

# THE ICAO MODEL



ADCI TF/1-PPT/2

# SAFETY MANAGEMENT

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# THE ICAO MODEL



- ◆ SAFETY MANAGEMENT – WHY NEEDED?
- ◆ AERODROME SAFETY MANAGEMENT– THE TOOLS
- ◆ WHAT’S NEW - Annex 19 & Doc 9859 – AN/474
- ◆ QUESTIONS

*“Safety is the raison d’être of ICAO”*

# SMS – Why needed?



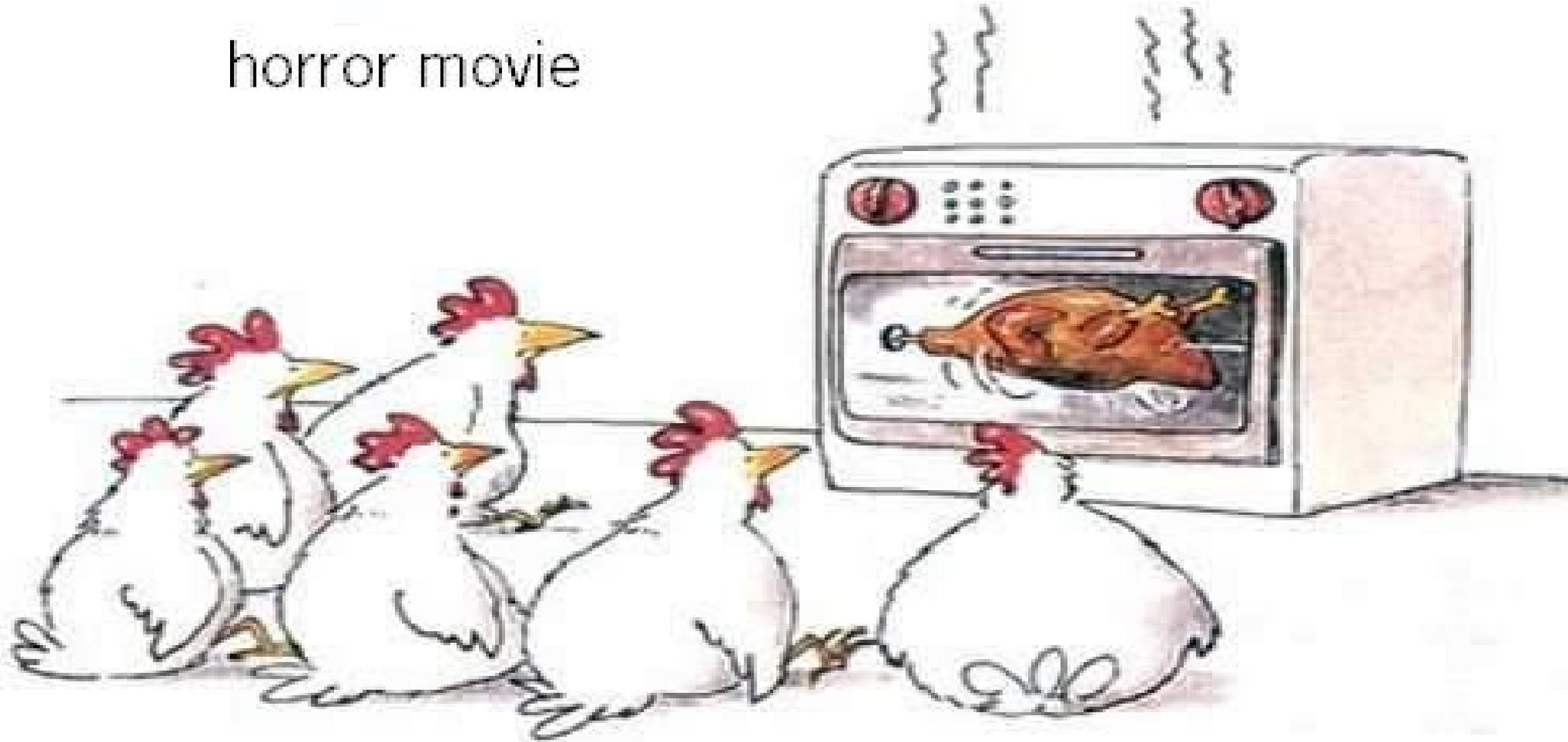
# SMS – Why needed?



# SMS – Why needed?



horror movie

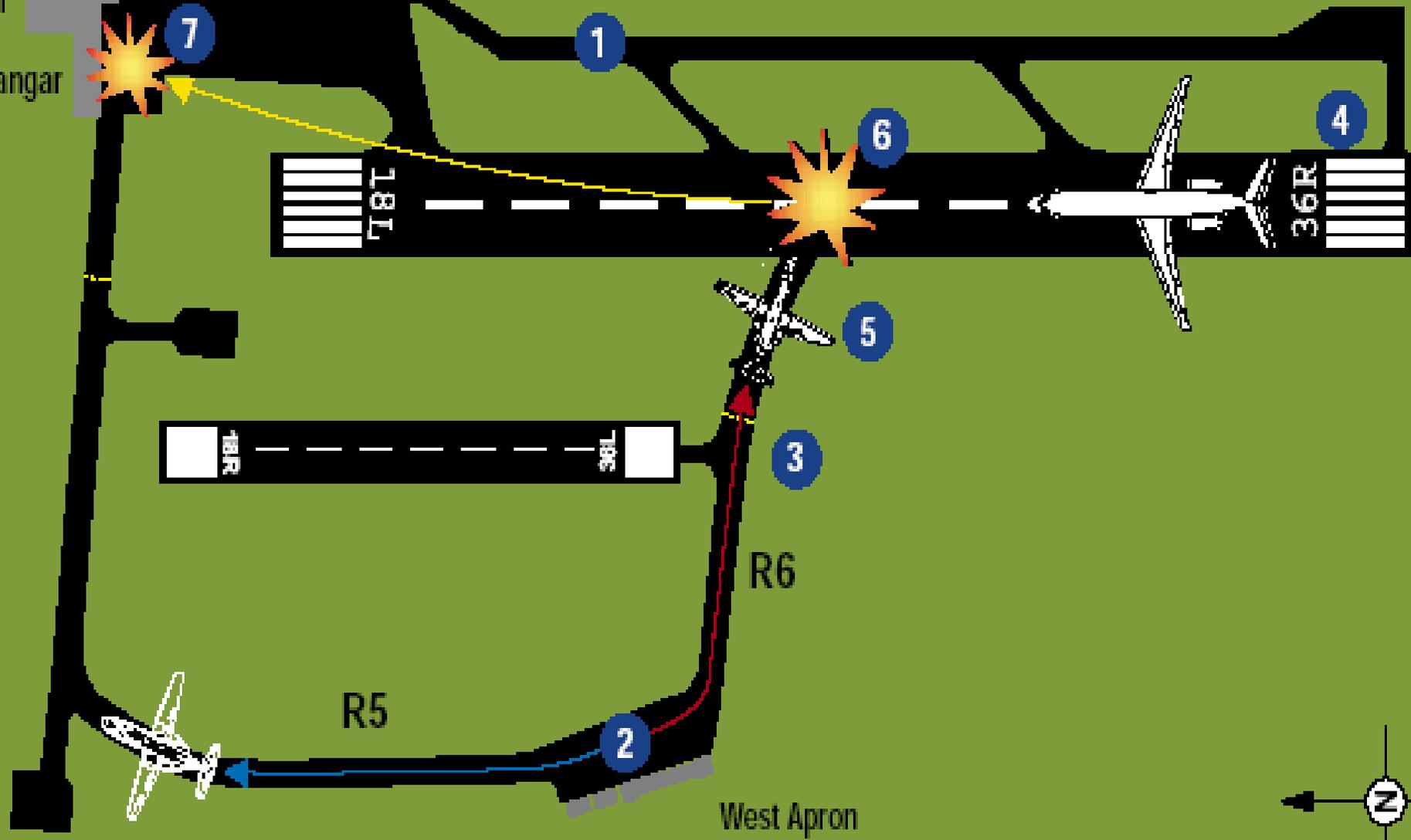




# October 2001: Linate Airport, Milan.

Passenger terminal  
Cargo hangar

Tower



West Apron

# Fatal ground collision of 2 aircraft at Milan's Linate Airport



# Fatal ground collision of 2 aircraft at Milan's Linate Airport



- ✓ Both MD 87 and Cessna Citation, were destroyed on the ground.
- ✓ 118 crew and passengers killed.
- ✓ Airport management were heavily criticized and their reputation damaged.
- ✓ Several airport staff/managers are now serving jail sentences in Italy – how and why did the system fail them and those that suffered and died?





# New Airport Markings



**Enhanced Taxiway Centerline**



**Surface Holding Position Signs**

[http://www.faa.gov/airports/airport\\_safety/signs\\_marking/](http://www.faa.gov/airports/airport_safety/signs_marking/)

# Excerpts from the accident report



- After analysis of evidence available and information gathered, it can be assumed that the immediate cause for the accident has been the runway incursion in the active runway by the Cessna.
- The obvious consideration is that the human performance issues related to the Cessna crew – during low visibility conditions – must be weighted against the scenario that allowed the course of events that led to the fatal collision.

# Excerpts from the accident report



- Equally, it can be stated that the system in place at Milano-Linate aerodrome was not geared to trap misunderstandings, inadequate procedures, human errors and faulty airport layout.
- The aerodrome standards did not comply with ICAO Annex 14 provisions.
- No functional Safety Management System (SMS) was in operation.



# SMS – Why needed?

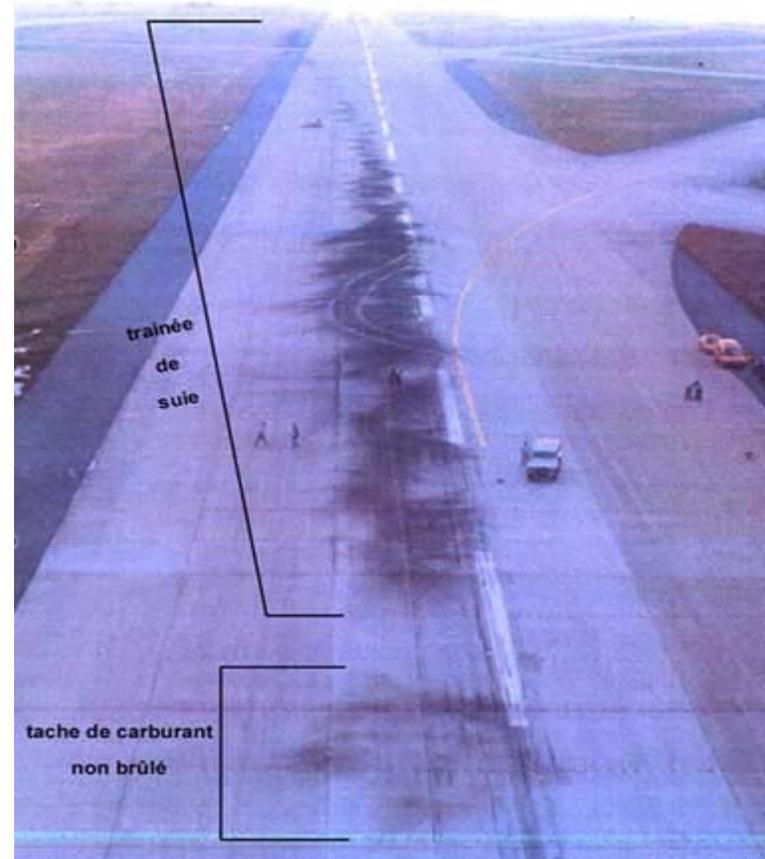
## Traditional approach – prevent accidents

- Focus on outcomes (causes)
- Unsafe acts by operational personnel
- Assign blame/punish for failure to “perform safely”
- Address identified safety concerns exclusively

Identifies : WHAT? WHO (scapegoat)? WHEN?

But does not always disclose: WHY? HOW?

# Flight AF - 4590



# Flight AF - 4590



**but this isn't the end of the story....**

# Flight AF - 4590



## Concorde case set to go to trial

**CRASH IN 2000 KILLED 113 PEOPLE**  
**Continental among six defendants**  
**charged with manslaughter**

LUCIEN LIBERT  
 REUTERS

PARIS - Ten years after a Concorde crash killed 113 people, Continental Airlines faces a trial on Tuesday to determine its responsibility in a disaster that ended an era of luxury supersonic travel.

Previous investigations have concluded that one of the Concorde's tires was punctured by a small piece of metal that had fallen off a departing Continental Airlines flight, hurling debris into the airplane's fuel tanks and causing a raging fire.

Continental has denied responsibility for the crash, and last week its lawyer, Olivier Metzner, said he had 28 witnesses disputing that version of events.

The results of the trial could have wide-ranging im-

plications on the way the airline industry maintains its planes and the stringency of security measures.

"(The trial) will revolve around the question of who knew what and who - despite knowing something - did not act and whether that person could therefore be prosecuted," aviation security expert Ronald Schmid told Reuters Television.

On trial for involuntary manslaughter are Continental Airlines; John Taylor, a welder who worked for Continental at the time of the crash, and his supervisor, Stanley Ford.

Henri Perrier, the head of testing of the Concorde program before becoming its director, and Jacques Herubel, the plane's former chief engineer, are also accused.

The sixth defendant is the

former head of France's civil aviation body, Claude Frantzen.

All five are accused as individuals.

Metzner said Continental was determined to show that it was not responsible for the crash, and he said there were many questions over the safety and maintenance level of the Concorde.

"The stake is above all a moral one. Continental Airlines is a company that has an excellent reputation and doesn't want its image destroyed, which is respected by passengers and would not stand being held responsible," he said.

The Air France Concorde was attempting to take off from Paris on July 25, 2000, carrying mostly German tourists bound for a deluxe Caribbean holiday cruise, when an engine caught fire.

Unable to gain altitude and trailing a fiery plume as long as its fuselage, the plane crashed into a hotel in the town of Gonesse, six kilometres southwest of Paris's Charles de Gaulle airport.

Black box recordings showed that the plane's captain tried desperately to turn the plane to land but did not have time. All 109 passengers, including three children, perished along with four hotel employees on the ground.

"The survivors expect ... a fair trial and an investigation into this accident. They want to learn why their relatives had to die and who is perhaps responsible for that," Schmid said.

Prosecutors say the metal strip was fitted incorrectly on the Continental plane and was made of titanium, which is tougher than regulation aluminum and therefore more likely to cause punctures.

Continental lawyer Metzner said his witnesses, who include pilots and members of the fire brigade, will attest that the strip of metal was not to blame for the fire on Concorde.

The crash hastened the demise of the highly uneconomical Concorde, and its two operators, Air France and British Airways, took the plane out of service in 2003.

REUTERS FILE PHOTO  
 The crash of a supersonic Concorde jet in July 2000, near Paris, killed 109 aboard and four people on the ground.

# Flight AF - 4590

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# SMS – Why needed?

## *Old System*

- ✓ **Audits and inspections on hardware**
  - **Equipment**
  - **Lay-out**
  - **Visual aids etc**



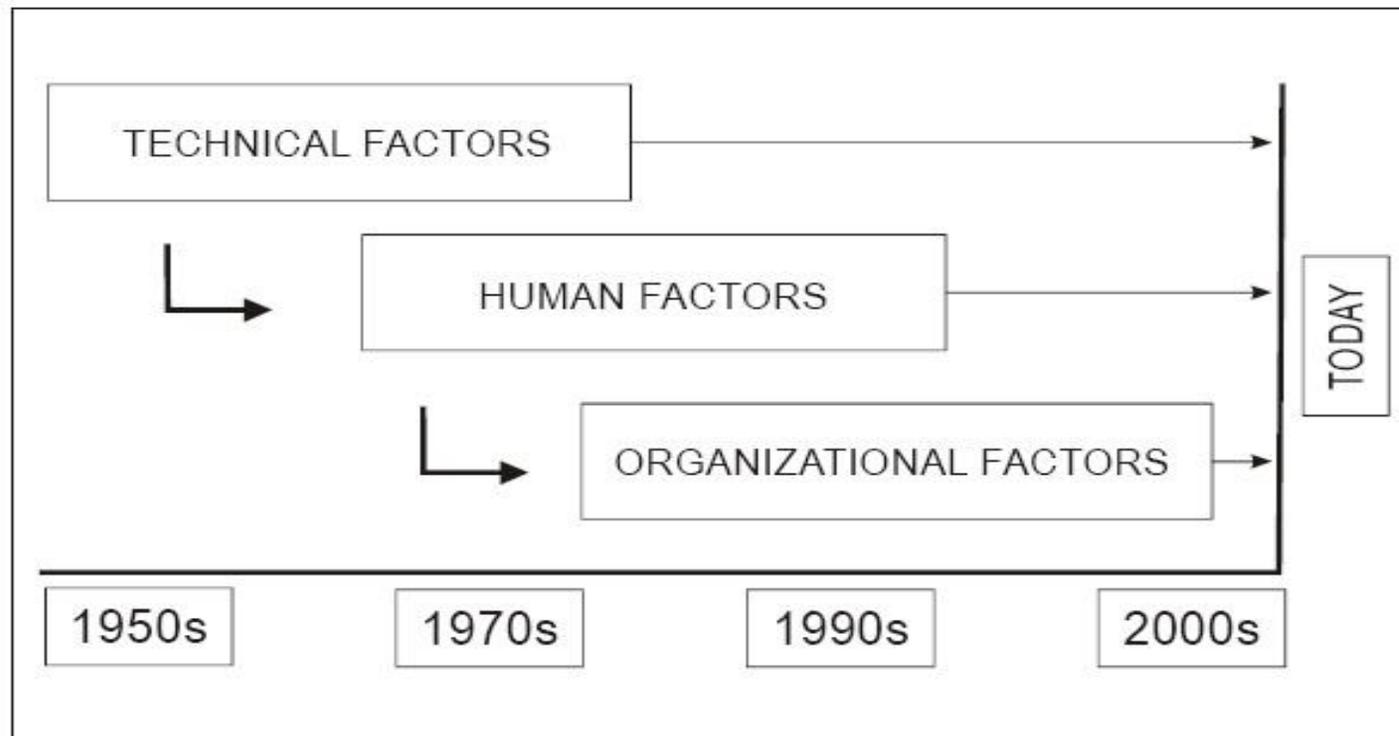
# SMS – Why needed?

## *Old System*

- ✓ **No audits and inspections on software**
  - **Responsibilities**
  - **Procedures**
  - **Organization**
  - **Quality**
  - **Competence**

# SMS – Why needed?

## *A Paradigm Shift to a New System*





# SMS – Why needed?

## *New System*

- ✓ **Movement from hardware to software with focus on Safety Management (SM)**
- ✓ **SM : management, competence, facilities and equipment, procedures, safety policy**

# SMS – Why needed?



*What service providers should do?*

**Service provider should take a proactive and systematic approach to managing safety**





# SMS – Why needed?

## *How?*

- ✓ Such an approach is best implemented by means of a formalised Safety Management System (SMS)
- ✓ The use by industry of SMS is an increasingly necessary basis for fulfilling service-providers' safety responsibilities



# SMS – Why needed?

## *Essence*

- ✓ Addresses the “organizational accident” where some of the causal or contributory factors of an accident are generated by corporate weakness, rather than solely by the error of an individual.
- ✓ Is the continuous pro-active improvement of the underlying causes of accidents, instead of just reactive “fixes”, to prevent the last accident.



# SMS – Why needed?

## ICAO Doc 9870 Quote

“An evolution in safety thinking has led to a change in focus: from that of the individual to that of the organization as a whole. It is now acknowledged that senior management decisions are influential in shaping the operational contexts within which operational personnel perform their duties and discharge their responsibilities...



# SMS – Why needed?

.. It is also accepted that, regardless of the extent to which operational personnel excel in their job performance, they can never ultimately compensate for systemic deficiencies and flaws in the system that binds them. This new way of thinking is reflected in recent Standards and Recommended Practices on safety management which, for the first time explicitly address the contribution and responsibility of senior management regarding safety.”



# SMS – Why needed?

## OBJECTIVE

- ✓ To enable airports to meet their objectives in regard to safety of aircraft using the airport facilities
- ✓ To meet States' obligation as ICAO members
- ✓ To meet national regulations
- ✓ To cover risks to aircraft using airport facilities from hazards that may not be covered by SARPs or minimum standards...



# SMS – Why needed?

## OBJECTIVE

- ✓ To prioritize valuable and sometimes finite resources
- ✓ To learn the lessons from incidents and accidents, whether national or international such as the Milan Linate airport.

# The Tools



## EVOLUTION OF SAFETY MANAGEMENT AT ICAO



# The Tools



<b>Safety Management SARPs for Service Providers</b>			
Annex	Intended Audience	Denomination	Date Applicable
11	Air traffic services providers	Safety Management Programme	Nov, 2001
14	Certified Aerodromes	Safety Management Programme	Nov, 2001
<b>2005 – Harmonization of Safety Management SARPs</b>			
6, 11 and 14	A/C Operators & AMOs	SMS	Jan, 2009
<b>2008 – 2nd Harmonization of Safety Management SARPs</b>			
1	Training Organizations	SMS	Nov, 2010
8	Manufacturers	SMS	Nov, 2013
1, 6, 11, 14		SMS Framework	Nov, 2010

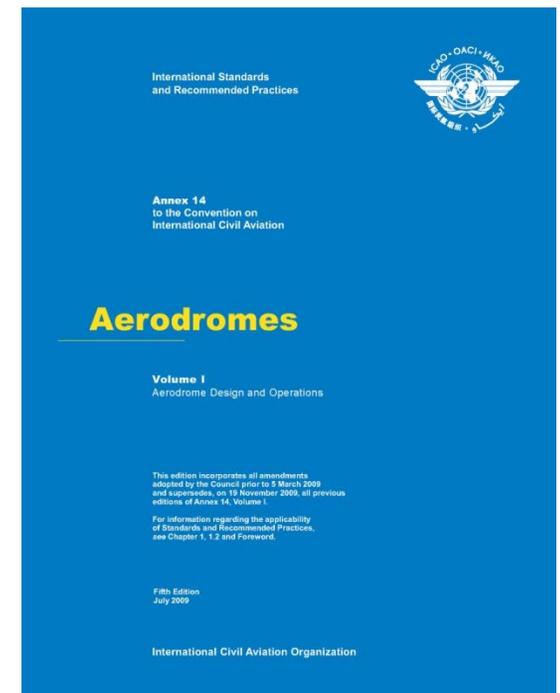
<b>Safety Management SARPs for States</b>			
Annex	States	Denomination	Date Applicable
<b>2005 – Harmonization of Safety Management SARPs</b>			
6, 11 and 14	States	Safety Programme	Nov, 2006
<b>2008 – 2nd Harmonization of Safety Management SARPs</b>			
1, 8 and 13	States	SSP	Nov, 2010
1, 6, 8, 11, 13, 14	States	SSP Framework *	Nov, 2010

\*Attachment

# The Tools



## Tracing the development of Safety Management in Annex 14, Volume I



# Amendment 4 (2001)



**1.3.4 Recommendation.- *A certified aerodrome should have in operation a safety management system.***

***Note.-- The intent of a safety management system is to have in place an organized and orderly approach in the management of aerodrome safety by the aerodrome operator:***

# Amendment 4 (2001)



**1.3.5 Recommendation. *As part of the certification process, States should ensure that an aerodrome manual which will include all pertinent information on the aerodrome site, facilities, services, equipment, operating procedures, organization and management including a SMS, is submitted by the applicant for approval/acceptance prior to granting the aerodrome certificate.***

# Amendment 4 (2001)



**1.3.6 As of 24 November 2005, a certified aerodrome shall have in operation a safety management system.**



# Amendment 8 (2006)



- Arising from the harmonization of safety management SARPs across several ICAO Annexes, the SM provisions in section 1.4, Annex 14, Vol I were relocated to a new:

## Section 1.5 Safety Management

# Amendment 8 (2006)



## 1.5 Safety Management

**1.5.1 States shall establish a safety programme in order to achieve an acceptable level of safety in aerodrome operations.**

**1.5.2 The acceptable level(s) of safety to be achieved shall be established by the State(s) concerned.**

# Amendment 8 (2006)



**1.5.3 States shall require, as part of their safety programme, that a certified aerodrome operator implements a SMS acceptable to the State that, as a minimum:**

- a) identifies safety hazards;**
- b) ensures that remedial action necessary to maintain an acceptable level of safety is implemented;**

# Amendment 8 (2006)



- c) provides for continuous monitoring and regular assessment of the safety level achieved; and**
- d) aims to make continuous improvement to the overall level of safety.**

**1.5.4 A safety management system shall clearly define lines of safety accountability throughout a certified aerodrome operator, including a direct accountability for safety on the part of senior management.**

# Amendment 10B (2010)



- Establishes a formal requirement regarding a **State Safety Programme (SSP)**, and an associated **acceptable level of safety (ALoS)** of the SSP;
- Establishes a formal requirement regarding **Safety Management System (SMS)**, including the **safety performance of an SMS**

# Amendment 10B (2010)



In broad terms:

- a **SSP** comprised of an integrated set of regulations and activities aimed at improving safety. It includes specific safety activities that must be performed by the State, and regulations and directives promulgated by the State to support fulfilment of its responsibilities on safe and efficient delivery of aviation activities in the State
- a **SMS** is a systematic approach for a service provider to manage safety, including the necessary organizational structure, accountabilities, policies and procedures.

# Amendment 10B (2010)



**1.5.1 States shall establish a State safety programme in order to achieve an acceptable level of safety in ~~aerodrome operations~~ civil aviation.**

***Note.— A framework for the implementation and maintenance of a State safety programme is contained in Attachment C and guidance on a State safety programme is contained in the Safety Management Manual (SMM) (Doc 9859).***

# Amendment 10B (2010)



**1.5.2 The acceptable ~~level(s)~~ level of safety to be achieved shall be established by the State(s) ~~concerned~~.**

***Note.— Guidance on defining acceptable level of safety is contained in the Safety Management Manual (SMM) (Doc 9859).***

# Amendment 10B (2010)



**1.5.3 States shall require, as part of their State safety programme, that a certified aerodrome operator implements a safety management system acceptable to the State that, as a minimum:**

**a) identifies safety hazards;**

# Amendment 10B (2010)



- b) ensures ~~that~~ the implementation of remedial action necessary to maintain ~~an acceptable level of~~ agreed safety performance ~~is implemented~~;**
  
- c) provides for continuous monitoring and regular assessment of the safety ~~level achieved~~ performance; and**

# Amendment 10B (2010)



d) aims ~~to make~~ at a continuous improvement ~~to~~ of the overall ~~level of safety~~ performance of the safety management system.

*Note.— Guidance on defining safety performance is contained in the Safety Management Manual (SMM) (Doc 9859).*

# Amendment 10B (2010)



**1.5.4 A safety management system shall clearly define lines of safety accountability throughout a certified aerodrome operator, including a direct accountability for safety on the part of senior management.**

# Amendment 10B (2010)



***Note.— The framework for the implementation and maintenance of a safety management system is contained in Appendix 7. Guidance on safety management systems is contained in the Safety Management Manual (SMM) (Doc 9859), and in the Manual on Certification of Aerodromes (Doc 9774).***

***Attachment C provides guidance on the framework for SSP***

# Amendment 10B (2010)



## Difference between an Appendix to the Annex and an Attachment to the Annex

# Amendment 10B (2010)



## Foreword

### Status of Annex components

**Appendices comprising material grouped separately for convenience but forming part of the SARPs adopted by Council**

# Amendment 10B (2010)



## Foreword

### Status of Annex components

**Attachments comprising material supplementary to the SARPs, or included as a guide to their application.**

# Amendment 10B (2010)



## APPENDIX 7. FRAMEWORK FOR SAFETY MANAGEMENT SYSTEMS

- ✓ applicable for certified aerodromes
- ✓ 4 components and 12 elements
- ✓ commensurate with the size of the organization and complexity of services provided

# Amendment 10B (2010)



**4 components and 12 elements**

# Amendment 10B (2010)



- 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**

# Amendment 10B (2010)



## 2. Safety risk management

### 2.1 Hazard Identification

### 2.2 Safety risk assessment and mitigation

## 3. Safety assurance

### 3.1 Safety performance monitoring & measurement

### 3.2 The management of change

### 3.3 Continuous improvement of the SMS

# Amendment 10B (2010)



## 4. Safety promotion

### 4.1 Training and education

### 4.2 Safety communication

*(Each of the elements is described in detail in the Appendix)*

# Amendment 10B (2010)



## ATTACHMENT C. FRAMEWORK FOR THE STATE SAFETY PROGRAMME (SSP)

- ✓ a managing system for the management of safety by the State
- ✓ 4 components and 11 elements
- ✓ commensurate with the size and complexities of the State's aviation system

# Amendment 10B (2010)



**4 components and 11 elements**

# Amendment 10B (2010)



## 4 components and 11 elements

1. **State safety policy and objectives**
  - 1.1 **State safety legislative framework**
  - 1.2 **State safety responsibilities & accountabilities**
  - 1.3 **Accident and incident investigation**
  - 1.4 **Enforcement policy**

# Amendment 10B (2010)



## 4 components and 11 elements

- 2. State safety risk management**
  - 2.1 Safety requirements for the service provider's SMS**
  - 2.2 Agreement on the service provider's safety performance**

# Amendment 10B (2010)



## 4 components and 11 elements

### 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

# Amendment 10B (2010)



## 4 components and 11 elements

### 4. State safety promotion

4.1 Internal training, communication and dissemination of safety information

4.2 External training, communication and dissemination of safety information

*(Each of the elements is described in detail in the Attachment)*



# WHAT'S NEW ?



**NEW!**

## Recommendation of HLSC 2010

‘ ICAO should develop, in close collaboration with States, int’l and national organizations, a new Annex dedicated to SM responsibilities and processes which would address the SM responsibilities of States framed under the SSP; and

The new SM Annex should facilitate the provision of State and air carrier safety information to the travelling public, in addition to specifying the high level responsibilities of States.”

# WHAT'S NEW ?



**State letter AN 8/3-12/42 dated 29 June 2012 for consultation with States on Annex 19 and consequential amendments to Annexes 1, 6, 8, 11, 13 & 14, Volume I, with due date 28 Sept 2012**

**- Available on ICAONET**

# WHAT'S NEW ?



## IN THE PIPELINE...

# A NEW ANNEX 19 SAFETY MANAGEMENT

- consolidate SM responsibilities and processes currently contained in multiple Annexes
- document SM responsibilities under the SSP
- will reference all Annexes containing SM-related provisions

# WHAT'S NEW ?



***ICAO Integrated Safety Management Section:***

***<http://www2.icao.int/en/ism/default.aspx>***

***ICAO Safety Management SARPS***

***<http://www2.icao.int/en/ism/Pages/Standards.aspx>***

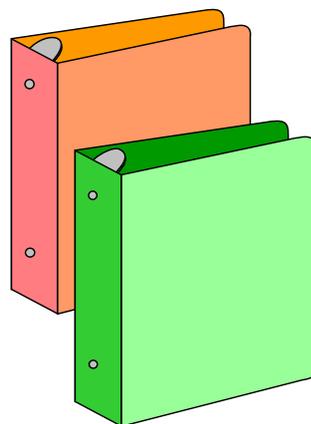
***ICAO Doc 9859 SMM, 3<sup>rd</sup> Edition, 2012***

***<http://www2.icao.int/en/ism/Pages/GuidanceMaterials.aspx>***

# DOC 9859 – AN/474

## SAFETY MANAGEMENT MANUAL

### (draft) 3<sup>RD</sup> EDITION 2012



# WHAT'S NEW ?



## DOC 9859

## CHAPTERS

1. SM FUNDAMENTALS
2. ICAO SM SARPS
3. SSP (STATE)
4. SMS (OPERATORS/SERVICE PROVIDERS)

# The last words.....

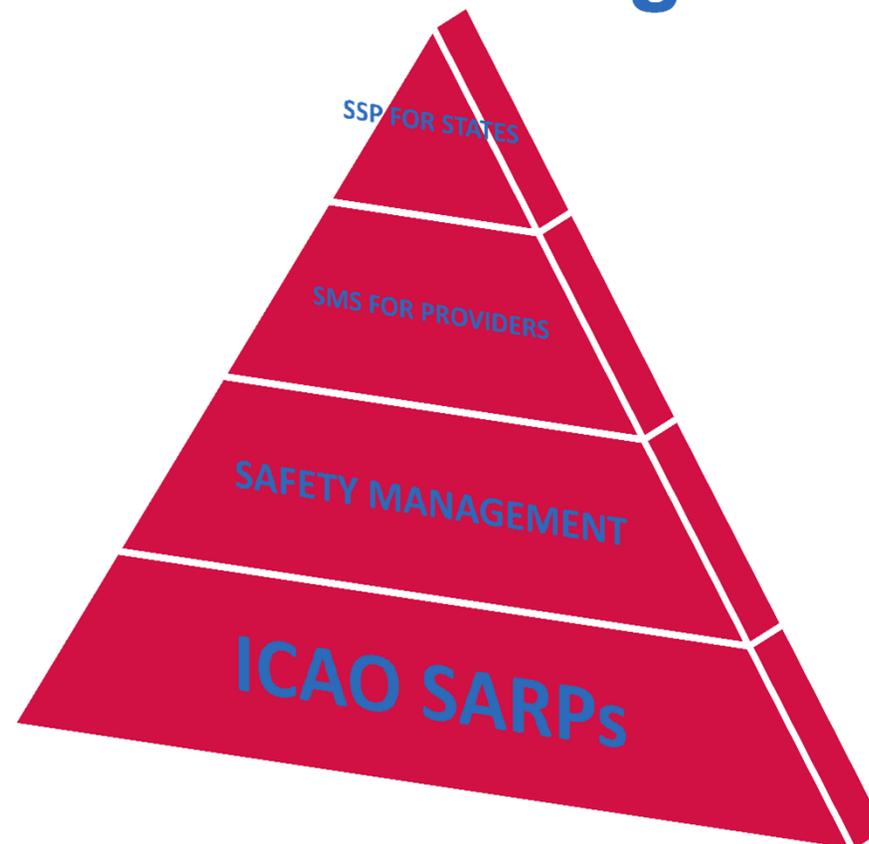


- ✓ **Safety Management is a tool with which to manage safety**
- ✓ **It is NOT A SUBSTITUTE for compliance with ICAO SARPs and regulation and having the necessary infrastructure, facilities, working procedures and competent personnel.**

# The last words.....



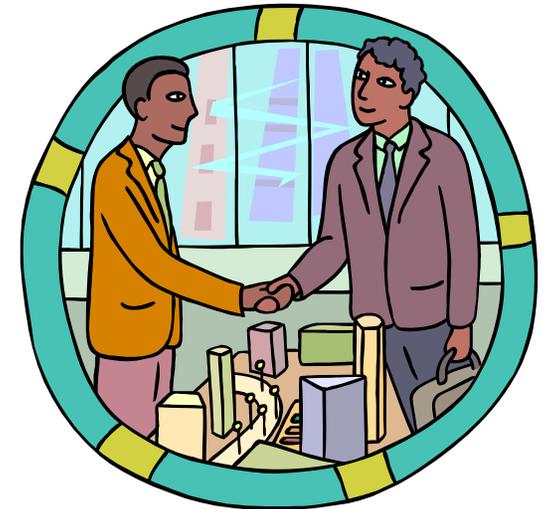
## The basis for regulation



# The last words.....



- ❖ **Regulator sets safety standards**
- ❖ **Industry manages safety**
- ❖ **Promotion of safety culture**
- ❖ **Shared responsibilities**
- ❖ **Mutual respect and inclusion**
- ❖ **Firm, fair and prompt enforcement**



# The last words.....



*A Safety Management System*

=

**SAFE OPERATIONS**

=

**Good Business**



# THE END

