



International Standards
and Recommended Practices



Annex 19
to the Convention on
International Civil Aviation

ANEXO 19

Safety Management

GESTÃO SEGURANÇA OPERACIONAL

The first edition of Annex 19 was adopted by the Council on 25 February 2013 and becomes applicable on 14 November 2013.

For information regarding the applicability of the Standards and Recommended Practices, see Chapter 2 and the Foreword.

First Edition
July 2013

International Civil Aviation Organization

SUMÁRIO:

- ❖ MOTIVAÇÃO & PANORÂMICA
- ❖ ICAO ESTRUTURA
- ❖ ESTATÍSTICA TAC GLOBAL
- ❖ ICAO CONCEPÇÃO ANEXO
- ❖ ICAO ANEXO 19
- ❖ ICAO Doc. 9859
- ❖ COMPROMISSOS NACIONAIS
- ❖ CONCLUSÕES



PERIGO POTENCIAL



International Civil Aviation Organization

WORKING PAPER

A38-WP/85
TE/19
5/8/13



EXECUTIVE SUMMARY

Aircraft manufacturers predict that potentially, by 2030, there will be one commercial aviation accident every three months. In order to address this clearly unacceptable societal risk there is a need, complementary to the sharing of safety data, for a consolidated and industry-wide approach

(Presented by Romania on behalf of the European Union and its Member States¹ and the other Member States of the European Civil Aviation Conference² and by EUROCONTROL)

EXECUTIVE SUMMARY

Aircraft manufacturers predict that potentially, by 2030, there will be one commercial aviation accident every three months. In order to address this clearly unacceptable societal risk there is a need, complementary to the sharing of safety data, for a consolidated and industry-wide approach to safety knowledge management, building on the foundations of State Safety Program. The strategy should be approved by the Member States of the European Civil Aviation Conference and by EUROCONTROL.



RISCO ACEITÁVEL?

Severity Likelihood	Higher Lower		More Less	
	←	→	↑	↓
↑	Yellow	Yellow	Red	Red
↓	Green	Green	Yellow	Yellow
More	Green	Green	Yellow	Yellow
Less	Green	Green	Yellow	Yellow
↓	Green	Green	Yellow	Yellow

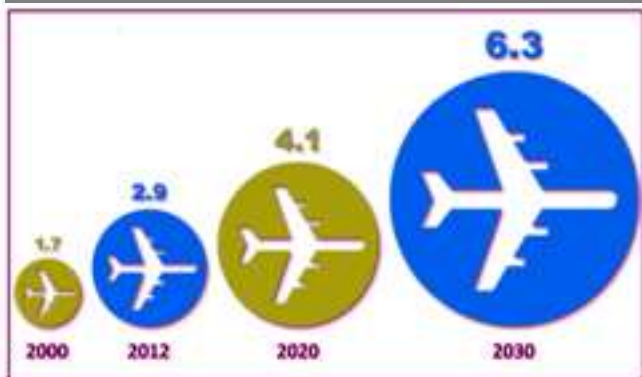
Acceptable with Mitigation

Acceptable

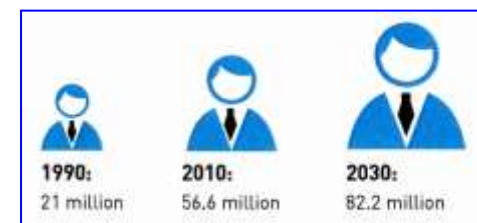
Unacceptable

AVIAÇÃO MUNDIAL EM 1990/2010 E PROJEÇÃO PARA 2030:

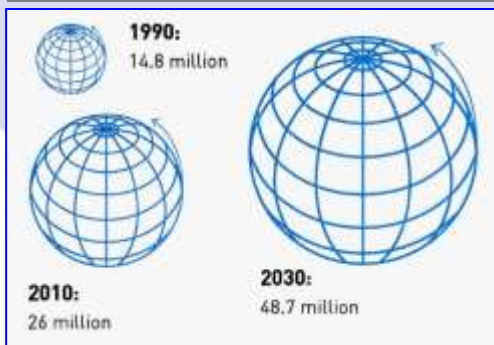
Tráfego de passageiros estimado (bilião de pax.)



EMPREGOS



MOVIMENTOS



AVIÕES EM SERVIÇO



Source – ICAO NET JUN2013 & ATAG 2012

“MOVIMENTAÇÃO” ECONÓMICA A NÍVEL MUNDIAL (TAC):

	2010	2030
Revenue	\$2.2 Triliões	\$6.9 Triliões
GDP (global)	3,5%	?
Cargo	\$5.3 Triliões	?

GDP – Gross Domestic Product

Long scale (EU) – trillion equivalent 10^{18}

ESTRUTURA ICAO



- INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) - ONU;
- ESTABELECIDADA: 1944 POR 52 ESTADOS CONTRATANTES;
- PRESENTEMENTE: 191 ESTADOS MEMBROS (MS).

ICAO OBJECTIVOS & ESTRATÉGIAS

PRIMEIRO OBJECTIVO ESTRATÉGICO:

➔ PREVENIR E GARANTIR SAFETY!

ESTRATÉGIA 1 ➔ REGULAMENTOS

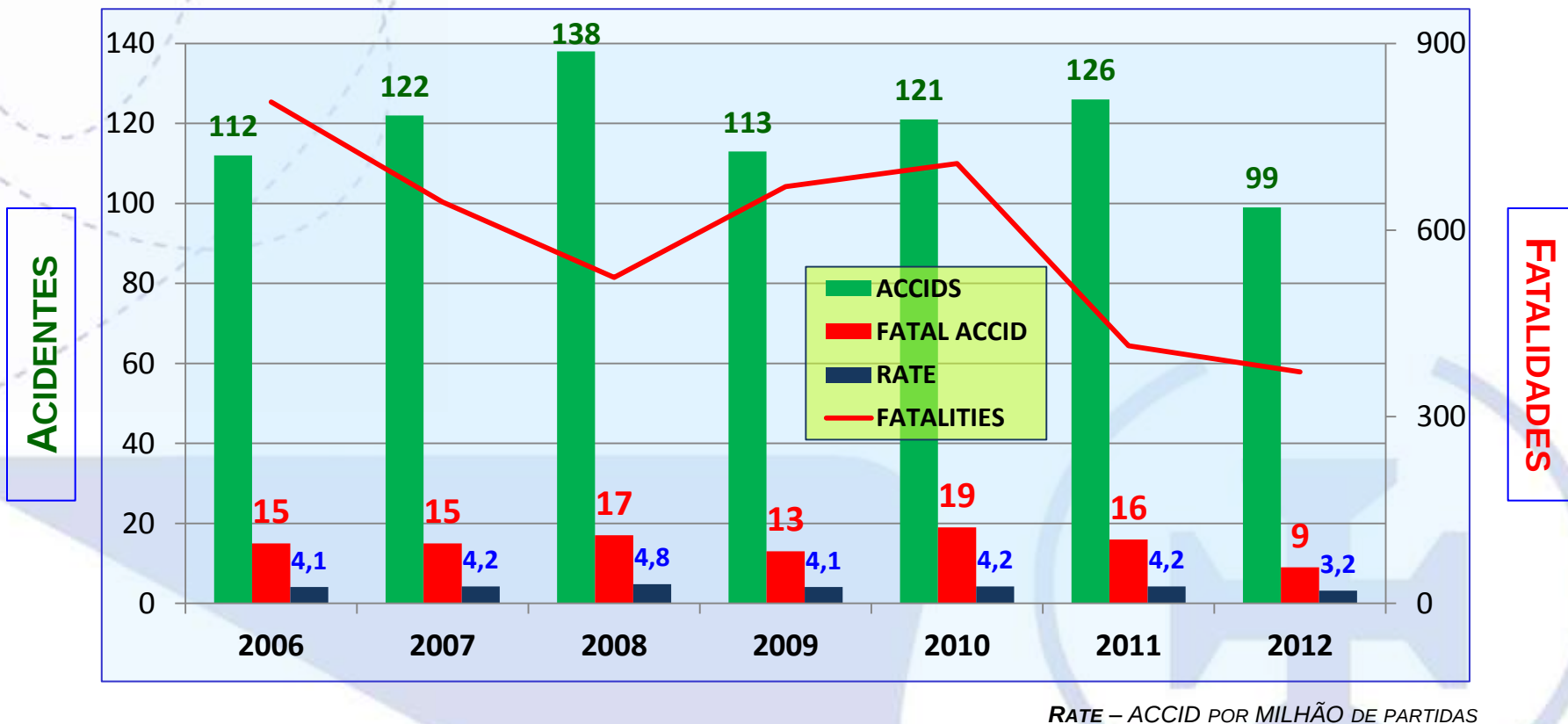
- ➔ **ANEXO** – regulamento onde se encontram especificados “*provisions*¹” Standards e Práticas Recomendadas (SARPs) globalmente aceites pelos MS (art.º 37 to *Chicago Convention* – 1951);
- ➔ Presentemente, existem 19 Anexos cobrindo todas as áreas da aviação civil.

ICAO Publications

ANEXOS (SARPs - adopted)	19
PANS (procedures - approved)	4
CIRCULARES (CIR) (guidelines)	332 (3)
DOCUMENTOS (DOC) (technical)	346

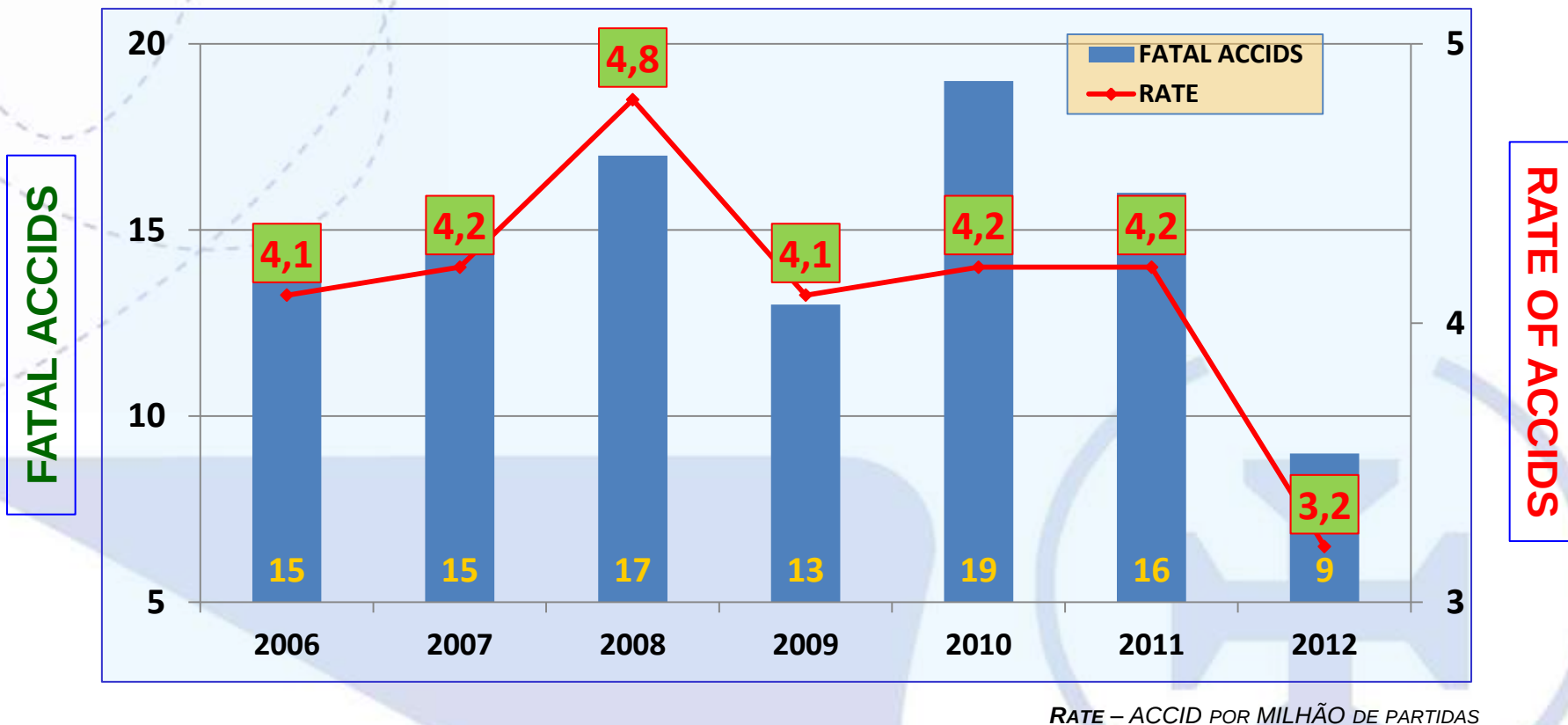
Provision – cláusula ou condição

TAC – ESTATÍSTICAS GLOBAIS SAFETY



Source – ICAO Safety Report 2013 & ICAO iSTARS

TAC – ESTATÍSTICAS GLOBAIS SAFETY



Source – ICAO Safety Report 2013 & ICAO iSTARS

PROCESSO “CONCEPTIVO” DO ANEXO!



International Standards
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Annex 19
to the Convention on
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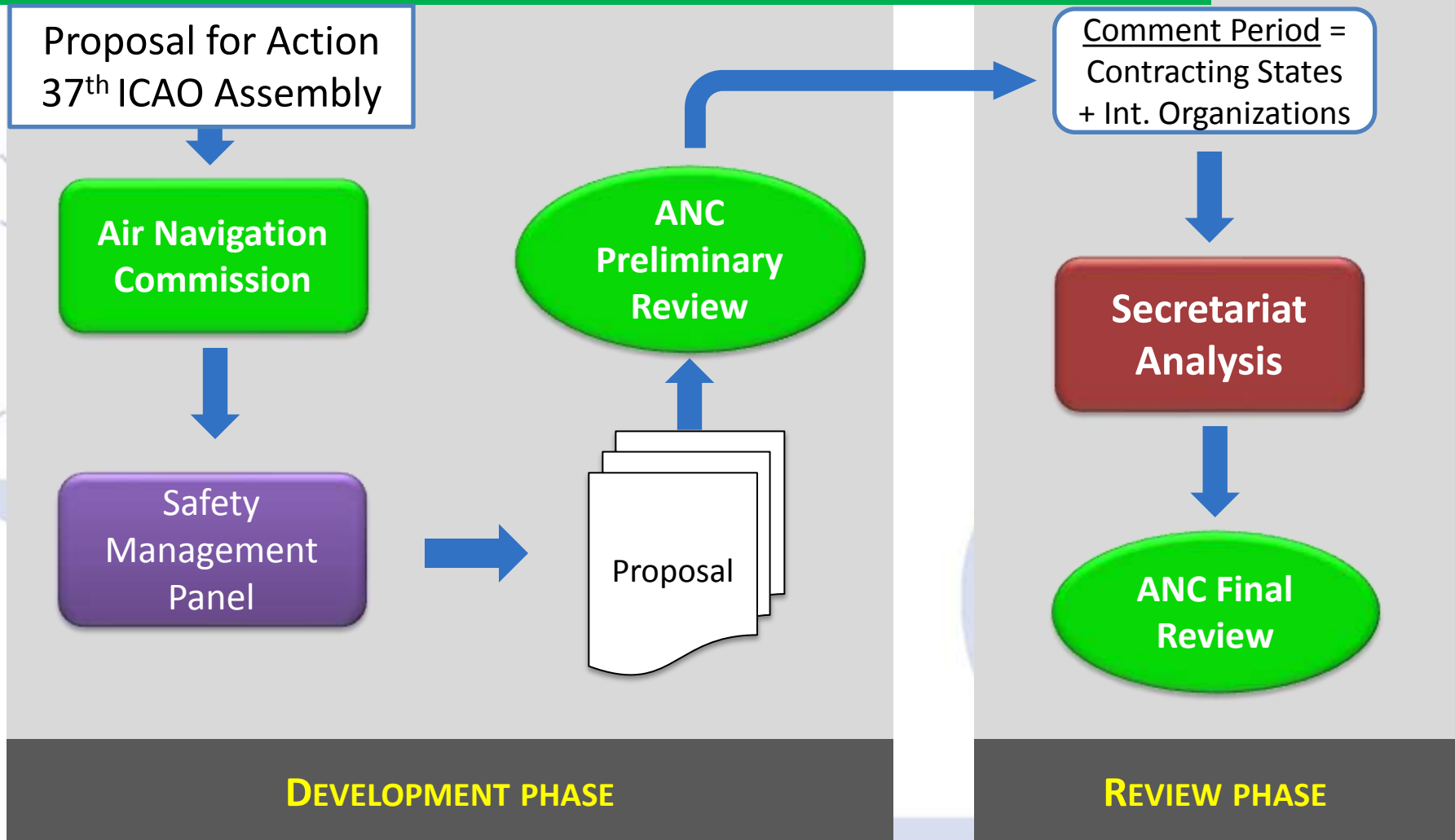
Safety Management

5 Capítulos
2 Apêndices
2 Anexos } 24 PAG.

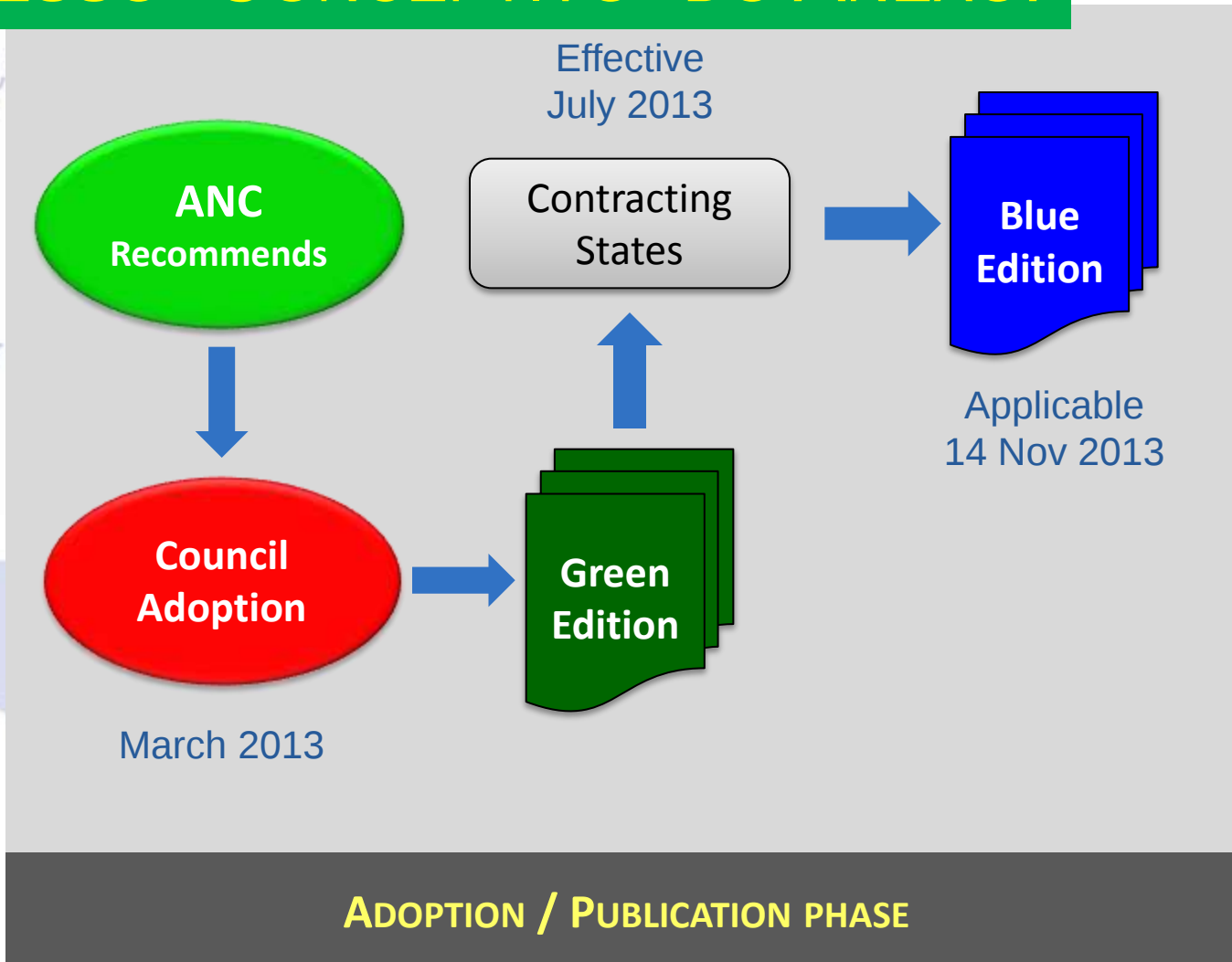
First Edition
July 2013

International Civil Aviation Organization

PROCESSO “CONCEPTIVO” DO ANEXO 19!



PROCESSO “CONCEPTIVO” DO ANEXO!



ANEXO 19 CALENDÁRIO (SUMÁRIO)

PROPOSAL FOR ACTION

DEVELOPMENT PHASE

0 – 5 ANOS

Annex 19 contained in this document was adopted by the Council of ICAO on **25 February 2013**. Such parts of this Annex as have not been disapproved by more than half of the total number of Contracting States on or before 15 July 2013 will become effective on that date and will become applicable on **14 November 2013** as specified in the Resolution of Adoption. (State letter AN 8/3-13/30 refers.)

ANC FINAL REVIEW

ADOPTION/PUBLICATION PHASE

APROXIMADAMENTE 2 ANOS

Table A. Amendments to Annex 19

11

<i>Amendment</i>	<i>Source(s)</i>	<i>Subject(s)</i>	<i>Adopted Effective Applicable</i>
1st Edition	Secretariat; first special meeting of the Safety Management Panel (SMP/SM/1)		25 February 2013 15 July 2013 14 November 2013

ADOPTION DATE

EFFECTIVE DATE

APPLICABILITY DATE

PORQUÊ UM NOVO ANEXO ?

A 37th Assembleia concluiu que os processos de gestão **safety**, sob a directa responsabilidade do Estados, eram CRÍTICOS para a segurança operacional e que deviam estar consignados num único Anexo, contemplando:

- SSP e os 8 Elementos Críticos (EC) no sistema de auditoria à segurança operacional;
- Cobertura das actividades da aviação geral e executiva;
- Mantendo o Sistema de Gestão da Segurança (SMS) requisitos específicos para uma área de actividades em anexos individuais.

Resulta da transferência ou duplicação de SARPs sobre a gestão *safety* dos seguintes Anexos:

- ✿ **Annex 1 — *Personnel Licensing*;**
- ✿ **Annex 6 — *Operation of Aircraft, Part I — International Commercial Air Transport — Aeroplanes, Part II — International General Aviation — Aeroplanes and Part III — International Operations***
- CUT, COPY & PASTE....!**
- ✿ **Annex 11 — *Air Traffic Services*;**
- ✿ **Annex 13 — *Aircraft Accident and Incident Investigation*; and**
- ✿ **Annex 14 — *Aerodromes, Volume I — Aerodrome Design and Operations***

Nota: Independentemente da data de APLICABILIDADE do Anexo 19 (14NOV2013), as referidas SARPS mantém a sua original data de aplicação, a partir de 2001.

OBJECTIVO DO ANEXO 19

SARPs constantes no ANEXO 19 têm como objectivo integrar e harmonizar a implementação das práticas de gestão *safety* dos Estados e de todas organizações envolvidas na actividade de aviação.

COMO ?

... consolidando todo o material incluído nos Anexos já existentes, e relativo ao SSP/SMS, coligindo toda a informação *safety*!

ANNEX 19 OVERVIEW *(12 SHEETS)*

CHAPTER 1 – Definitions

CHAPTER 2 – Applicability

CHAPTER 3 – State safety management responsibilities (SSP)

CHAPTER 4 – Safety management system (SMS)

CHAPTER 5 – Safety data collection, analysis and exchange

APPENDIX 1 – State safety oversight system *(Material part of 8 SARPs)*

APPENDIX 2 – SMS Framework (4 components and 12 elements)

ATTACHMENT A – SSP Framework *(Material supplementary to SARPs).*

ATTACHMENT B – Legal guidance for the protection of information from safety data collection and processing systems.



CHAPTER 1 - DEFINITIONS

NEW DEFINITIONS:

Safety – The state in which risks associated with aviation activities, related to, or in direct support of the operation of aircraft, are reduced and controlled to an acceptable level.

Safety performance – A State or a service provider's safety achievement as defined by its safety performance targets and safety performance indicators (*continuous “past” & “future”*)

Safety performance indicator – A data-based parameter used for monitoring and assessing safety performance (*“past”*).

Safety performance target – The planned or intended objective for safety performance indicator(s) over a given period (*“future”*).

Safety risk – The predicted probability and severity of the consequences or outcomes of a hazard.

Operational personnel – Personnel involved in aviation activities who are in a position to report safety information (*meaning “all”*).

INTEGRAÇÃO DE CONCEITOS



Differences between SSP and SMS:

- **Safety Management Systems (SMS)** are **standards** that States regulate for its industries and service providers. The SMS is put in place by service providers and are approved by the Member State (the regulator).
- **State Safety Programme (SSP)** is created and maintained by the State itself. The SSP describes how the State will **monitor, measure, evaluate, and regulate** the level of performance of its providers using the SMS requirements. SSP provide assurance to States of the safety management capabilities of their service providers while also providing safety information into ICAO CMA.

CHAPTER 3 – STATE SAFETY MANAGEMENT RESPONSIBILITIES (SSP)

**States shall establish a SSP;
As part of SSP, States require to SP's to implement an SMS.**

Here is outlined safety management responsibilities directly applicable to the State, including the SMS requirements be implemented by the following **Service Providers**:

1. Approved training organizations;
2. Operators of aeroplanes or helicopters authorized to conduct international commercial air transport;
3. Approved maintenance organizations providing services to operators;
4. Organizations responsible for the type design or manufacture of aircraft;
5. Air traffic services (ATS) providers, and;
6. Operators of certified aerodromes.

CHAPTER 3 – SSP (cont.)

Each State shall establish and implement a safety oversight system (SSP) in accordance with Appendix 1

CHAPTER 4 - SMS

- Outlines and establishes the safety management responsibilities of each service providers (there are 6 categories of SP's), which are described in Appendix 2 (**SMS framework**);
- Also includes the safety management responsibilities of **international general aviation operators**, conducting operations of large or turbojet aeroplanes.

CHAPTER 5 – SAFETY DATA COLLECTION, ANALYSIS AND EXCHANGE

As part of SSP (3 STANDARDS + 1 *RECOMMENDED PRACTICE*):

- safety data collection (MOR/ASR + voluntary reporting system);
- safety data analysis plus database (ECCAIRS);
- safety data protection (*just culture or non-punitive*):
- *safety information exchange (safety alerts for other States).*

APPENDIX 1. STATE SAFETY OVERSIGHT SYSTEM

RESPONSIBILITIES

1. Primary aviation legislation (*State shall promulgate and provide...*)
2. Specific operating regulations (*State shall promulgate ...*)
3. State system and functions (*State shall establish and ensure resources...*)
4. Qualified technical personnel (*State shall establish...*)

APPENDIX 1. STATE SAFETY OVERSIGHT SYSTEM (cont.)

RESPONSIBILITIES

5. Technical guidance, tools and provision of safety-critical information (*State shall provide...*)
6. Licensing, certification, authorization and/or approval obligations (*State shall implement...*)
7. Surveillance obligations (*State shall implement...on continuous basis*)
8. Resolution of safety issues (*State shall use a documented process...for corrective and enforcement actions*)

APPENDIX 2. FRAMEWORK FOR

Comprises 4 components (

1. Safety policy and objectives
2. Safety risk management
3. Safety assurance;
4. Safety promotion.

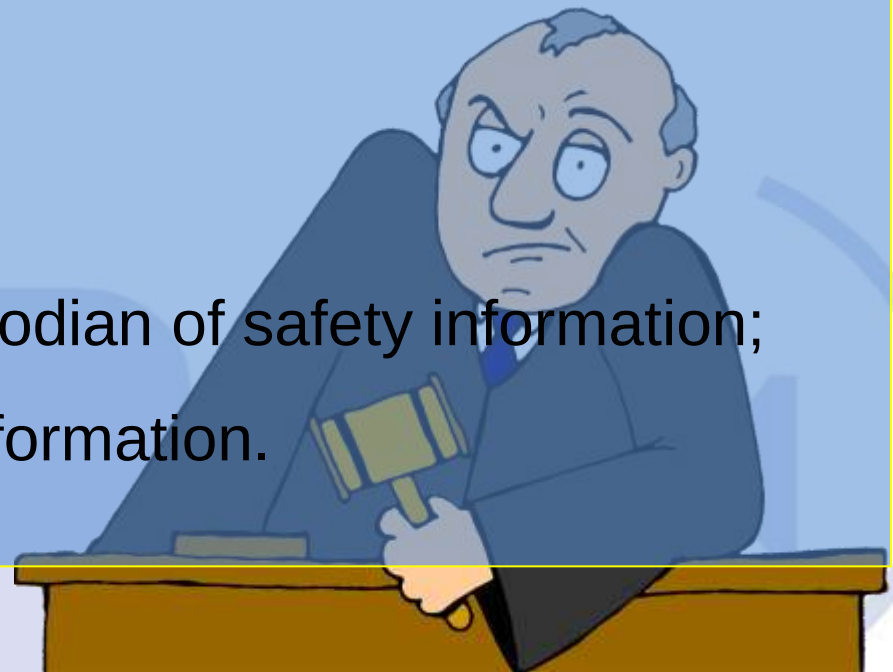
APPENDIX 2. FRAMEWORK FOR A SAFETY MANAGEMENT SYSTEM (SMS)

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 Safety 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

ATTACHMENT B. LEGAL GUIDANCE FOR THE PROTECTION OF INFORMATION FROM SAFETY DATA COLLECTION AND PROCESSING SYSTEMS

(See Chapter 5, 5.3)

1. Principles of protection;
2. Principles of exception;
3. Public disclosure;
4. Responsibility of the custodian of safety information;
5. Protection of recorded information.



CHANGES & UPDATES

1. The SMS framework now **applies to organizations** responsible for the type **design and manufacture** of aircraft;
2. The **four** components of the SSP framework are elevated to the status of **Standard** in chapter 3;
3. The State Safety Oversight (Appendix 1) are applicable to the oversight of all **product and service providers**;
4. The Safety Data Collection Analysis and Exchange (Chapter 5) and the Legal Guidance for the Protection of Safety Information from Safety Data Collection and processing systems (Attachment B) **complement the SSP**.

CHANGES & UPDATES (cont.)

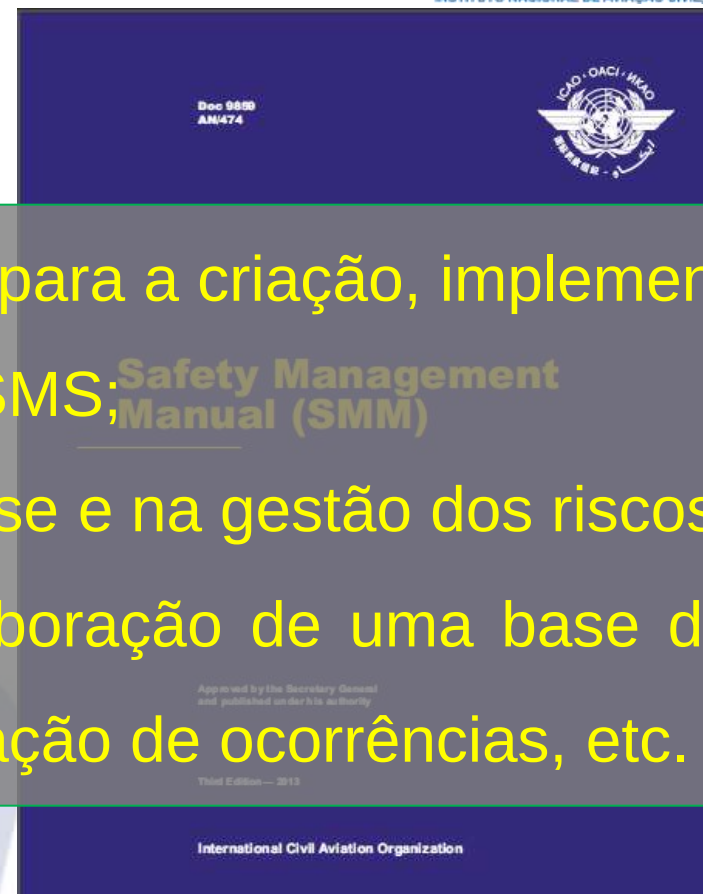
- ✈ The SMS framework now applies to organizations responsible for the type design and manufacture of aircraft, meaning to all “*service providers*”;
- ✈ The following four components of the SSP framework were elevated to the status of Standard in chapter 3:
 - State Safety policy and objectives;
 - State Safety Risk Management;
 - State Safety assurance;
 - State Safety promotion.
- ✈ The State Safety Oversight (Appendix 1) are applicable to the oversight of all product and service providers (*States have already signed MoUs with ICAO, introducing the use of the 8 CEs as the foundation of the Universal Safety Oversight Audit Programme (USOAP).*

ANEXO 19 “MAIS VALIA”

- ➔ Enforces the **importance of safety management** at the State level;
- ➔ Enhances safety by **consolidating safety management stipulations** applicable to multiple aviation areas;
- ➔ Enables the **evolution of safety management** provisions;
- ➔ An opportunity to **further promote the implementation of SMS and SSP** provisions;
- ➔ A process established to **analyze** safety management implementation.

ICAO Doc. 9859 - SMM

- Detalha informação orientadora para a criação, implementação e manutenção do SSP e SMS;
- Providencia assistência na análise e na gestão dos riscos;
- Fornece informação para a elaboração de uma base de dados *safety*, sistema de notificação de ocorrências, etc.



COMPROMISSOS NACIONAIS (CURTO E MÉDIO PRAZO...)

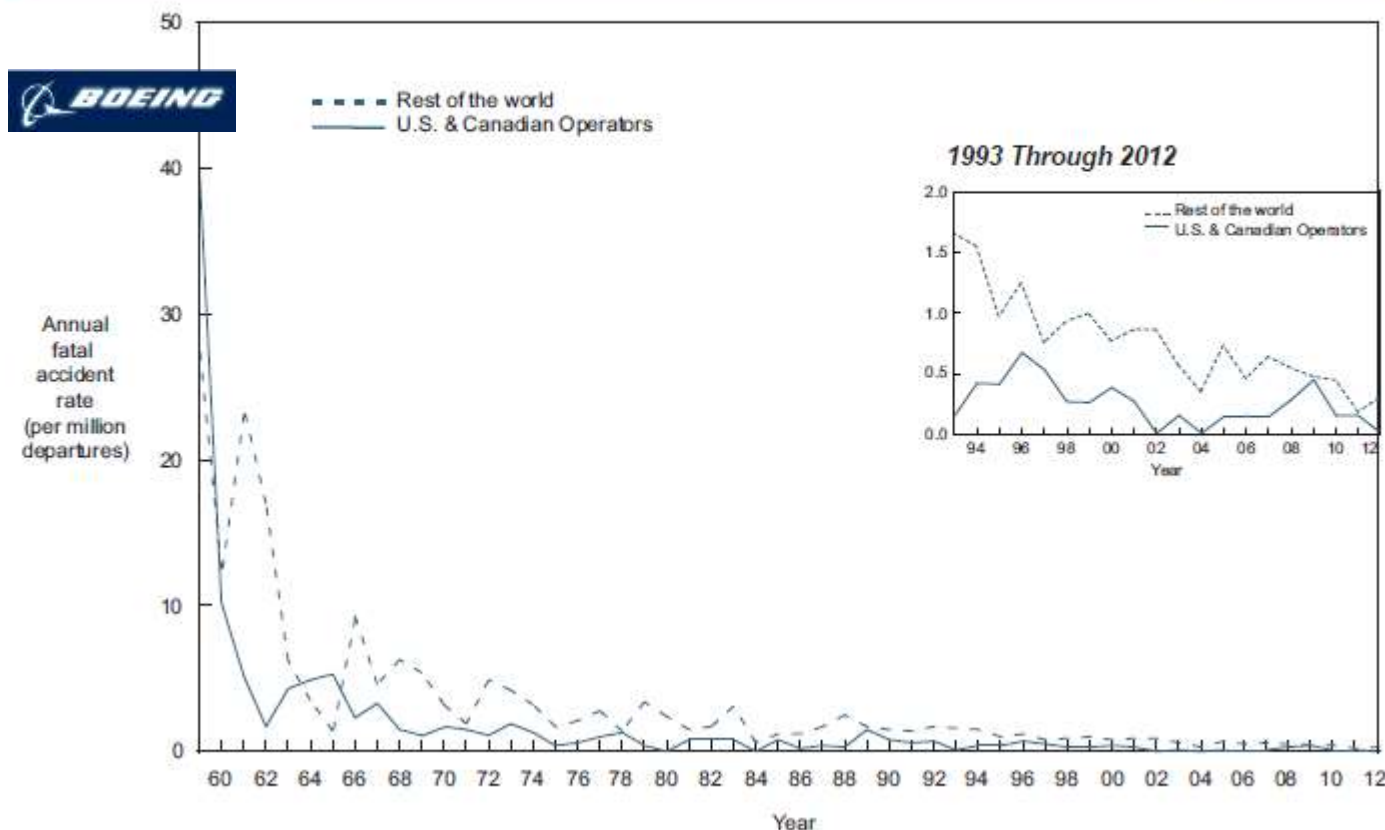
IMPLICAÇÕES AO NÍVEL DOS ESTADOS MEMBROS RELATIVAS À ADOÇÃO DO ANEXO 19

- Notificar a ICAO relativamente às diferenças ao Anexo 19;
- Notificar à ICAO a data, ou datas, da aplicação dos SARPs;
- Rever as diferenças dos Anexos 1, 6, 8, 13 e 14;
- Providenciar “*guidance material*” para que os “*service providers*” possam estabelecer SMSs;
- Estabelecer mecanismos de monitorização ou de auditoria aos SMS, com identificação dos perigos e gestão dos riscos associados;
- Estabelecer procedimentos de prioritização de inspecções, auditorias, análises, etc. a todas áreas que possam afectar o sistema *safety*.

CONCLUSÃO – ANEXO 19

- Redução de acidentes
- Elevação da segurança
- Aumento da confiança
- Promoção da segurança
- Inclusão de novas áreas da aviação.

U.S. and Canadian Operators Accident Rates by Year Fatal Accidents – Worldwide Commercial Jet Fleet – 1959 Through 2012



*The true value of safety is often
only appreciated in its ... absence!*





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

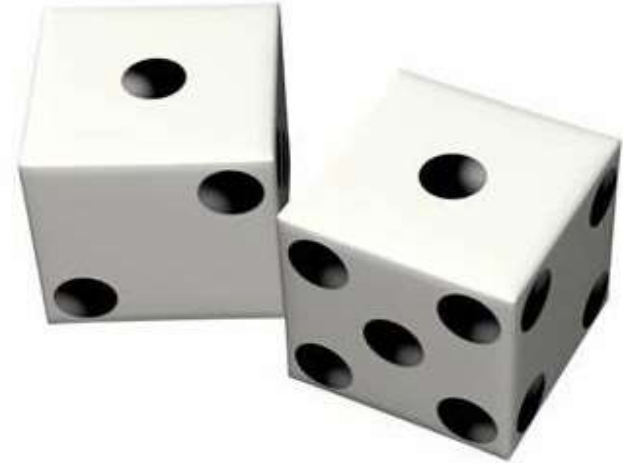
Definitions

- **Probability**

- The likelihood that an unsafe event or condition might occur

- **Severity**

- The possible effects of an unsafe event or condition, taking as reference the **worst foreseeable situation**



Basic safety management SARPs – Part I

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

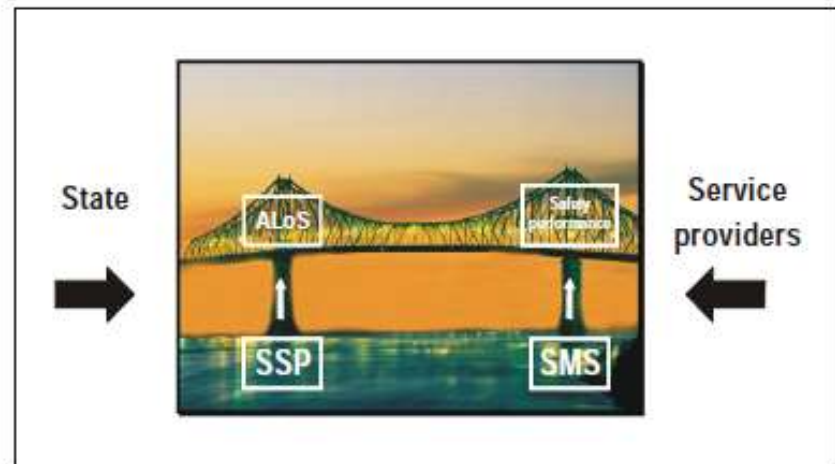


Figure 11-1. SMS bridges the gap between the safety processes of the State and those of the service provider

Basic safety management SARPs – Part II

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

Service providers

- The following service providers are required to implement ICAO SARPs on SMS:
 1. Approved training organizations that are exposed to safety risks during the provision of their services
 2. Aircraft operators
 3. Approved maintenance organizations
 4. Organizations responsible for design and/or manufacture of aircraft
 5. Air traffic services providers
 6. Certified aerodromes



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



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.
- ❖ The acceptable level of safety (ALoS) to be achieved shall be established by the State.

Service provider

- ❖ States shall require, as part of their State safety programme (SSP), that a [service provider] implements a safety management system (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 continuing monitoring and regular assessment of the safety performance; and
 - aims at a continuous improvement of the overall performance of the SMS.

Introductory concepts – The basic theory: examples

- **Safety indicators**

- Fatal airline accidents/serious incidents
- Runway excursion events/ground collision events
- Development/absence of primary aviation legislation
- Development/absence of operating regulations
- Level of regulatory compliance
- ...

- **Safety targets**

- Reduction in fatal airline accident/serious incidents
- Maintain the number in runway excursion events/ground collision events
- Improve the actual level of regulatory compliance
- ...

ALoS – Legal considerations

- Establishing ALoS related to an SSP
 - does not replace legal, regulatory, or other already established requirements, but it must support compliance with them
 - leaves unaffected the obligations of States, and does not relieve States from compliance with SARPs



Summary

State accepts and oversees individual service providers' SMS



SSP
(ALoS)

State agrees and supervises individual service provider's SMS safety performance



State accepts and oversees individual service providers' SMS



SSP – State safety risk management component

- **State safety risk management**
 - 2.1 Safety requirements for service providers' SMS
 - 2.2 Agreement on service providers' safety performance

Activities that allow the State to carry out safety risk management based on combined prescription / performance architecture

SSP – State safety assurance component

- **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

Controls to ensure that the State carries out safety assurance based on combined prescription / performance architecture



Oversight and surveillance



- **Oversight** capability of a State safety oversight authority is based on the effective implementation of the eight (8) critical elements
- **Surveillance** by a State safety oversight authority is one of the eight critical element (*CE-7*) and basically is a method for carrying out and verifying regulatory compliance throughout inspections, audits and surveys





SSP safety promotion



4.1 Internal training, communication and dissemination of safety information

- The State aviation organization that has been designated as placeholder for the SSP shall develop and maintain a safety training programme that ensures that the appropriate personnel of its civil aviation organizations involved in the SSP are qualified to perform SSP duties, as appropriate



SSP safety promotion



4.2 External training, communication and dissemination of safety information

- The State shall develop and maintain a formal means for safety communication that ensures that
 - service providers' personnel are fully aware of the SSP and its relationship with the SMS
 - safety critical information is conveyed to service providers
 - service providers understand why particular safety actions are taken



Initial SSP Plan and draft

- ❖ *State Safety Policy*
- ❖ *SSP implementation team*
- ❖ *Assign responsibilities...*
- ❖ *Coordination with other...*



Mature SSP

Collect and evaluate (Cont.)

- ❖ *State safety data collection and analysis capabilities*
- ❖ *Agreement on safety performance indicators*
- ❖ *ALoS with safety measurement + safety performance measurement*



SSP implementation plan



SSP

Additional requirements

- ❖ *During all the implementation phases, the State must determine if additional safety arrangements are required to implement and maintain the organization's SSP*



2013



	DATE	AC/TYPE	FATALITIES	AIRLINE	SITE
1	29JAN	Bombardier CRJ200	21	SCAT Airlines	Kazakistan
2	13FEV	Antonov Na-24	5	South Airlines	Ukraine
3	13APR	B737	0	Lion Air	Indonesian
4	29APR	B747	7	National Airlines	Afghanistan
5	16MAY	Havilland DHC-6	0	Nepal Airlines	Nepal
6	06JUL	B777	3	Asiana Airlines	San Francisco (US)
7	07JUL	Havilland DHC-3	10	Rediske Air	Alaska
8	14AUG	A300	2	UPS Airlines	Birmingham (US Alabama)
9	03OCT	Embraer 120	15	Associated Aviation	Lagos
10	16OCT	ATR-72	49	Lao Airlines	Laos
11	17NOV	B737	50	Tatarstan Airlines	Russia
12	29NOV	Embraer 190	33	LAM Mozambique Airlines	Namíbia
TOTAL			195		