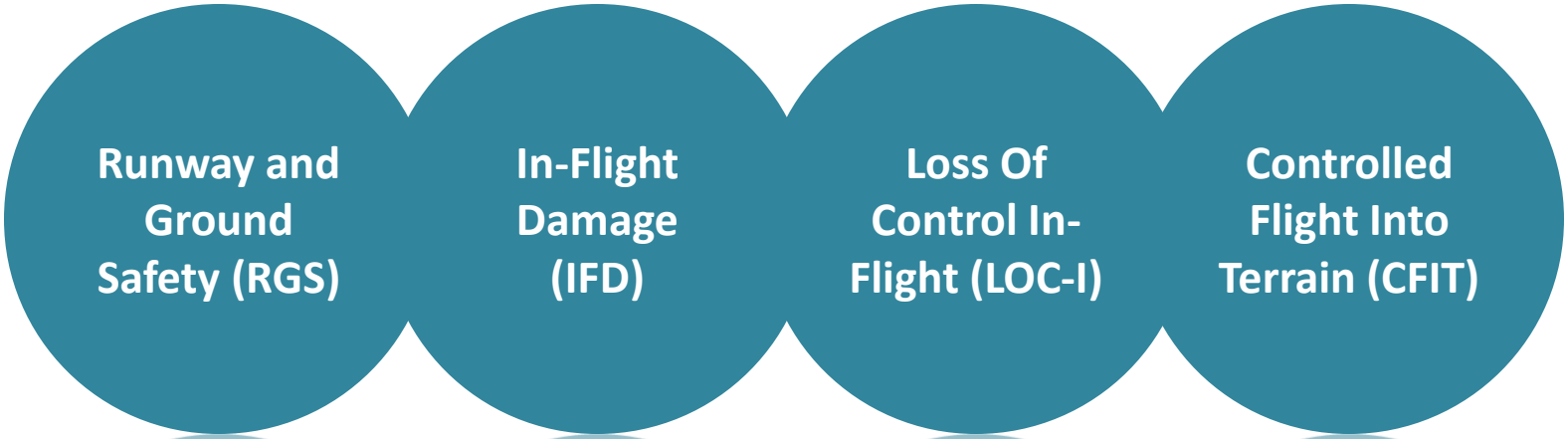
Reported between 2006 and 2010



Source: RASG-MID Annual Safety Report – First Edition 2012

Regional Aviation Safety Team (RAST):

- Identification of 4 Focus Areas



- Initial set of Safety Enhancement Initiatives (SEIs) agreed

Runway Ground Safety (RGS) SEIs

1. Specific training for pilots and air traffic controllers to **avoid unstabilized approaches** and promotion of pilot **adherence to Standard Operating Procedures** for approaches including go-around decision making

Runway Ground Safety (RGS) SEIs

2. Develop guidance material and training programs to support creation of action plans by **local aerodrome runway safety teams** with immediate emphasis on
   - identification and publication of aerodrome **Hot Spots** and timely; and
   - accurate notification regarding **runway conditions and weather** by AIS and ATS units

Runway Ground Safety (RGS) SEIs

3. Focus on **Aerodrome Infrastructure and Maintenance Management** with priority given to the following:
   - Promote/Monitor implementation of **RESA**s including other means such as arresting systems;
   - Regulation, guidance and specific training in relation to **maintaining aerodrome runway/taxiway related markings**; and
   - Regulation, guidance and specific training in relation to **maintaining runways** in accordance with Annex 14

The Session

Role of the Regulator	Role of the Aerodrome & ATC	Role of the Operator
-Runway Safety Teams (RSTs) -Oversight -Tools and best practice examples	-Runway Safety Teams (RSTs) -Hot spots -Outcome of RRSS-MID	-Stable approaches -Runway Safety Teams (RSTs) -Tools and best practice examples

Panel Discussions

Three Teams

Top Five Proposed Initiatives

MID Region Safety Strategy (MID-RSS)

Summary

Runway Safety

and the

Role of the Regulator

Bahrain

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MINISTRY OF TRANSPORTATION

- **FAA Update**
- **Requirements & Resources**
- **Training & Awareness**
- **Runway Safety Action Team Participation**
- **SMS**
- **Compliance**

FAA Update

- **US Airports experienced serious capacity issues as FAA deals with a severe winter storm in an uncoordinated manner;**
- **Working with airports on wildlife mitigation,**
- **Runway incursions**
- **Many certificated airports that are not adequately meeting their responsibilities for annual training of firefighters.**

Winter Operations

Winter Operations Suggestions and Actions

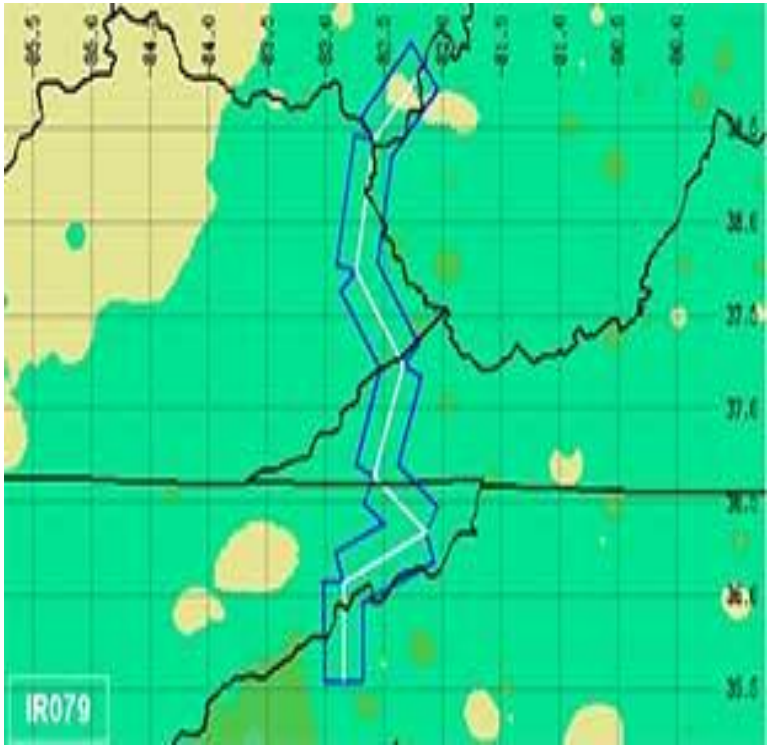
- Developing an airport information web page;
- Increasing participation of smaller airports in strategic planning teleconferences;
- Better coordinating FAA equipment outages; and
- Improving airport contingency plans.

Wildlife Management

Current Hazard Assessment Systems

- **The two systems that are currently being used for estimating wildlife strike hazard are the U.S. Air Force's Bird Avoidance Model, and the Avian Research Laboratory's Avian Hazard Advisory System.**

- **These tools provide information regarding bird strike risk, and allow pilots to make informed decisions about their routes with regards to wildlife strike risk.**



Runway Incursions

Analysis of Training Programs

- **Emphasis on airport layout and descriptions of runway and taxiways and their accessibility;**
- **Significant discussion and illustrations of airport signs, markings, lighting and NAVAIDS;**
- **Including situational examples used to ensure proper radio communication;**
- **Discussion of safety areas and their importance to movement area safety;**
- **Including differences in day and night driving;**
- **Cautions for known congested and bottleneck areas on the airport, and;**
- **Practical driving “check rides”.**

Airport Construction

- Construction Safety Plans
- SMS
- Driver Training
- Escorting construction vehicles
- Routine coordination meetings with stakeholders.
- NOTAMs
- Charting

So What Is the Regulator to Do???

Requirements

- **Establish State requirements for runway safety, including the conduct of Runway Safety Team meetings**
- **Integrate runway safety requirements into State directives**

Resources

- **Provide the staffing and funding to successfully implement and support the runway safety program at the State level**
- **To support Runway Safety Team meetings**

Training & Awareness

- **Establish a runway safety program for regulatory staff**
- **Establish runway safety training and checking requirements for pilots, controllers and drivers**

- **Develop standardized materials for education and training related to signage, markings, lighting, surface procedures for pilots and drivers**
- **Identify Best Practices for implementation at aerodromes and control**

Runway Safety Team (RST Participation

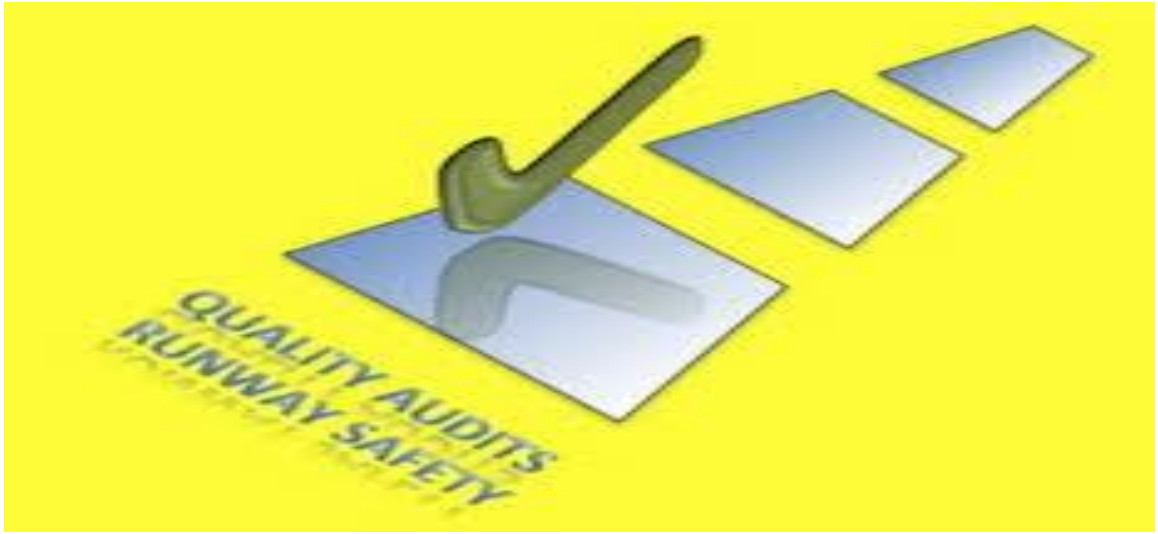
- **Support the RST with representation of subject matter experts related to pilots, aerodromes and air navigation service providers**
- **If necessary, facilitate the RST meetings with subject matter experts**

SMS Requirements

- **Ensure the RST RSAP is forwarded to the air traffic service provider and aerodrome operator SMS offices**
- **Follow up and track hazards and actions via the SMS offices in addition to the RST activities.**
- **NOTE: SMS is the responsibility of the service providers, not the RST.**

Compliance

- **Compliance with regulatory requirements falls under the purview of the Regulator.**
- **In the event a non-compliance issue is identified during a RST meeting, the Regulator should have the option to allow the RST to document it and take action, versus pursing a formal regulatory action**



Runway Safety is Everyone's Responsibility

Thank You for being part of the solution!

MID Safety Summit

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Enhancing Runway Safety

Adel Ramlawi, P. Eng.

Regional Officer, Aerodromes

ICAO Middle East Office, Cairo

Enhancing Runway Safety

Contents

- Role of the Aerodrome (including ATC)
- Runway Safety Teams (RSTs)
- Hot spots
- Outcome of RRSS-MID
- RST Survey

Runway Safety – The Concept

- Runway Safety needs to be the collaborative effort of all stakeholders to reduce Runway Incursions and Excursions
- ICAO's Runway Safety Initiative includes partner Organizations and Stakeholders
- ICAO's Regional Runway Safety Seminars (RRSS) are promoting Runway Safety Teams (RST)

Runway Safety - Stakeholders

- Aerodrome Operator
- Air Traffic Control
- Commercial Airline Operator
- General Aviation
- Military Operators
- Pilots
- Regulator / CAA
- RFF

Individual Roles & Responsibilities

Runway Safety - Roles & Responsibilities

- Aerodrome Operator
  - Identification and Mitigation of hazards
    - Airport Design
    - Communication
    - Construction
    - Operational
    - Visibility
  - Actively support the Runway Safety Team
  - Commitment to execute mitigation plans

Runway Safety - Roles & Responsibilities

- Air Traffic Control
  - Identification and Mitigation of hazards
    - Airport Design (Tower location)
    - Communication
    - Construction
    - Operational / Procedural
    - Meteorological
  - Actively support the Runway Safety Team
  - Commitment to execute mitigation plans

Runway Safety – Runway Safety Team RST

- The Runway Safety Team
  - Is not considered a regulatory authority
  - Is not considered to replace components of a Safety Management System SMS
  - Is defined to identify and manage runway safety risks in a collaborative, multidisciplinary way
  - Consists of representative key stakeholders organizations who meet periodically to review current and potential hazards within the aerodrome environment

Runway Safety – Runway Safety Team RST

- Roles and responsibilities of RST members
  - Identification of hazards in their area of responsibility
  - Collaborative approach to define mitigation strategies
  - Commit to execute agreed mitigation plans
  - Share information
  - Promote a just culture for non punitive reporting systems -> **important for data collection**

Runway Safety – Runway Safety Team RST

- Hot Spots (*) are one issue of Runway Safety.
  - Data collection through reporting & sharing of information by all stakeholders
  - Define and execute mitigation strategies
    - awareness campaigns;
    - enhanced visual aids (signs, markings and lights);
    - use of alternative routings;
    - changes to the movement area infrastructure, such as construction of new taxiways, and decommissioning of taxiways;
    - closed-circuit television (CCTV) for critical VCR sight line deficiencies.

(*) A location on an aerodrome movement area with a history or potential risk of collision or runway incursion, and where heightened attention by pilots/drivers is necessary. (ICAO Doc 9870, Manual on the Prevention of Runway Incursions)

Runway Safety – Outcome of RRSS-MID

- States to develop action plans to establish Runway Safety Teams (RSTs);
- Consider the creation of a Regional RST Go-Team with participation of ICAO Runway Safety partners to assist States with the creation of RSTs;
- Safety Partners to assist/mentor the RSTs by: performing a gap analysis, providing recommendations to support the implementation of RSTs, and supporting RSTs as appropriate; and
- Organization of another Runway Safety Seminar/Workshop to provide additional guidance on the establishment and running of RSTs

Runway Safety – Runway Safety Team RST

- Tool Box for Runway Safety Teams
  - ICAO Regional Runway Safety Seminars
  - ICAO Runway Safety Website

    http://www.icao.int/safety/RunwaySafety/Pages/default.aspx
  - ICAO Runway Safety Team Portal

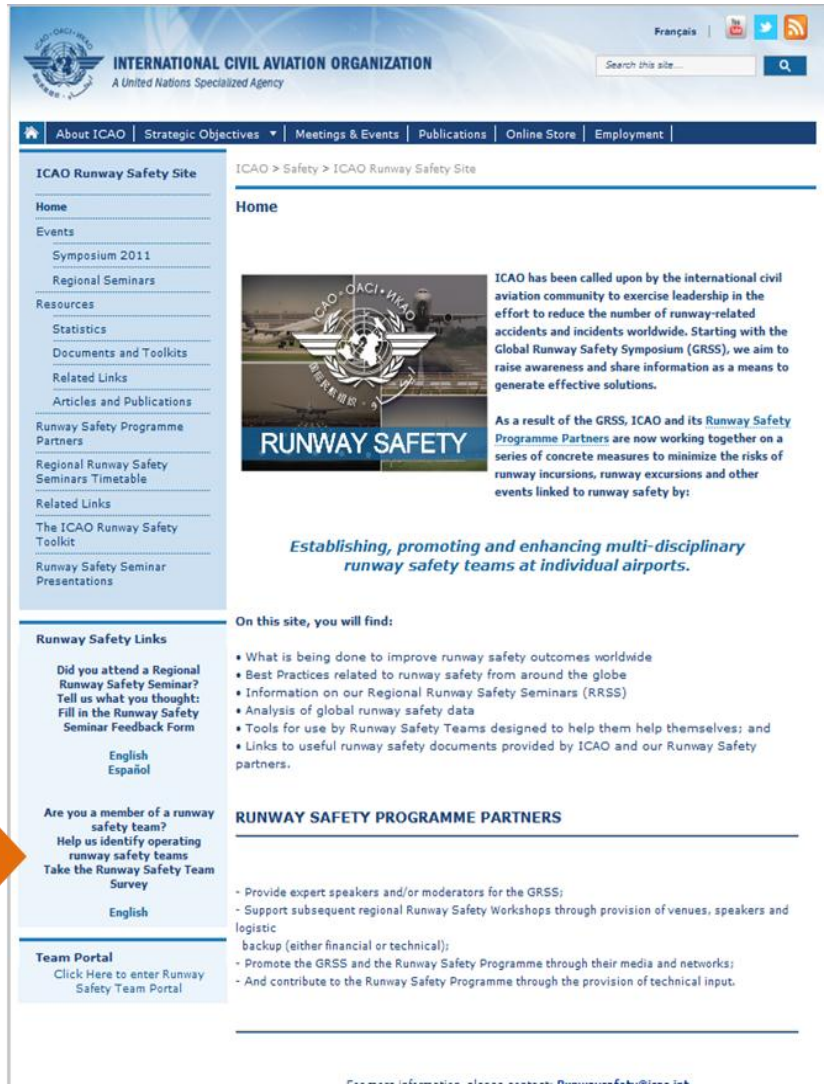
    http://www.icao.int/safety/RunwaySafety/Pages/RSAP.aspx
  - ICAO Runway Safety Team Handbook

    The handbook compiles comments from all partners of the ICAO Runway Safety Initiatives. A draft version is waiting for approval by SEC GEN to be released.

Runway Safety – Runway Safety Team RST

- RST Survey

To complete this map please share your RST details with ICAO
http://www.icao.int/safety/RunwaySafety/Pages/default.aspx



Thank You

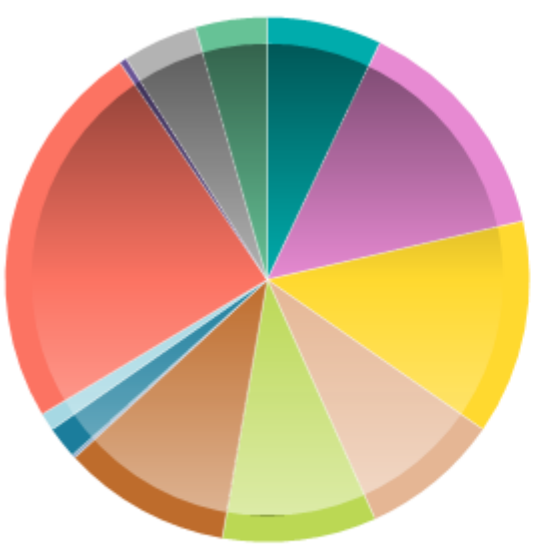
Runway Safety Overview

Mid-Safety Summit
Bahrain April 28-30, 2013

Chris Glaeser, Director Global Safety

Global Accidents:

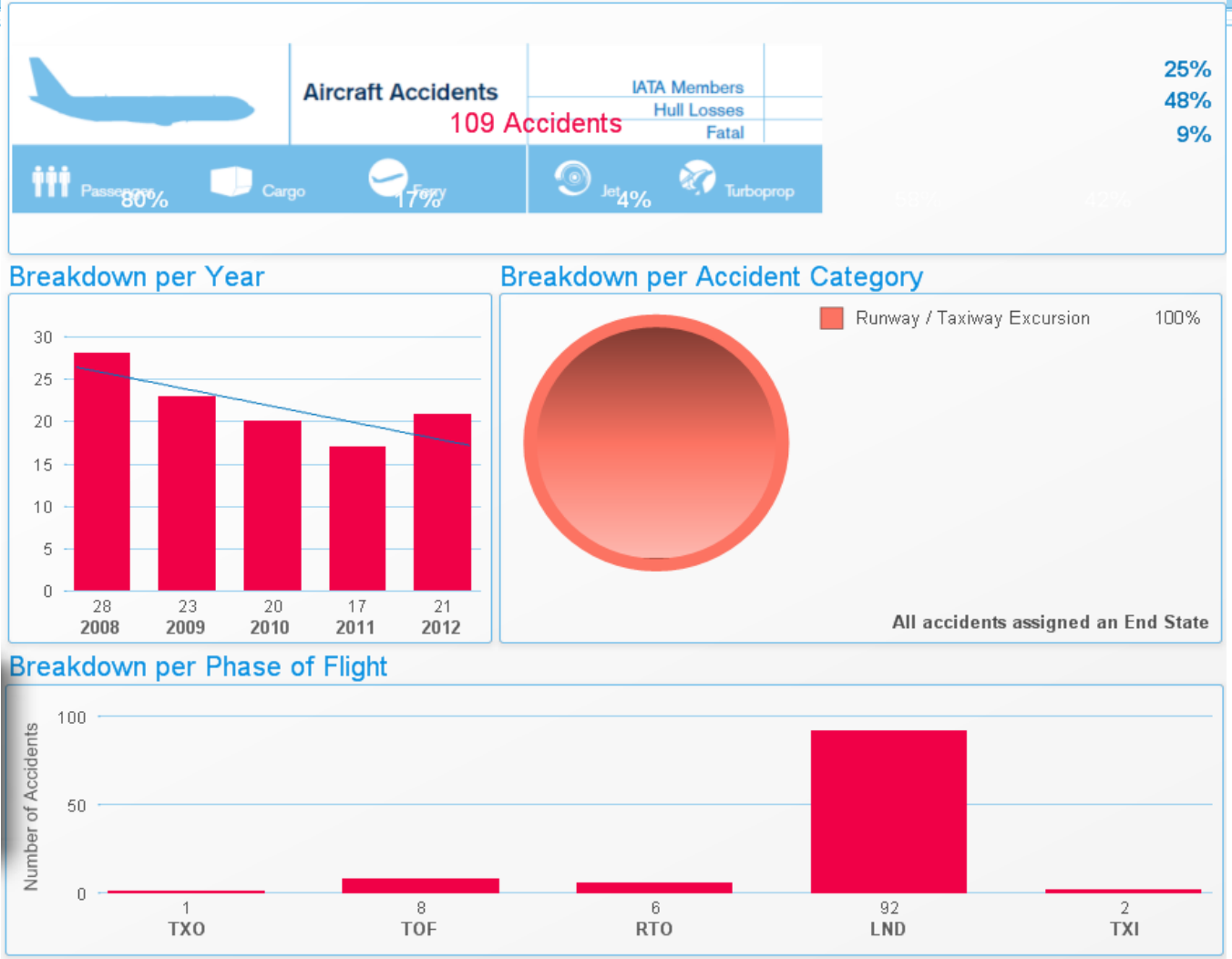
2008-2012 Breakdown per accident categories



Controlled Flight Into Terrain (CFIT)	7%
Gear-up Landing / Gear Collapse	14%
Ground Damage	13%
Hard Landing	9%
In-flight Damage	9%
Loss of Control In-flight	10%
Mid-air Collision	0%
Off Airport Landing / Ditching	2%
Other End State	1%
Runway / Taxiway Excursion	24%
Runway Collision	0%
Tailstrike	5%
Undershoot	4%

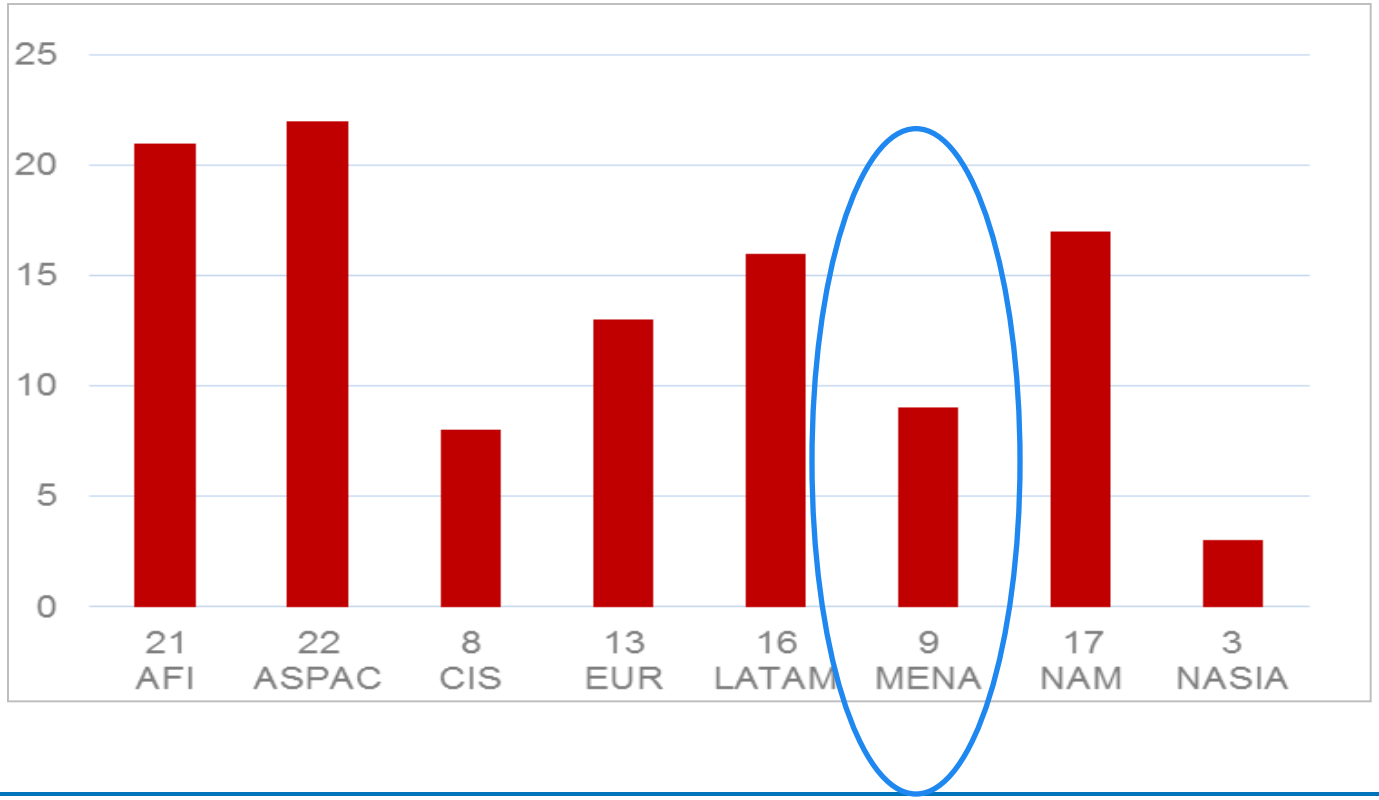
7 Accidents could not be assigned an End State

2008-2012 Runway Excursions



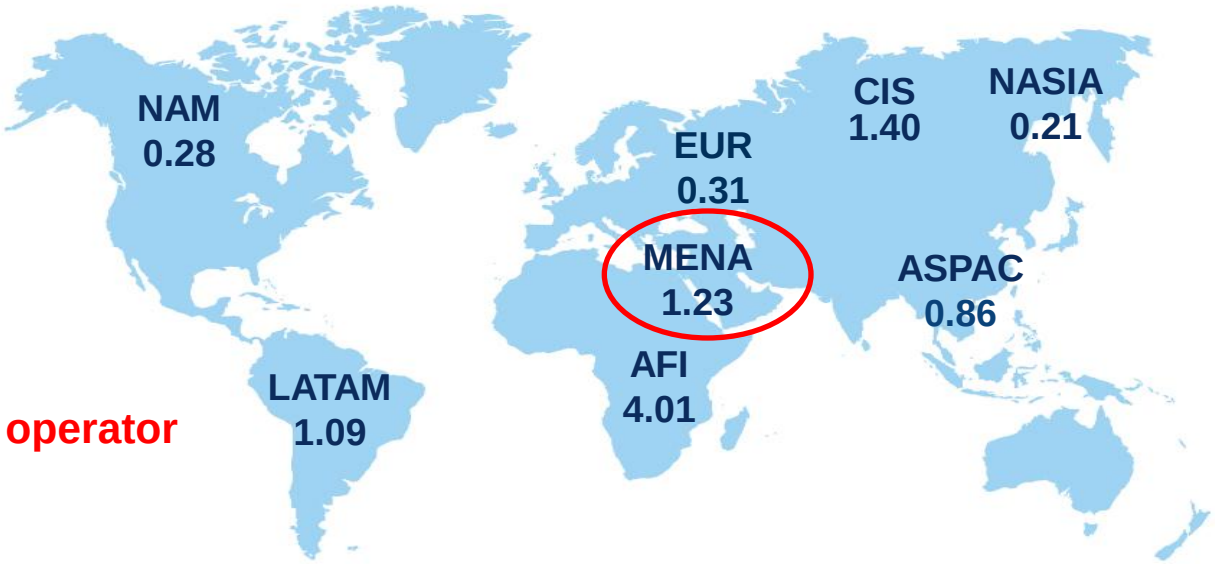
Runway/Taxiway Excursion Accidents

Accident count per region



Runway/Taxiway Excursion Accidents

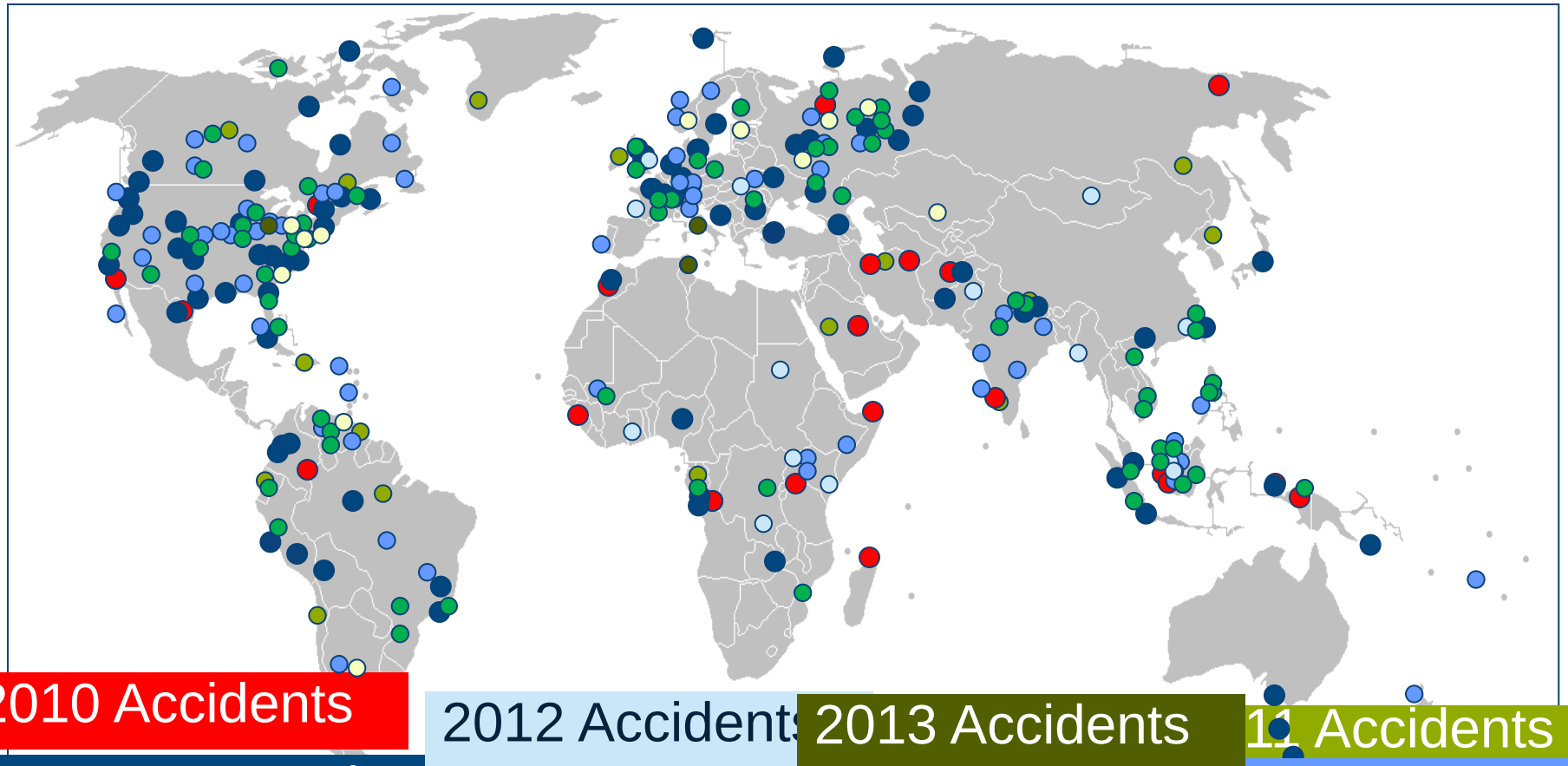
2008 – 2012 Accident rates per million sectors



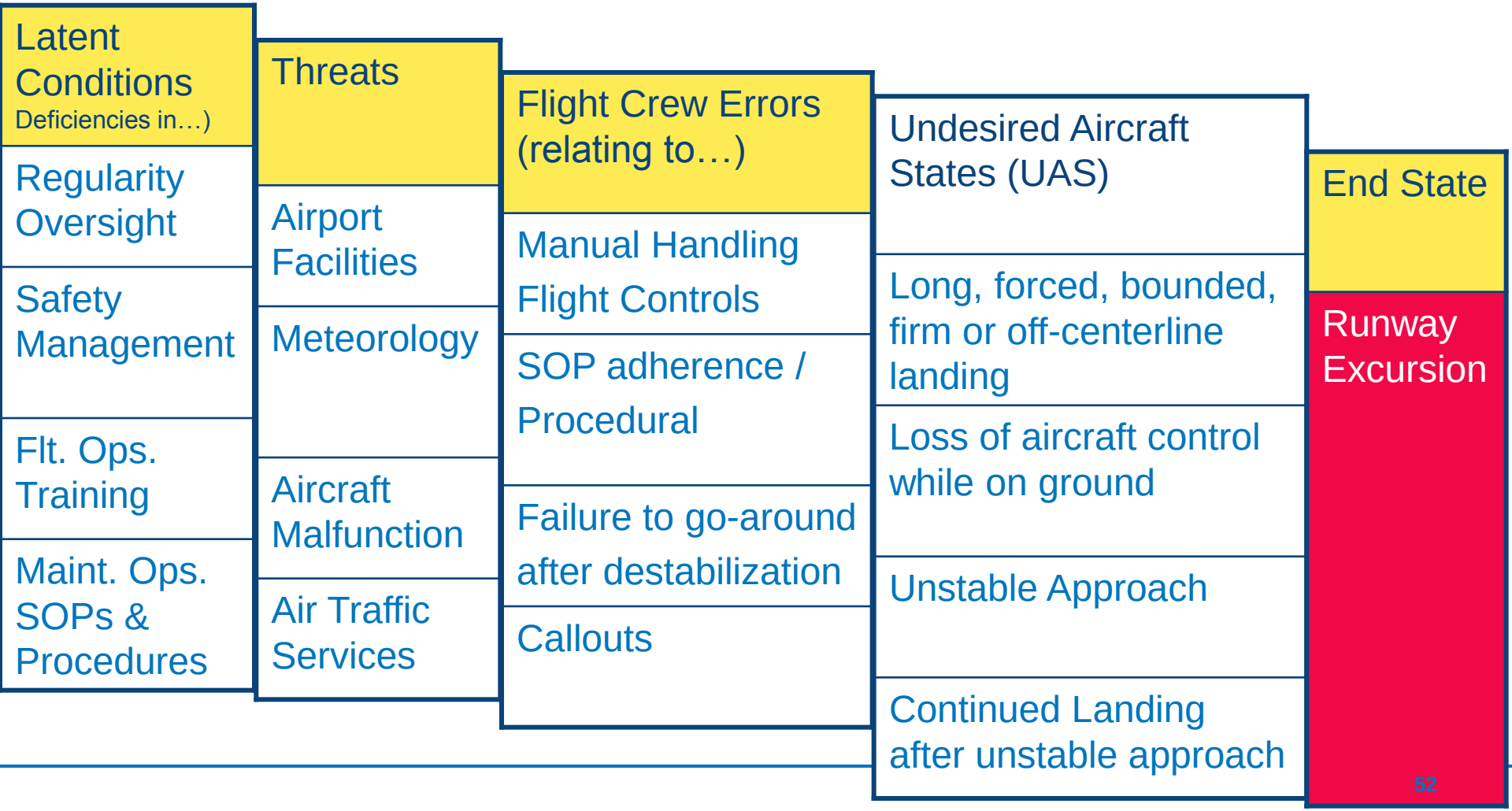
Based on region of operator

Global: 0.62

2010-2013 Runway Excursion Events – as at 1 Mar



Runway Excursions - Top Contributing Factors



Runway Excursions Prevention

- Runway excursion is the most frequent type of accidents
- IATA developed with ICAO and other safety partners RERR 2nd edition
- IATA Runway Excursion workshops conducted
- ICAO and its safety partners delivered RRSS at 14+ venues
- Analysis indicates an improvement by an average of 2 accidents per year

Strategy

- IATA to continue working with the industry partners to support Regional Runway Safety Seminars (RRSS), and
- to update the IATA Runway Excursion Risk Reduction (RERR) toolkit to include Runway Incursions,
- RERR Toolkit is available @ http://www.iata.org/publications/Pages/runway-toolkit.aspx

Runway Excursion Risk Reduction Toolkit 2nd Edition

http://www.iata.org/publications/Pages/runway-toolkit.aspx

Runway Excursion Risk Reduction

(RERR) Toolkit – 2nd Edition: Contents

Tabs	Name of File
Executive Material	IATA/ICAO Executive Letter
	IATA/ICAO Introductory Video
	IATA/ICAO CEO/COO Brief
IATA Analysis Report	IATA Runway Excursion Analysis Report
Airports/CAAs	ICAO Aerodrome Best Practices- Landscape Format
	ICAO Aerodrome Best Practices-Portrait Format
	ICAO Self Audit Checklist for Airports
	ICAO Self Audit Checklist for CAAs
	IATA Airport Markings and Signage- (STEADES analysis)
	IATA Use of Technology to Mitigate Overrun
	ACI Practices and Recommendations
Flight Ops	IATA Recommendations for Wet / Contaminated Runway Operations
	IATA Risk Management Process
	IATA Air Carrier Self Audit Checklist- Analysis
	IATA Air Carrier Self Audit Checklist-Questionnaire
	IATA Runway Excursion Case Studies Manual

Tabs	Name of File
ATM	IATA ATC/Pilots Best Practices:
	CANSO ATCO Educational Booklet:
Animations	IATA Animation - B733_Unstable Approach_VOR - B738_Unstable Approach_ILS - B738_Unstable Approach_VOR
Workshop Materials	IATA Workshop Materials
Contributing Reports	FSF Report - Reducing the Risk of Runway Excursions
	ECTL - A Study of Runway Excursions from a European Perspective
	ICAO Runway Friction Report
	NLR Report - Rejecting Take Off after V1
	ATSB Reports - Runway Excursion Part I - Runway Excursion Part II

Runway Excursion Risk Reduction

(RERR) Toolkit – 2nd Edition: Contents

Flight Data eXchange (FDX)

For airline operators

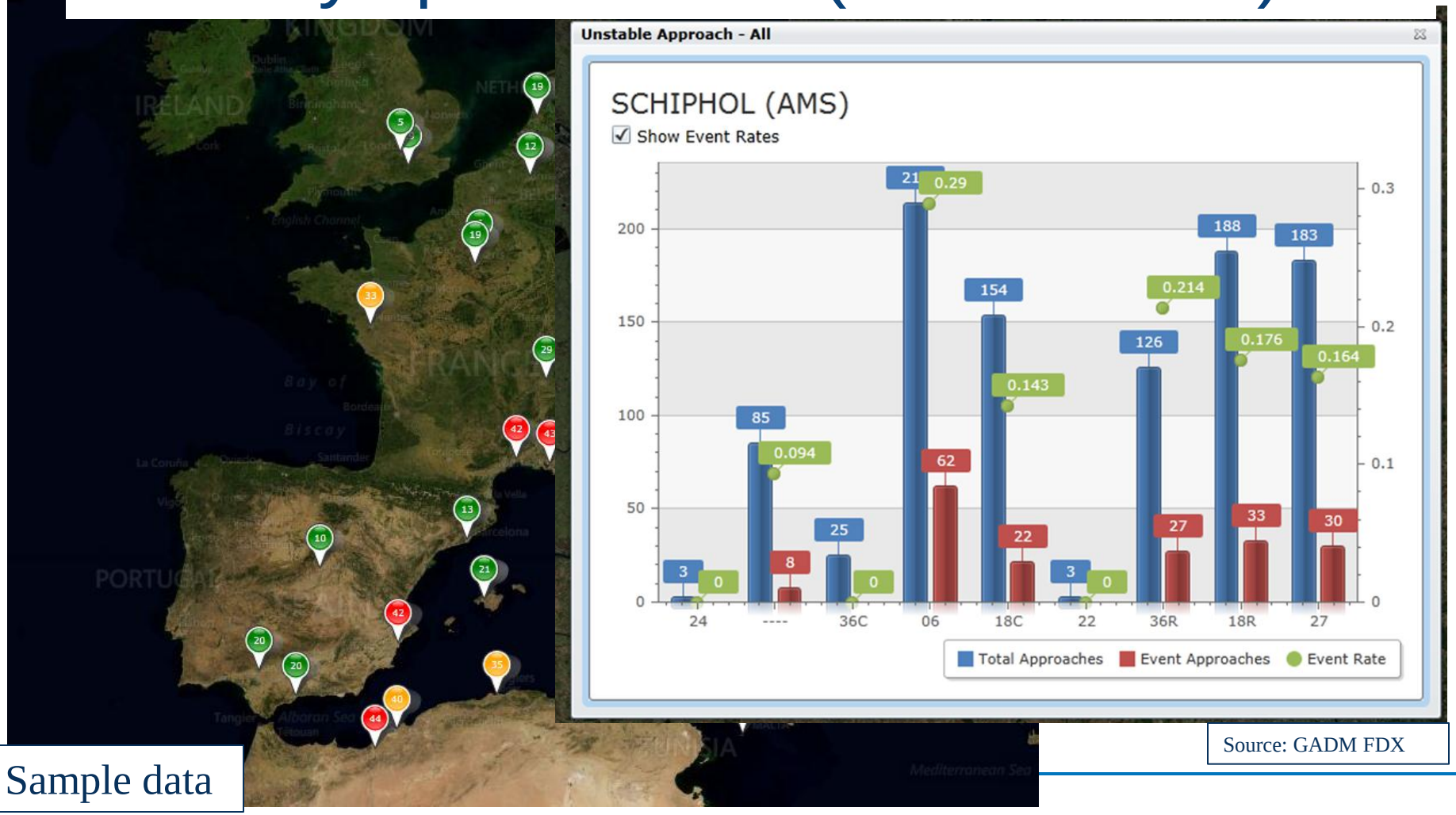
Integrated Analysis is Already Online

> 50 Ops and Safety queries active

Sample data

Source: GADM FDX

Runway specific data (most events)



Source: GADM FDX

Sample data

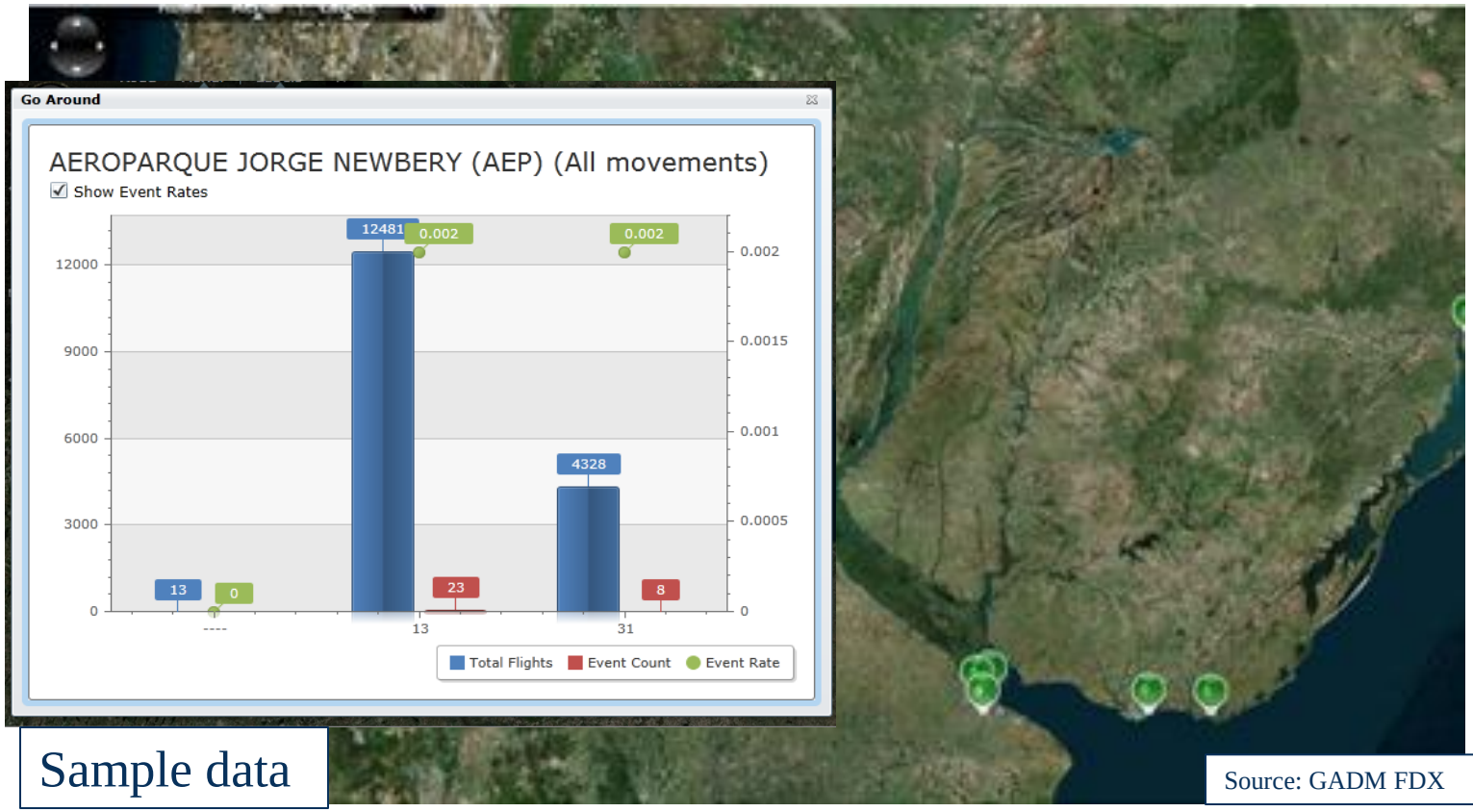
Automated Performance Comparisons

Sample data

Source: GADM FDX

Go-around rate by runway

data for operational analysis

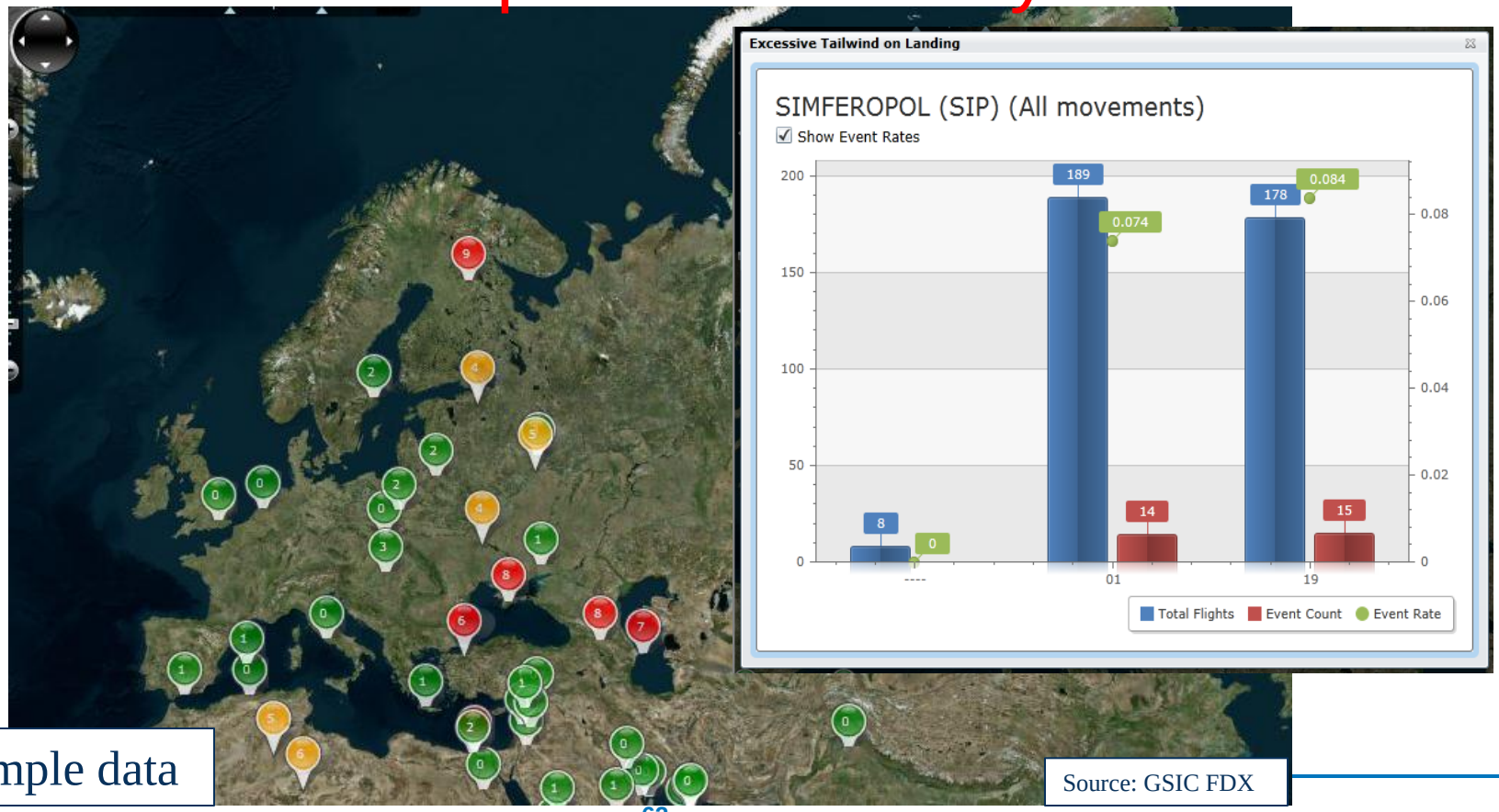


Sample data

Source: GADM FDX

ExcessiveTailwinds

data for operational analysis



Sample data

Source: GSIC FDX

ICAO Activities

ICAO Partners

Regional Aviation Safety Groups (RASGs)

- The activities of the Regional Aviation Safety Groups (RASGs) are aligned with the Global Aviation Safety Plan (GASP) objectives
- The RASGs focus on the top safety risk areas in the region through collaboration, cooperation and sharing best-practices and available training
- The Top Focus areas are:
  - Runway Safety
  - Loss of Control Inflight (LOC-I)
  - Controlled Flight into Terrain (CFIT)

Runway Safety Teams (RSTs)

- As an one of the outcomes of the ICAO Global Runway Safety Symposium in May 2011, is the establishment of the RSTs - multidisciplinary teams established locally and hosted by the airports
- The objective of RST is to collaborate on runway safety matters and coordinate responses to identified hazards or concerns
  - These teams can help to ensure that runways are constructed and maintained to maximize effective friction and drainage, that runways are closed when conditions dictate, that airports provide timely and accurate runway condition reports, and that they put in place effective snow and ice control plans

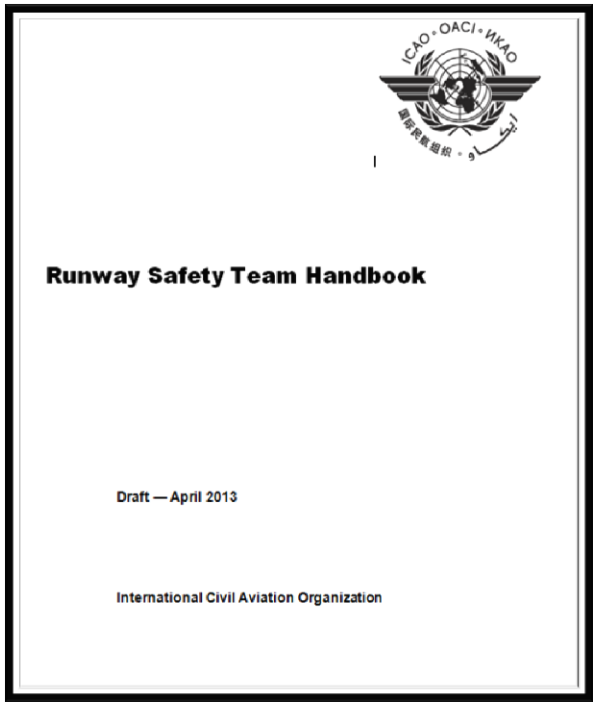
Runway Safety Teams (RSTs) Survey

- IATA, ACI and ICAO, believe that RSTs are an essential component of an airport-level Runway Safety Strategy.
- ICAO, ACI and Runway Safety Program Partners are working together on safety critical survey to obtain information on the status of implementation of the established RSTs - as a baseline to encourage setting up RSTs at all major airports.
- The survey may be found at the bottom left of ICAO's Runway Safety website,

  http://www.icao.int/safety/RunwaySafety/Pages/default.aspx

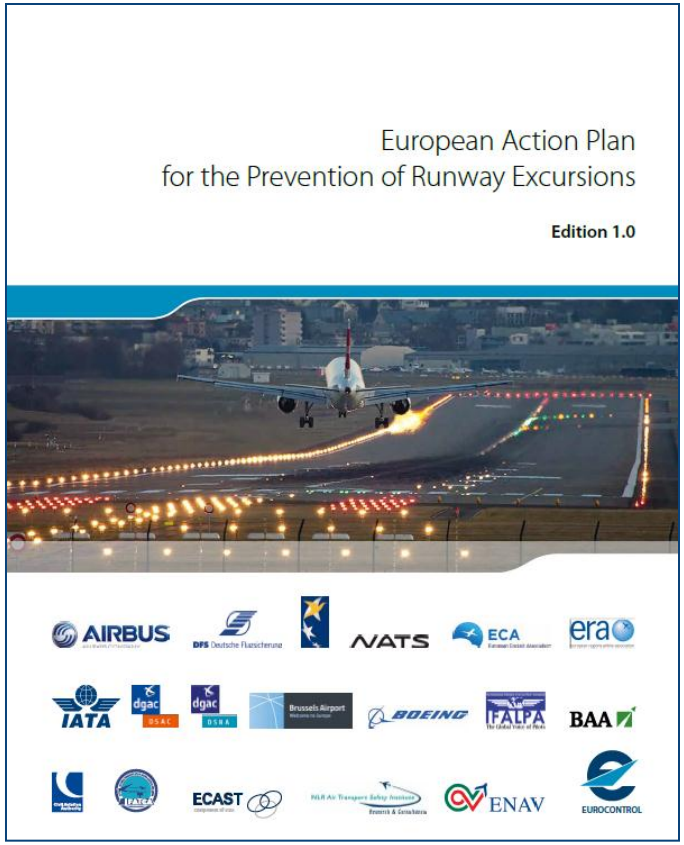
Runway Safety Teams (RSTs) Handbook

- Runway Safety Team Handbook is in draft format … it is designed to:
  - describe the components of an effective (RST)
  - provide useful examples and serve as a single reference while conducting RST activities
  - establish a network for sharing safety information between RSTs via the ICAO Runway Safety Team Portal



European Action Plan for Prevention of Runway Excursions

- The European Action Plan for the Prevention of Runway Excursions was released in 2003 as an outcome of the EUROCONTROL "Study of Runway Excursions from a European Perspective"
- The document is available for download: http://www.skybrary.aero/bookshelf/books/2053.pdf



European Action Plan for Prevention of Runway Incursions

- The European Action Plan for the Prevention of Runway Incursions was released in 2003 as a product of the European Runway Safety Initiative.
- The document is available for download: http://www.skybrary.aero/index.php/European_Action_Plan_for_the_Prevention_of_Runway_Incursions

to represent, lead and serve the airline industry

Open Discussions

Fatigue Risk Management

MID Safety Summit

Bahrain

28-29 April 2013

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FAA Air Traffic Organization

Office of Safety and Technical Training

Federal Aviation Administration

DRAFT

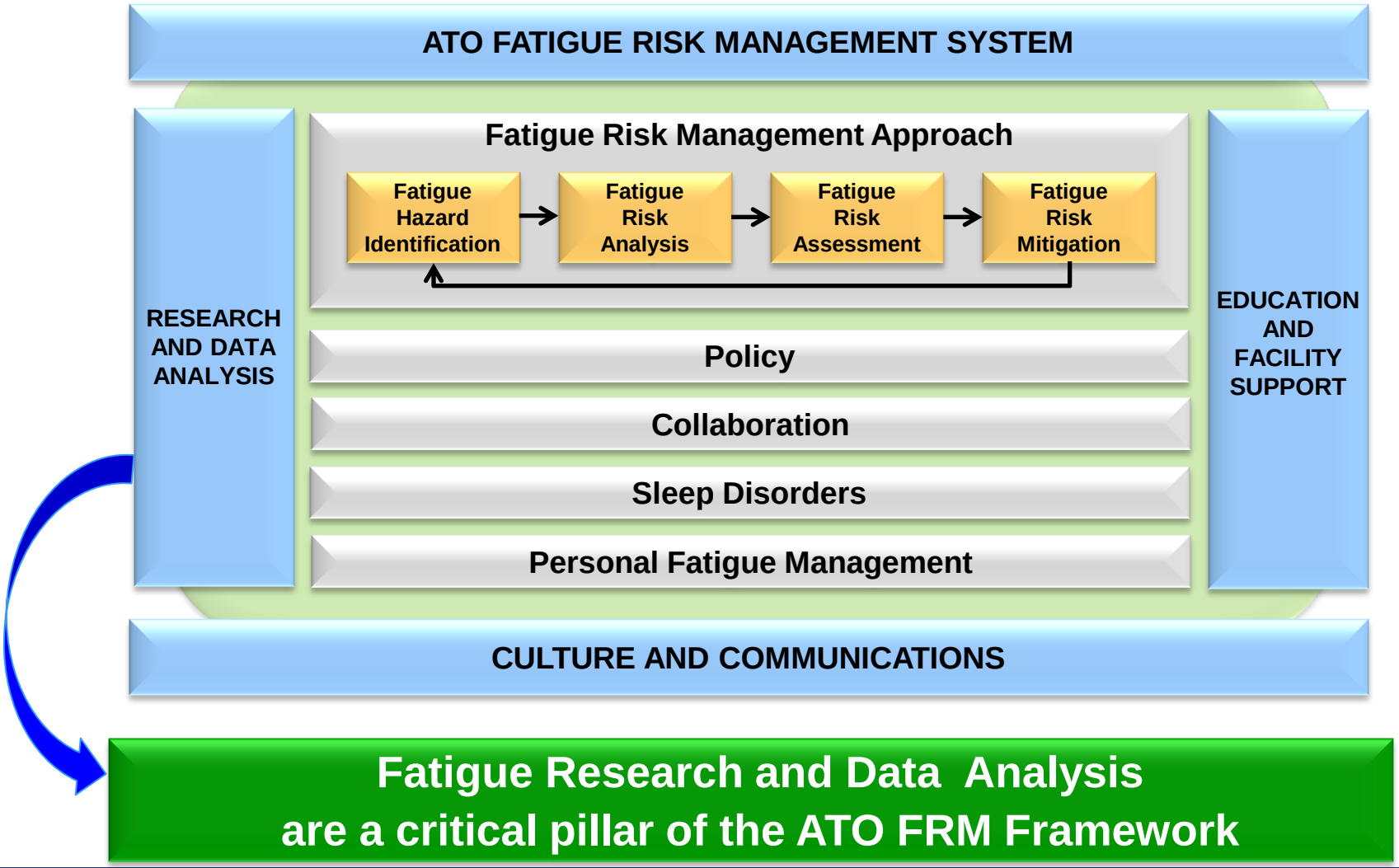
Air Traffic Control Fatigue Risk Management System

Presented to: First MID Region Safety Summit

Presented by: Maggie Geraghty

Date: 28 - 30 April 2013

ATO Fatigue Risk Management Framework



Air Traffic Control Operations

- Gate thru takeoff
- Thru ascent, cruise and descent
- Landing back to gate
- Plus, overall System Operations

- 24 - 7 - 365
- 316 facilities
- 55,000+ aircraft every day!
- 15,000+ Air Traffic Controllers

Technical Operations

- 8,300+ Specialists, Engineers and Managers
- Design, Install, Manage, Maintain, 24 - 7 - 365
- 64,425 equipment and systems throughout NAS:
  - Communications
  - Surveillance
  - Weather
  - Navigation
  - Automation
  - Mission support and infrastructure

On any day, at any hour, in any weather, EVERY TIME

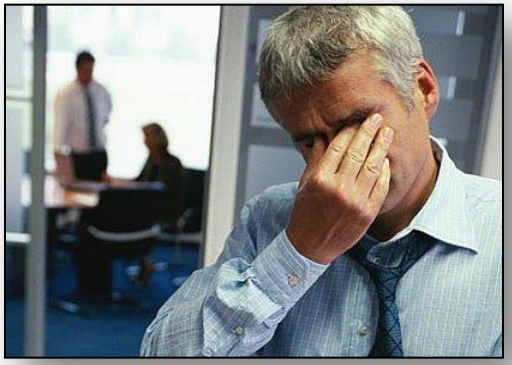
Contributors to Fatigue

Primary – Direct Contributors to Fatigue

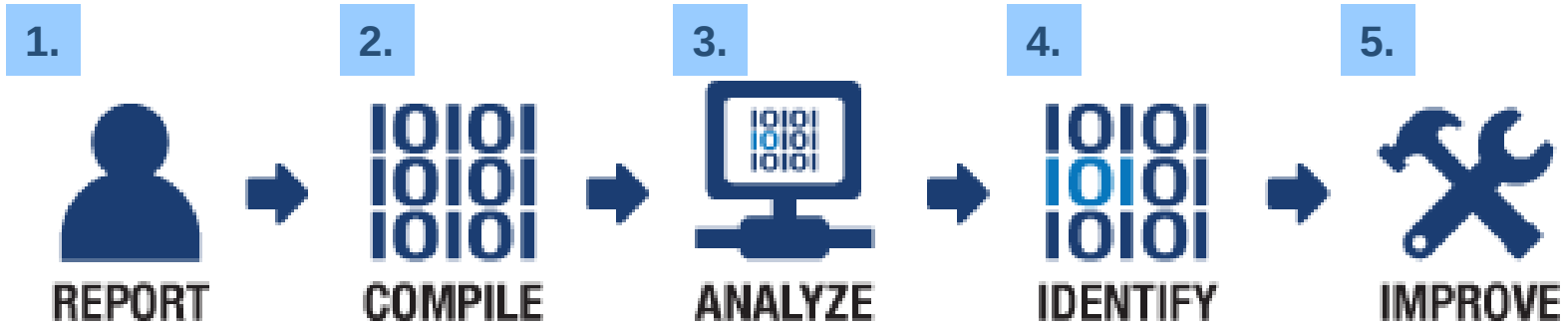
- Time Awake - extended wakefulness
- Time Asleep - quality and quantity
- Circadian Clock (internal body clock) - out of sync with work/home

Secondary – Exacerbate Impact of Fatigue

- Work schedules
- Work environment
- Sleep disorders, stress, or illness
- Lifestyle & Choices
- Personal responsibilities
- Individual differences
- Workload
- Travel across time zones



ATO FRMS - Process



1. Report fatigue conditions
2. Compile fatigue-related data
3. Analyze data
4. Identify and prioritize fatigue-related hazards and risks

Evaluation by FRMS FSSC and
Recommendation Disposition by VP ATO Safety

5. Improve safety via collaborative fatigue mitigations

Fatigue-Related Data

- **Subjective and objective Air Traffic Control fatigue baseline research**
  - Controller Alertness and Fatigue Monitoring Study completed in January 2013; analysis in process
- **Alaska FSS fatigue baseline assessment**
  - Phase I (subjective assessment) completed January 2013
- **Subjective and objective Technical Operations fatigue baseline research**
  - Technical Operations Fatigue Baseline Study completed in January 2013; analysis in process
  - Includes NATCA engineers and PASS technicians and managers
- **Voluntary Safety Reporting data**

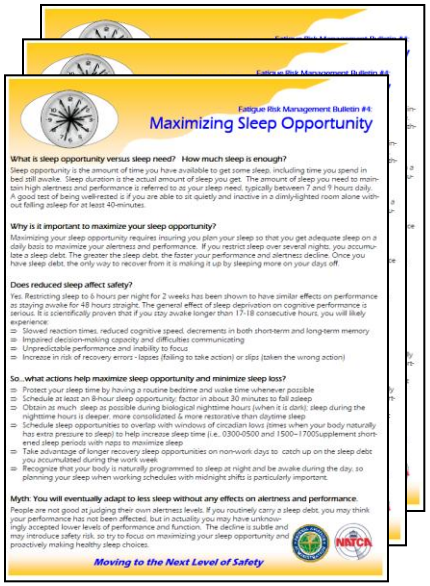
Predictive, Proactive, and Reactive Fatigue Hazard Analysis

- **Predictive**
  - Comparative bio-mathematical modeling of work schedules
- **Proactive**
  - Occurrences of fatigue-related states in operational environment
  - Analysis of Voluntary Safety Reporting Program reports
  - Analysis of fatigue baseline research assessment results
  - Batch bio-mathematical modeling of actual work schedules
- **Reactive**
  - Analysis of event and risk analysis reports

IMPROVE

Training and Communications

- **Developed and delivered training for all stages of career**
  - New hire ATC fatigue lesson at the Academy (instructor led)
  - Annual refresher training course (eLearning)
  - Operational supervisors workshop fatigue lesson (facilitated)
- **Developed and delivered communications**
  - 52 Fatigue Facts publication
  - Fatigue newsletters and articles (ATO)
  - Fatigue risk management bulletins
  - Shift work fatigue mitigation tips brochure
  - Obstructive Sleep Apnea brochure under development with Aerospace Medicine


Fatigue Risk Management Bulletin #4:
Maximizing Sleep Opportunity

What is sleep opportunity versus sleep need? How much sleep is enough?

Sleep opportunity is the amount of time you have available to get some sleep, including time you spend in bed still awake. Sleep duration is the actual amount of sleep you get. The amount of sleep you need to maintain high alertness and performance is referred to as your sleep need, typically between 7 and 9 hours daily. A good test of being well-rested is if you are able to sit quietly and inactive in a dimly-lighted room alone without falling asleep for at least 40-minutes.

Why is it important to maximize your sleep opportunity?

Maximizing your sleep opportunity requires insuring you plan your sleep so that you get adequate sleep on a daily basis to maximize your alertness and performance. If you restrict sleep over several nights, you accumulate a sleep debt. The greater the sleep debt, the faster your performance and alertness decline. Once you have sleep debt, the only way to recover from it is making it up by sleeping more on your days off.

Does reduced sleep affect safety?

Yes. Restricting sleep to 6 hours per night for 2 weeks has been shown to have similar effects on performance as staying awake for 48 hours straight. The general effect of sleep deprivation on cognitive performance is serious. It is scientifically proven that if you stay awake longer than 17-19 consecutive hours, you will likely experience:

- Slowed reaction times, reduced cognitive speed, decrements in both short-term and long-term memory
- Impaired decision-making capacity and difficulties communicating
- Unpredictable performance and inability to focus
- Increase in risk of recovery errors - lapses (failing to take action) or slips (taken the wrong action)

So...what actions help maximize sleep opportunity and minimize sleep loss?

- Protect your sleep time by having a routine bedtime and wake time whenever possible
- Schedule at least an 8-hour sleep opportunity; factor in about 30 minutes to fall asleep
- Obtain as much sleep as possible during biological nighttime hours (when it is dark); sleep during the nighttime hours is deeper, more consolidated & more restorative than daytime sleep
- Schedule sleep opportunities to overlap with windows of circadian lows (times when your body naturally has extra pressure to sleep) to help increase sleep time (i.e., 0300-0500 and 1500–1700)Supplement shortened sleep periods with naps to maximize sleep
- Take advantage of longer recovery sleep opportunities on non-work days to catch up on the sleep debt you accumulated during the work week
- Recognize that your body is naturally programmed to sleep at night and be awake during the day, so planning your sleep when working schedules with midnight shifts is particularly important.

Myth: You will eventually adapt to less sleep without any effects on alertness and performance.

People are not good at judging their own alertness levels. If you routinely carry a sleep debt, you may think your performance has not been affected, but in actuality you may have unknowingly accepted lower levels of performance and function. The decline is subtle and may introduce safety risk, so try to focus on maximizing your sleep opportunity and proactively making healthy sleep choices.

Moving to the Next Level of Safety

IMPROVE

Fatigue Relief Valves

- **Formalized guidance on self-declaration of fatigue**
  - Established policy (MOU) permitting fatigue call-ins and declaration
  - Providing management and controllers guidance via FRM Bulletin on self-declaration policy
- **Revised formal policy on recuperative breaks (7210.3X)**
  - *"Personnel performing watch supervision duties must not condone or permit individuals to sleep during any period duties are assigned. Any such instance must be handled in accordance with applicable Agency policy and the applicable collective bargaining agreement"*

Fatigue-Related Operational Impacts

ATC

- Failure to catch an incorrect or incomplete readback
- Transposing a response to another aircraft's clearance (similar sounding call signs)
- Forgetting an assigned altitude
- Issuing unclear control instructions (taxi/altitude/heading)
- Late or incomplete clearance
- Reduced situation awareness
- Sloppy phraseology
- Reduced provision of safety of flight items (icing, WX, turb)

Pilot

- Incorrect or incomplete readback
- Response to another aircraft's clearance (similar sounding call signs)
- Failure to follow air traffic procedures
- Failure or slowed response to control instructions
- Delayed frequency change
- Multiple requests to repeat clearances
- Clearance confusion (taxi/altitude/heading)
- Sloppy phraseology

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Fatigue Risk Management

Pushing the Boundaries of what we know

ASHLEY NUNES

29 APR 2013

Why are we here

Fatigue

Safety

Service Disruption

Revenue

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Why are we here

But lets take a few steps back . . . .

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Air Transportation

A ‘global trade’ enabler

Timeline Access

Its signature offering

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The Flight Schedule

Finances

Human Capital

Technology

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Service Expectations affecting Schedule

Delay

Efficiency

Predictability

Flexibility

Access

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As for Safety and the Schedule

The ‘Net’

‘Ego-centric’ safety views

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Redefining the Problem Space

The Old: Fatigue has an impact on safety

But is safety what airlines are selling ?

The New: What is the impact that fatigue has on the ability to support a flight schedule ?

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Understanding Fatigue

What it is not

What it is

Unpredictability affects the flight schedule by compromising associated service expectation

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Fatigue Disruption

Fatigue

Delay

Predictability

Flexibility

Efficiency

Access

Safety

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Why this matters

Global Aging

Workforce Contraction

Shortage

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In airline news today . . .

Business | Aviation

Middle East carriers will need 36,000 new pilots

flight crews required for plane orders worth $450b

By Shweta Jain, Senior Reporter
Published: 00:00 October 19, 2011

Dubai: The Middle East needs 36,000 new pilots to fl
will be delivered to the region between this year ar
estimates by Boeing.

Worldwide, the pilot requirement will rise t
a total of 33,500 new aircraft are set for deli
value of $4.06 trillion (Dh14.9 trillion), of which
billion.

But it's not just the shortage of pilots that airlines acro
grappling with.

There is also a strong demand for more than 40,000 aviation
currently, according to Roei Ganzarski, chief customer officer for
Services.

Middle East carriers to face challenges addressing pilot shortage

Middle East: Tuesday, June 19 - 2012 at 10:37

Tweet 3 Like 8 +1 0 Share 1

With demand for pilots growing at a faster rate than local pilots can be trained, Middle East carriers are likely to find it increasingly difficult to hire enough pilots to meet their needs.

GU seeing a rapid rise in orders for business jets and military aircraft. According to estimates by Boeing, the Middle East will need 36,000 new commercial pilots to fly the 2,500 new aircraft bound for the region in the next 20 years.

Experts point out that while the problem is acute in the Middle East, it is also a challenge that faces carriers worldwide. Sherry Carbary, vice president of Boeing Flight Services, says the main issue is not so much a shortage of pilots, but rather a significant increase in demand.

"We are currently at a point in time where demand is above supply and thus you see two situations occurring," she told AMEInfo.com. "One is airlines hiring away people from other airlines - many times in other regions of the world. This in fact does not solve the supply. It simply moves the problem to another place. Airlines are also slowing their growth and sometimes even grounding airplanes due to lack of people to operate them."

Compounding the problem is the fact that the aviation sector is facing stiff

Home to some of the fastest growing commercial airlines in the world, the Middle East is also

Related content

Flydubai touches down at Sri Lanka's new Mattala... »

Emirates to introduce A380 in two-class... »

Etihad may finalise Jet Airways' deal this week: report »

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In ANSP news today . . .

FAA faces shortage of air traffic controllers because of retirements

Posted on: 3:10 pm, January 30, 2012, by Cary Docter

WASHINGTON (CNN)—
Despite a five-year hiring s
the Federal Aviation
Administration is at risk c
having enough senior a
controllers for its busie
most critical facilities,
they are needed to r
operations and trai
experienced contr
according to the
independent ins

Nearly one-th
controllers a
report by th
controllers

Shortage of air traffic controllers spells more drama for Qantas

Australian Broadcasting Corporation
Broadcast: 31/07/2008
Reporter: Deborah Cornwall

**It is turbulent times for the aviation indu
prices, maintenance issues and Qa
shortage of air traffic controll
chunks of Australian**

Transcript

Print

**uggles with rising fuel
isaster. Now a
with claims large
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industry as it
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India could face shortage of air traffic control officers

PTI Oct 20, 2012, 01.38PM IST

Tags: risk management | Indian Air Force | Gagan | DGCA | Airports Authority of India | air traffic controllers

NEW DELHI: With burgeoning air traffic, India could soon face a severe shortage of air traffic control officers (ATCOs), a top aviation official said today, asking the Airports Authority of India to take immediate steps to recruit them in large numbers.

Responding to the suggestion by DGCA chief Arun Mishra, AAI Chairman V P Agrawal said the average annual intake of ATCOs was about 250, apart from an almost similar number for communication officers. "We will step up this recruitment process in the coming days," he said.

(With burgeoning air traffic,...)

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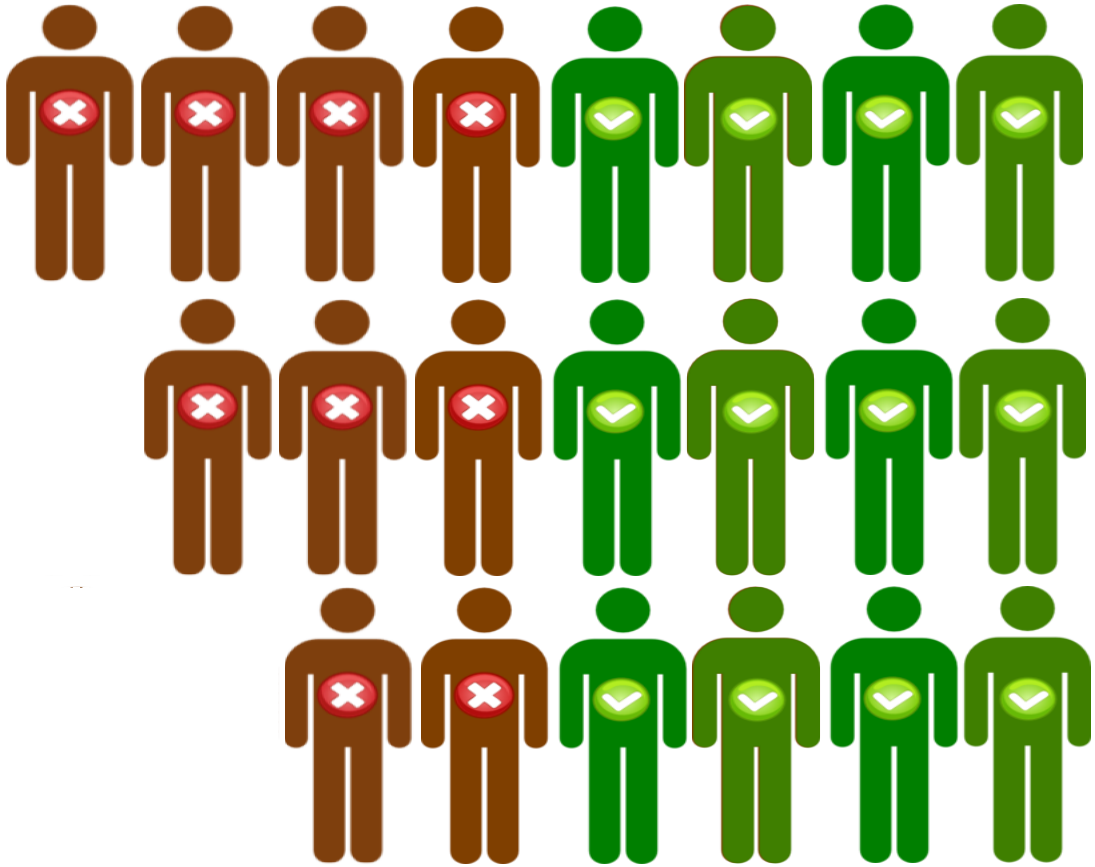
An ATC example



= 4 duty hours

= 5 duty hours

= 6 duty hours

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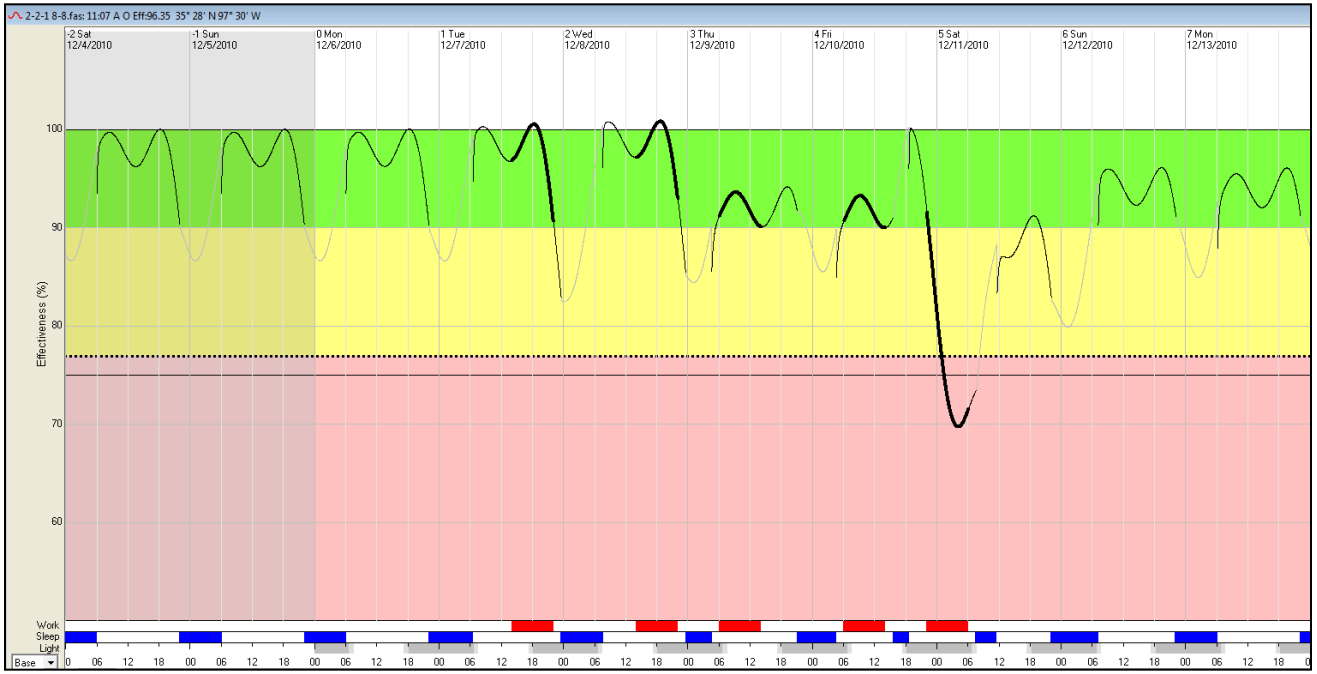
Fatigue Risk Management Today



When ?

How Long ?

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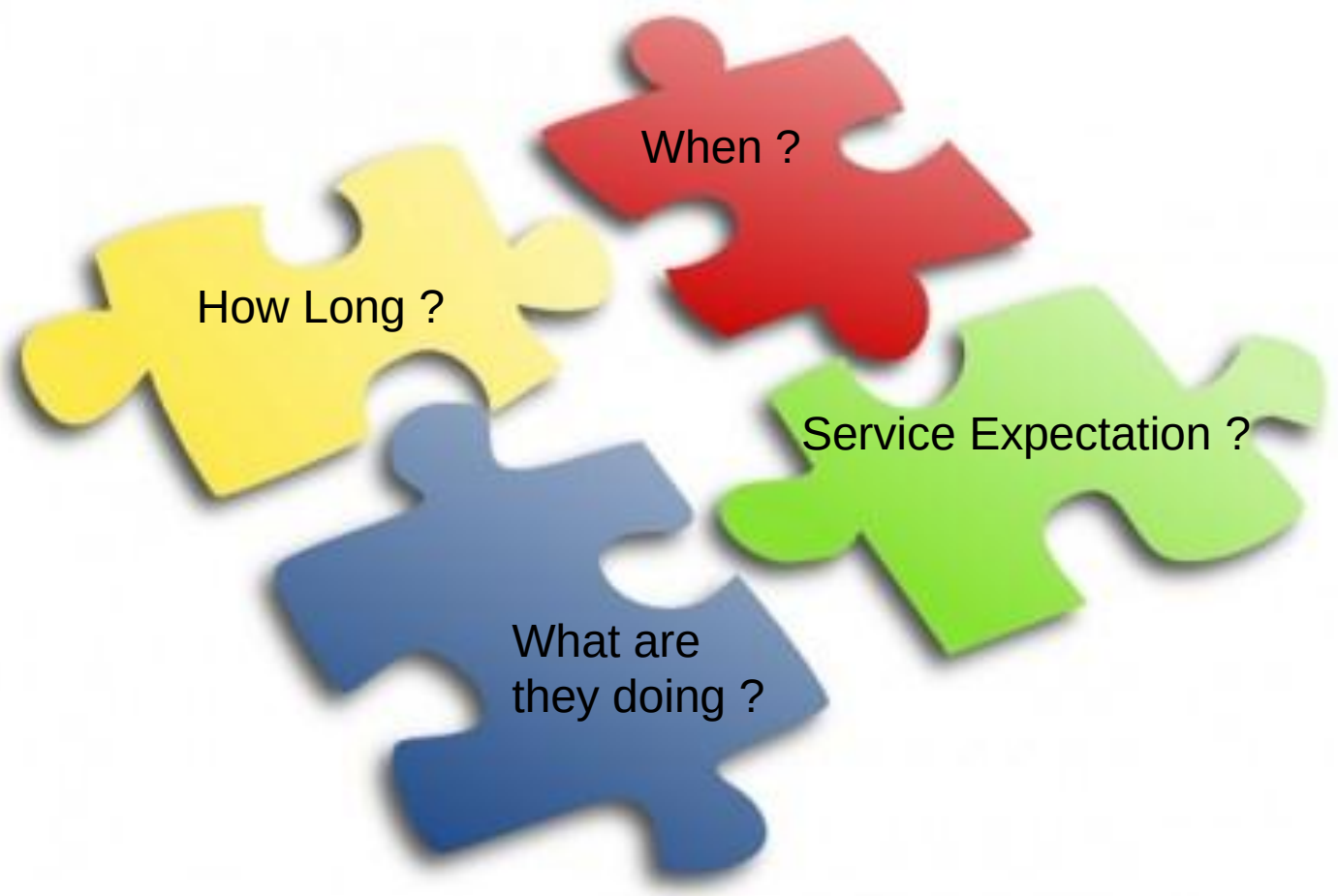
The Missing Piece(s)



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A Demonstration of Importance

How does ATCo fatigue impact quality and consistency of service provision ?

Method

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
0600 - 1300	0600 - 1300	1300 - 2200	1300 - 2200	2200 - 0600	2200 - 0600	Sleep	Off	Off	Off

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
0000 - 0400	0400	0800	0000 - 0800	0000 - 0800	0800 - 1200	1800 - 2000	0000 - 0800	0000 - 0800	0000 - 0800
1400 - 1530	1400 - 1530			1800 - 2000	1800 - 2000				
2200 -	2200 -								

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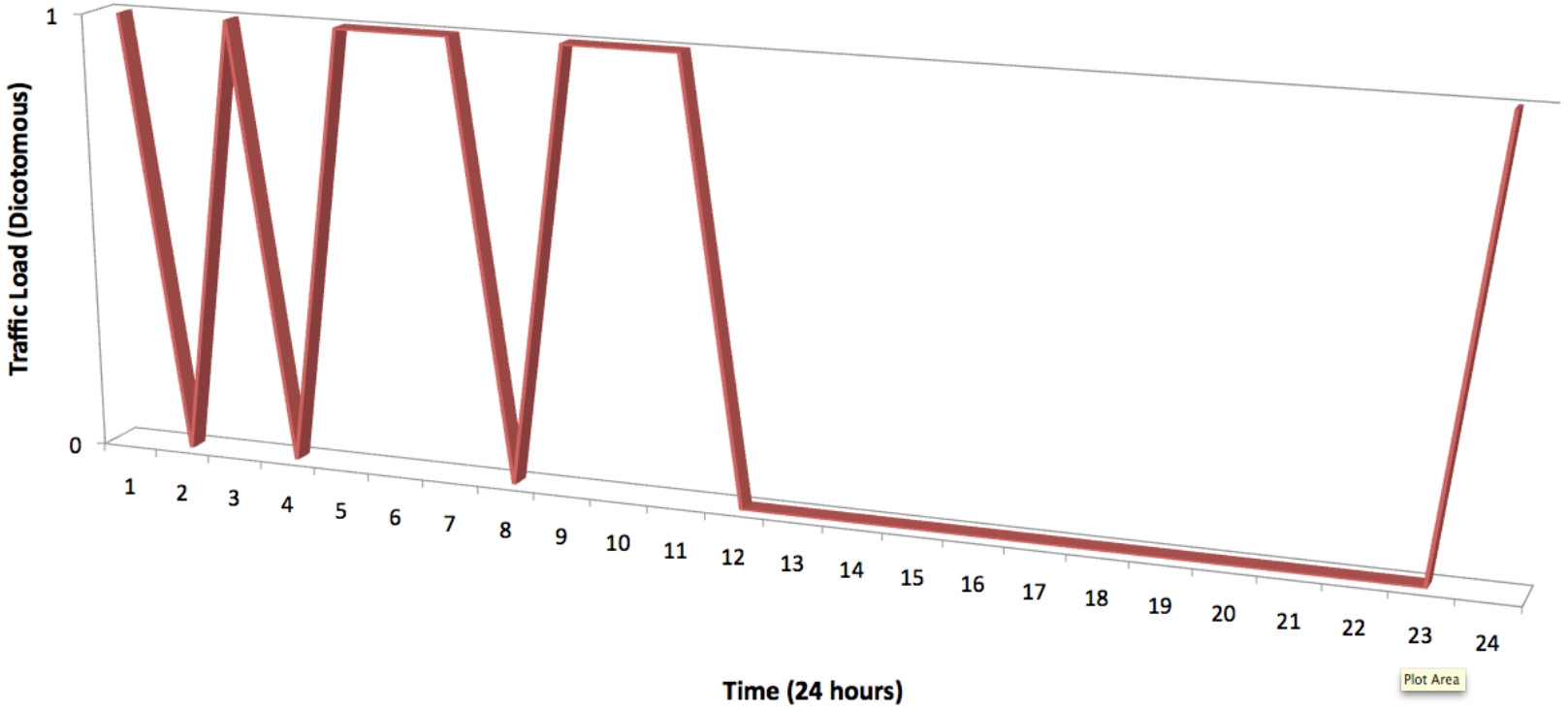
Facility Traffic Profile Profile

- Traffic Pushes
  - 0200 – 0300, 0430 – 0700, 0800 – 1100, 2300 - 0100



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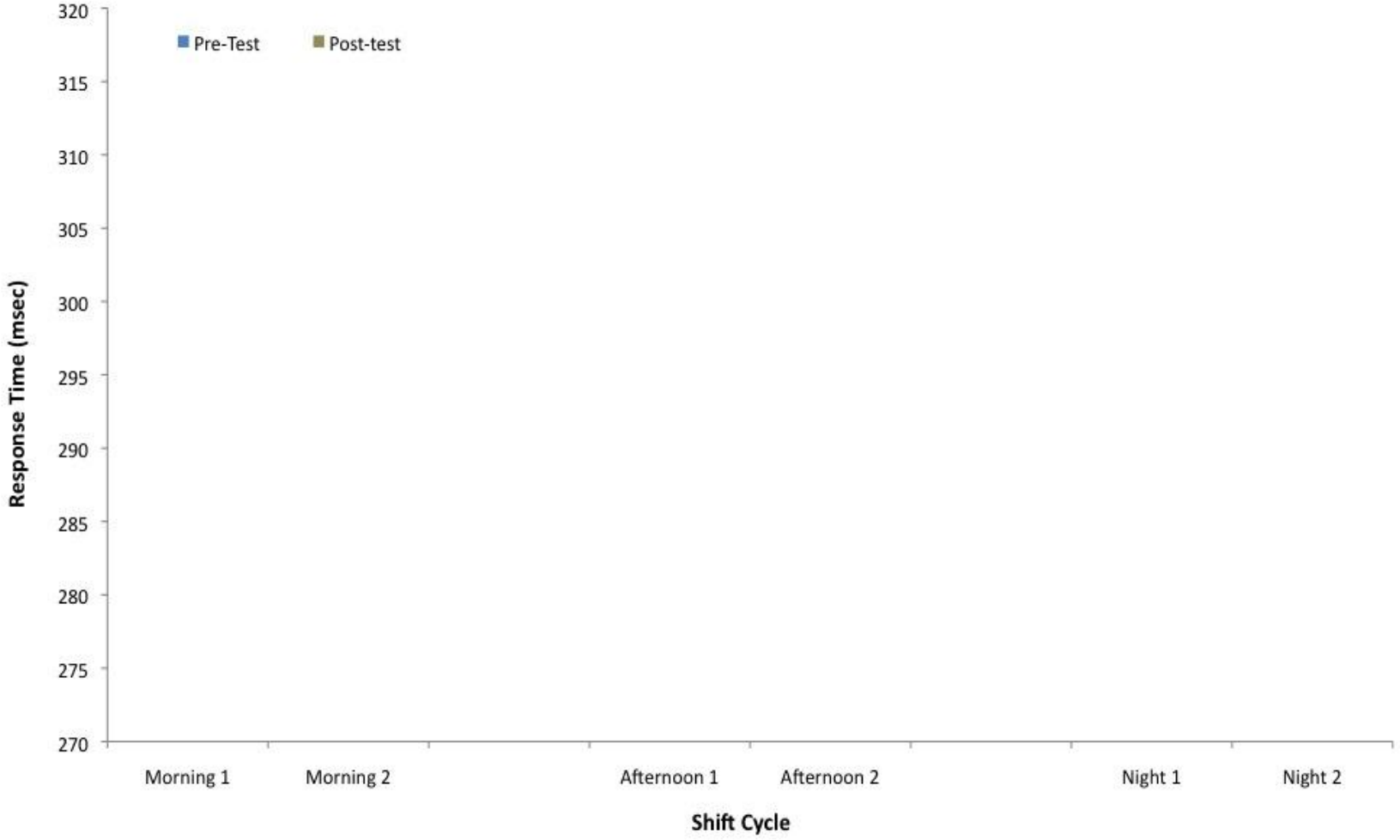
Analysis Results



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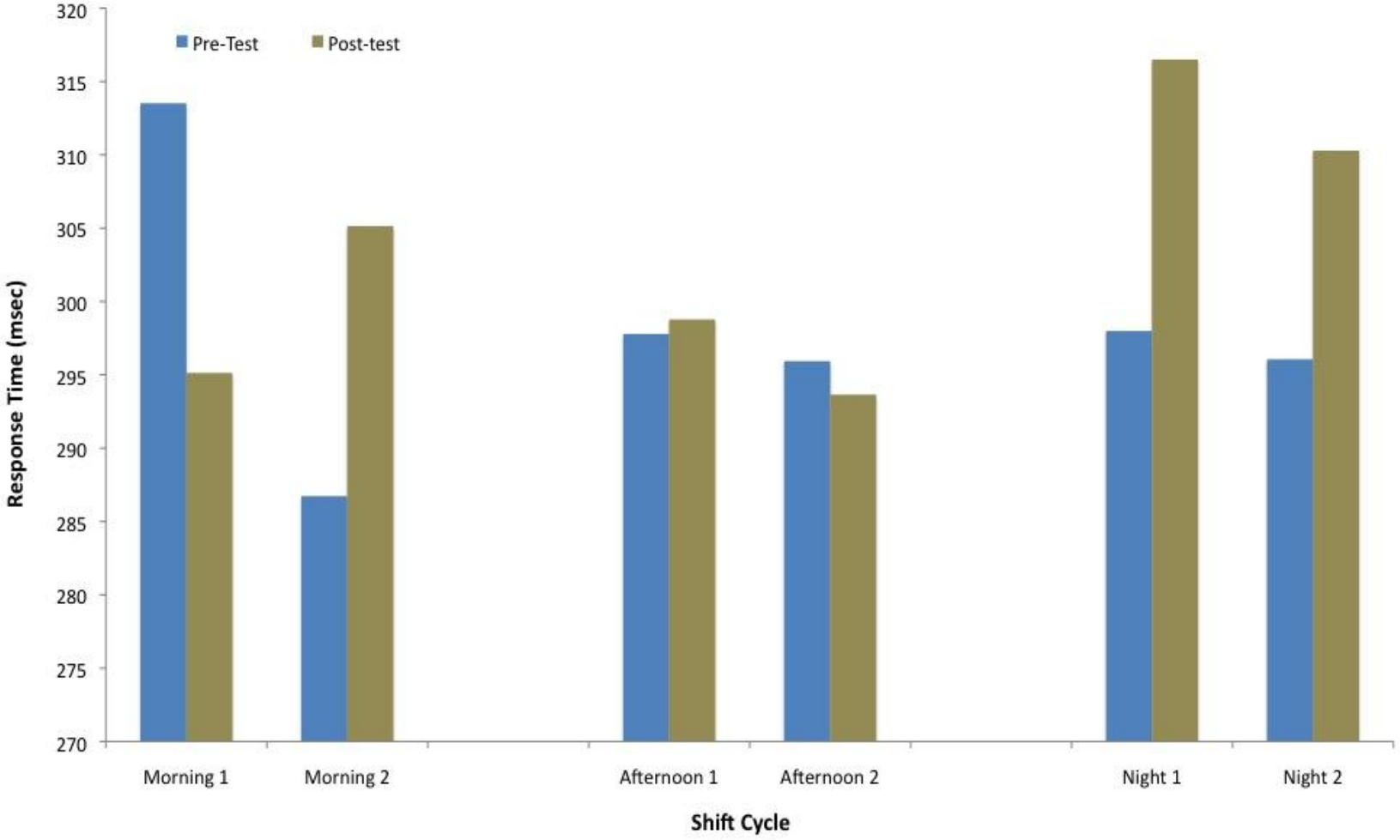
Fatigue Analysis Results



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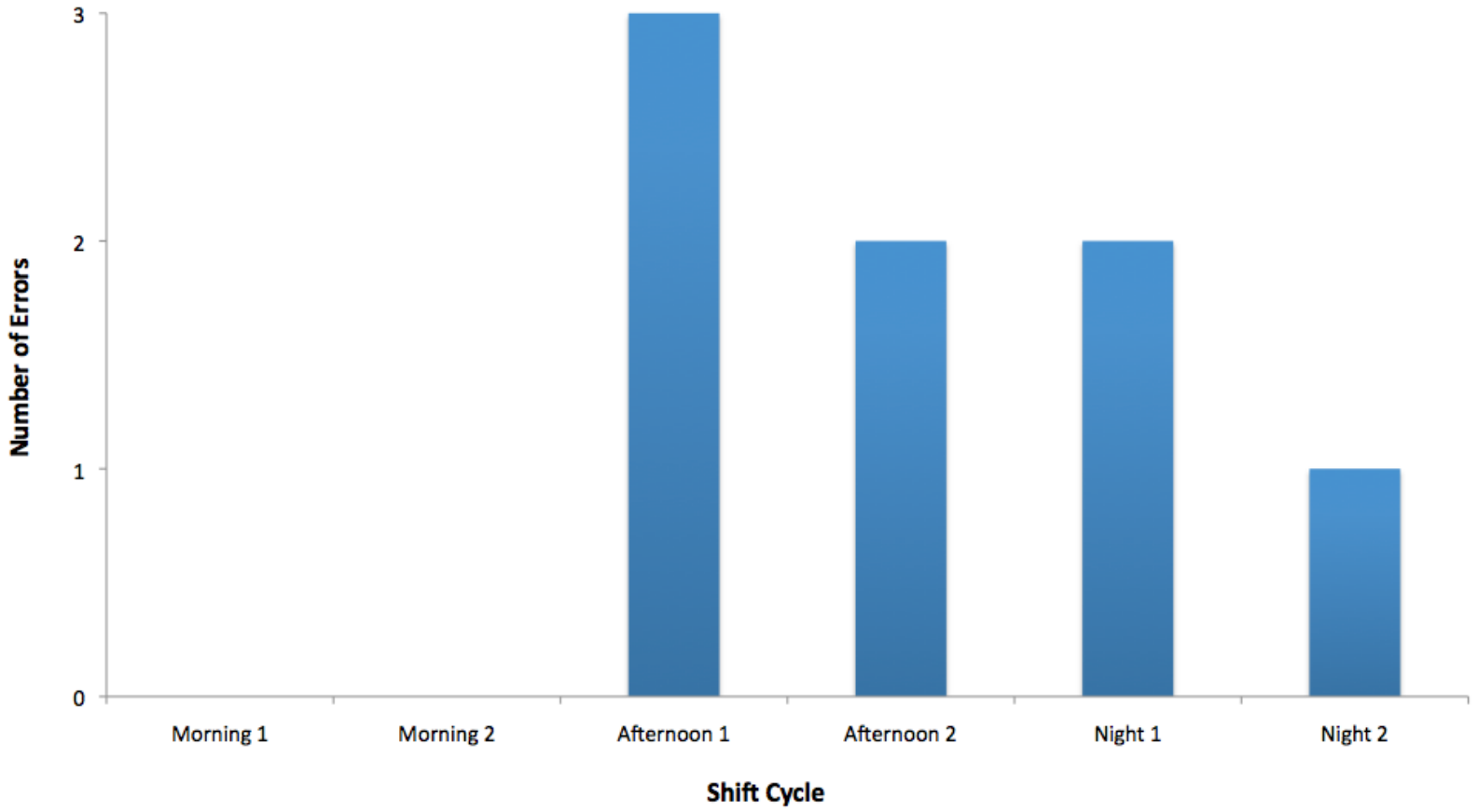
Separation LoS (Terminal)



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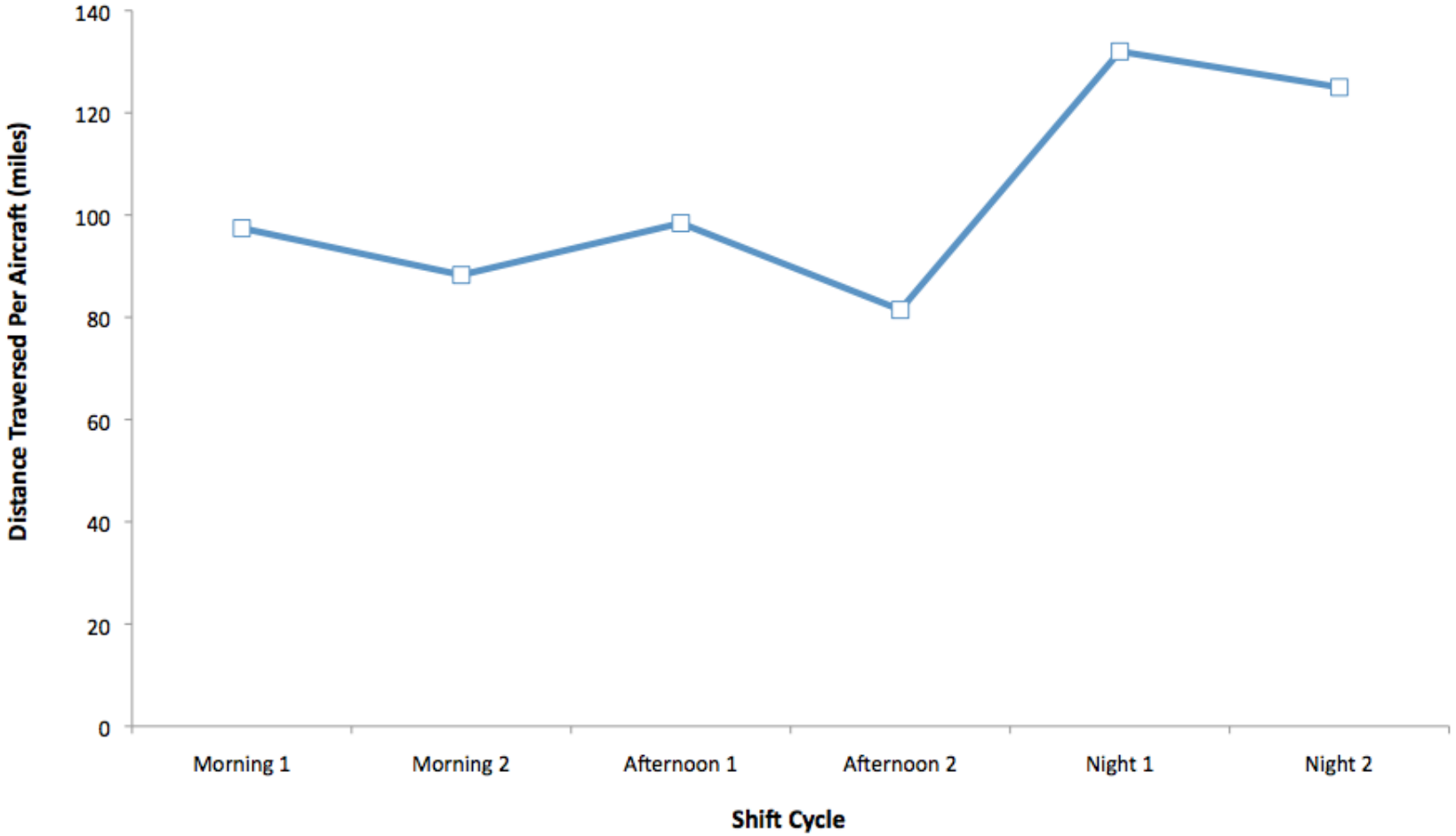
Efficiency Analysis



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Discussion

Fatigue associated w/ low density appears to be related to safety errors

Fatigue associated w/ high density appears to be associated with ‘significantly’ less efficient aircraft movement

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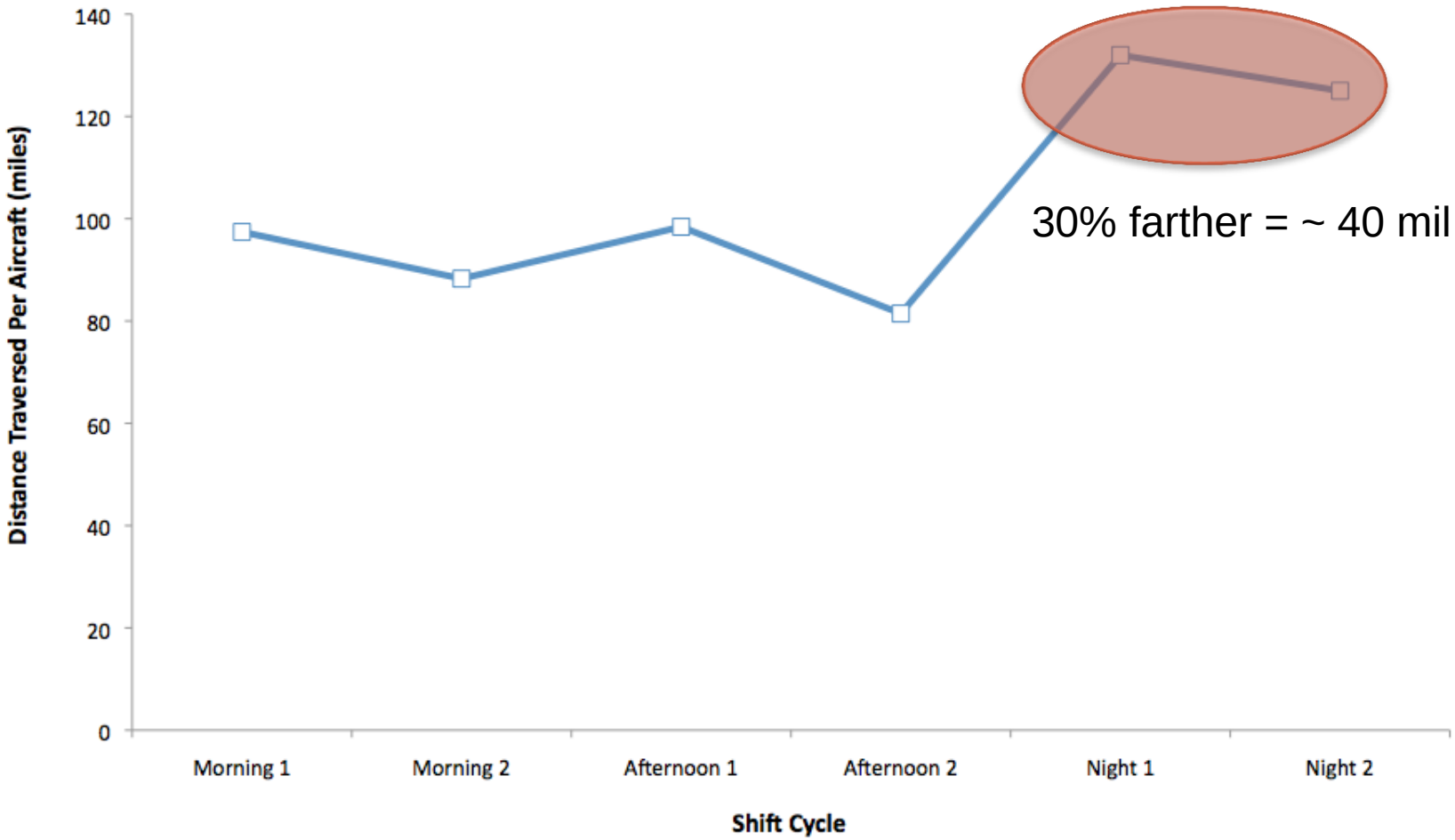
How much less ?



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What does 40 miles cost in Fuel ?

0.27 mi/gal = 148 gal

Fuel Cost: $2.71 per gal

Total Cost: $401 per flight

For a fleet (100 aircraft): $40,100 per day

For the year: $14,636,500

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What $14 mil does NOT include

Increased Missed Connections

Higher Labor Costs

Decreased Passenger Satisfaction

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It’s all about the schedule

Fatigue

Delay

Predictability

Flexibility

Efficiency

Access

Safety

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Fatigue Effects . . .

For ANSPs

↓ Service Quality

For Airlines

↑ Costs per FLT

↓ Ability to adhere to schedule

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Why you should care

Air transportation Importance

What people are working on matters

It impacts quality and consistency

And affects . . . . .

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The schedule

What we need now . .

More data

More cooperation

Advancement of state-of-the-art

Revenue

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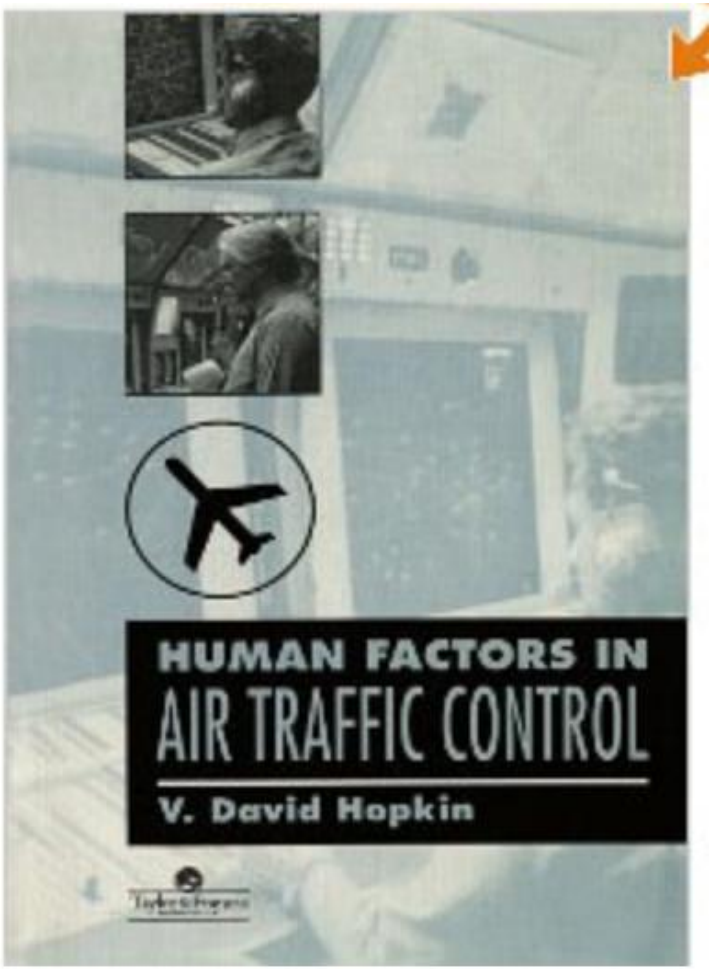
Finally



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MID Safety Summit

Bahrain

28-29 April

الطيران المدني
CIVIL AVIATION

مملكة البحرين
Kingdom of Bahrain

وزارة المواصلات
MINISTRY OF TRANSPORTATION

Fatigue Risk Management
An operator's view

Captain John Alsford BSc ARSM FRAeS
Senior Vice President - Fleet, Emirates Airline

Introduction

- The Challenge
- Human Factors
- FRMS Evolution
- Practical Mitigations
- Regulation
- Conclusion

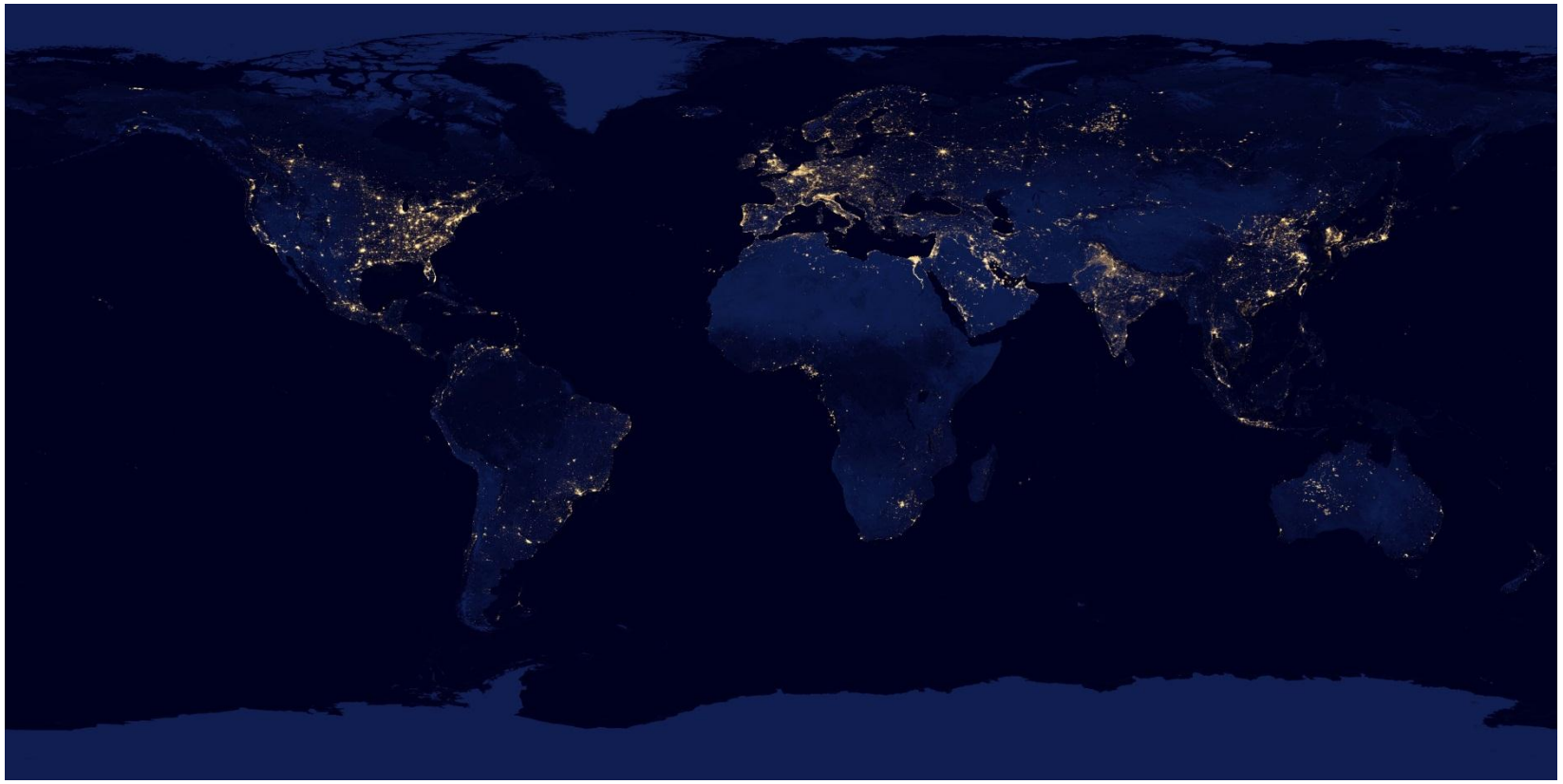
ICAO Fatigue Definition

A physiological state of reduced mental or physical performance capability resulting from sleep loss or extended wakefulness, circadian phase, or workload (mental and/or physical activity) that can impair a crew member's alertness and ability to safely operate an aircraft or perform safety-related duties

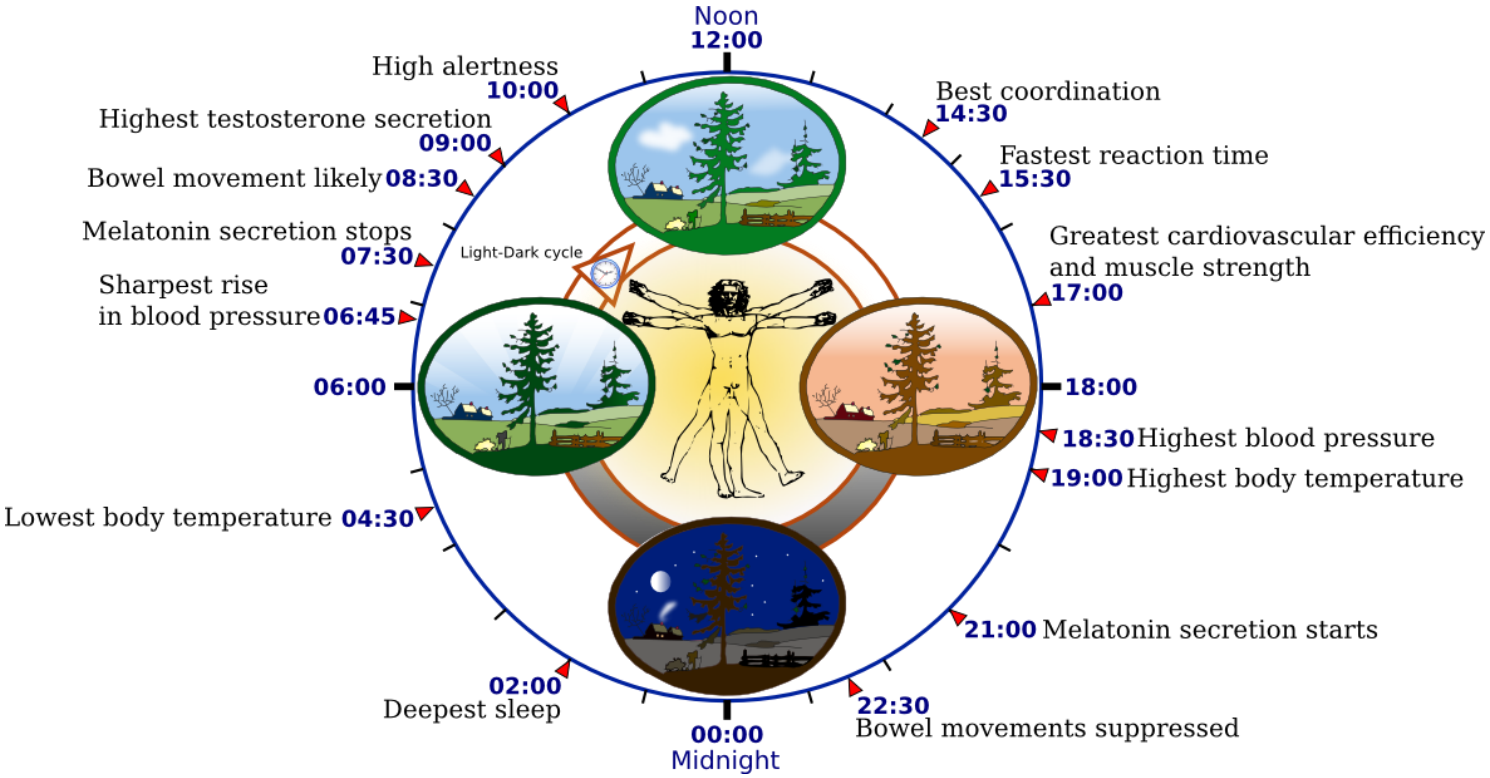
Fatigue Report

"My mind clicks on and off. I try letting one eyelid close at a time while I prop the other with my will. But the effect is too much, sleep is winning, my whole body argues dully that nothing, nothing life can attain is quite so desirable as sleep. My mind is losing resolution and control."

The Challenge – The Modern World



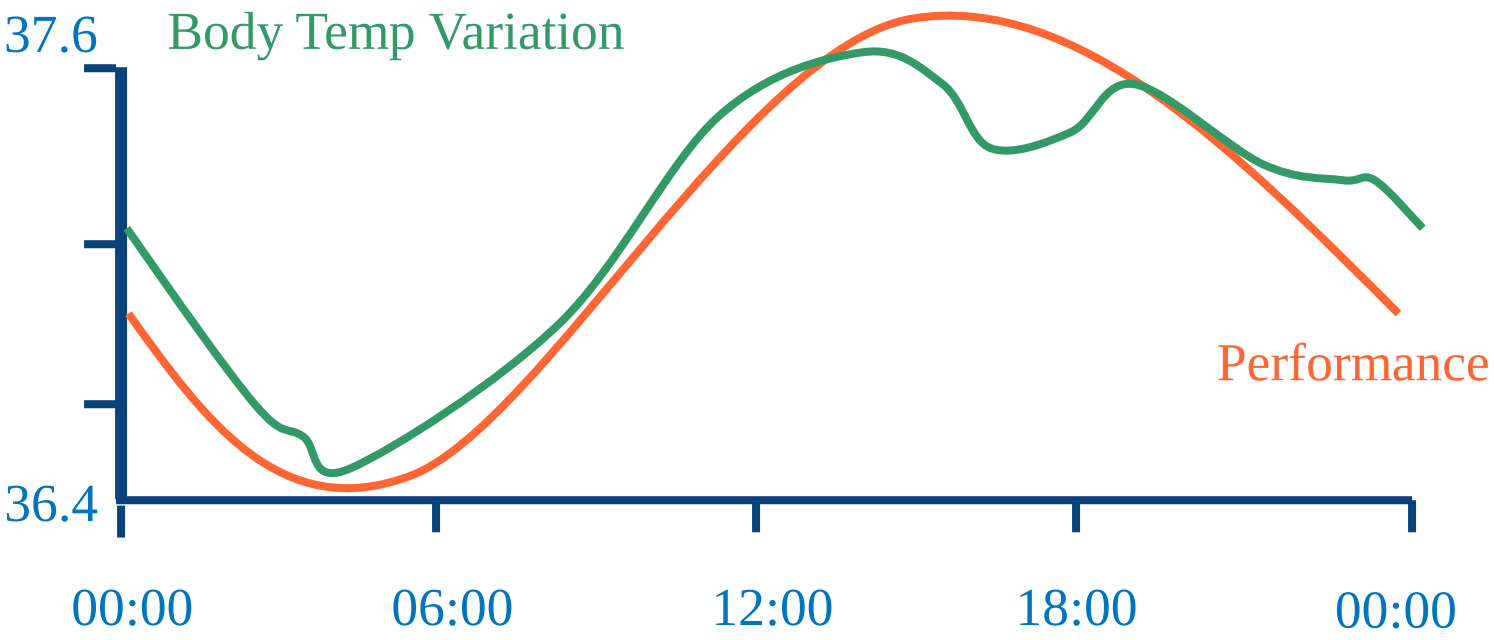
The Challenge – Not So Modern Man



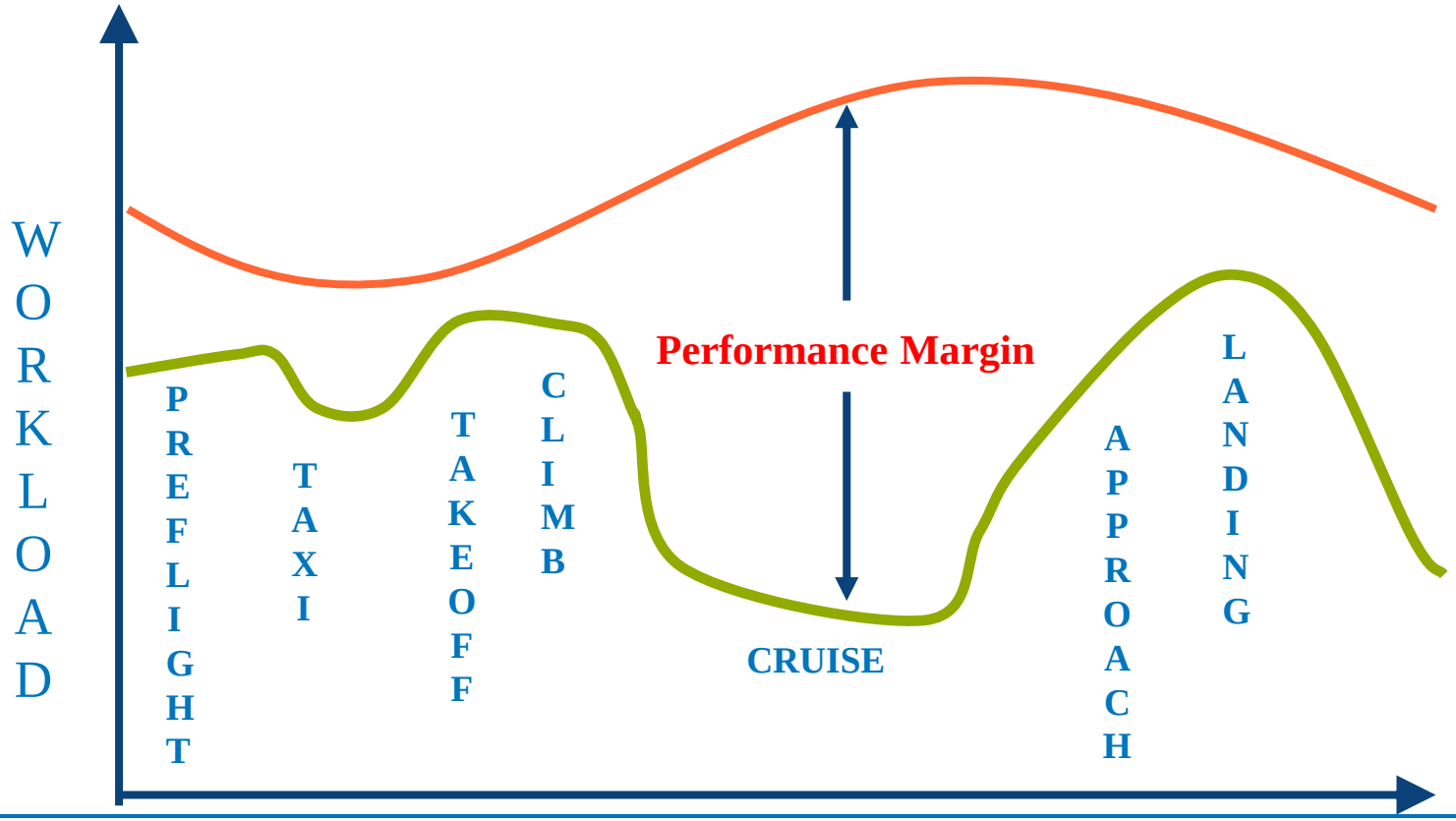
The Human Factor – Circadian Rhythm

- Cyclic production of clock proteins
- Programmed for sleep at night
- The “biological day” is about 25 hours
- Synchronisation to 24 hours by time cues (zeitgebers)
  - the day/night cycle (light/dark)
  - social cues from the day
  - day-active community
  - work patterns

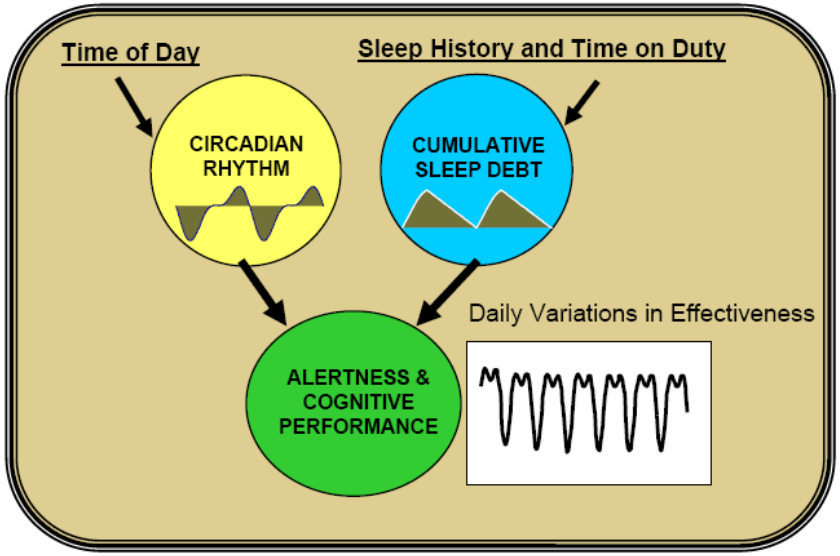
Performance Cycle



Performance Margin



Bio-Mathematical Fatigue Models



Mathematical modeling is not an exact science and generally ignores:

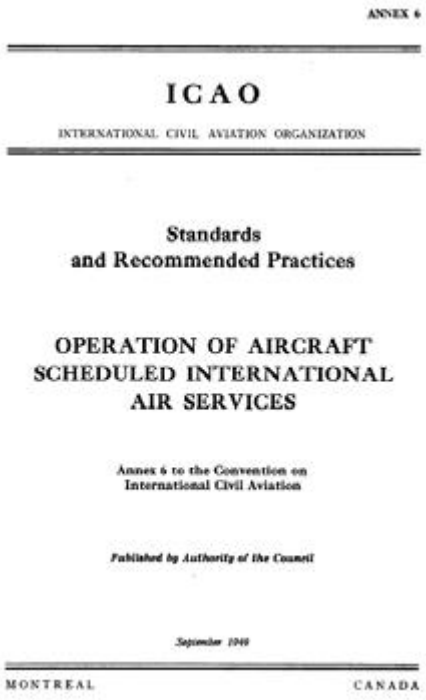
- Age, gender, health, medication
- Stressors
- Physical Activity
- Aircraft automation
- Caffeine
- Controlled Cockpit Rest

Hence the output needs to be viewed with caution and in combination with empirical data

Fatigue Risk Awareness Evolution

1949, ICAO Annex 6 First edition

"An operator shall establish limitations on the flight time of flight crew members. These limitations shall be such as to ensure that fatigue, either occurring in a flight or successive flights or accumulating over a period of time, does not endanger the safety of a flight. The limitations shall be approved by the State of Registry".


ANNEX 6

ICAO

INTERNATIONAL CIVIL AVIATION ORGANIZATION

Standards
and Recommended Practices

OPERATION OF AIRCRAFT
SCHEDULED INTERNATIONAL
AIR SERVICES

Annex 6 to the Convention on
International Civil Aviation

Published by Authority of the Council

September 1949

MONTREAL CANADA

Fatigue Risk Awareness Evolution

1956 -ICAO Circular, Foreword:

- •"…the effectiveness with which this [flying] competence is available for use depends upon each crew member's being sufficiently well rested to utilize his capabilities efficiently".
- •"…the continuation of any task long enough under even the most favourable circumstances will ultimately produce fatigue and consequent loss of efficiency."


ICAO
CIRCULAR
1956
CIRCULAR 49-AN/44
FLIGHT CREW FATIGUE
AND FLIGHT TIME LIMITATIONS
Prepared by the Secretariat
and published by authority of the Secretary General

Fatigue Risk Awareness Evolution

- 1975 - CAP 371 –The Avoidance of Fatigue in Aircrews
- 1980 - NASA Ames Research Center Workshop on sleep and fatigue
- 1995 - Fatigue Symposium NTSB-NASA
- 2003 - Flight Safety Foundation meeting between Operators & Regulators to discuss ULR methodologies
- 2011 - FAA Aviation Fatigue Symposium
- 2011 - ICAO Symposium: “Managing Fatigue Related Risk through FRMS”

In response to the need to manage fatigue-related risks, ICAO approved amendments to Annex 6 Part I to include Fatigue Risk Management Systems (FRMS) Standards and Recommended Practices (SARPs)

FTL & FRMS

- Prescriptive flight and duty time limits attempt to limit fatigue through a simplistic association of time and length of duty. They offer a binary, go/no-go output.

- FRMS employs multi-layered defensive and mitigation strategies, based upon SMS and RMS principles, to manage fatigue-related risks

- FRMS allows a scientific, data-driven, flexible approach.

FRMS – Advantages

- Enhances flight safety through the proactive oversight of crew-related fatigue while containing costs
- Addresses more than just hours of work - physiology, specific operational aspects and other factors
- Offers greater operational flexibility and potentially the ability to operate beyond FTL where required
- Allows responsible operators to “self-regulate”
- Reduction in fatigue, lost duty days and sickness incidence due to fatigue-related factors

Proactive Mitigation - Education

FRMS needs to be understood by all stakeholders

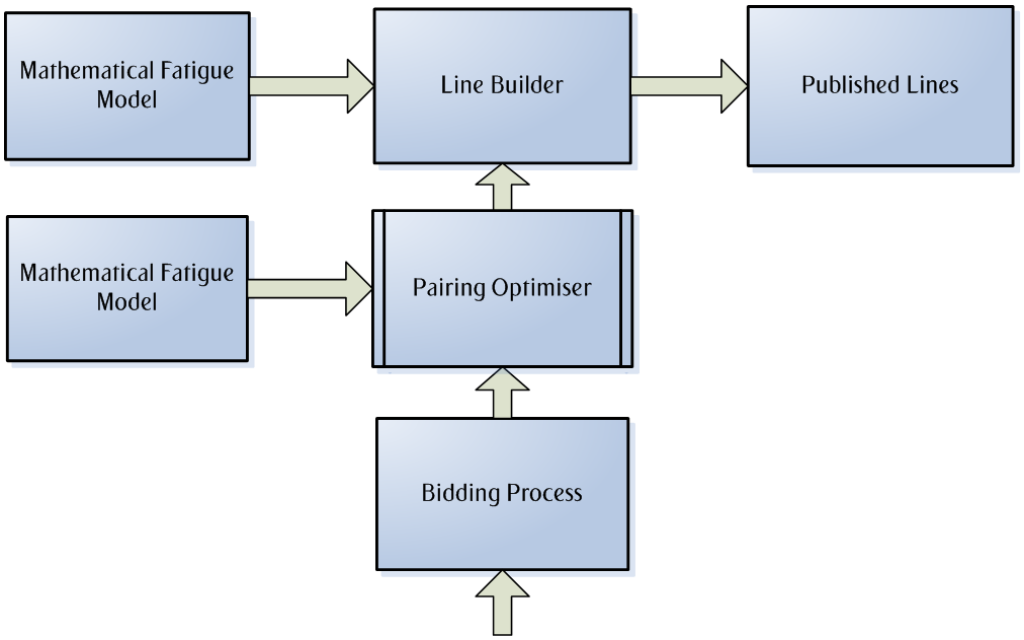
- Education for :
  - Pilots and Cabin Crew (and their families?)
  - Planners
  - Rostering staff
  - Crewing staff
  - Managers - at all levels
  - Regulators

Proactive Mitigation - Education

Content

- Causes of fatigue
- Fatigue risk specific to an operation
- Personal coping strategies
- Personal responsibilities
- Company responsibilities, policies and procedures
- Regulatory requirements

Proactive Mitigation - Rostering



Reactive - Subjective Data Analysis

Fatigue Report Form

Emirates

Name:	Staff number:	Role on this flight: Training Capt / Capt / FO / Augment
Flight Date: ___ / ___ / ___(UTC)	Time when fatigue occurred: ___:___ (UTC)	Sector or place where fatigue occurred*: EK ____From (e.g. "DXB") ____ to ____
Number of flight crew: 2 / 3 / 4	Aircraft type: A330 / A340 / A380 / B777	Confidentiality* If confidentiality is required tick here ○

Describe what happened and what you observed:

Please circle how you felt:

1. Fully alert, wide awake
2. Very lively, somewhat responsive, but not at peak
3. OK, somewhat fresh
4. A little tired, less than fresh
5. Moderately tired, let down
6. Extremely tired, very difficult to concentrate
7. Completely exhausted, unable to function effectively

What were possible contributing factors (circle, more than one may apply):

Fatigue prior to duty | Roster or combination of duties | Duty itself | In-Flight rest | Hotel
Circadian dysrhythmia* | Not rested during rostered rest (personal)* | Not rested during rostered rest (company)*
Other / Comments:

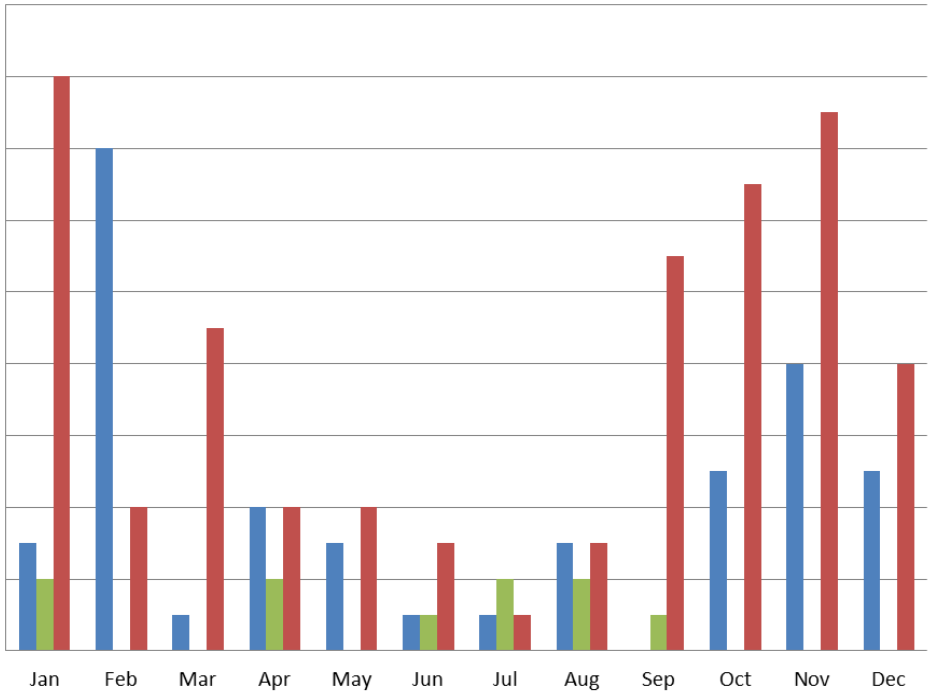
What actions did you take to manage or reduce fatigue (circle, more than one may apply):

Controlled rest | Caffeine
Other / Comments:

What corrective action do you suggest (circle, more than one may apply):

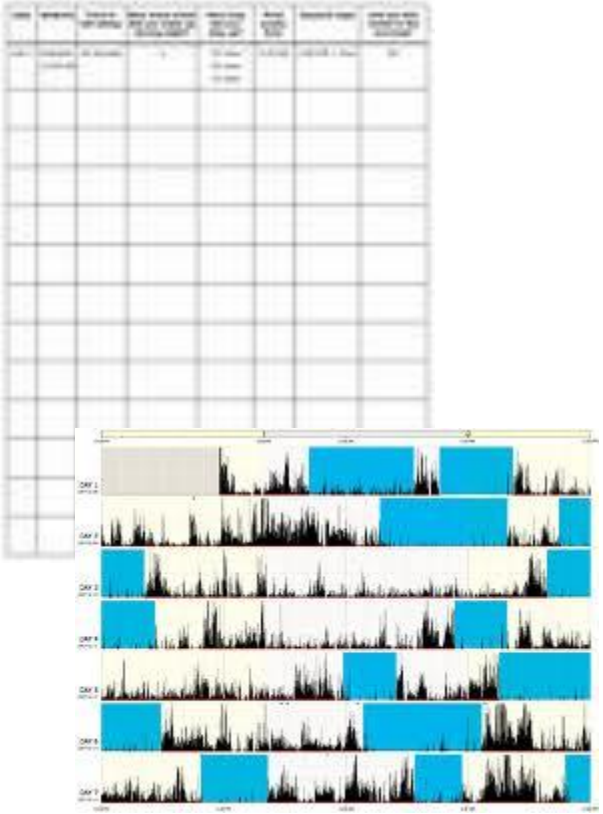
Increase home pre-flight rest | Increase home post-flight rest
Increase layover rest | Decrease layover (to reduce circadian shift) | Crew augmentation
Other / Comments:

FRMS fatigue report form V 9.1 | 11 January 2012 | * = See reverse for explanation



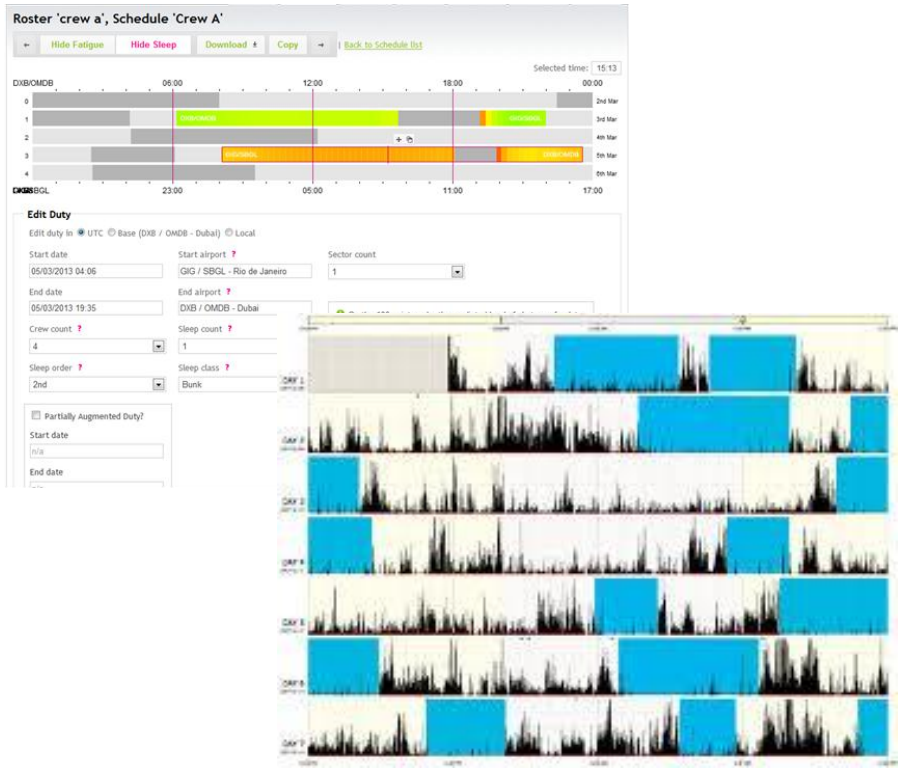
Reactive – Objective Data Collection

- Activity sensors
- Psychomotor Vigilance Task
- Sleep Logs

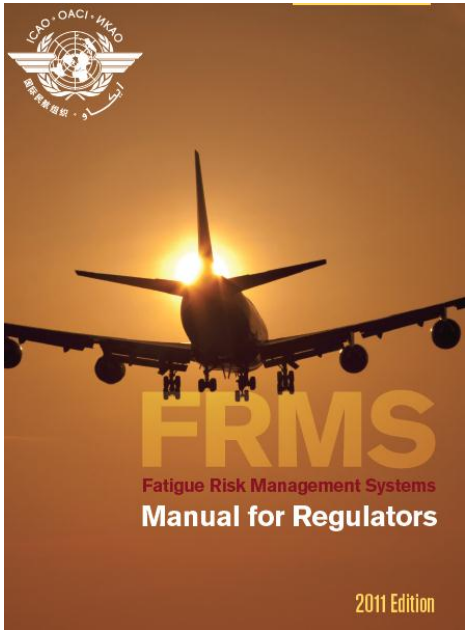


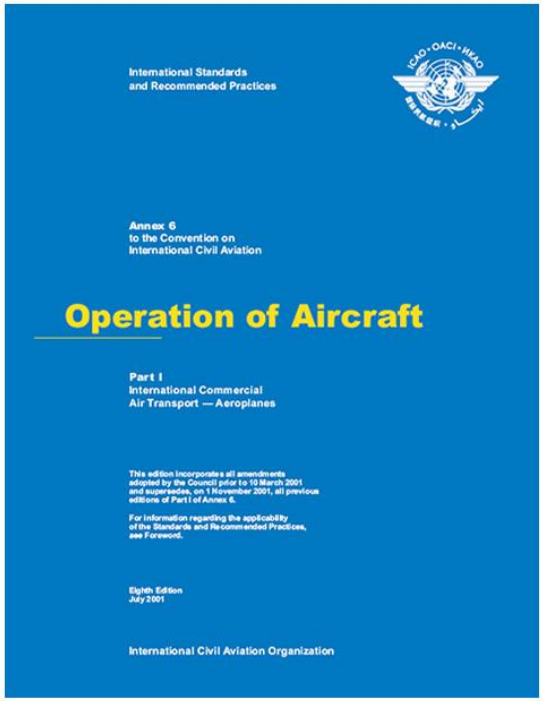
Data Analysis & Validation

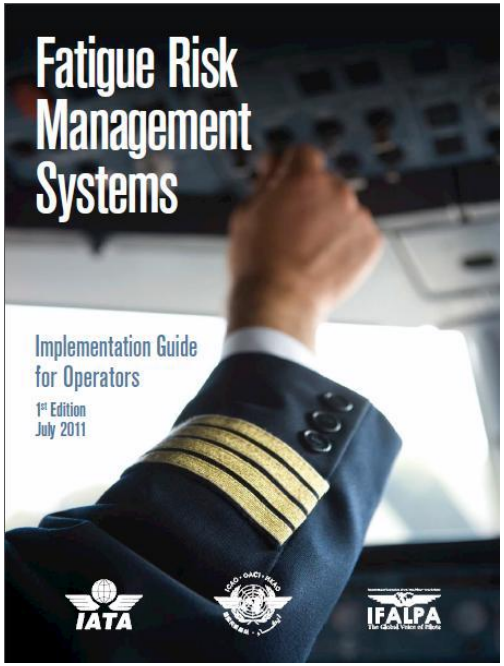
- ULR studies by external scientific advisors
- In house analyses
- Subjective data (surveys, diaries, FRF, ASR)
- Objective data (actiwatch, PVT)
- Other risk data sources



Regulation


FRMS
Fatigue Risk Management Systems
Manual for Regulators
2011 Edition


International Standards
and Recommended Practices
Annex 6
to the Convention on
International Civil Aviation
Operation of Aircraft
Part I
International Commercial
Air Transport — Aeroplanes
This edition incorporates all amendments adopted by the Council prior to 10 March 2001 and supersedes, on 1 November 2001, all previous editions of Part I of Annex 6.
For information regarding the applicability of the Standards and Recommended Practices, see Foreword.
Eighth Edition
July 2001
International Civil Aviation Organization


Fatigue Risk Management Systems
Implementation Guide for Operators
1st Edition
July 2011
IATA
IFALPA

Conclusions

- FRMS is not a silver bullet for fatigue
- FRMS is just one tool in a suite of risk management processes
- FRMS education is essential
- All stakeholders need to understand their responsibilities
- Full implementation will take time.
- Regulation should not inhibit the use of FRMS as an safety enhancement device

MID Safety Summit

Bahrain

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Fatigue – An ATC perspective

IL76 Go around event at Dubai World Central (DWC) airport in Dubai due to a tower ATCO falling asleep….

The ‘story & the Investigation Report’….

ATCO Background

- Leave - 15th Oct- ATCO Z's first day back at work after leave
- Morning of 16th Oct- ATCO Z was asked to work as an LCE which would end at 1300 LT
- At 1200LT ATCO Z late notice to cover night shift.
- ATCO Z agrees as other ATCO will be left doing a 10hr night shift solo
- In order to comply with regulations it is arranged that he starts the shift at 2330LT
- ATCO Z attended Company Family Fun day & left at1730.

Sequence of events

- At 2330LT ATCO Z started his night shift & between 0200 and 0430 (17th) he took a break and managed to get some sleep.
- At 0526 range check given (160nm to the west)
- 0544:20 Strip appears of departing IL76
- Actions of others (repeated calls from pilot & phone calls from Approach ATCO)
- Outcome – IL76 goes around & approach Sup goes to the TWR

Excerpts from Investigation Report Conclusions.

- Reasons DWC TWR ATCO fell asleep unable to be determined, although likely related to low physiological arousal at a time within the circadian rhythm of increased sleepiness.
- TWR ATCO took care to ensure he was fit for the night shift.
- TWR ATCO took reasonable action during the shift to provide reasonable assurance that he would remain in a fit state to fulfill his duties
- The ANSP did not have any Fatigue Management procedure in place – only following regulatory prescriptive rules.
- DWC a very quiet airport at the moment.

Excerpts from Investigation Report Recommendations

- ATC Training develop and implement a Fatigue education program for ATS shift staff.
- Operational Management commence steps towards implementing a fatigue management process, with the ultimate goal of a fully implemented Fatigue Risk Management System (FRMS).
- DWC TWR and APP review their LoA so as to ensure that coordination (range checks) take place within a maximum and minimum distance from DWC
- ATC Ops management review current staff procedures at DWC TWR, with a view to ensuring that the likelihood of such an occurrence recurring is as low as possible.

Additional recommendations

- Management “Buy - in”
- Self Assessment
- Understanding
  - Scientific Evidence
  - Transparent
  - Non-punitive
- Education
- Work environment
- Counseling

Thank You

This is an abridged version due to time constraints. If anybody wants a copy of the full presentation or FRM procedure please email me. Grant.Marpole@dubaiairnav.gov.ae

Open Discussions

Enjoy the lunch break

شركة مطار البحرين
bahrain airport company

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Performance Management & Safety

MID Safety Summit

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Overview of Safety Management Principles

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Concept of Safety (Doc 9859)

Safety is the state in which the possibility of harm to persons or property damage is reduced to, and maintained at or below, an acceptable level through a continuing process of hazard identification and risk management.

Three key definitions

- **Hazard** – Condition or object **with the potential** of causing injuries to personnel, damage to equipment or structures, loss of material, or reduction of ability to perform a prescribed function

- **Consequence** – Potential outcome(s) of the hazard

- **Safety risk –** The assessment, expressed in terms of predicted **probability** and **severity,** of the consequence(s) of a hazard taking as reference the worst foreseeable situation

What is an SSP?

- An integrated set of regulations and activities aimed at improving safety
- An SSP is a management system for the management of safety by the State

What is an SMS?

- *A systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures*
- Service providers are responsible for establishing an SMS
- States are responsible, under the SSP, for the acceptance and oversight of service providers' SMS

Safety management by service providers

- The Safety Management System (SMS) provides:
  - a platform for Service Providers to apply safety management principles, such as safety risk management (SRM) and safety assurance (SA), during the delivery of their product activity to address the resolution of their particular safety concerns

Safety management by States

- The State Safety Programme (SSP) provides:
  - a platform for States to apply safety management principles, such as safety risk management (SRM) and safety assurance (SA), to the discharge of their safety responsibilities
  - a structural framework that allows the State safety oversight a… iders to interact r… c… s… ncerns

Safety Risk Management (SRM)
What is wrong?

Safety Risk Management

- Processes and procedures aimed at hazard identification and initial mitigation of safety risks
- State responsibility regarding the SRM component of the ICAO SSP framework r
  broaden rulemaking to includ
  response to internationa/regi
  well as regulation as mitigation
  specific hazards

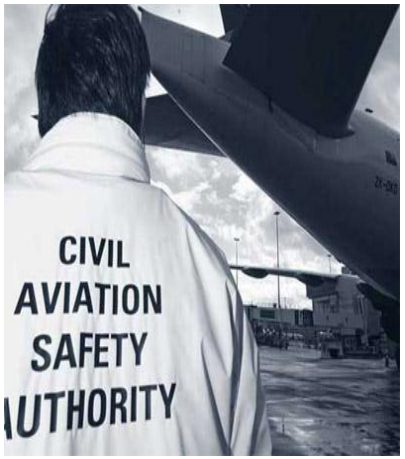
Safety Risk Management

- **What is it?**
  - The **analysis** and **elimination**, and/or **mitigation** to an acceptable level of the safety risks of the consequences of identified hazards
- **What is the objective?**
  - A balanced allocation of resources to address **all** safety risks and **viable** safety risks control and mitigation
- **Why is it important?**
  - It is a **data-driven** approach to safety resources allocation, thus defensible and easier to explain

Safety Assurance (SA) – Does the fix work?

Safety assurance

- Processes and procedures that guarantee (generate confidence) that hazard identification and initial mitigation of safety deficiencies and the consequences of hazards perform as planned/expected
- State responsibility regarding the SA component of the SSP is to broaden the on-going compliance-oriented surveillance to include the assessment of the safety performance of service providers SMS, and as a result of such assessment prioritize surveillance towards the areas of greater safety concern or need, as identified by the analysis of data on hazards, their consequences in operations, and the assessed safety risks



A key management axiom

- **Objectives**
  - Storage of safety data
  - Continuous analyses of safety data
  - Continuous monitoring of the effectiveness of initial mitigation strategies
  - Re-deployment of alternative mitigation strategies

- To achieve this Objectives, it is important to underline the management axiom that "one cannot manage what one cannot measure".

Safety measurement

- Quantification of outcomes of selected high-level/ high-consequence events
  - Accident rates
  - Serious incident rates
  - Quantification of selected high-level State functions
  - Development/absence of primary aviation legislation
  - Development/absence of operating regulations
  - Level of regulatory compliance
- A measure of achievement of high-level safety objectives of safety interventions and/or mitigations strategies

Safety performance measurement

- Quantification of the outcomes of selected low-level/low-consequence processes (generally associated to an SMS)
  - Number of FOD events per number of ramp operations
  - Number of ground vehicle events in taxiways per number of operations
  - …
- A measure of the actual performance of safety interventions and/or mitigation strategies, beyond accident rates and regulatory compliance

Basic safety management SARPs in summary

State

- States shall establish a State safety programme (SSP), in order to achieve an acceptable level of safety (ALoS) in civil aviation
- ALoS to be achieved shall be established by the State

Service provider

- States shall require, as part of their SSP, that a [service provider] implement an SMS acceptable to the State that, as a minimum:
  - identifies safety hazards
  - ensures the implementation of remedial action necessary to maintain agreed safety performance
  - provides for continuous monitoring and regular assessment of the safety performance
  - aims at a continuous improvement of the overall performance of the safety management system

ICAO SSP & SMS Frameworks

SSP Components and Elements

1. **State safety policy and objectives**
   - 1.1 State safety legislative framework
   - 1.2 Safety responsibilities and accountabilities
   - 1.3 Accident and incident investigation
   - 1.4 Enforcement policy
2. **State safety risk management**
   - 2.1 Safety requirements for service providers SMS
   - 2.2 Agreement on service providers' safety performance
3. **State safety assurance**
   - 3.1 Safety oversight
   - 3.2 Safety data collection, analysis and exchange
   - 3.3 Safety data driven targeting of oversight on areas of greater concern or need
4. **State safety promotion**
   - 4.1 Internal training, communication and dissemination of safety information
   - 4.2 External training, communication and dissemination of safety information

SMS Components and Elements

1. **Safety policy and objectives**
   - 1.1 – Management commitment and responsibility
   - 1.2 – Safety accountabilities
   - 1.3 – Appointment of key safety personnel
   - 1.4 – Coordination of emergency response planning
   - 1.5 – SMS documentation
2. **Safety risk management**
   - 2.1 – Hazard identification
   - 2.2 – Risk assessment and mitigation
3. **Safety assurance**
   - 3.1 – Safety performance monitoring and measurement
   - 3.2 – The management of change
   - 3.3 – Continuous improvement of the SMS
4. **Safety promotion**
   - 4.1 – Training and education
   - 4.2 – Safety communication

SSP/SMS Implementation

- SSP implementation requires coordination among multiple authorities responsible for individual element functions in the State
- Effectively performing SMS by service providers can only flourish under the enabling umbrella provided by an SSP
- Four implementation phases are proposed for the implementation of the SSP and SMS (SMM 3rd Edition, refers)
- Need to agree on safety indicators, targets & action plans for the short and mid-term (phases 1 to 3), for incorporation in the MID Region Safety Strategy.

Phase 1

SSP Components and Elements

1. **State safety policy and objectives**
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Phase 1

- **SSP element 1.2(i):**

✓ **Identify SSP Place Holder Organization and Accountable Executive**
✓ **Establish SSP Implementation Team**
✓ **Perform SSP Gap Analysis**
✓ **Develop SSP Implementation Plan**
✓ **Establish SSP coordination mechanism**
✓ **SSP Documentation including the State's SSP framework, its components and elements**

1. SMS element 1.1(i):
a. Identify SMS Accountable Executive
b. Establish SMS Implementation Team
c. Define scope of the SMS
d. Perform SMS Gap Analysis
2. SMS element 1.5(i):
a. Develop SMS Implementation Plan
3. SMS element 1.3:
a. Establish a key person/ office responsible for the administration and maintenance of the SMS.
4. SMS element 4.1(i):
a. Establish SMS training program for personnel, with priority for SMS implementation team.
5. SMS element 4.2(i):
a. Initiate SMS/ Safety communication channels

***SSP element 4.1, 4.2**: Internal SSP & SMS training. Promotion of external SMS training. Internal & external communication and dissemination of safety information are progressively implemented through Phase 1 to 4.*

SMS element 1.5: SMS Documentation (Phase I to IV)
SMS element 4.1, 4.2: SMS Training, education & communication (Phase I & thereafter)

Phase 2

SSP Components and Elements

1. **State safety policy and objectives**
   - 1.1 State safety legislative framework
   - 1.2 Safety responsibilities and accountabilities
   - 1.3 Accident and incident investigation
   - 1.4 Enforcement policy
2. **State safety risk management**
   - 2.1 Safety requirements for service providers SMS
   - 2.2 Agreement on service providers' safety performance
3. **State safety assurance**
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   - 3.3 – Continuous improvement of the SMS
4. **Safety promotion**
   - 4.1 – Training and education
   - 4.2 – Safety communication

Phase 2

1. SSP element 1.1:
- **National aviation legislative framework**

2. SSP element 1.2(ii):
- **Safety management responsibilities & accountabilities**
- **State Safety Policy & Objectives**

3. SSP element 1.3:
- **Accident and serious incident investigation**

4. SSP element 1.4(i):
- **Establish basic enforcement (penalty) legislation**

5. SSP element 3.1(i):
- **State safety oversight and surveillance of its service providers**

6. SSP element 2.1(i):
- **SMS education & promotion for service providers**

1. SMS element 1.1(ii):
a. Establish Safety Policy & Objectives

2. SMS element 1.2:
a. Define safety management responsibilities & accountabilities across relevant departments of the organization
b. Establish SMS/ Safety coordination mechanism/ committee.
c. Establish departmental/ divisional SAGs where applicable

3. SMS element 1.4:
a. Establish Emergency Response Plan

4. SMS element 1.5(ii):
a. Initiate progressive development of an SMS Document/ Manual & other supporting documentation

***SSP element 4.1, 4.2**: Internal SSP & SMS training. Promotion of external SMS training. Internal & external communication and dissemination of safety information are progressively implemented through Phase 1 to 4.*

SMS element 1.5: SMS Documentation (Phase I to IV)

SMS element 4.1, 4.2: SMS Training, education & communication (Phase I & thereafter)

Phase 3

SSP Components and Elements

1. **State safety policy and objectives**
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SMS Components and Elements

1. **Safety policy and objectives**
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4. **Safety promotion**
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   - 4.2 – Safety communication

Phase 3

1. SSP element 1.4(ii):

- **Enforcement Policy/ Legislation to include:**
- **Provision for service providers operating under an SMS, to deal with and resolve safety and quality deviations internally**
- **Conditions and circumstances under which the State may intervene with safety deviations**
- **Provision to prevent use or disclosure of safety data for purposes other than safety improvement**
- **Provision to protect the sources of information obtained from voluntary/ confidential reporting systems.**

2. SSP element 2.1(ii):

- **Harmonized regulations requiring SMS implementation**

3. SSP element 3.2(i):

- **Safety data collection & exchange systems**
- **Establish high consequence State safety performance indicators and target/ alert levels**

***SSP element 4.1, 4.2**: Internal SSP & SMS training. Promotion of external SMS training. Internal & external communication and dissemination of safety information are progressively implemented through Phase 1 to 4.*

1. SMS element 2.1(i):

a. Establish voluntary hazards reporting procedure

2. SMS element 2.2:

a. Establish safety risk management procedure

3. SMS element 3.1(i):

a. Establish occurrence reporting & investigation procedure

b. Establish safety data collection & processing system for high consequence outcomes

c. Develop high consequence SPIs & associated targets & alert settings

4. SMS element 3.2:

a. Establish Management of Change procedure that includes safety risk assessment

5. SMS element 3.3(i):

a. Establish internal quality audit programme

b. Establish external quality audit programme

SMS element 1.5: SMS Documentation (Phase I to IV)
SMS element 4.1, 4.2: SMS Training, education & communication (Phase I & thereafter)

Conclusion

- The monitoring of safety performance and its enhancement is achieved through identification of relevant safety indicators as well as the adoption and attainment of aviation safety targets
- The selection of appropriate safety indicators is an essential foundation for the development and implementation of ALoSP
- Need to agree on safety indicators, targets & action plans related to SSP/SMS implementation, to feed into the MID Region Safety Strategy.
- SST/RASG-MID to monitor the process

Thank you

Thank you for your attention

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MID Safety Summit

Khalil Radhi

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Performance Management

"You can't manage what you can't measure."

Safety Performance Measurement

'Performance' Dictionary Definition

[How well or badly a person, company, etc. does a particular job or activity. How well a car, system or other machine works.]

ICAO SMM 9859 Definition

[The quantification of the outcomes of selected low-level, low consequence processes.] i.e. FOD events/x operations.

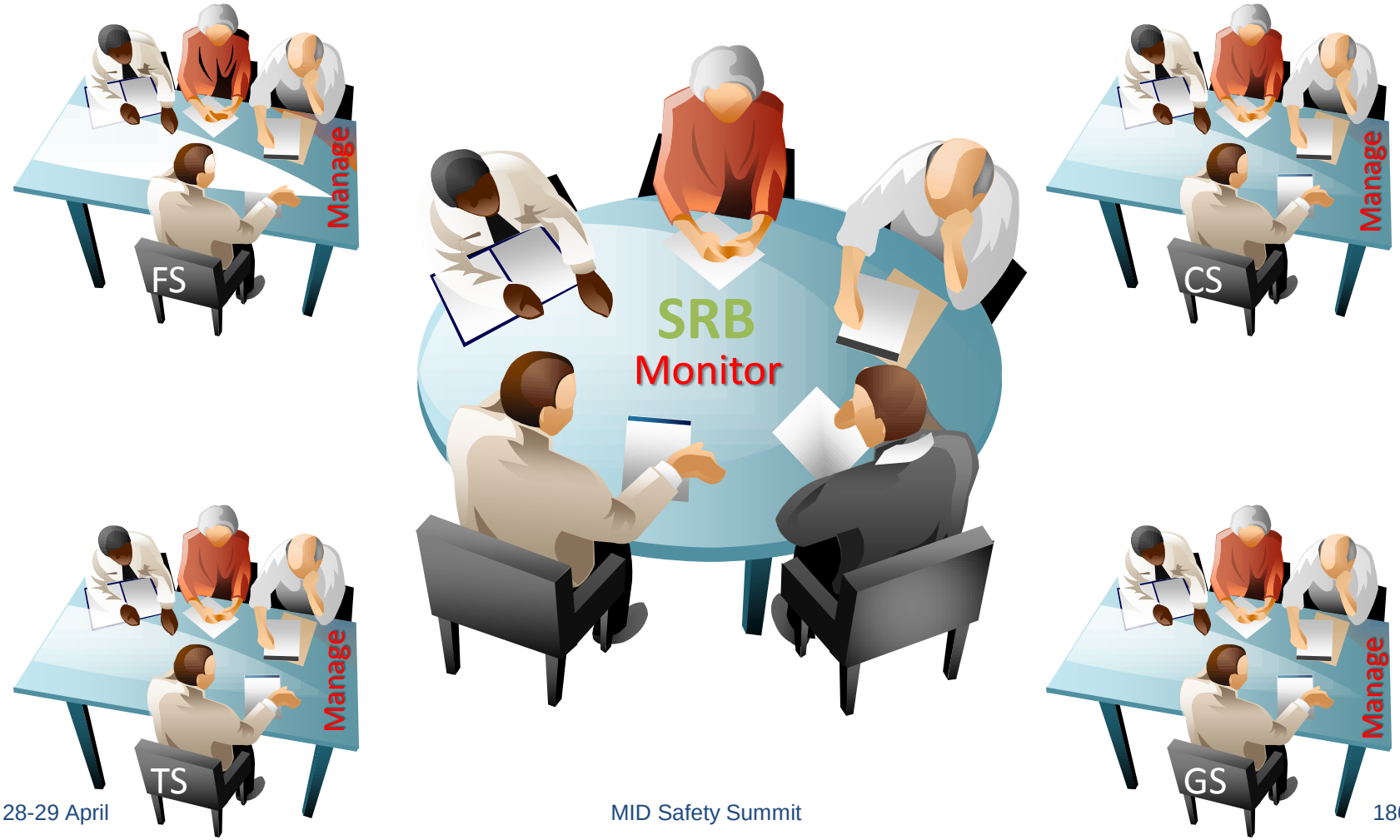
Performance Management & Safety

- The SMS outcome is Safety Assurance (generate confidence)
- Safety Assurance relies on performance, as accidents are rare events
- To manage performance we need to measure it (safety metrics)

Who's Responsibility

- Shareholders are responsible for setting the strategic objectives
- AM is responsible for establishing the Safety Objectives
- SM is responsible for setting the process for Performance Management, provide training and guidance to the stakeholders
- The Functional Managers are responsible for setting their SPIs and SPTs in line with the Safety Objectives
- SRB is responsible for Accepting and Monitoring the SPIs and SPTs
- State is responsible for establishing ALoS, accepting, and monitoring the operator's SPIs and SPTs.

Performance Management



Safety Action Groups

SAGs Role Includes…

- Establishing Safety Performance Indicators (SPIs)
- Setting Safety Performance Targets
- Devising Action Plans to achieve/maintain SPTs
- Continuous Monitoring and Maintenance of SPTs

SRB Role Includes…

- Setting the Safety Objectives
- Agree on SPIs and SPTs
- Link SPTs to Safety Objectives
- Prioritize resources allocation (through AM) to achieve the SPTs, and hence the safety objectives
- Continuous Monitoring of Safety Performance

Which Indicators?

- Quantifiable and permitting statistical inferential procedures
- Valid or representative to what is to be measured.
- Provide minimum variability when measuring the same conditions.
- Sensitive to change in environmental; or behavioural conditions.
- Cost of obtaining and using measures is consistent with the benefits.
- Comprehended by those in charge with the responsibility of using them.

Rockwell (1959)

Setting SPIs and SPTs

Safety Indicator	Number of crew injuries per number of aircraft movements
Baseline (current) performance	10 injuries per 1000 sectors
Safety Performance Targets	Reduce the injury rate by 10% by December 2013, OR Reduce number of injuries to 5 per 1000 aircraft movements by December 2014 **(ALARP)**
Required Interventions	1. Share lessons learned with crew members through safety literature. 2. Conduct Cabin Injury prevention workshops to highlight the main areas of concern and prevention strategies. 3. Include injury prevention tips and techniques in cabin crew briefing. 4. Monitor and review task/time allocation to ensure cabin crew are not forced to rush to accomplish their duties. (prevent normalization of deviance)

The Phased Approach

Phase 1

- Safety Policy and Objectives established

Phase 2

- Define sources of information for safety performance monitoring

Phase 3

- Safety Performance Indicators and Safety Performance Targets established
- Agree with BCAA on SPIs and SPTs

Phase 4

- First cycle of safety performance monitoring and measurement completed
- Initial plan to rectify situations involving below standard performance approved

Summary

- You can’t manage what you can’t measure.
- The performance of safety management systems are monitored by means of safety performance indicators
- SPIs need to be measurable. SPTs need to be **SMART**
  - **S**pecific
  - **M**easurable
  - **A**chievable
  - **R**elevant
  - **T**ime-bound

Challenges

- The development and measurement of proper safety performance indicators is not straightforward
- Accepting ownership requires cultural change
- Achieving good performance monitoring requires training and continuous calibration
- All of the above requires more interaction with the regulator.

Kingdom of Saudi Arabia State Safety Program

Haithem Gauwas
Manager, Aviation Safety
General Authority of Civil Aviation
Kingdom of Saudi Arabia

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Overview

- Saudi Arabia State Safety Program Policy Purpose
- SSP 2013 Achievements (Phase I)
- SSP 2014 Implementation Plan Phase II
- SSP Obstacles
- SSP Suggested Management
- SSP Suggested Management Process
- Recommendations
- Summary

Saudi Arabia SSP Policy

- Employing ICAO standards and recommended practices, as minimum international standards and recommended practices, General Authority of Civil Aviation (GACA) will ensure the highest level of safety in the Kingdom of Saudi Arabia aviation system. Mindful of Kingdom of Saudi Arabia's State Safety Program (SSP), GACA will maintain an integrated set of regulations and activities aimed at enhancing aviation safety.
- GACA will implement proactive and as far as possible predictive strategies encouraging all stakeholders/service providers to understand the benefits of a safety culture, which should be based on an inclusive reporting culture. GACA will foster and assist stakeholders in developing comprehensive Safety Management Systems (SMS) and will develop preventive safety strategies for the aviation system in an environment of a "just culture".

SSP 2013 Achievements Phase I

- Head start since 2010
- Established an SSP regulation
- Established an SMS pamphlet
- Established an SSP eBook (review & inspection checklists)
- Maintained more than three years of Saudi Airspace Aviation Occurrences database (OATS system)
- Inquired each service provider to have an accepted SMS manual by the end of 2013
- Started the review and acceptance of SMS manuals
- Ensured each service provider has Safety & Quality Assurance Department to carryout SMS functions and duties.
- Started working on establishing SSP internal procedures and responsibilities

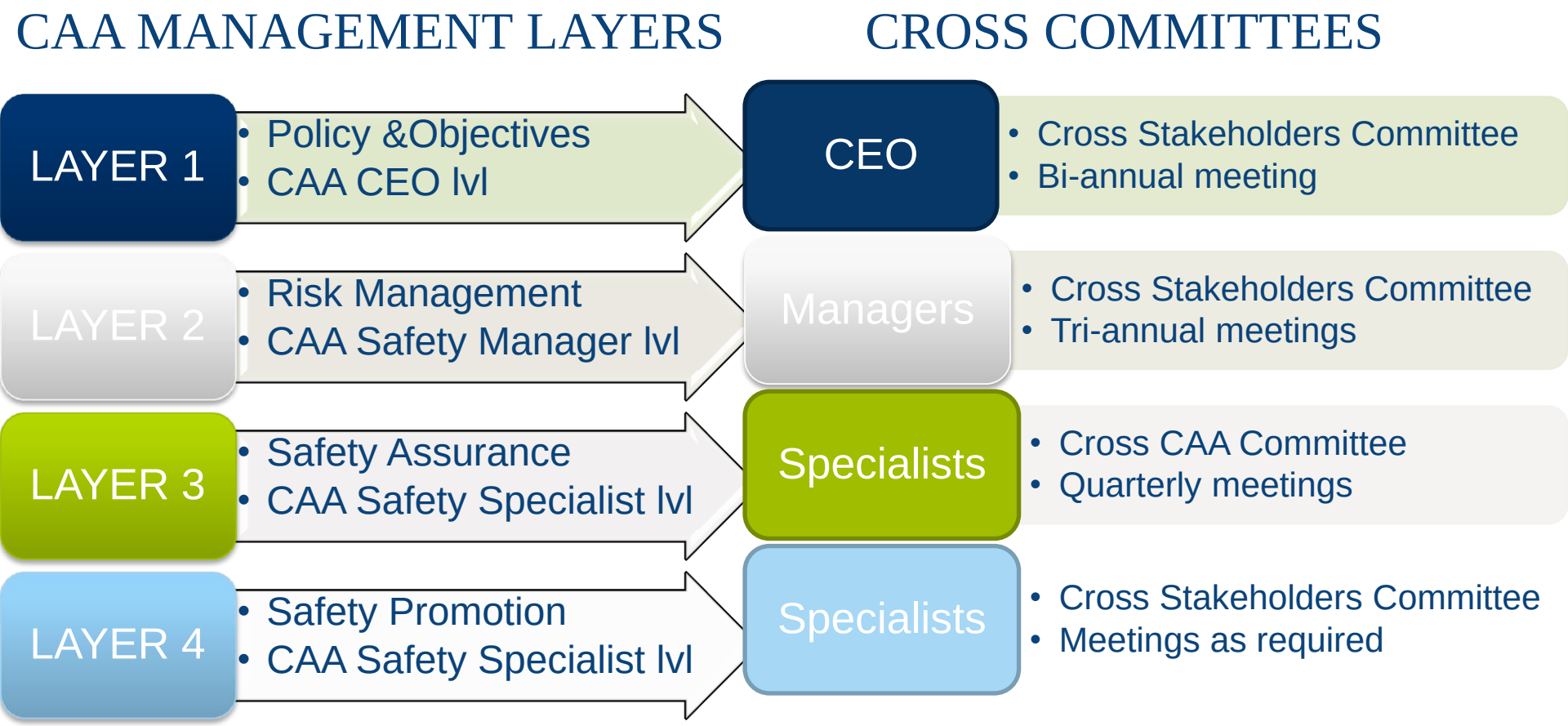
SSP 2014 Implementation Plan Phase II

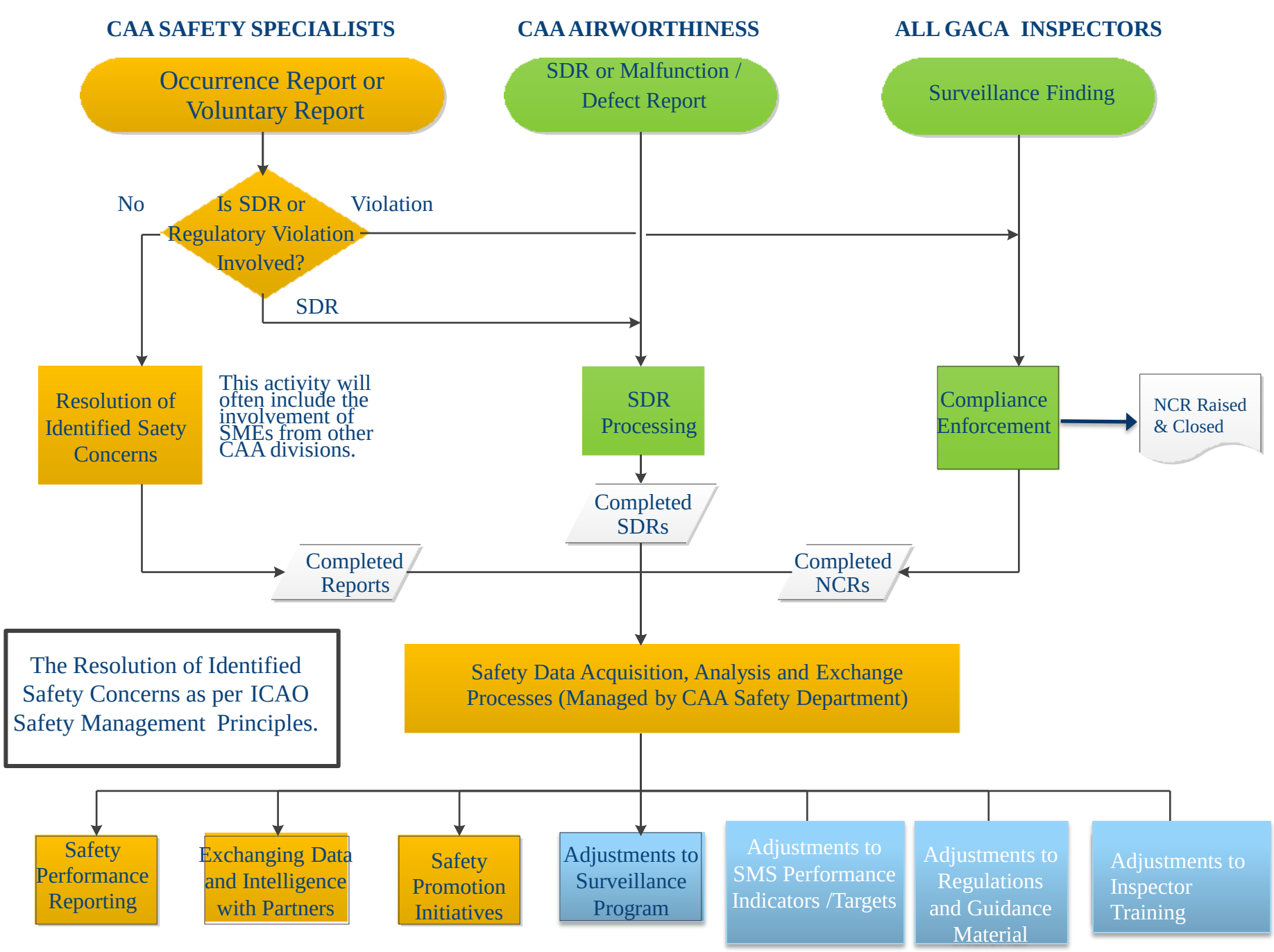
- GACA new electronic database and reporting system
- SMS compliance oversight
- Assuring each service provider training compliance
- Ensuring each service provider database availability and reporting system efficiency
- Signing MOUs with interested parties
- Planning Acceptable Level of Safety (ALOS)

SSP Obstacles

- Civil Aviation Authorities lack of SSP experts (worldwide)
- SSP as a new program (worldwide)
- Service Providers shortage of SMS experts in the region (MID)
- Setting up SSP Internal policy, procedures, and responsibilities
- Safety Culture as a new concept to the MID-Region
- Service Providers lack of database
- The sharing of safety information (Service Providers vs. CAAs)
- Safety cost vs. visible outcomes
- Acceptable Level of Safety (ALOS) trial & error

SSP Suggested Management




CAA SAFETY SPECIALISTS
CAA AIRWORTHINESS
ALL GACA INSPECTORS
Occurrence Report or Voluntary Report
SDR or Malfunction / Defect Report
Surveillance Finding
No
Is SDR or Regulatory Violation Involved?
Violation
SDR
Resolution of Identified Saety Concerns
This activity will often include the involvement of SMEs from other CAA divisions.
SDR Processing
Compliance Enforcement
NCR Raised & Closed
Completed SDRs
Completed Reports
Completed NCRs
The Resolution of Identified Safety Concerns as per ICAO Safety Management Principles.
Safety Data Acquisition, Analysis and Exchange Processes (Managed by CAA Safety Department)
Safety Performance Reporting
Exchanging Data and Intelligence with Partners
Safety Promotion Initiatives
Adjustments to Surveillance Program
Adjustments to SMS Performance Indicators /Targets
Adjustments to Regulations and Guidance Material
Adjustments to Inspector Training

Recommendations

- In order to implement all four phases of SSP by the end of 2018, ICAO is urged to provide not less than 5 days comprehensive workshop covering the new material presented in Annex 19.
- Starting with the first phase through the second phase of implementation, Civil Aviation Authorities should consider the unification of their database, reporting system, and occurrences classifications to assure future easiness in data sharing and regional analysis.
- MID Civil Aviation Authorities are urged to start working on phase by phase implementation approach for SSP compliance, which should ensure better communication internally with their own service providers and externally with surrounding countries authorities.

Summary

- Kingdom of Saudi Arabia GACA SSP
- GACA SSP 2013 Accomplishments
- GACA SSP 2014 Plan
- GACA SSP Obstacles
- Recommendations

MID Safety Summit

Bahrain

28-29 April 2013

SERCO Overview
Kingdom of Bahrain

David Jones
Serco Safety Manager
Bahrain Air Traffic Control Centre

الطيران المدني
CIVIL AVIATION

مملكة البحرين
Kingdom of Bahrain
وزارة المواصلات
MINISTRY OF TRANSPORTATION

ATC/ANSP IMPLEMENTATION

MANAGEMENT SUPPORT

STRUCTURE / CLARITY

COMMUNICATION

ATC/ANSP IMPLEMENTATION

- Senior Level Management Support
  - Resources
  - Accountability
  - Regular Involvement

ATC/ANSP IMPLEMENTATION

- Structure / Clarity
  - Accountable Representatives
  - Procedures
  - Post Implementation Operations

ATC/ANSP IMPLEMENTATION

- Communication
  - Transparency
  - Feedback / Reporting
  - Inclusion
  - WIFM

Open Discussions

Loss of Control In-flight (LOC-I)

MID Safety Summit

Bahrain

28-29 April 2013

الطيران المدني
CIVIL AVIATION

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Kingdom of Bahrain

وزارة المواصلات
MINISTRY OF TRANSPORTATION

Loss of Control risk mitigation

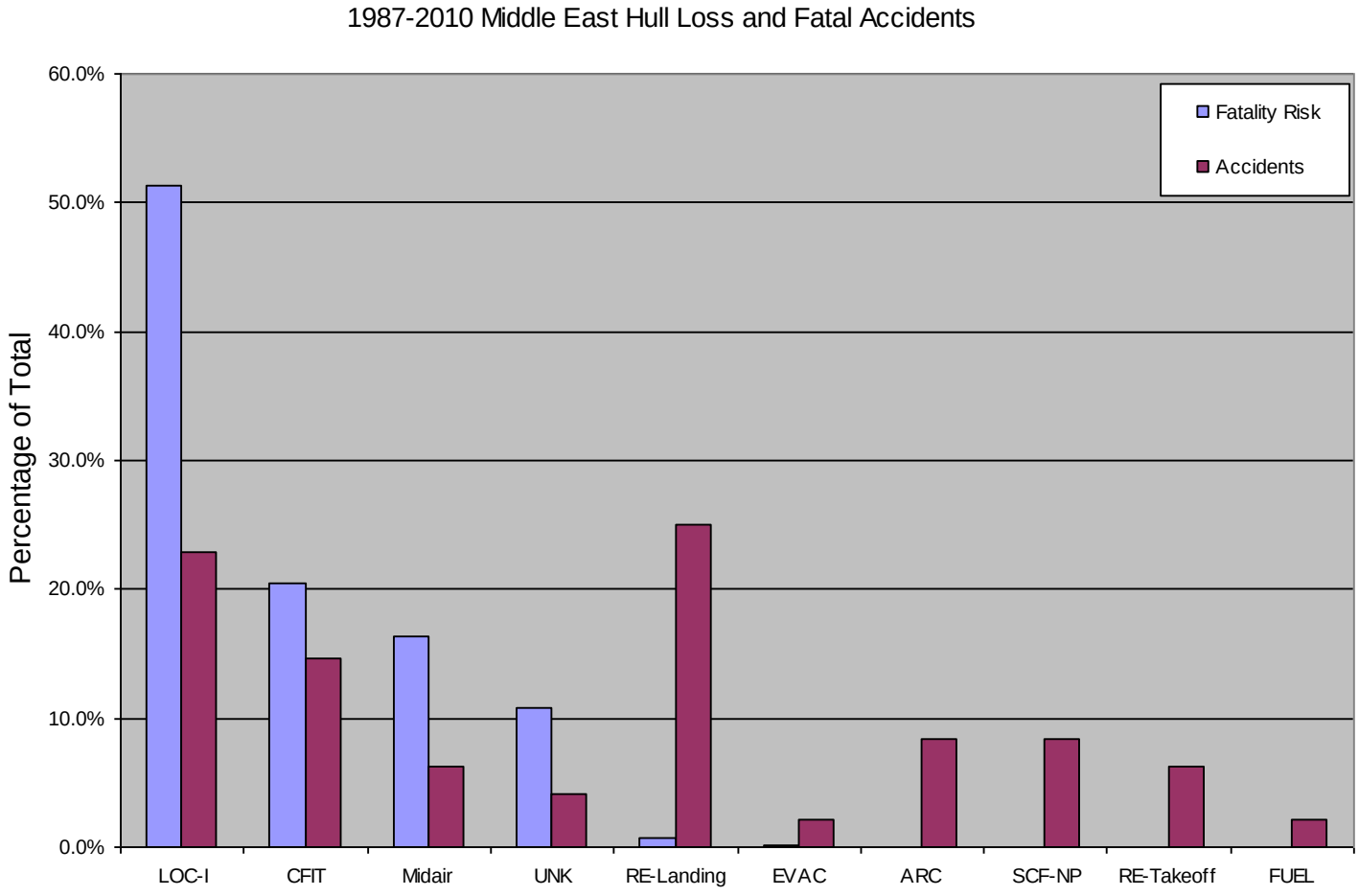
Chamsou Andjorin
Director, Africa and ME,
Aviation Safety

RASG-MID Safety Summit
28-30 April 2013, Bahrain

LOSS OF CONTROL

Major cause of aircraft fatalities

Aviation System Safety

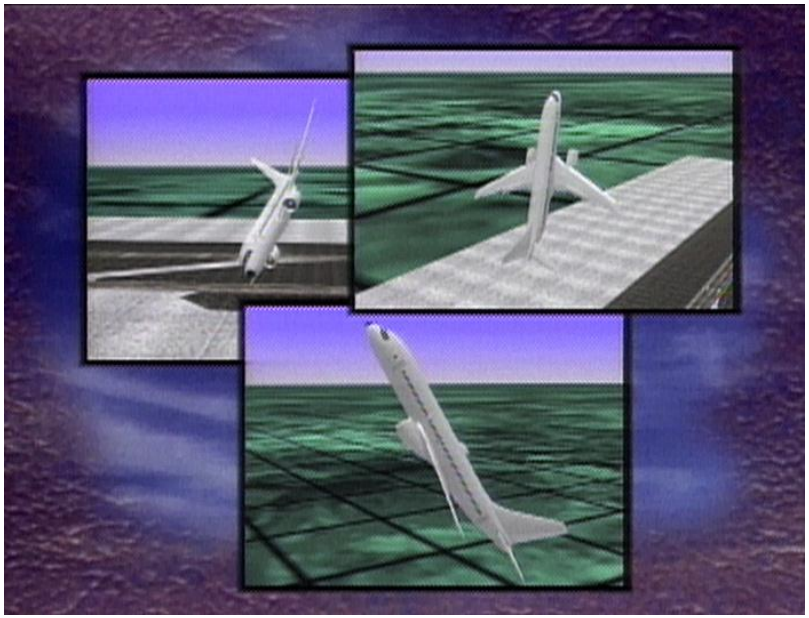


*Western built airplanes, Part 121 equivalent operations: 48 accidents

LOC | Description

Aviation
System Safety

1. **Loss of control usually occurs because the aircraft enters a flight regime which is outside its normal envelope, usually, but not always at a high rate, thereby introducing an element of surprise for the flight crew involved.**
2. **May be transitional or terminal**
3. **May Involve loss of situational awareness, aircraft systems anomalies, environmental factors, flight crew competency**



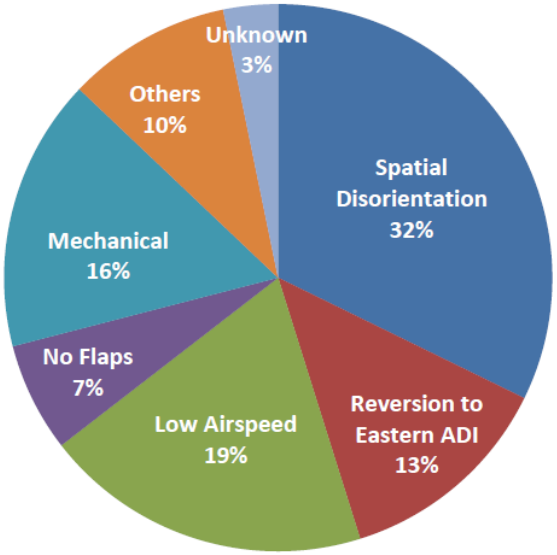
LOC | Events classification

The causes of in flight Loss of Control, whether transitory or terminal, are many and include:

- **loss of Situational Awareness (especially through Distraction but also through Complacency),**
- **Low level wind shear or higher level Clear Air Turbulence,**
- **Structural or multiple power plant damage caused by, for example, by a Bird Strike, exposure to severe Turbulence, or collision with another aircraft.**
- **Intended or unintended mishandling of the aircraft,**
- **Attempted flight with total load or load distribution outside of safe limits**
- **Unintentional mis-management of Aircraft Pressurisation Systems,**
- **An attempt to take off without ensuring that critical parts of the the airframe are (or will be at rotation) free of both frozen deposits and previously applied ground de/anti-icing fluids**
- **The effects of high levels of airframe ice accumulation or a significant loss of power on all engines attributable to engine icing,**
- **Attempting to maneuver an aircraft outside its capabilities to resolve a prior problem (including mis-navigation).**
- **In-Flight Fire**
- **Fuel exhaustion or starvation**
- **False instrument readings displayed to the flight crew**
- **Wake turbulence, especially if recommended spacing is not maintained**
- **Malicious interference**

LOC | Contributing factors

- Spatial disorientation
- Lack of awareness or competency in procedures for recovery from unusual aircraft attitudes
- Adverse weather
- Inadequate SOPs for effective flight management
- Insufficient height above terrain for recovery
- Inappropriate flight control inputs in response to a sudden awareness of an abnormal bank angle
- Mechanical or structural failure
- Aircraft loading



LOC | Mitigation strategy

Aviation System Safety

- **Perspectives from Airlines Pilots** **(Capt R.Dharamraj, IATA, QR)**
- **Perspectives from ICAO** **(M. Mashhor Ablowi, ICAO-MID)**
- **Perspectives from Manufacturer** **(M. Xavier Barriola , Airbus)**
- **Perspectives from CAST** **(Capt Brit Etzold, Boeing, CAST)**
- **Interactive discussions** **(ALL)**

Thank you

Qatar Airways

Capt. R Dharamraj

Senior Manager Safety, Quality & Standards

Loss Of Control - Inflight.
Bahrain Meeting.

28-30 April 2013

LOC-I Prevention Strategy

- Crew Training
- Crew Awareness
- Crew Reporting
- Flight Data Monitoring
- LOSA
- FRMS

QATAR AIRWAYS القطرية

Crew Training

5.7.6 Windshear / Thunderstorms

Windshear/Thunderstorms avoidance and recovery training shall be conducted during conversion training, in the Line Orientation phase, and also at regular intervals during recurrent training (refer to *Chapter 6.1.14*).

The training shall consist of both ground training (e.g. CBT, video or instructor briefings) and simulator training.

5.7.7 CFIT/GPWS Training

CFIT/GPWS training shall be conducted during conversion training, in the Line Orientation

Aircraft upset recovery training shall includes at least the following :

- factors leading to an upset situation;
- upset situation identification;
- recovery techniques; and
- emphasis on aerodynamic factors present during the upset and recovery.

The training shall consist of both ground training (CBT, video, instructor briefings), and simulator training. The contents of the training shall be based upon the recommendations of the Flight Safety Department.

5.7.8 Steep Approach Training (Appendix 1 to JAR–OPS 1.515 (a)(3))

Steep approach is an approach which is performed using glideslope angles of 4.5° or more and with screen heights of less than 50 feet but not less than 35 feet.

The aerodrome (e.g. Kathmandu, Sana'a etc...) have difficult conditions such as steep approach, unusual weather conditions, performance limitations … etc, which affects the complexity and workload of the flight. Therefore, the flight crew member will require additional knowledge and/or training, prior to operating into such aerodromes.

The training may be in the form of simulator or a visit flight into that aerodrome. This training shall be conducted by the use of self-study training material i.e. aerodrome briefing provided in the Operations Manual, Part C : Route and Aerodrome Instructions and Information or CBT … etc.

The detailed syllabus and lesson plan for the simulator training is given in the relevant aircraft type training manual.

For validity and revalidation requirement, refer to *Chapter 3.4.11*.

14.4 Approved Courses for E-learning

Training Element	Initial	Recurrent	Exam
AWOPS	✗	✓	N/A
AVSEC (1)	✗	✓	✗
Dangerous Goods (1)	✗	✓	✓
Deicing/Winter Ops	✓	✓	✓
FAA DOT 42 (2)	✓	N/A	N/A
FANS/CPDLC	✗	✓	N/A
Freighter OPS	✗	✗	N/A
FRMS	✗	✓	N/A
ETOPS	✗	✓	✓
MNPS	✗	✓	N/A
NAT Video (5)	✓	✓	N/A
ILS PRM OISA	✓	✓	✓
Jeppesen EFB App	✓	✓	N/A
OEM CBT (4)	✓	✓	✓
Polar Ops (3)	✗	✓	✓
RNAV	✗	✓	N/A
RNP-AR	✓	✓	✓
RVSM	✓	✓	✓
SEP (1)	✗	✓	✓
SMS	✓	✓	N/A
TCAS	✓	✓	✓
Upset Recovery (5)	✓	✓	N/A
Walk Around Trng (5)	N/A	✓	N/A

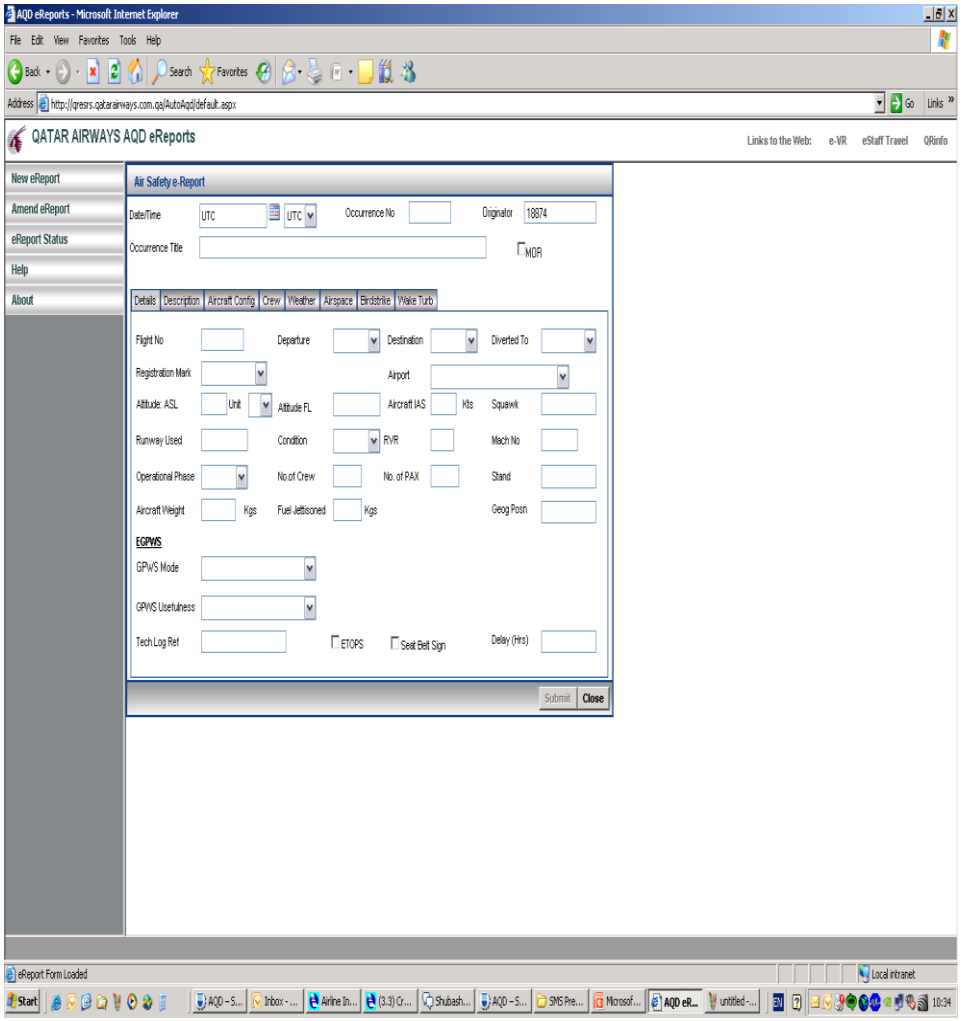
Notes: *1) Special program. See course description.*
2) External LMS MEDAIRE.
3) Delivery on LMS, under supervision of instructor.
4) Covers A320/A330/A330F/A340/B777/B777F/B787.
5) Video content only.

Crew Awareness

Through Upset Recovery study material

QATAR AIRWAYS القطرية

Crew Reporting



QATAR AIRWAYS القطرية

AIR SAFETY REPORT

ASR REFERENCE

QCAA REFERENCE

1. TYPE OR EVENT — ASR ☐ AIRMISS/ATC ☐ BIRDSTRIKE ☐ WAKE TURBULENCE ☐ TCAS RA ☐ — TICK ALL THAT APPLY

2. CAPTAIN	STAFF NO.	CO PILOT	STAFF NO.	OTHER CREW	STAFF NO.
	_ _ _ _ _		_ _ _ _ _		_ _ _ _ _

3. DATE OF OCCURRENCE	4. TIME LOCAL/UTC	5. FLIGHT NR	6. ROUTE	7. SQUAWK
D M Y / /	DAY/NIGHT		From To Diverted	
8. A/C TYPE	**9. REGISTRATION**	**10. PASSENGER/CREW**	**11. FUEL JETTISONED**	**12. ETOPS**
			KG	YES / NO
13. ALTITUDE	**14. SPEED / MACH NR**	**15. A/C WEIGHT**	**16. TECH LOG REF**	
FL / FT		KG	Tech Log Page Nr / Item Nr	

17. FLIGHT PHASE

TOWING ✈ PARKING ✈ PUSH-BACK ✈ TAXI OUT ✈ TAKE OFF ✈ INITIAL CLIMB (BELOW 1500 FT)

CLIMB ✈ CRUISE ✈ DESCENT ✈ HOLDING ✈ APPROACH (BELOW 1500 FT) ✈ LANDING ✈ TAXI-IN

18. AIRPORT + STAND

19. GEOG POSITION

20. MET	21. WX ACTUAL	22. SIGNIFICANT WX
IMC / VMC	WIND VIS/RVR CLOUD TEMP QNH / km / °C ____	MODERATE / SEVERE RAIN / SNOW / ICING / FOG / TURBULENCE HAIL / STANDING WATER / WINDSHEAR
23. RUNWAY	**24. RUNWAY STATE**	**25. CONFIGURATION**
	DRY / WET / ICE / SNOW / SLUSH	A.PILOT / A.THRUST / GEAR / FLAP / SLAT / SPOILERS ___ ___ ___ ___ ___ ___

26. SUMMARY (CONCISE DESCRIPTION OF THE EVENT)

27. EVENT AND CAUSE (DETAILED DESCRIPTION OF THE EVENT AND ITS IMMEDIATE CAUSE)

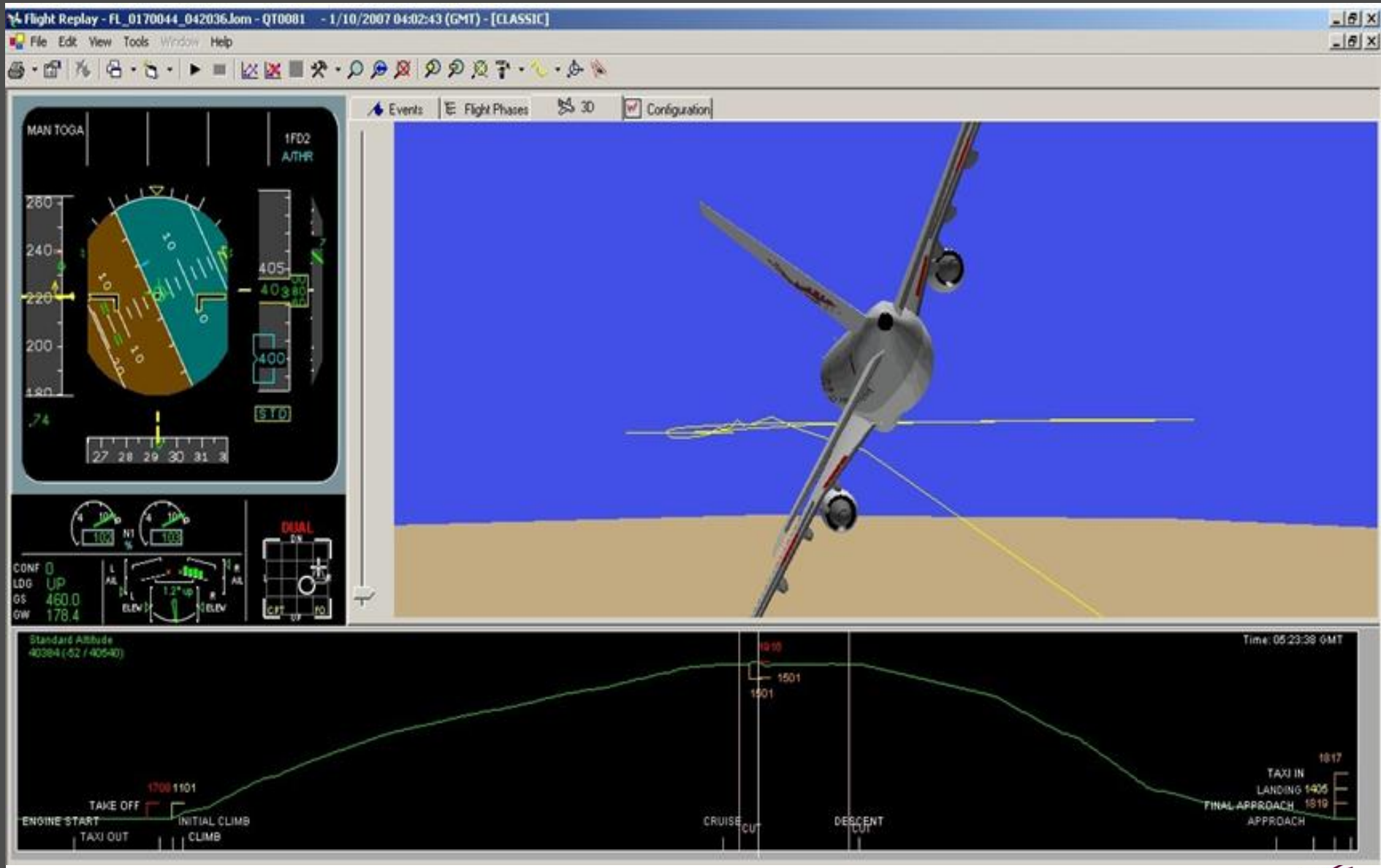
28. ACTIONS AND RESULTS (ACTIONS TAKEN, THEIR RESULT AND ANY SUBSEQUENT EVENTS)

29. OTHER INFORMATION AND SUGGESTIONS FOR PREVENTIVE ACTION

PTO

QATAR AIRWAYS القطرية

Flight Data Monitoring



QATAR AIRWAYS القطرية

LOSA

- Conducted its 1st LOSA programme
- Identify threat and errors during line operations
- Distraction management

QATAR AIRWAYS القطرية

FRMS

- Ultra-Long Haul fatigue research
- Crew Fatigue Training
- Crew Fatigue reporting system
- Boeing Alertness Module

FRMS

Accident Analysis and Prevention 45S (2012) 27–31

Contents lists available at SciVerse ScienceDirect

Accident Analysis and Prevention

journal homepage: www.elsevier.com/locate/aap

Sleep and sleepiness during an ultra long-range flight operation between the Middle East and United States

Alexandra Holmes[a,*], Soha Al-Bayat[b], Cassie Hilditch[a], Samira Bourgeois-Bougrine[a,c]

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[b] Qatar Airways Medical Centre, P.O. Box 22550, Doha, Qatar
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MID Safety Summit

Bahrain
28-29 April 2013

ICAO's activities regarding LOC-I:
A Harmonized Approach to Upset Prevention and Recovery Training

الطيران المدني
CIVIL AVIATION

مملكة البحرين
Kingdom of Bahrain
وزارة المواصلات
MINISTRY OF TRANSPORTATION

How does ICAO implement changes?

- Voluntary work force develops proposals for ICAO provisions and recommends changes:
  - RAeS's ICATEE is working since 2009. Delivered a draft manual in December 2012
  - LOCART (ICAO, FAA, EASA, Regulators,…) – Loss of Control Avoidance and Recovery Training
  - Use the existing Airplane Upset Recovery Training Aid (AURTA)
- ICAO:
  - Secretariat participates in ICATEE work
  - ICAO will review/integrate material from various sources
  - Secretariat will run the Annex and PANS-TRG proposals through the ICAO adoption/approval process (Nov 2014)
  - Guidance material will be published under the authority of the Secretary General (end 2013, Q1 2014)

What is ICAO doing for addressing LOC-I?

- This has been assigned a #1 priority for safety
- Deliverables proposed for:
  - Annex 1: Recommended Practice for CPL + UPRT requirements for MPL and type-rating.

2.4 Commercial pilot licence

…

2.4.3.2 *Flight instruction [for the issue of an aeroplane category rating]…*

2.4.3.2.2 ***Recommendation***.— *The applicant should have received in actual flight upset prevention and recovery training*.

2.5 Multi-crew pilot licence appropriate to the aeroplane category

…

2.5.3 Experience…

2.5.3.2 Flight experience in actual flight shall include at least …, upset **prevention and** recovery training, ...

+ Notes referring to guidance in PANS-TRG and the new manual on UPR

What is ICAO doing for addressing LOC-I?

- Annex 1: Recommended Practice for CPL + UPRT requirements for MPL and type-rating.

2.1.5.2 *Type rating as required by 2.1.3.2 a)*

The applicant shall have: …

d) for the issue of an aeroplane category type rating, received upset prevention and recovery training.

+ Notes referring to PANS-TRG, the new manual on UPR and Doc 9625.

What is ICAO doing for addressing LOC-I?

- Annex 6, Part I: UPRT requirement for the training of commercial air transport operators

9.3 Flight crew member training programmes

…

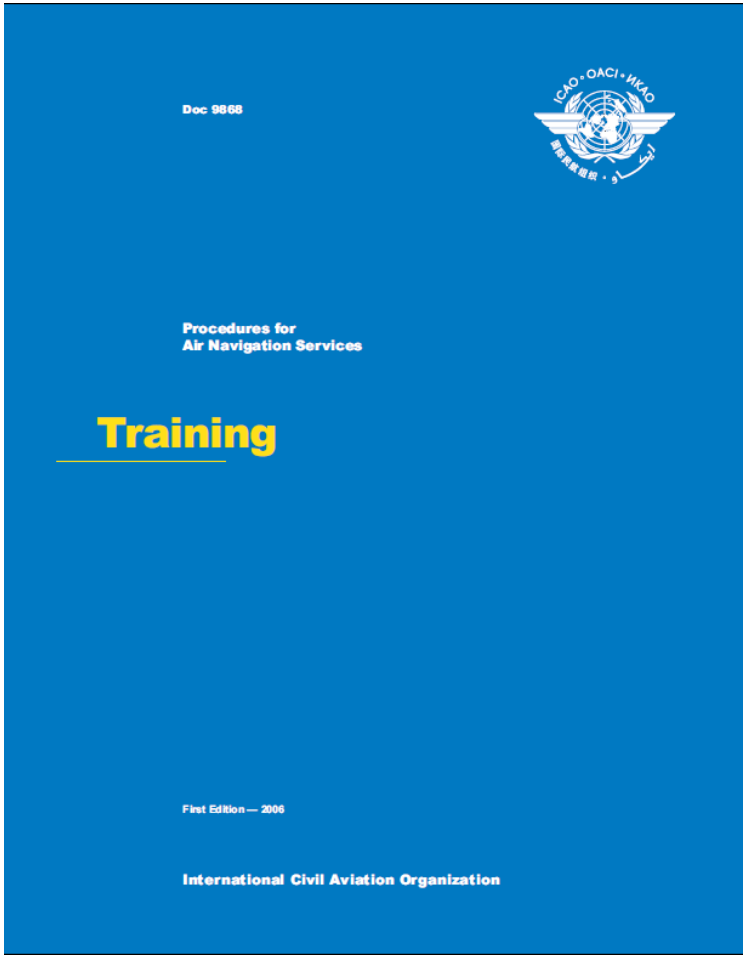
9.3.1 An operator shall establish and maintain a ground and flight training programme, approved by the State of the Operator, which ensures that all flight crew members are adequately trained to perform their assigned duties. The training programme shall: …

d) include upset prevention and recovery training;…+ notes for guidance

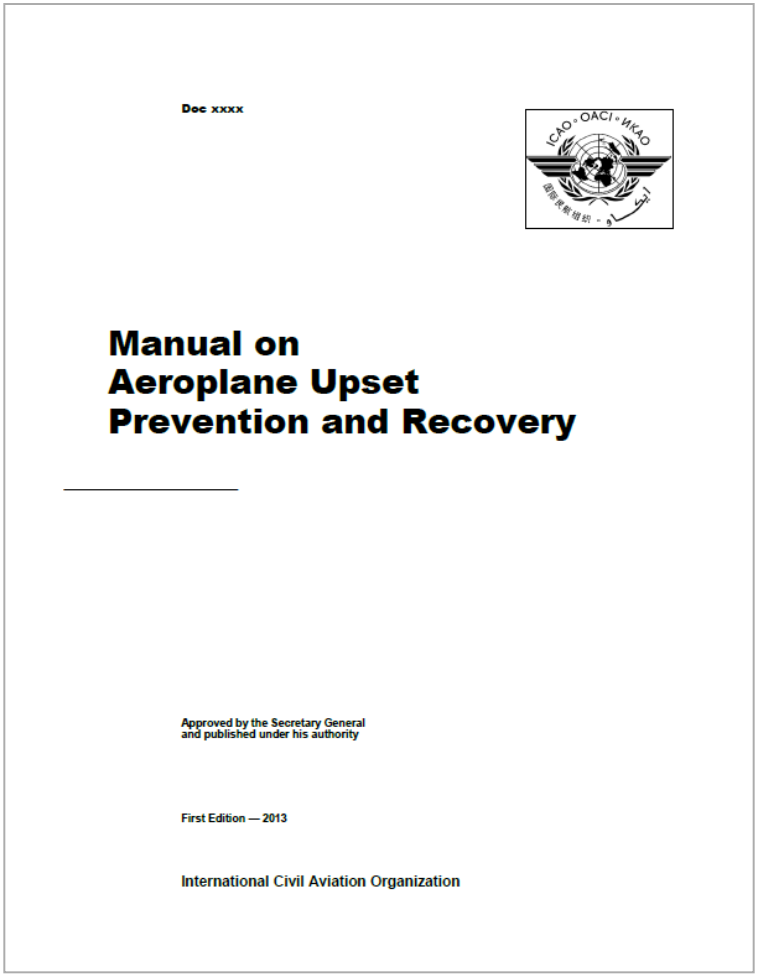
What is ICAO doing for addressing LOC-I?

Chapter 7. UPSET PREVENTION AND RECOVERY TRAINING (UPRT)

- 7.1 Applicability
- 7.2 Background
- 7.3 UPRT philosophy: CBT, no checking
- 7.4 Regulatory requirements
- 7.5 Training: single-pilot training on-aeroplane; multi-crew training in an FSTD; and type-specific training in an FSTD. FSTD and instructor qualifications
- 7.6 Regulatory oversight



What is ICAO doing for addressing LOC-I?



Doc xxxx

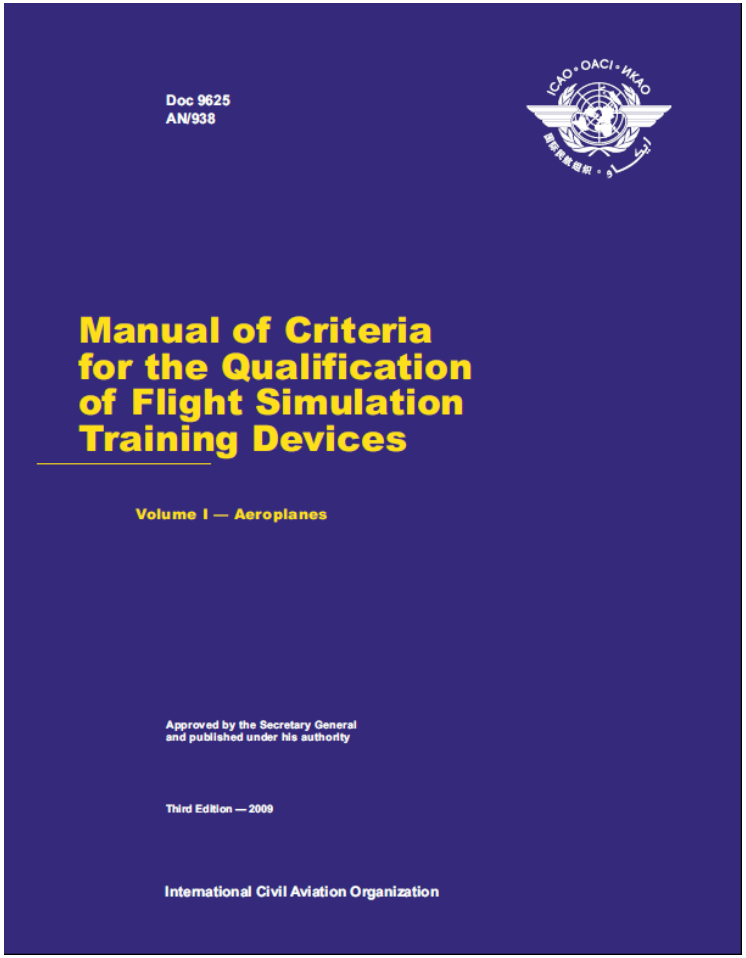
Manual on Aeroplane Upset Prevention and Recovery

Approved by the Secretary General and published under his authority

First Edition — 2013

International Civil Aviation Organization

What is ICAO doing for addressing LOC-I?



What is ICAO doing for addressing LOC-I?

- Annex 1: Recommended Practice for CPL + UPRT requirements for MPL and type-rating.
- Annex 6, Part I: UPRT requirement for the training of commercial air transport operators
- UPRT provisions in a new chapter of PANS-TRG.
- Manual on Aeroplane Upset Prevention and Recovery (end 2013). New
- Guidance on FSTD modelling for upset recovery training, (Amendment to Doc 9625, Volume I – Q1 2014).

PREVENTION IS THE KEY FACTOR BEING EMPHASIZED

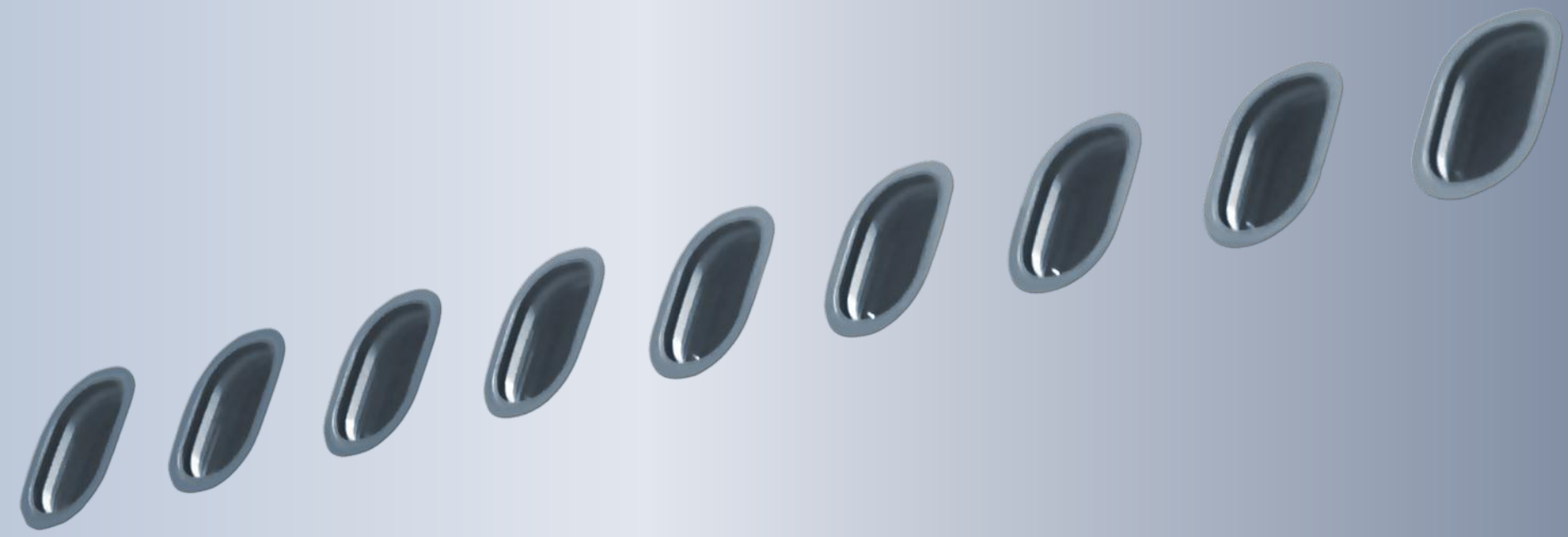
What is ICAO doing for addressing LOC-I?

ICAO will host a Loss of Control In-flight Symposium on 20–22 May, 2014

- *Will provide a variety of tools to pilots, operators, regulators and training organizations in a cohesive package.*

- *Will showcase work being undertaken throughout the industry that addresses individual and crew strategies, operational countermeasures, as well as training and educational approaches to prevent and recover from a loss of control in-flight.*

Thank You



Airbus Flight Safety

Update on stall procedure

Presented by
Xavier BARRIOLA
Director of Flight Safety

AIRBUS

Introduction

- Accidents following failure to recover from stall still occur.
- Wrong or inappropriate procedure often applied

Need for a procedure change

- Working together with other manufacturers, we decided to change the stall recovery procedure
- Discussions with FAA led to the creation of the FAA Stall Recovery Working Group
- Decision to create a generic template for stall recovery, valid for all types of aircraft, based on a key item:

APPLY NOSE DOWN PITCH CONTROL TO REDUCE AOA, AS A FIRST ACTION

Content

- Stall phenomenon
- AoA control
- Stall recovery
- New procedure
- Conclusion

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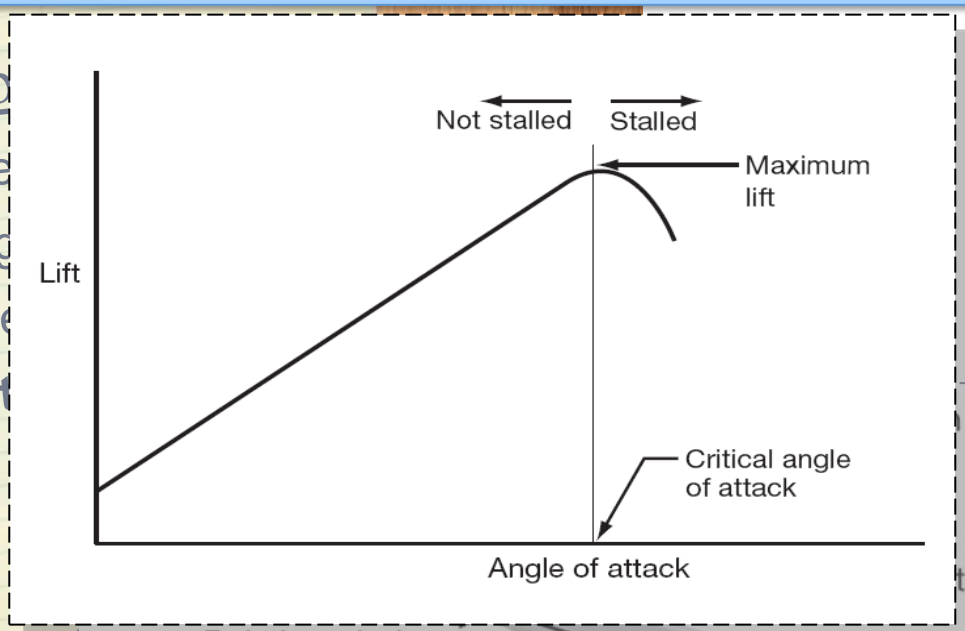
Aerodynamic Review

For a given configuration, a given speed and a given altitude,

Lift is only linked to AoA



For a given aircraft configuration and speed

An aircraft stalls for a given AoA

Page 237

Stall

- A loss of speed can result in an aircraft reaching the stall AoA
- BUT it remains an AoA issue

Stall is only an AoA problem

Low speed is a common contributing factor

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Content

- Stall phenomenon
- AoA control
- Stall recovery
- New procedure
- Conclusion

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AoA Control – Pitch control effect

The pitch control is a direct AoA command

- The elevators control DIRECTLY the AoA.
- A nose down command has an IMMEDIATE effect :

Nose down command ⇒ AoA decrease

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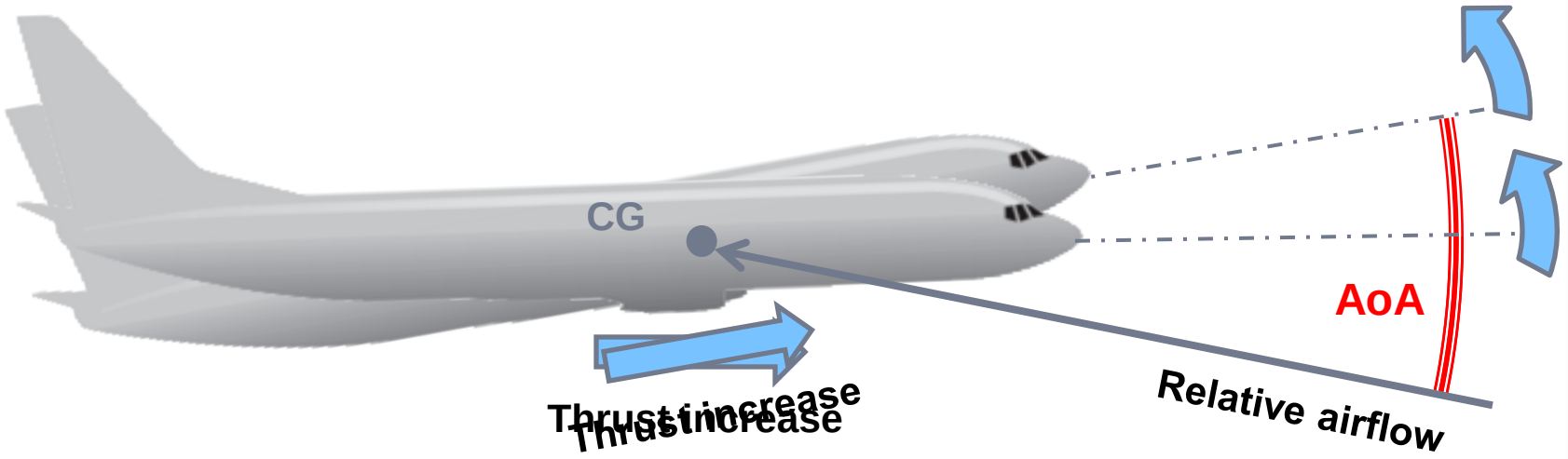
AoA Control – Thrust effect

- **Aircraft with engines below the aircraft Center of Gravity**

  ⇒Thrust has a significant pitch effect

Thrust increase ⇒ AoA increase



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Content

- Stall phenomenon
- AoA control
- Stall recovery
- New procedure
- Conclusion

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Stall Recovery

When Aircraft is stalled

- FIRST: **AoA MUST BE REDUCED**
  - Release back pressure on stick or column
  - Nose down pitch input may be needed

  Note : Increasing thrust has an adverse effect on AoA reduction for Aircraft with engines below aircraft CG

- SECOND: If speed needs to be recovered
  - When stall indications cease, increase thrust with care due to possible pitch up effect

AoA comes first, speed second

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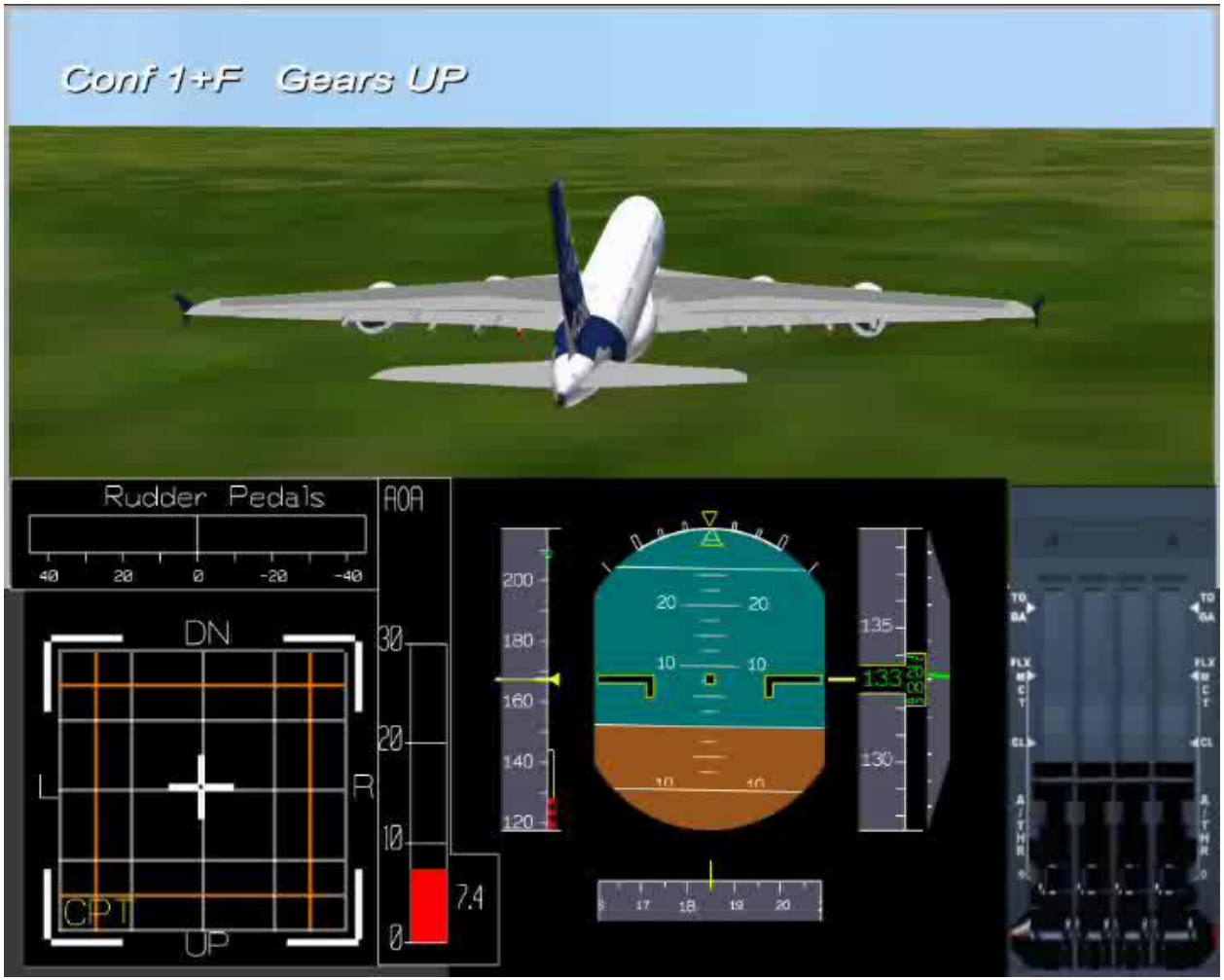
A380 Stall in flight test



Content

- Stall phenomenon
- AoA control
- Stall recovery
- New procedure
- Conclusion

Page 245

New Procedure

- The FAA Stall Recovery Working Group issued a generic ***"Stall Recovery"*** procedure
  - A generic procedure for ALL types of aircraft
  - One single procedure to cover ALL stall conditions
  - Prevent full thrust/TOGA from being first action
  - Focus on **AoA reduction**

Page 246

Conclusion

- Working together with other aircraft manufacturers, we have:
  - ✓ Agreed the principle with the FAA Stall Recovery Working Group
  - ✓ Issued a harmonized procedure focusing on AoA reduction as a first action
- Information to operators:
  - ✓ The procedure and the associated FCTM were published in 2010
  - ✓ Simulator scenario was published in 2011
  - ✓ Presented at the opportunity of various conferences (Safety, training, operation)

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Thank You !

BCA Engineering

Safety Enhancements Applied to Loss of Control

Capt. Brit Etzold
Deputy Chief Engineer
Aviation System Safety/Regulatory Affairs

MID Safety Summit
28-30 April, 2013

Safety Enhancement| Themes

CFIT, LOC and RE

- Accountability of workers, managers and regulators
- Standard Operating Procedures (SOP)
- Training and manuals (pilot, controller, mechanic, etc.)
- Ground and aircraft equipage, both existing and new technology
- Safety information (FDM, Reports, Observations)
  - Objective (what, where, when)
  - Subjective (why)
- Risk assessment and prioritization

Safety Enhancement| LOC-I

Loss Of Control - Inflight

- **All airline operators publish and enforce clear, concise, and accurate flight crew SOPs. These SOPs should include expected procedures during all phases of flight** (SE26)
  - Simulator training
  - Checklists
  - PF/PNF duties, transfer of control, automation operation, rushed and/or unstabilized approaches, rejected landings and missed approaches
  - In-flight pilot reports of icing
  - Airline instructors and check airmen should ensure these SOPs are trained and enforced in their aircrew proficiency and standardization programs.

Safety Enhancement| LOC-I

Loss Of Control - Inflight

- **Improving methods of risk assessment for operational issues** (SE 27)
  - Identify, develop and implement methods for operators, regulators and manufacturers to prioritize safety-related decisions (basic SMS)
- **Manufacturer safety information and operational procedures** (SE 28)
  - Operating manuals and training programs for pilots include essential safety information and operating procedures generated by airplane manufacturers

Safety Enhancement| LOC-I

Loss Of Control - Inflight

- **Use safety information from FDM and Reporting programs** (SE 29)
  - Continuously improve pilot performance and proficiency
  - Flight Data Monitoring, Mandatory and Voluntary Reporting, Line Audits
- **Adopt consensus policies and procedures relating to mode awareness and energy state management** (SE30)
  - Based upon air carrier industry consensus survey and subsequent report

Safety Enhancement| LOC-I

Loss Of Control - Inflight

- **Advanced Maneuvers Training (AMT) to prevent and recover from hazardous flight conditions outside of the normal flight envelope or from inappropriate energy state management conditions.** (SE 31)
  - Stall onset recognition/recovery
  - Upset recoveries
  - Causes: icing, energy awareness, escape maneuvers, etc.
- **Improved display and alerting systems in new airplane designs** (SE 32, 39, 40)
  - New airplane designs (jet and turboprop) should include angle-of-attack/low speed protection, thrust asymmetry compensation, and bank angle protection using hard or soft limits.

EASA Safety Information Bulletins - LOC-I

- **Manual Flight Training and Operations**
  - Manual flying during recurrent simulator training and also, when appropriate, during flight operations
- **Stall and Stick Pusher Training**
  - Emphasises reduction of the angle of attack as the most important response
- **Flight Deck Automation Policy - Mode Awareness and Energy State Management**
  - Based on CAST SE 30

Aircraft State Awareness Themes - 2013

- **ATC Enhancements**
  - stable approach practices, SOPs, phraseology
- **Maintenance-Related Processes & Procedures**
  - diagnostic tools, risk management, MEL
- **Non-standard Operations**
  - crew qualifications, test planning, risk management
- **SOP Effectiveness and Adherence**
  - re-emphasis, assurance, fatigue risk management
- **Flight Crew Proficiency - System Status**
  - training for non-normal conditions
- **Flight Crew Roles and Responsibilities**
  - emphasis on monitoring

Open Discussions

Questions?

LOC | Mitigation strategy

Aviation System Safety

- **Upset Prevention and Recovery Training or AMT**
  - Adopt ICAO UPRT Manual (2014)

- **Legislative and regulatory framework that supports data protection for individual reporters and data providers**

- **FDM , Voluntary Reporting and LOSA**
  - Strong data analysis capability at each so they understand their own events and develop information to share

  - The “why” and “how” of event types (contributing factors) is critical to full understanding

LOC | Mitigation strategy

Aviation System Safety

- **Emphasis on robust standard operating procedures (SOPs) and crew resource management (CRM) through training, monitoring and validation**
- **Encourage operators to develop Fatigue Risk Management Strategy (FRMS)**
- **Encourage aircraft manufacturers to pursue innovation in practical and cost effective technology to mitigate LOC risks**
- **ATC contribution to potential LOC events**
  - Go-Around

LOC | Reference docs

Aviation System Safety

- "Aerodynamic Principles of Large-Airplane Upsets" by The Boeing Company",
- ‘ Applying Take-off Thrust on unsuitable pavement surface may have hidden dangers ’ by Bertand de Courville, Air France
- ‘ Some thoughts on reducing the risk of aircraft loss of control’ by Don Bateman for the FSF EASS 2011.
- Bramble Jr . William J. ‘ Spatial disorientation accidents in large commercial airplanes: case studies and countermeasures’ oct 2008 FSF IASS

Enjoy the coffee break

Tricom Group

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CIVIL AVIATION

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MINISTRY OF TRANSPORTATION

MID Safety Summit

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Conclusions & Way Forward

Outcomes of Break-out Sessions

Main Outcomes of Break-out Session Runway Safety
Action to achieve Safety Targets

- **Runway Safety Actions**

1. **Establishment and support of local Runway Safety Teams.**
2. **Establishment of Regional RST GO-Team.**
3. **Effective reporting system to exchange and analyze safety information.**
4. **Runway Safety Seminar/Workshop.**
5. **Adopt specific regulations related to runway safety.**
6. **Risk based approach**
7. **Identify hazards and mitigation measures on runway excursions/incursions and un-stabilized approach.**

Main Outcomes of Break-out Session Runway Safety Action to achieve Safety Targets

- **Aerodrome Certification**

1. **Establish process and identify a certification model**
2. **Safety oversight by CAA.**
3. **SMS implementation**
4. **Airport Emergency Plan.**
5. **Review initial and refresher training to ensure aerodromes certification requirements are met.**
6. **Develop regional guidance and a phased approach of aerodromes certification implementation.**

Main Outcomes of Break-out Session Fatigue Risk Management Action to achieve Safety Targets

1. **Information sharing (including forms and self assessments).**
2. **Developing training (individuals, management, regulators, and family members).**
3. **Customized/tailored guidance material**
4. **Streamline regulation to include GA community.**
5. **Effective implementation of JUST CULTURE**

Main Outcomes of Break-out Session
SSP & SMS
Action to achieve Safety Targets

1. **Agreement to have a phased approach implementation, based on the ICAO Safety Management Manual.**
2. **Agreement to implement Phases I, II, & III until 2018.**
3. **ICAO training courses (including CBT).**
4. **Awareness (including high-level management briefing).**
5. **Regional seminars and workshops**
6. **Communication**
7. **Sharing of safety information on regional basis**

Main Outcomes of Break-out Session LOC-I
Action to achieve Safety Targets

1. **Mandate Training on Threat and Error Management (TEM) for all crews**
2. **Encourage operators to develop Fatigue Risk Management Strategy (FRMS)**
3. **Encourage aircraft manufacturers to pursue innovation in practical and cost effective technology to mitigate LOC risks**
4. **Pursue LOC risk awareness with maintenance people and loadmasters**
5. **Consider implementation of CAST SEs 26-34, and 39-40 (ref WP/4)**

MID Safety Strategy

Strategic Safety Objective

Continuous improvement of aviation safety through a progressive reduction of the number of accidents and related fatalities in the MID Region to be in line with the global average, based on reactive, proactive and predictive safety management practices.

Safety Objectives
Near-term Objectives (2017)

- **All MID States should establish an effective safety oversight system with a score of ICAO's USOAP-CMA Effective Implementation (EI) not less than 60% in all areas, by 2017;**

- **reduce Runway Excursions and Incursions accidents in the MID Region by 50% by 2017, through establishment and activation of Runway Safety Teams (RST's), Aerodromes Certification, and implementation of Airport Safety Management System (SMS);**

- **reduce In-flight Damage accidents in the MID Region by 50% by 2017, through the development of regional guidance, and awareness training;**

Safety Objectives
Near-term Objectives (2017)

- **reduce Loss Of Control In-flight (LOC-I) related accidents in the MID Region by 50% by 2017, through appropriate Standard Operating Procedures (SOPs) related to mode awareness and energy state management, and Advance Manoeuvers Training;**

- **maintain the rate of Controlled Flight Into Terrain related accidents in the MID Region below the global rate, through pilot training, use of Fatigue Risk Management Systems (FRMS) framework, and implementation of PBN; and**

- **States with effective safety oversight (EI over 60% in all areas) proceed to fully implement SSP.**

Safety Objectives
Mid-term Objectives (2022)

- **achieve full implementation of State Safety Programme (SSP) by States and Safety Management Systems (SMS) by concerned service providers (namely air navigation service providers, airlines, airports and other aviation stakeholders) to facilitate the proactive management of safety risks**

- **gain safety benefits from the common implementation of the different modules of the Aviation System Block Upgrade**

Safety Objectives
Long-term Objectives (2027)

- **the implementation of proactive and predictive systems that ensure safety in a real-time, collaborative decision-making environment. Sustainable growth of the international aviation system will require the introduction of advanced safety capabilities (e.g. full trajectory-based operations) that increase capacity while maintaining or enhancing operational safety margins and manage existing and emerging risks.**
- **The long-term safety objective is intended to support a collaborative decision making environment characterized by increased automation and the integration of advanced technologies on the ground and in the air, as contained in ICAO‘s Aviation System Block Upgrades (ASBUs) strategy**