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Aerodrome Workshop-Regulation 139/2014 Aspects on SMS

Podgorica, 6 November 2014

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Safety 'Myths'

- Absence of accident is an indicator of good safety performance.
- We can't afford SMS.
- SMS is just for the 'big guys'.
- If it's not broke, don't fix it!
- I'm OK, it's the other guy you need to worry about.
- Safety management is for Managers.
- We already practice risk management.

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SMS basic

- A SMS provides a systematic way to identify hazards and control risks while maintaining assurance that these risk controls are effective.

- ICAO Doc 9859-" A **hazard** is generically defined by safety practitioners as a condition or an object with the potential to cause death, injuries to personnel, damage to equipment or structures, loss of material, or reduction of the ability to perform a prescribed function.

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History Lesson

- Chernobyl - 26. April 1986.
- King's Cross -18. November 1987.
- Herald of Free Enterprise – 6. March 1987.
- Piper Alpha platforma – 6. July 1988.
- Air Ontario, Dryden – 10. March 1989.

- Things that never happened before happen all the time.

(Sagan, 1993)

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History Lesson

- Piper alpha 1988
  - Gas explosion and subsequent oil fire
  - 167 killed
  - Maintenance and operational errors
  - Poor evacuation capability
  - Cullen report findings 1990

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History Lesson

- In the case of King`s Cross prior to the fire in November 1987 the Official Enquiry discovered the following:
- The regulator did not pursue an aggressive fire protection policy.
- The escalators where know to be fire risk. The statistics for fire on the escalators show over 400 incidents beetwen 1958 and 1987.
- The number of safety officers was inadequate and scattered over wide area.

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History Lesson

- Fire and emergency training was completely inadequate with only 4 of the 21 staff on duty having been trained in evacuation drills.
- There was no evacuation plan for King`s Cross station.
- No joint exercise with the emergency services had ever been carried out.

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History Lesson

Traditional approach – Preventing accidents

- Focus on outcomes (causes)
- Unsafe acts by operational personnel
- Attach blame/punish for failures to "perform safely"
- Address identified safety concern exclusively

Identifies:

WHAT? **WHO?** **WHEN?**

But not always discloses:

WHY? **HOW?**

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The evolution of safety

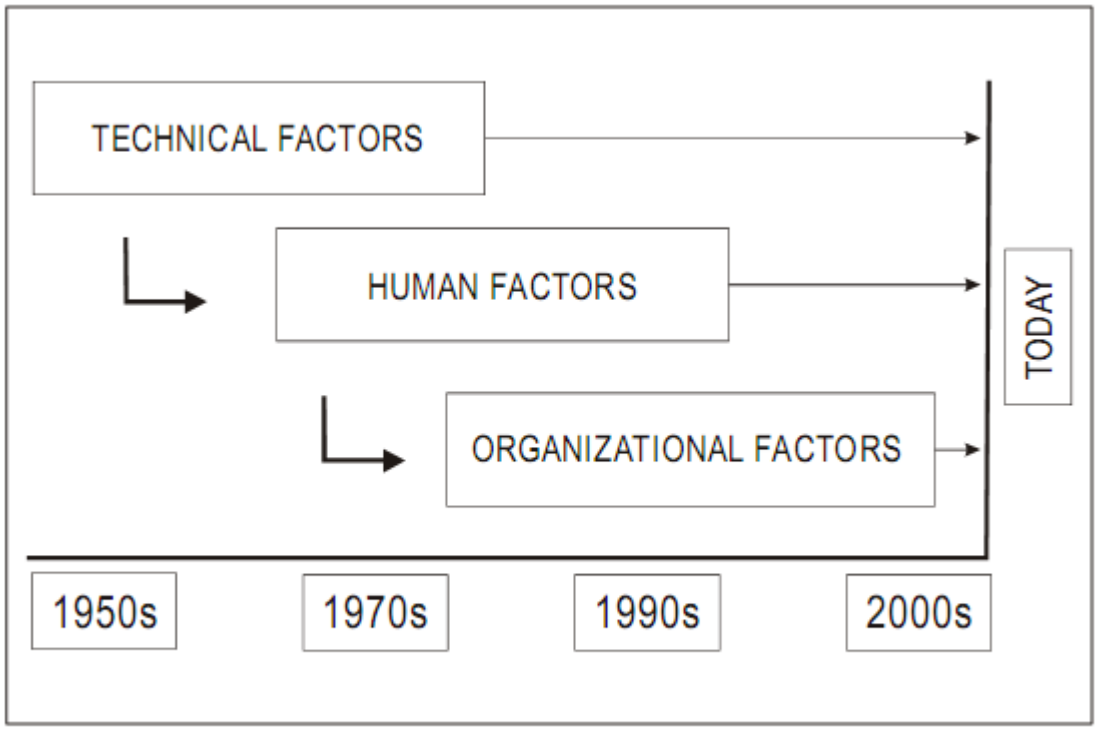

Figure 2-1. The evolution of safety

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Accidents and Incidents Cost!

Direct costs

- Loss of aircraft
- Injuries to or death of flight crewmembers, passengers
- Insurance deductibles
- Costs not covered by insurance

Indirect costs

- Loss of use of equipment
- Loss of staff
  - Involved in accident issues
  - Lower productivity
- Investigation & clean-up
- Legal claims
- Fines
- Misplaced/stranded passengers
- Negative media exposure

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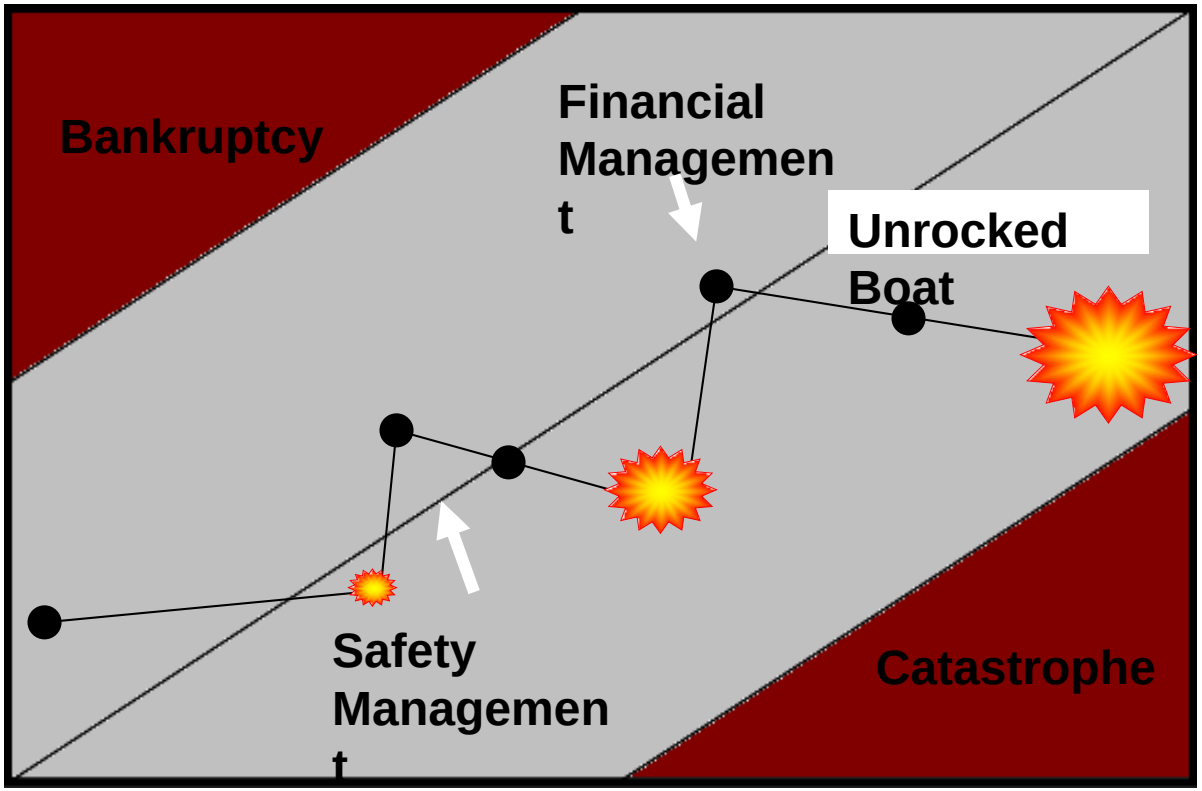
Safety Space



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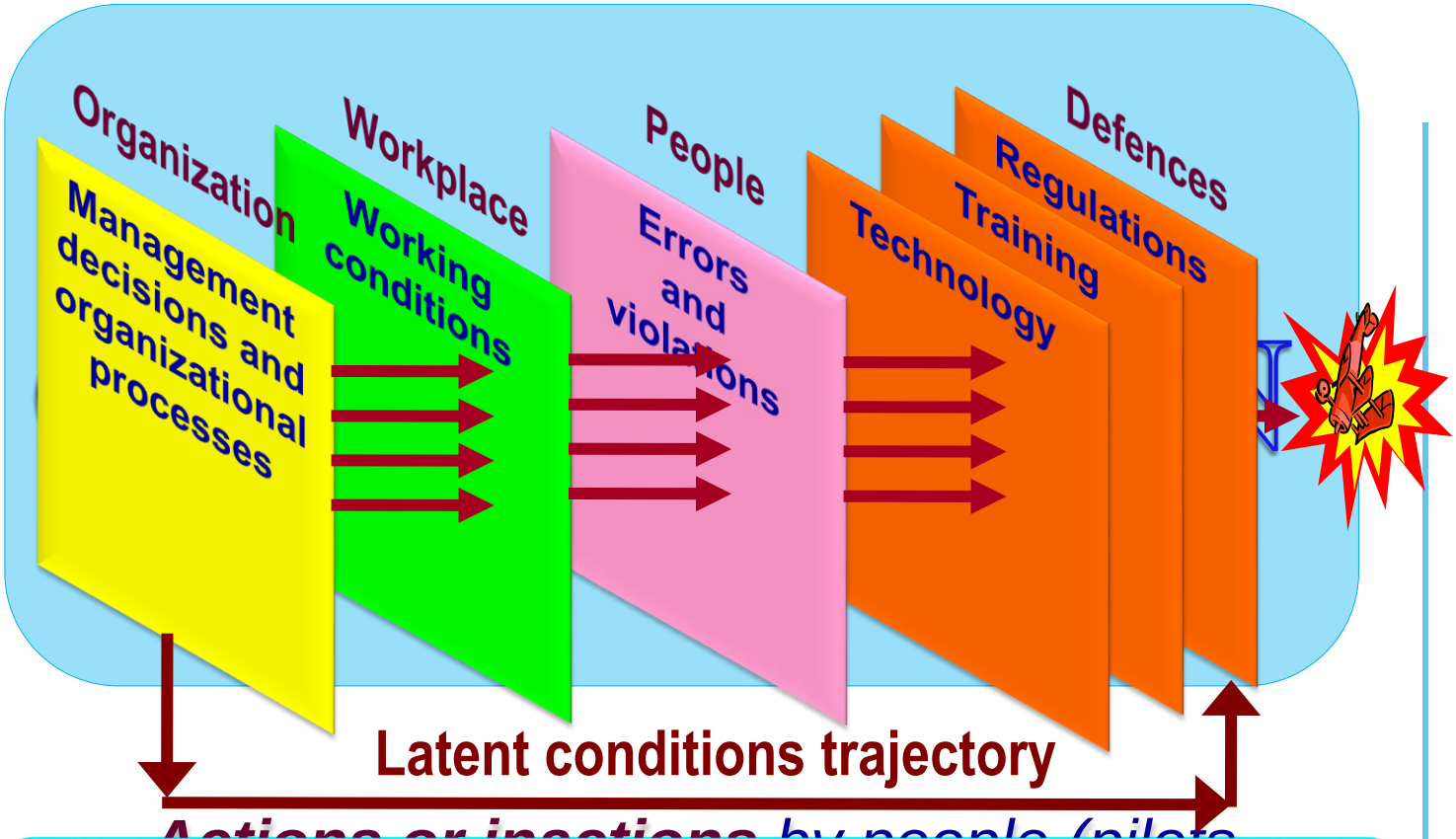
The concept of accident causation



*Conditions present in the system **before** the accident, **made evident** by triggering factors.*

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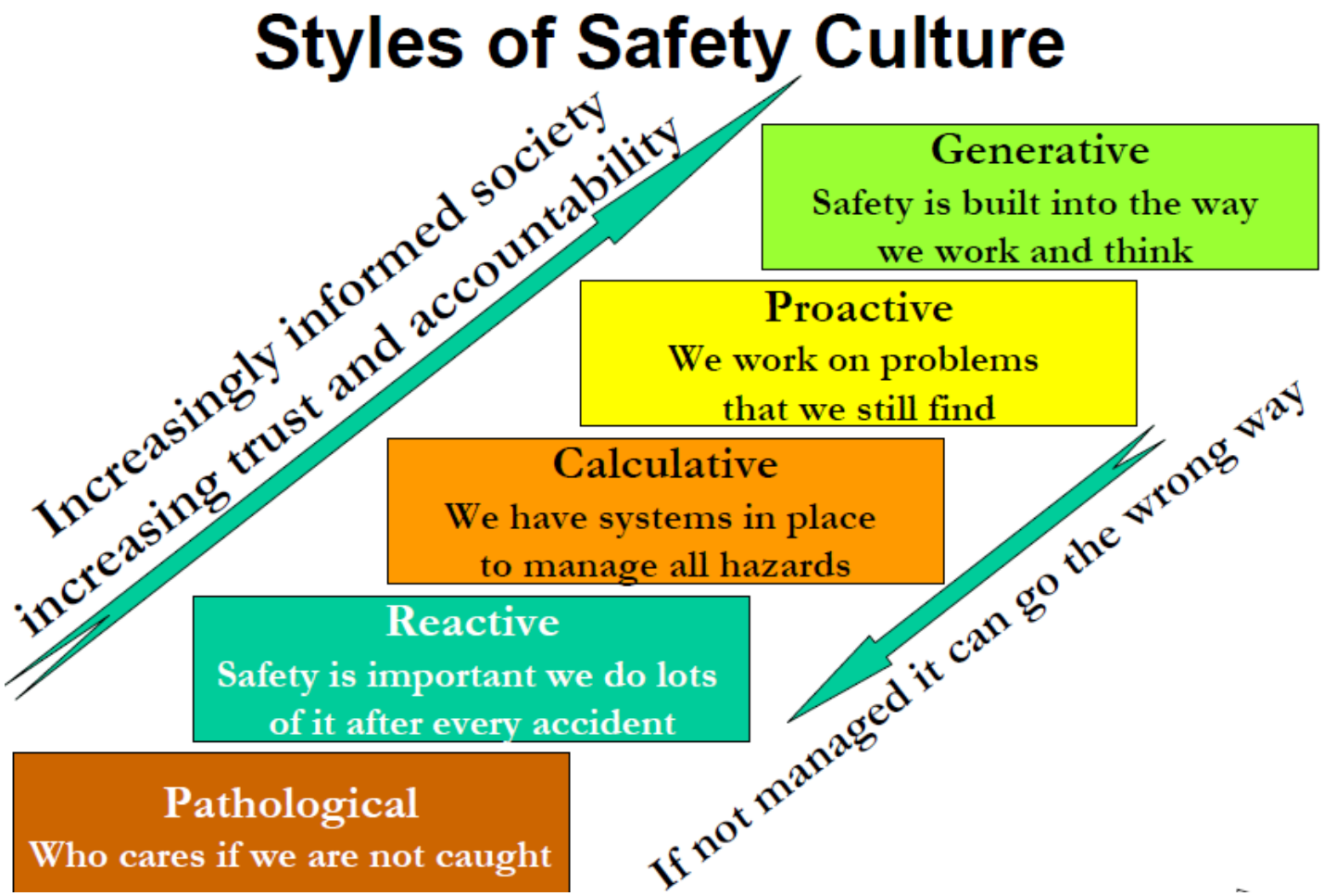
Safety Culture, Just culture Reporting



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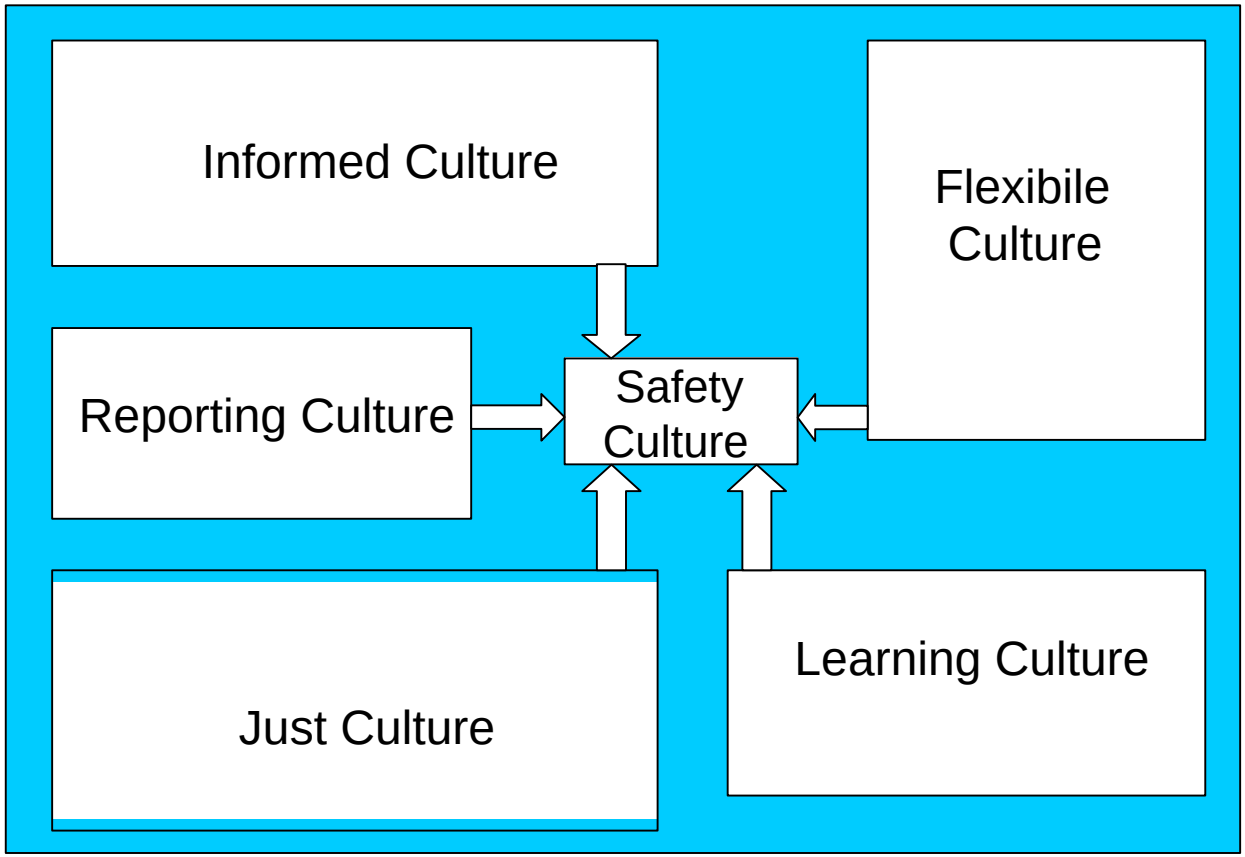
Safety Culture, Just culture Reporting



Reason describes a "Just Culture" as an atmosphere of trust in which people are encouraged (even rewarded) for providing essential safety-related information, but in which they are also clear about where the line must be drawn between acceptable and unacceptable behavior .

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Safety Culture, Just culture Reporting

Safety culture and Just culture as part of it, are the basis for one of the primary sources for Safety Risk Management and Safety Assurance…Reporting

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Safety Culture, Just culture
Reporting

Reporting: Mandatory (accidents and certain types of incidents), and voluntary system

Reporting stages

1st – whistle-blowers

2nd – Somebody else did something

3rd – I / We did something

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Culture Reporting

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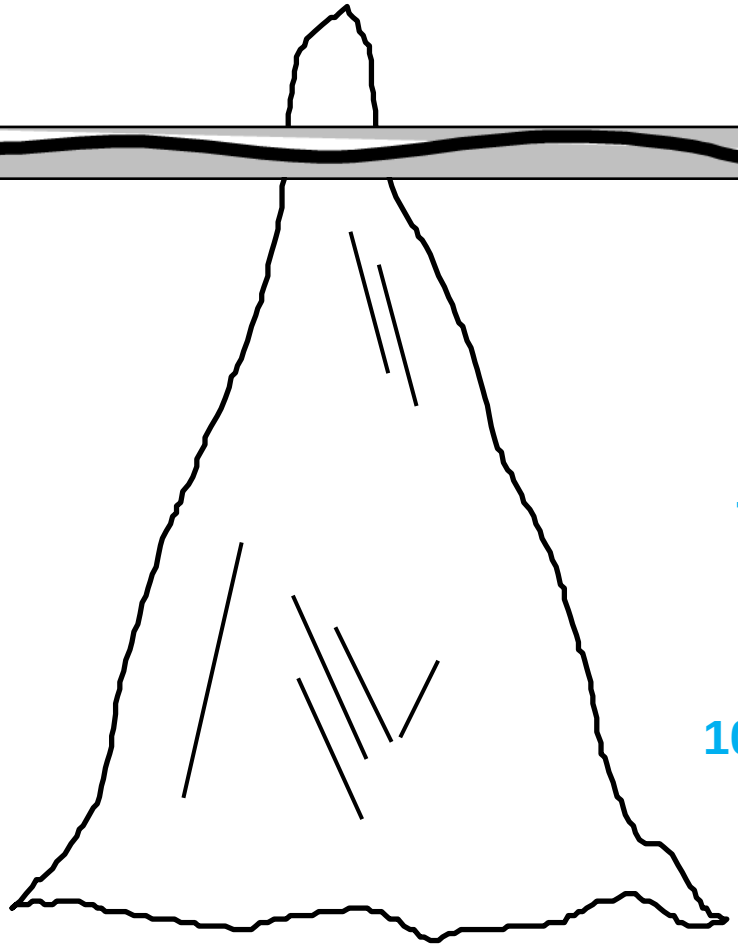
What gets communicated upward?



4% Problems known to top management

9% Problems known to middle management

74% Problems known to supervisors

100% Problems known to rank and file MX personnel

Source: Yoshida, Shuichi, 2nd Intl Quality Symposium, 1989

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The need for safety management

- Traditional – Accident/serious incident investigation
  - Aviation system performs most of the time as per design specifications (base line performance)
  - Compliance based
  - Outcome oriented
- Evolving – Safety management
  - Aviation system does not perform most of the time as per design specifications (practical drift)
  - Performance based
  - Process oriented
  - Compliance on its own does not assure safety

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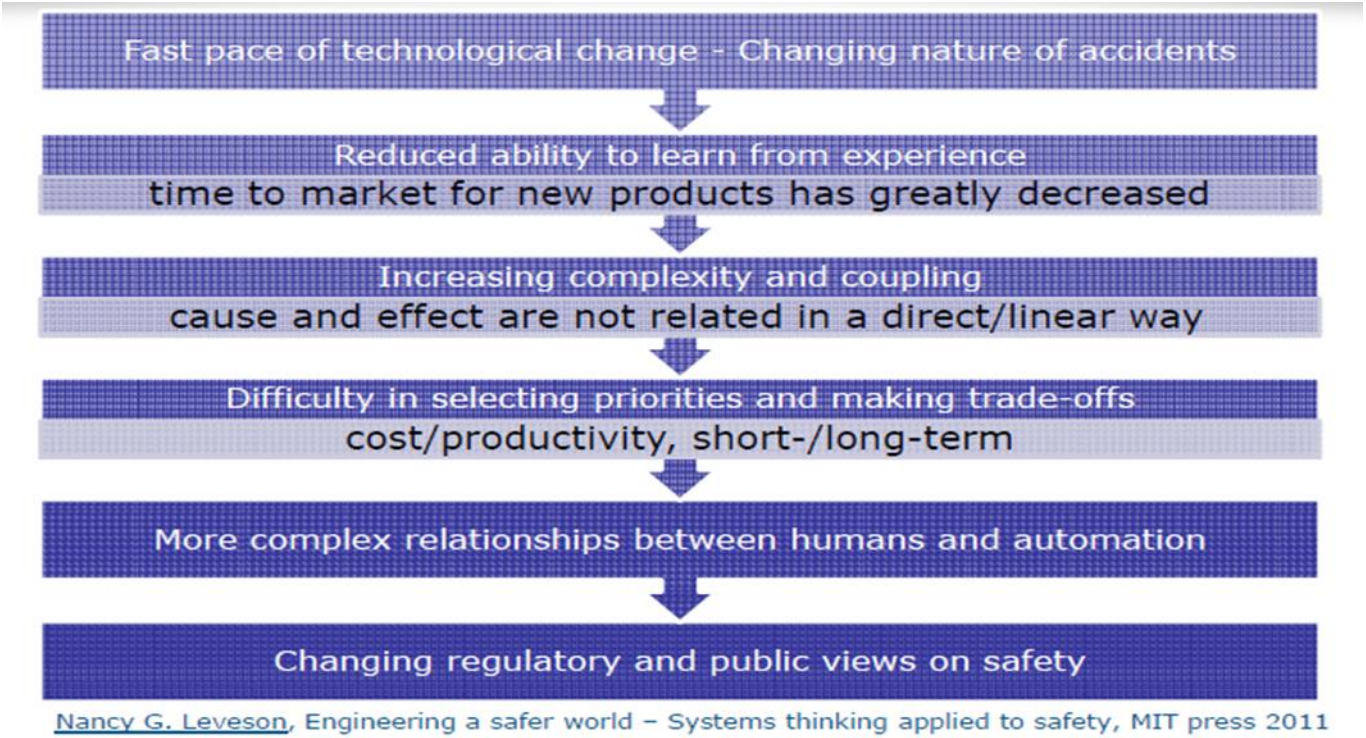
The need for safety management



Nancy G. Leveson, Engineering a safer world – Systems thinking applied to safety, MIT press 2011

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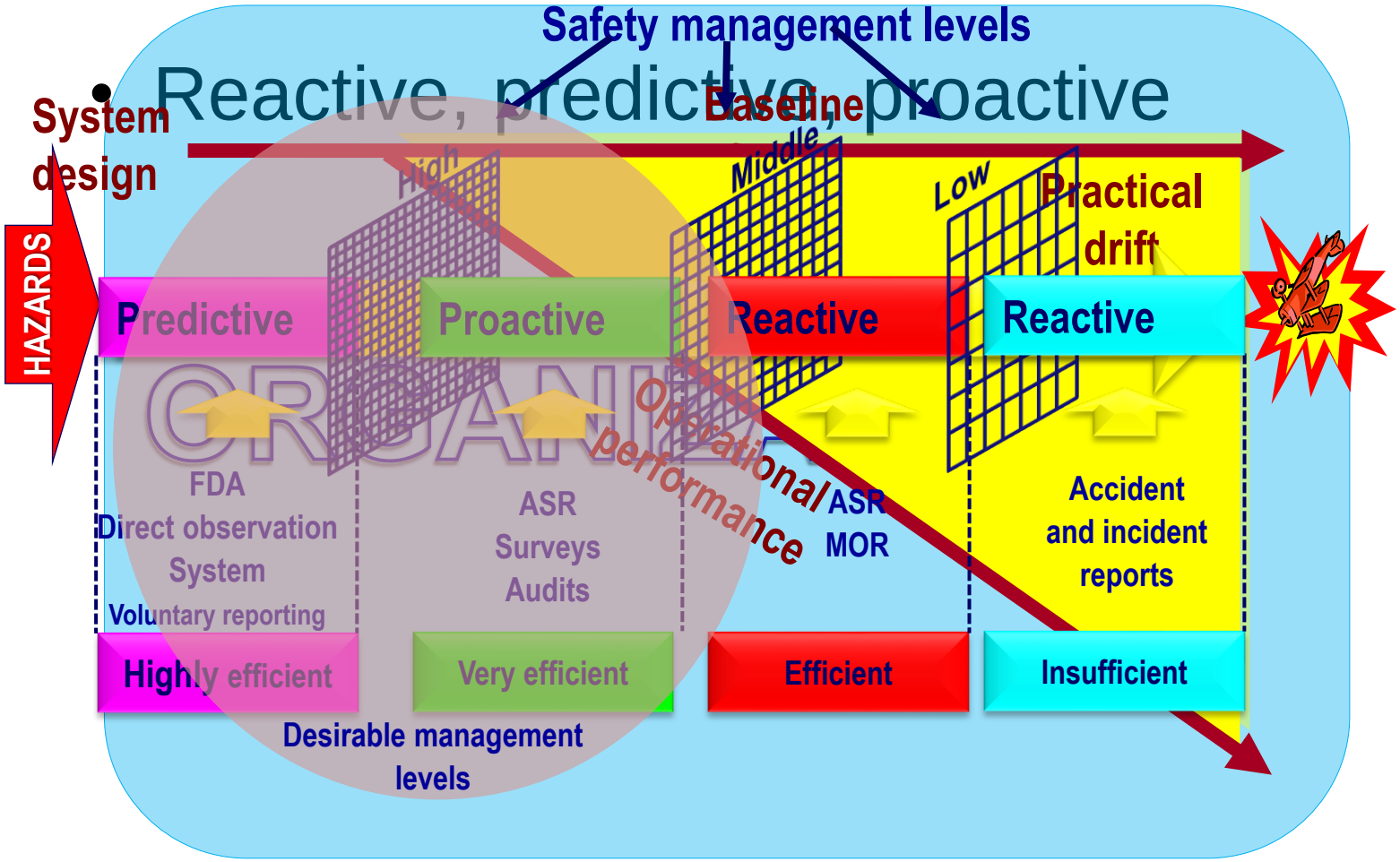
Safety management levels



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Basis of Annex 19, 1st edition

1. The transfer of overarching safety management provisions from the following Annexes:

- **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 — Helicopters;**
- **Annex 8 — Airworthiness of Aircraft;**
- **Annex 11 — Air Traffic Services;**
- **Annex 13 — Aircraft Accident and Incident Investigation; and**
- **Annex 14 —Aerodromes, Volume I — Aerodrome Design and Operations**

Note: Independently of the applicability date of Annex 19, these SARPS retain their original applicability, dating from 2001 onwards.

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Basis of Annex 19, 1st edition (cont.)

2. **The adaptation of Annex 6, Part I, Appendix 5 and Annex 6, Part III, Appendix 1, Safety oversight of Air Operators.**

3. **The duplication of Annex 13, Attachment E, Legal guidance for the protection of information from safety data collection and processing systems.**

- **Sector-specific safety management provisions were retained in their appropriate Annexes.**
- **Examples include:**

– **Annex 1 (1.2.4.2) - basic safety management principles applicable to the medical assessment process of license holders; and**

– **Annex 6, Part I and III - the flight data analysis programme is part of the aeroplane or helicopter operator's SMS.**

Annex 19 - EASA rules - compliance table

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ICAO Doc 9859

SMM 1st & 2nd editions in 2006 & 2009.

SMM 3rd edition (advance version) posted on 28 May 2012.

SMM 3rd edition final (en) version posted on 8 May 2013.

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ICAO Doc 9859-Third edition highlights

1. List of Definitions - new

Chapter 1 (Safety Management Fundamentals):

2. Organization risk profile assessment - new
3. Hazards prioritization procedure - new
4. Distinguishing Aviation & OSHE hazards - new
5. Basic risk mitigation tool
6. Performance-based requirements and its oversight

Chapter 2 (Safety Management SARPs):

7. Consolidation of current safety management SARPs-new
8. Introduction to Annex 19 development status - new

Chapter 3 (State Safety Program):

9. Clarity between enforcement policy & procedures

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ICAO Doc 9859-Third edition highlights

10. Agreement on SPIs, Targets & Alert settings
11. Mandatory & voluntary reporting systems - new
12. SPI & ALoS development
13. Safety information protection
14. Safety data and risk based surveillance process
15. Updated GAQs, including main text references
16. Documentation for gap analysis & tasks implementation - new
17. 4-phased progressive implementation of SSP - new
18. ALoSP measurement through SPI Target and Alert levels -new

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ICAO Doc 9859-Third edition highlights

Chapter 4 (SMS):

19. Guidance on emergency response planning
20. Guidance on development of a SMS Document/ Manual - new
21. Guidance on SMS voluntary reporting system - new
22. Basic Safety Assessment Tool - new
23. SMS-QMS integration guidance
24. Updated GAQs, including main text references
25. Safety performance measurement through SPI target and alert settings

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Main components and elements of SMS

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

Safety risk management

2.1 Hazard identification

2.2 Safety risk assessment and mitigation

Safety assurance

3.1 Safety performance monitoring and measurement

3.2 The management of change

3.3 Continuous improvement of the SMS

Safety promotion

4.1 Training and education

4.2 Safety communication

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1.1 Management commitment and responsibility

ADR.OR.D.005 Management system

(b) The management system shall include:

(2) a description of the overall philosophies and principles of the aerodrome operator with regard to safety, referred to as the safety policy, signed by the accountable manager;

AMC1 ADR.OR.D.005(b)(2) Management system

(b) The safety policy should:

(1) include a commitment:

(i) to improve towards the highest safety standards;

(ii) to comply with all applicable legal requirements, meet all applicable standards, and consider best practices;

(iii) to provide appropriate resources;

(iv) to enforce safety as one primary responsibility of all managers and staff;

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1.2 Safety accountabilities

ADR.OR.D.005 Management system

(a) The aerodrome operator shall implement and maintain a management system integrating a safety management system.

(b) The management system shall include:

(1) clearly defined lines of responsibility and accountability throughout the aerodrome operator, including a direct accountability for safety on the part of senior management;

ADR.OR.D.015 Personnel requirements

(a) The aerodrome operator shall appoint an accountable manager, who has the authority for ensuring that all activities can be financed and carried out in accordance with the applicable requirements. The accountable manager shallbe responsible for establishing and maintaining an effective management system.

(b) The aerodrome operator shall nominate persons responsible for the management and supervision of the following areas:

(1) operational services of the aerodrome; and

(2) maintenance of the aerodrome.

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1.3 Appointment of key safety personnel

ADR.OR.D.015 Personnel requirements

(c) The aerodrome operator shall nominate a person or group of persons responsible for the development, maintenance and day-to-day management of the safety management system.

Those persons shall act independently of other managers within the organisation, shall have direct access to the accountable manager and to appropriate management for safety matters and shall be responsible to the accountable manager.

AMC1 ADR.OR.D.015(c) Personnel requirements

SAFETY MANAGER

(a) The safety manager should be the focal point and responsible for the development, administration, and maintenance of an effective safety management system (see also AMC1 ADR.OR.D.005(b)(1)).

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1.4 Coordination of emergency response planning

ADR.OPS.B.005 Aerodrome emergency planning

The aerodrome operator shall have and implement an aerodrome emergency plan that:

(a) is commensurate with the aircraft operations and other activities conducted at the aerodrome;

(b) provides for the coordination of appropriate organisations in response to an emergency occurring at an aerodrome or in its surroundings; and

(c) contains procedures for periodic testing of the adequacy of the plan and for reviewing the results in order to improve its effectiveness.

AMC1 ADR.OPS.B.005(b) Aerodrome Emergency Planning

GENERAL

(a) The aerodrome operator should ensure that the aerodrome emergency plan includes the ready availability of, and coordination with, appropriate specialist rescue services to be able to respond to emergencies where an aerodrome is located close to water and/or swampy areas, and where a significant portion of approach or departure operations takes place over these areas.

(b) The aerodrome operator should ensure that an assessment of the approach and departure areas within 1000 m of the runway threshold is carried out to deter-mine the options available for intervention.

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1.5 SMS documentation

ADR.OR.D.005 Management system
(c) The aerodrome operator shall document all management system key processes.
AMC2 ADR.OR.D.005(c) Management system
AERODROME OPERATOR SAFETY MANAGEMENT MANUAL
(a) In cases where safety management is set out in a Safety Management Manual, it should be the key instrument for communicating the approach to safety for the aerodrome operator. The Safety Management Manual should document all aspects of safety management, including the safety policy, objectives, procedures,and individual safety responsibilities.

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1.5 SMS documentation

AMC2 ADR.OR.D.005(c) Management system

AERODROME OPERATOR SAFETY MANAGEMENT MANUAL

(b) The contents of the Safety Management Manual should include:

(1) scope of the safety management system;

(2) safety policy and objectives;

(3) safety responsibilities of key safety personnel;

(4) documentation control procedures;

(5) safety assessment process, including hazard identification and risk management schemes;

(6) monitoring of implementation and effectiveness of safety actions, and risk mitigation measures;

(7) safety performance monitoring;

(8) safety reporting (including hazard reporting) and investigation;

(9) coordination of emergency response planning;

(10) management of change (including organisational changes with regard to safety responsibilities);

(11) safety promotion; and

(12) safety management system outputs.

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2.1 Hazard identification

ADR.OR.D.005 Management system
(b) The management system shall include:
(3) a formal process that ensures that hazards in operations are identified;
AMC1 ADR.OR.D.005(b)(3) Management system
HAZARD IDENTIFICATION PROCESS
(a) Hazard identification should be based on a combination of reactive, proactive, and predictive methods of safety data collection. Reactive, proactive, and predictive schemes for hazard identification should be the formal means of collecting, recording, analysing, acting on, and generating feedback about hazards and the associated risks that affect safety.
(b) All reporting systems, including confidential reporting schemes, should include an effective feedback process.
GM1 ADR.OR.D.005(b)(3) Management system
HAZARD IDENTIFICATION (1) Hazard identification factors and processes, (2) Hazard identification from internal and external sources, (4) Hazard identification tools and techniques, (5) and (6) Hazard Log.

2.2 Safety risk assessment and mitigation

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ADR.OR.D.005 Management system

(b) The management system shall include:

(4) a formal process that ensures analysis, assessment and mitigation of the safety risks in aerodrome operations;

AMC1 ADR.OR.D.005(b)(4) Management system

SAFETY RISK ASSESSMENT AND MITIGATION

(a) A formal safety (risk) assessment and mitigation process should be developed and maintained that ensures analysis (in terms of probability and severity of occurrence), assessment (in terms of tolerability), and control (in terms of mitigation) of risks.

(b) The levels of management who have the authority to make decisions regarding the tolerability of safety risks, in accordance with (a) above, should be specified in the aerodrome manual.

GM1 ADR.OR.D.005(b)(4) Management system

Safety risk decision making and acceptance should be specified through a risk tolerability matrix. The definition and final construction of the matrix should be left to the operator to design, be documented in the aerodrome manual, and be subject to an approval by the Competent Authority.

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3.1 Safety performance monitoring and measurement

ADR.OR.D.005 Management system

(b) The management system shall include:

(5) the means to verify the safety performance of the aerodrome operator's organisation in reference to the safety performance indicators and safety performance targets of the safety management system, and to validate the effectiveness of safety risk controls;

AMC1 ADR.OR.D.005(b)(5) Management system

SAFETY PERFORMANCE MONITORING AND MEASUREMENT

(a) Safety performance monitoring and measurement should be the process by which the safety performance of the aerodrome operator is verified in comparison to the safety policy and objectives, identified safety risks and the mitigation measures.

(b) This process should include the setting of safety performance indicators and safety performance targets, and measuring the aerodrome operator's safety performance against them.

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3.1 Safety performance monitoring and measurement

GM1 ADR.OR.D.005(b)(5) Management system

SAFETY PERFORMANCE MONITORING AND MEASUREMENT

(a) The performance monitoring and measurement process should include:

(1) safety reporting,

(2) safety studies,

(3) safety reviews,

(4) safety audits,

(5) safety surveys,

(6) internal safety investigations whose scope should extend the scope of occurrences required to be reported to the Competent Authority.

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3.2 The management of change

ADR.OR.D.005 Management system
(b) The management system shall include:
(6) a formal process to:
(i) identify changes within the aerodrome operator's organisation, management system, the aerodrome or its operation which may affect established processes, procedures and services;
(ii) describe the arrangements to ensure safety performance before implementing changes; and
(iii) eliminate or modify safety risk controls that are no longer needed or effective due to changes in the operational environment;
GM1 ADR.OR.D.005(b)(6) Management system
THE MANAGEMENT OF CHANGE
(a) Change can introduce new hazards, impact the appropriateness and/or effectiveness of existing safety risk mitigation strategies. Changes may be external to the organisation, or internal.

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3.3 Continuous improvement of the SMS

ADR.OR.D.005 Management system

(b) The management system shall include:

(7) a formal processes to review the management system referred to in para-graph (a), identify the causes of substandard performance of the safety management system, determine the implications of such substandard performance in operations, and eliminate or mitigate such causes;

AMC1 ADR.OR.D.005(b)(7) Management system

CONTINUOUS IMPROVEMENT OF THE SAFETY MANAGEMENT SYSTEM

The aerodrome operator should continuously seek to improve its safety performance. The aerodrome operator should develop and maintain a relevant formal process. Continuous improvement should be achieved through:

(a) proactive and reactive evaluation of facilities, equipment, documentation, and procedures;

b) proactive evaluation of an individual's performance, to verify the fulfilment of that individual's safety responsibilities; and

(c) reactive evaluations in order to verify the effectiveness of the system for control and mitigation of safety risks.

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4.1 Training and education

ADR.OR.D.005 Management system
(b) The management system shall include:
(8) a safety training programme that ensures that personnel involved in the operation, rescue and firefighting, maintenance and management of the aerodrome are trained and competent to perform the safety management system duties;
GM1 ADR.OR.D.005(b)(8) Management system
STAFF SAFETY MANAGEMENT SYSTEM TRAINING REQUIREMENTS
(a) Operations, rescue and firefighting, and maintenance personnel
(1) Safety training should address safety responsibilities, including adherence to all operating and safety procedures, and recognising and reporting hazards;
(2) The training objectives should include the organisation's safety policy and safety management system fundamentals, and overview;
(3) The contents should include:
(i) definition of hazards, (ii) consequences and risks, (iii) the safety risk management process, including roles and responsibilities;
and (iv) safety reporting and the organisation's safety reporting system(s**).**

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4.2 Safety communication

ADR.OR.D.005 Management system

(b) The management system shall include:

(9) formal means for safety communication that ensures that personnel are fully aware of the safety management system, conveys safety critical information, and explains why particular safety actions are taken and why safety procedures are introduced or changed;

GM1 ADR.OR.D.005(b)(9) Management system

SAFETY COMMUNICATION

(a) An aerodrome operator, may use the following tools to communicate safety information:

(1) Safety Management System Manual;

(2) safety processes and procedures;

(3) safety newsletters, notices, and bulletins; and

(4) websites or emails;

(b) Regular meetings with personnel where information, actions, and procedures are discussed may be used to communicate safety matters.

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SMS Assessment Tools

SM ICG - SMS Evaluation tool

ICAO – SMS Audit Checklist

UK CAA – SMS Evaluation

EU Cross-domain Safety management Assessment methodology

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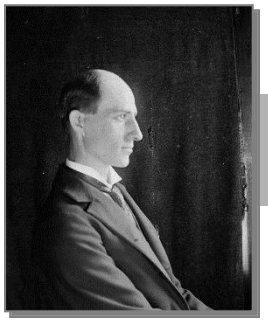
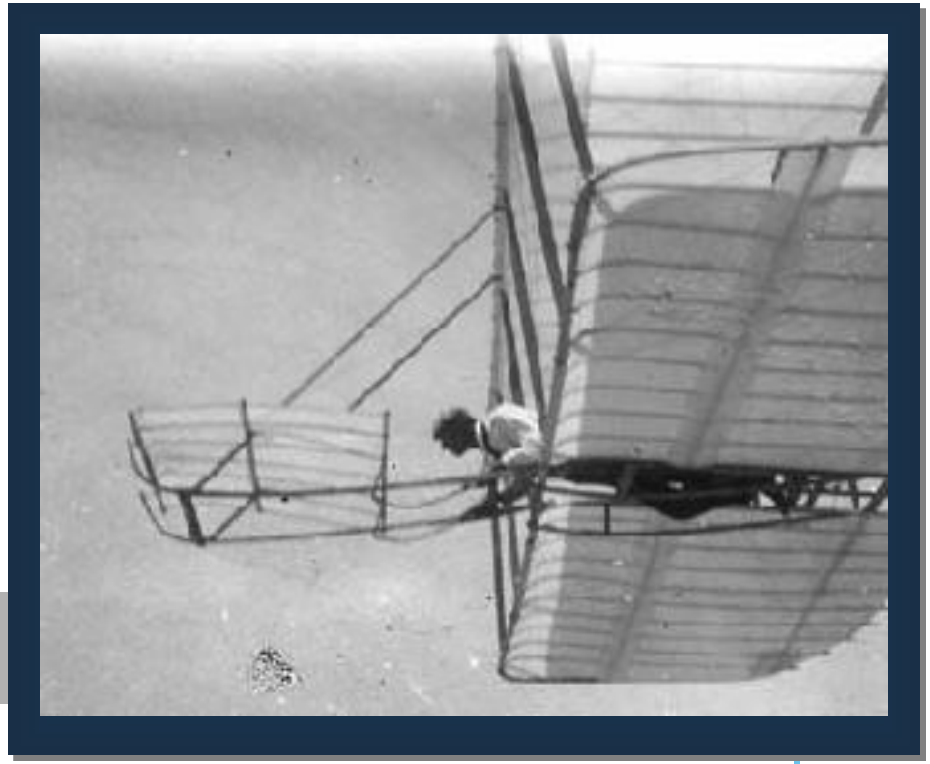
"Carelessness and overconfidence are more dangerous than deliberately accepted risk"
Wilbur Wright, 1901





Wilbur Wright gliding, 1901
Photographs: Library of Congress

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Thank you for attention