Safety Management Systems Introduction

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Safety Management

Something you *do*…

…not some *thing*
you have.

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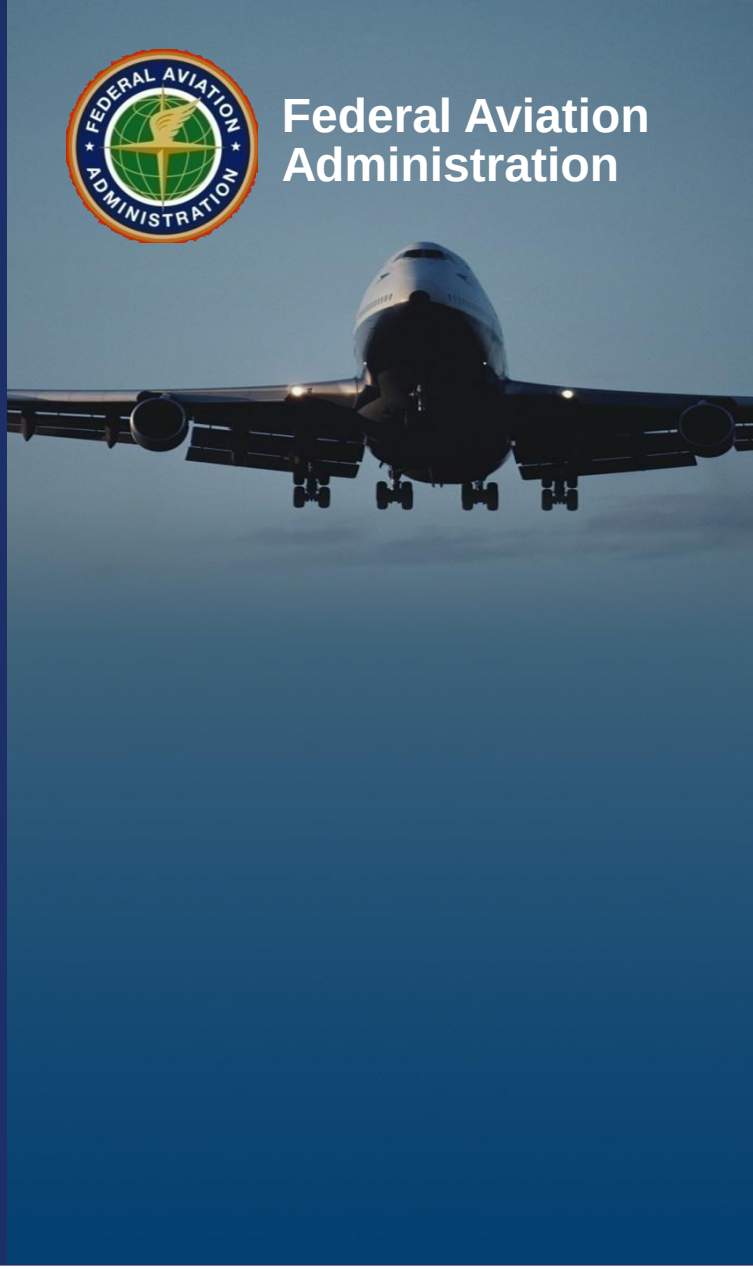
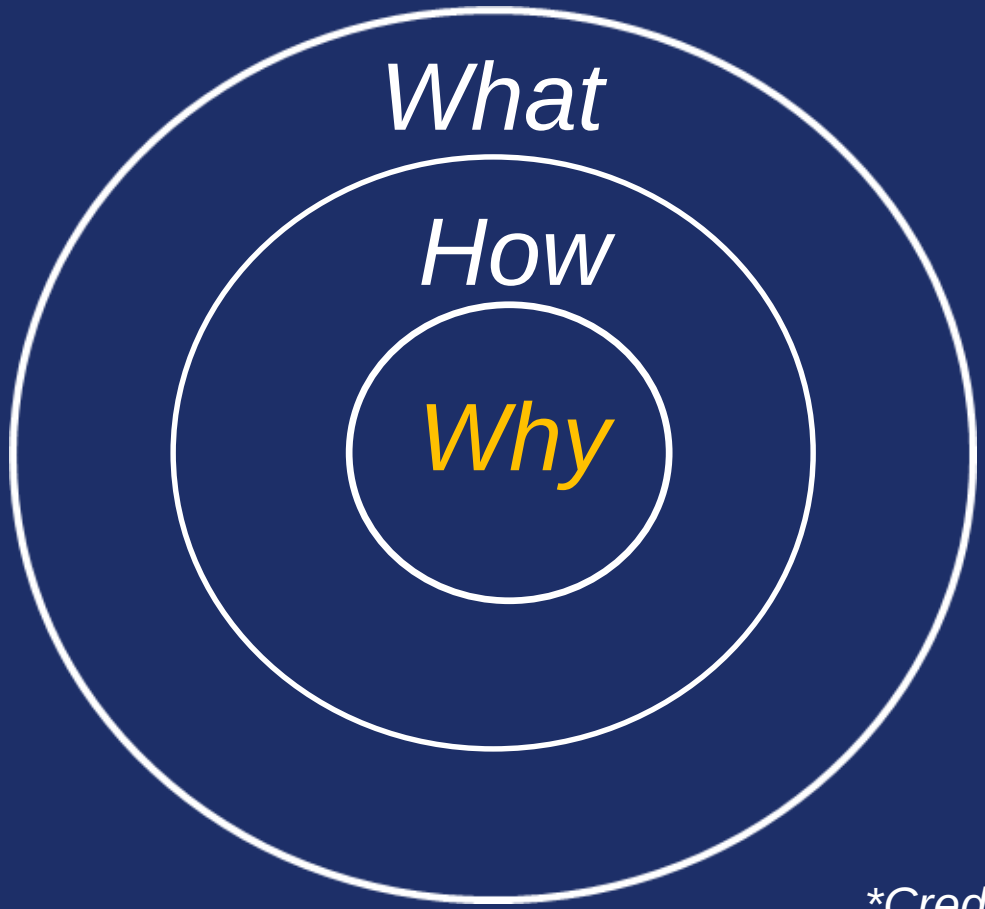
Senior Technical Advisor for Safety Management

FAA Flight Standards Service



Federal Aviation Administration

Start with “Why”



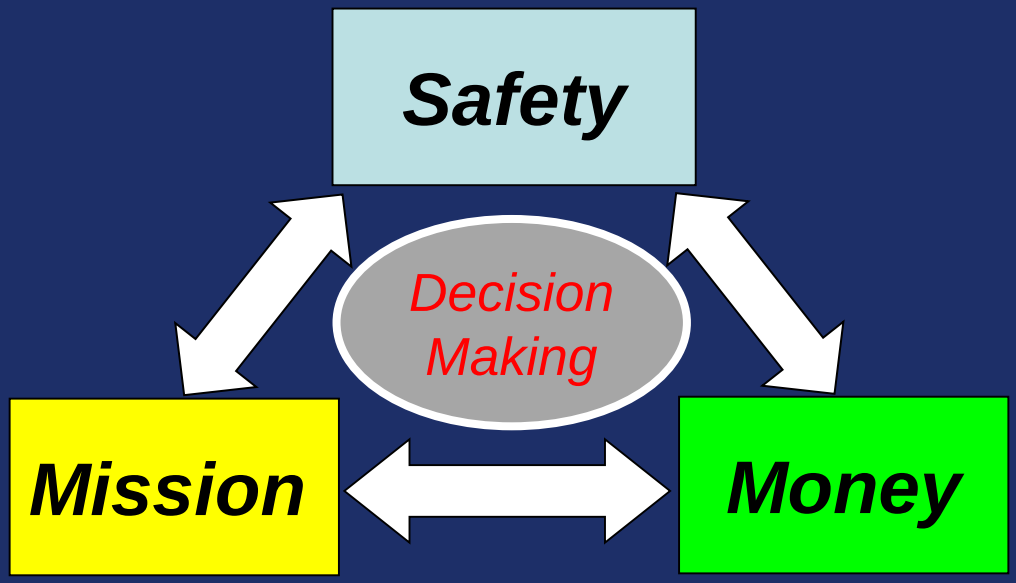
*Credit to Simon Sinek

Why are we doing this?

- **[System safety is] the application of special technical and managerial [processes] to the systematic, forward-looking control of hazards…**
- **One system, two aspects:**
  - Technical
  - Managerial
- **People - a problem to control or a resource to harness?**

Roland and Moriarty (1990); Sidney Dekker (2015)

Decision Making Balance



Safety

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

ICAO Doc 9859

Safety: Operational Definition

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

ICAO Doc 9859

Operationally defined…

"Safety" is ***How well risk is managed***

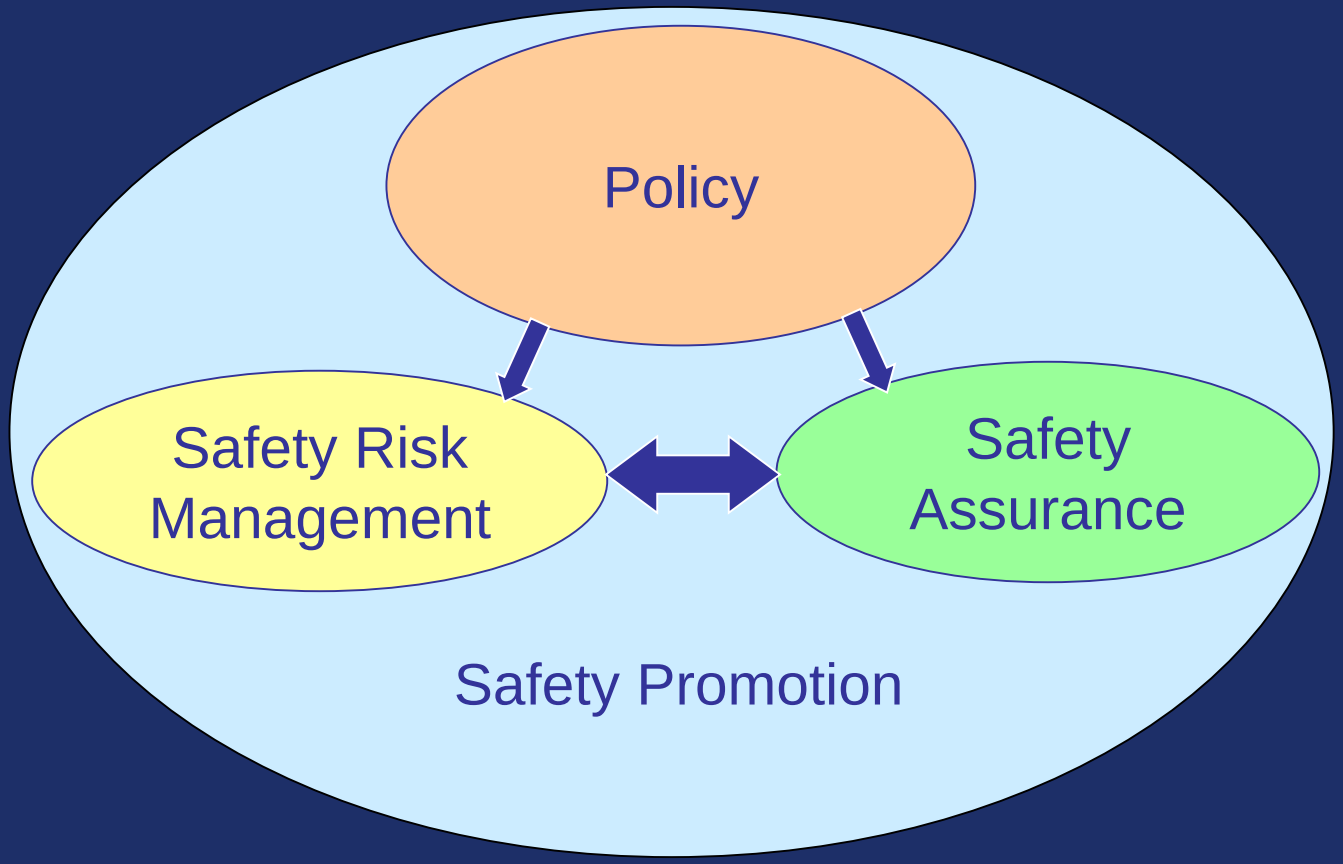
So where do we go from here?

For every complex question there's a solution that's clear, simple…

…and wrong.

H. L. Mencken

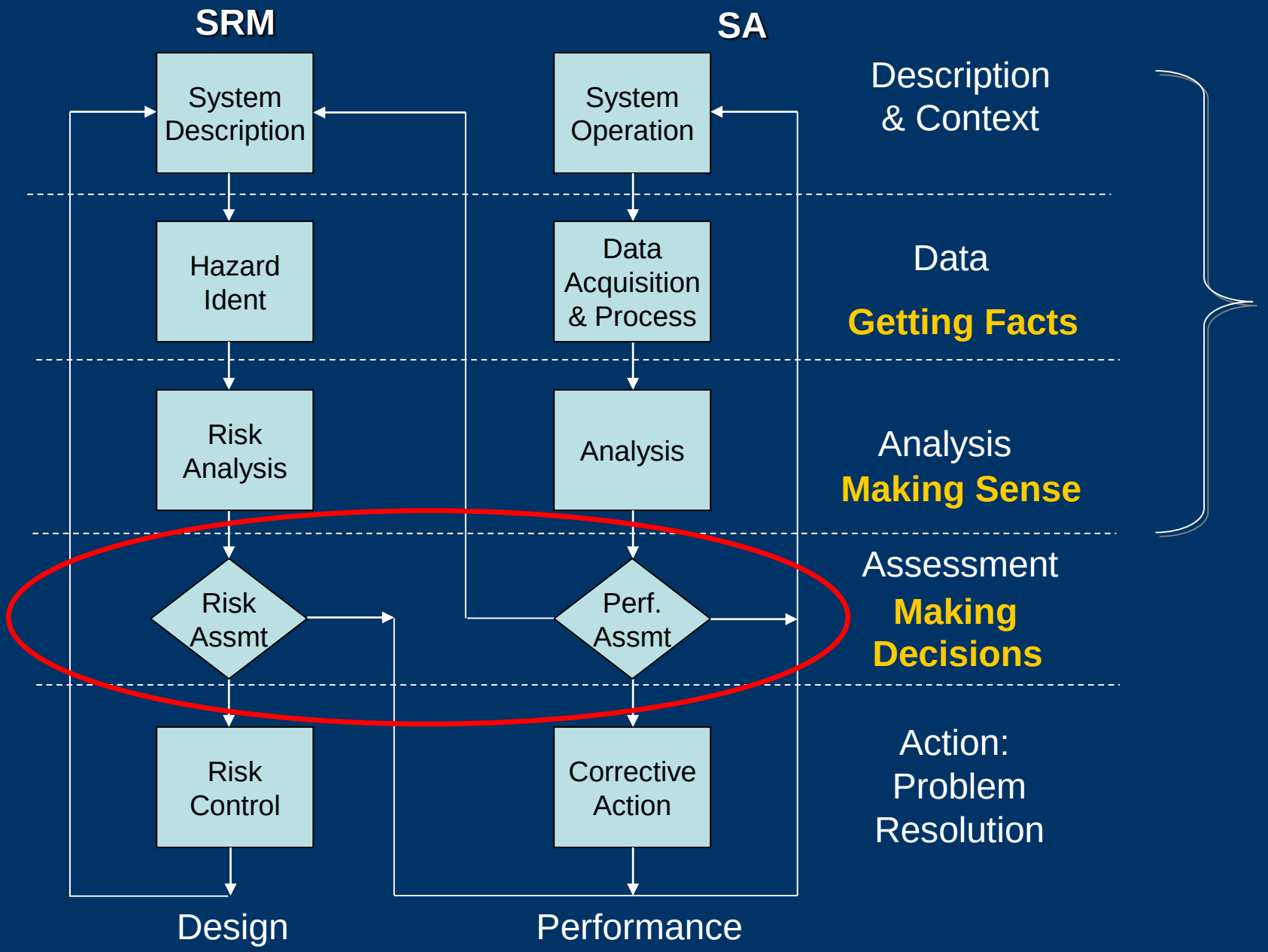
SMS Components (“Pillars”)



Accountability: What do we mean?

- Blame?
- A scapegoat?
- That's "backward accountability"
- We want "forward looking accountability"
- Taking responsibility for reporting
- Willingness to admit mistakes
- Taking responsibility for change

Safety Risk Management (SRM) and Safety Assurance (SA)



Levels of Risk Management

In-Depth

- Policy/ Procedures
- Task Analysis
- Training Design
- Development of Personal Practices
- **SMS: SRM**

Deliberate

- Task/Job Planning
- Dispatch/ Operational Control
- Pre-Shift/Pre-Task briefings
- **SMS: SA (Monitor)**

Real Time/Time Critical

- Builds on others levels
- Mission/Situation events in real time
- **SMS: Operation**

Situation Awareness

Monitor

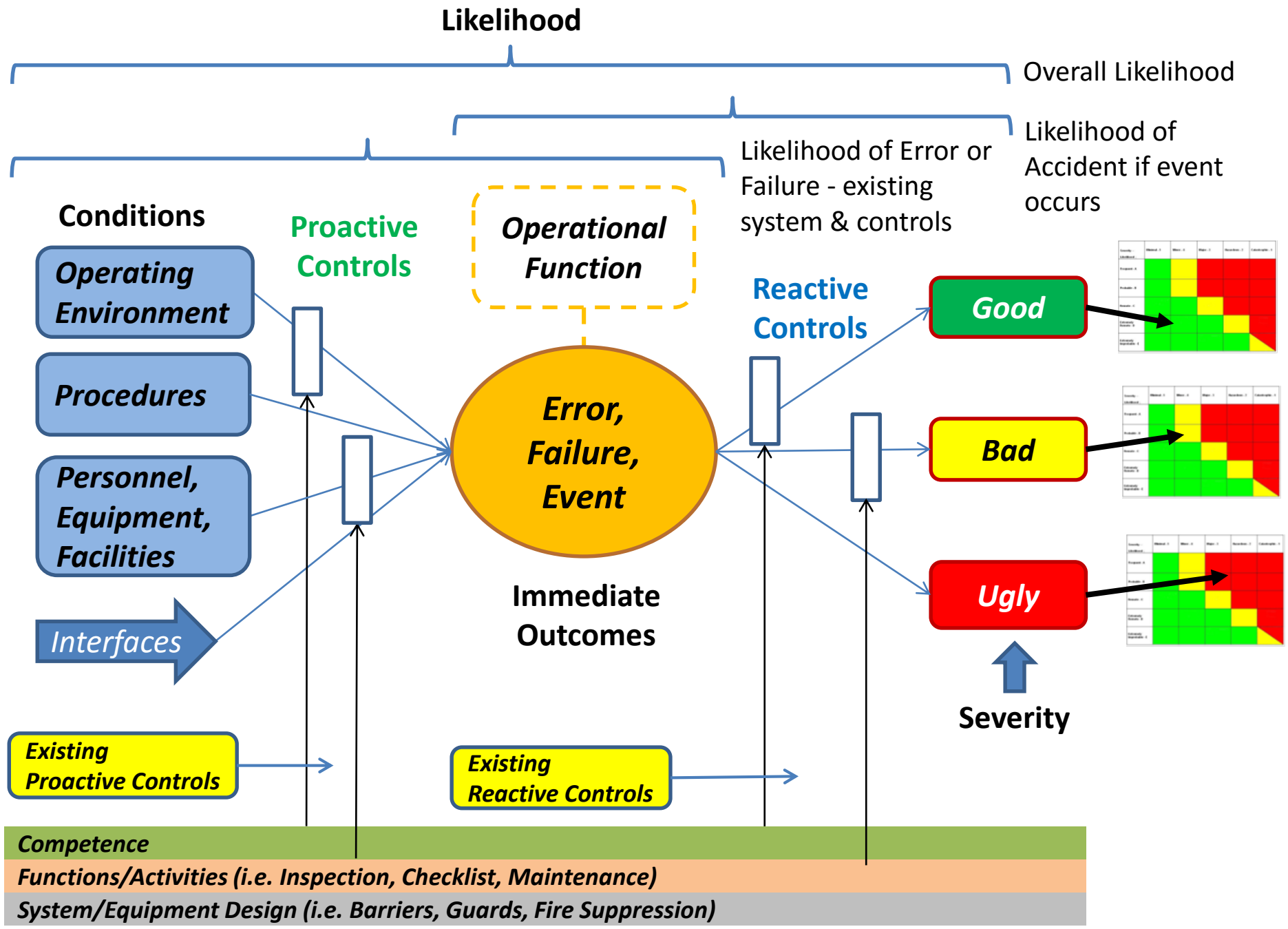
Evaluate

Anticipate

Decision

Action

Adapted from U.S. Navy OPNAVINST 3500.39C/U.S. Air Force AFI 90-802


Likelihood
Overall Likelihood
Likelihood of Error or Failure - existing system & controls
Likelihood of Accident if event occurs
Conditions
Operating Environment
Procedures
Personnel, Equipment, Facilities
Interfaces
Proactive Controls
Operational Function
Error, Failure, Event
Immediate Outcomes
Reactive Controls
Good
Bad
Ugly
Severity
Existing Proactive Controls
Existing Reactive Controls
Competence
Functions/Activities (i.e. Inspection, Checklist, Maintenance)
System/Equipment Design (i.e. Barriers, Guards, Fire Suppression)

SRM in a Nutshell

14 CFR Part 5, Subpart C

5.53(a)&(b)

Responsibilities
5.23(a)(2)(i)
5.25(c)(2)

Process
5.53(c)

Responsibility
5.25(c)(2)

Process
5.55(a)

Responsibility
5.23(a)(2)(i)

Authority
5.23(b)

Process
5.55(b)

Process;
Procedures,
Controls
5.55(c)&(d)

Risk Management

System Analysis
- Operation?
- Conditions?

Hazard Identification
- What could go wrong?
- Source/Conditions?
- Possible result?

Risk Analysis
- How Bad?
- How Likely?

Risk Assessment
- **Acceptable risk?**

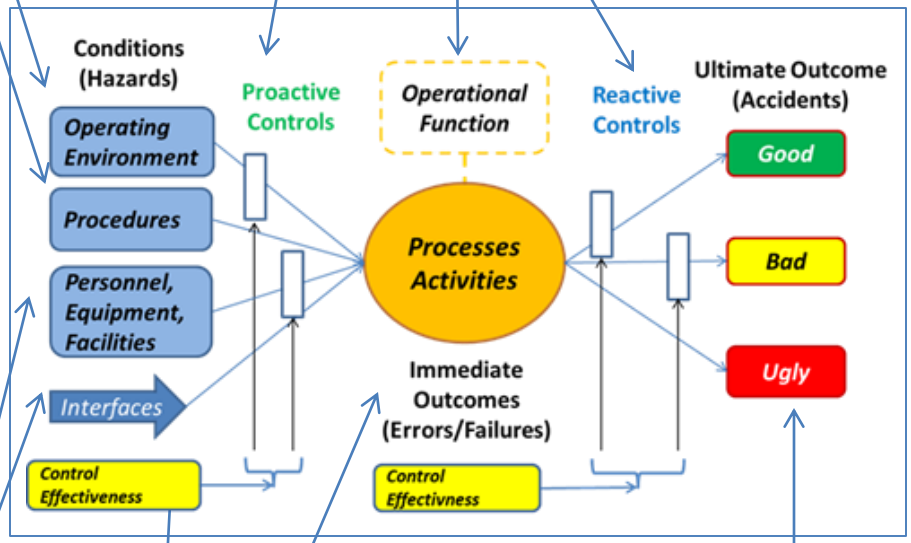
Risk Control
- **Control action?**

Controls

5.53(b)(3)

5.53(b)(2)

5.53(b)(1)



Interfaces

5.53(b)(4)

…potential system failures or errors, possibly resulting in an accident

Potential Outcomes

Process Measurement (Subpart D)

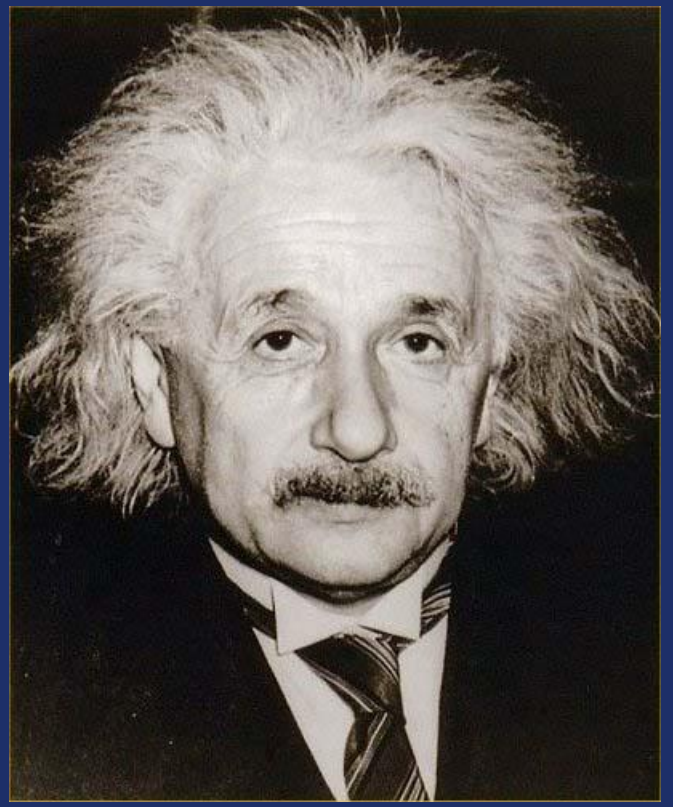
Safety Assurance

Safety Performance Measures : Challenges

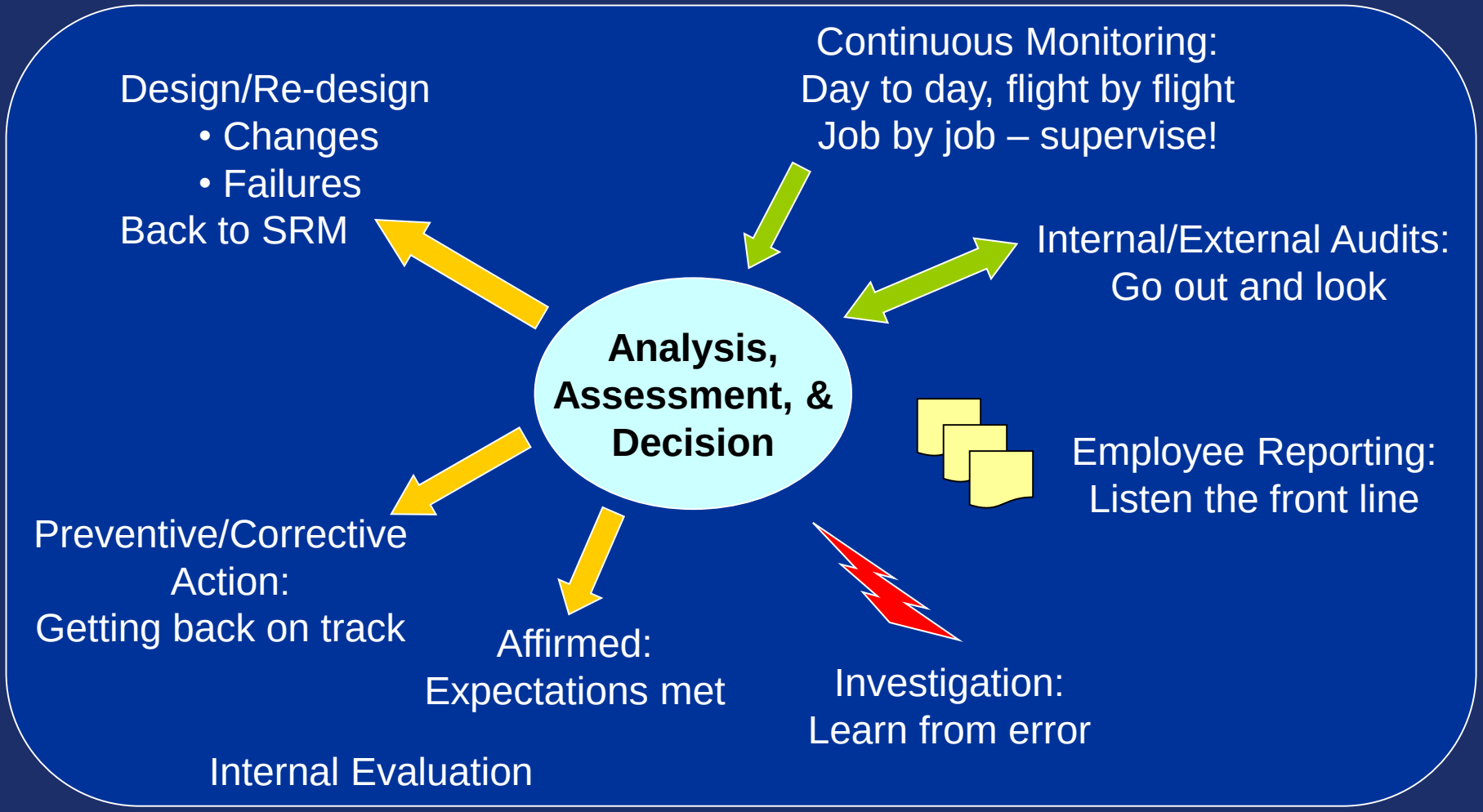
Everything that counts can't [always] be counted…

…everything that can be counted doesn't [necessarily] count.

Albert Einstein



Informed Decision Making

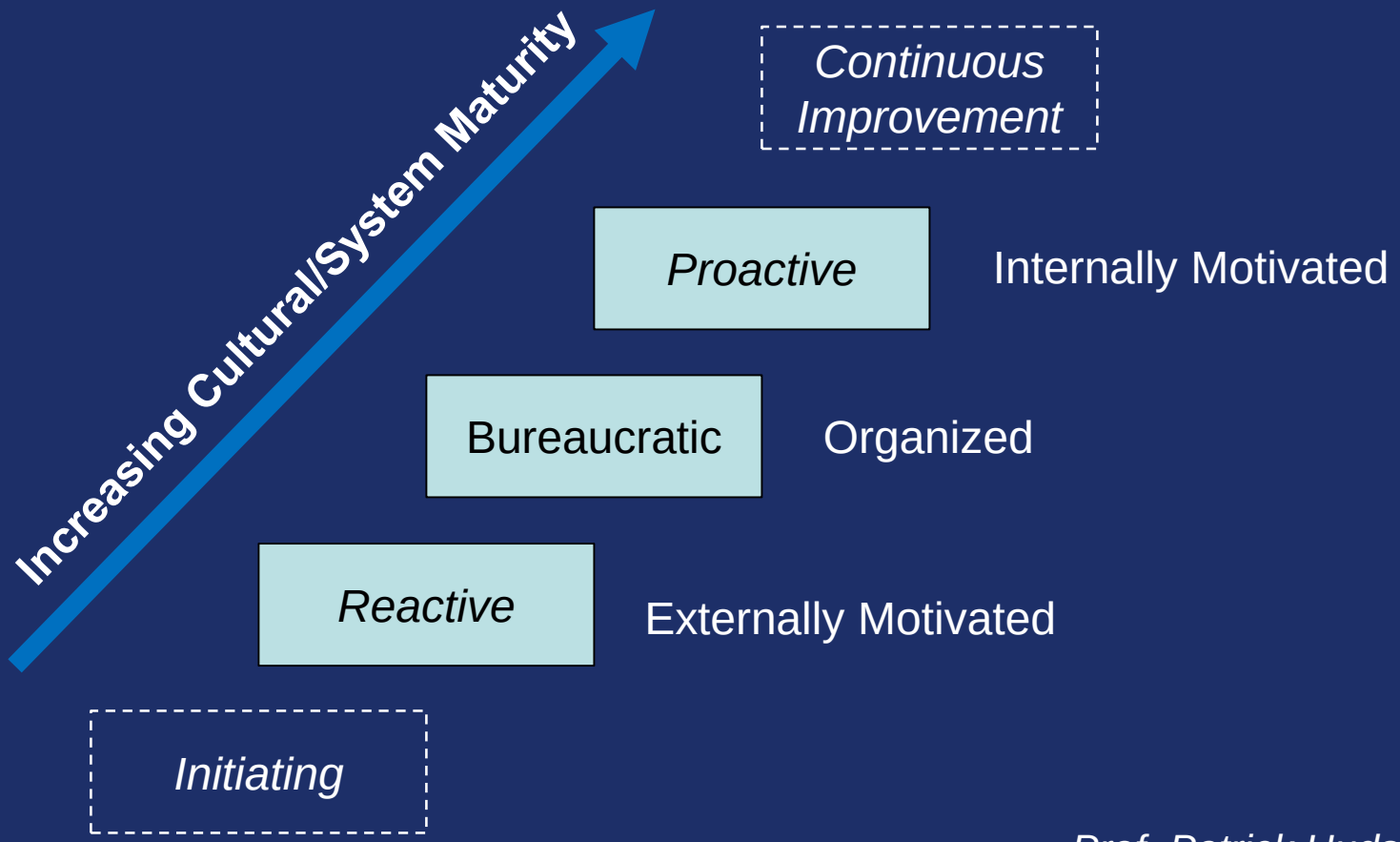


Traits of a Healthy Culture: High Reliability Organizations (HROs)

- Preoccupation with failure (track small failures)
- Reluctance to (over)simplify
- Sensitivity to operations
- Commitment to resilience (ability to recover)
- Deference to expertise

Weick & Sutcliffe

Fostering Cultural Maturation



Prof. Patrick Hudson; ECAST
**Original per Prof. Ron Westrum*

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

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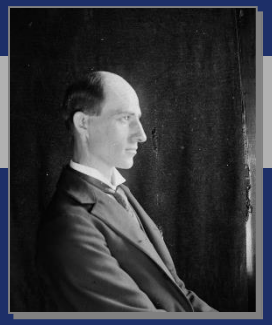
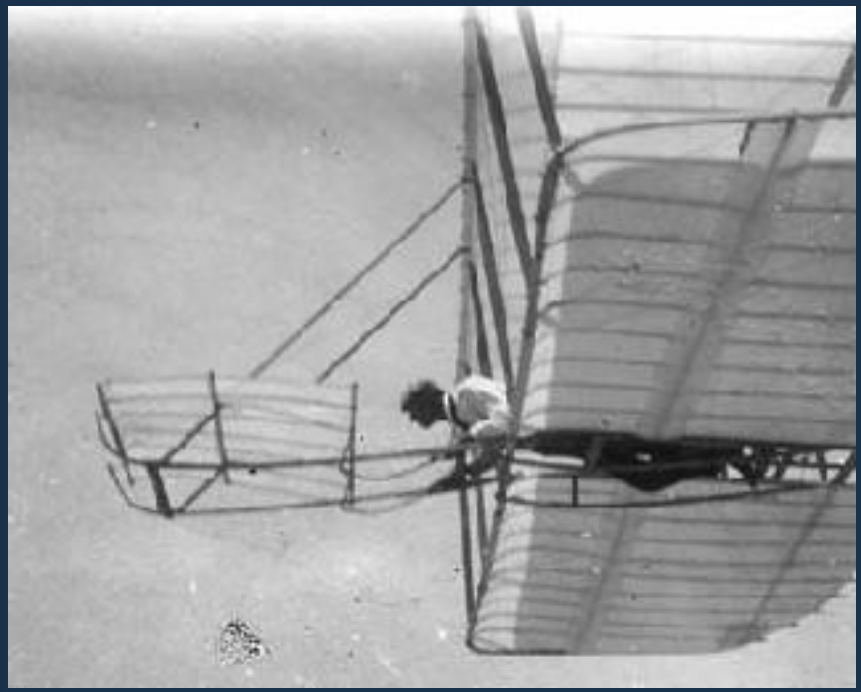
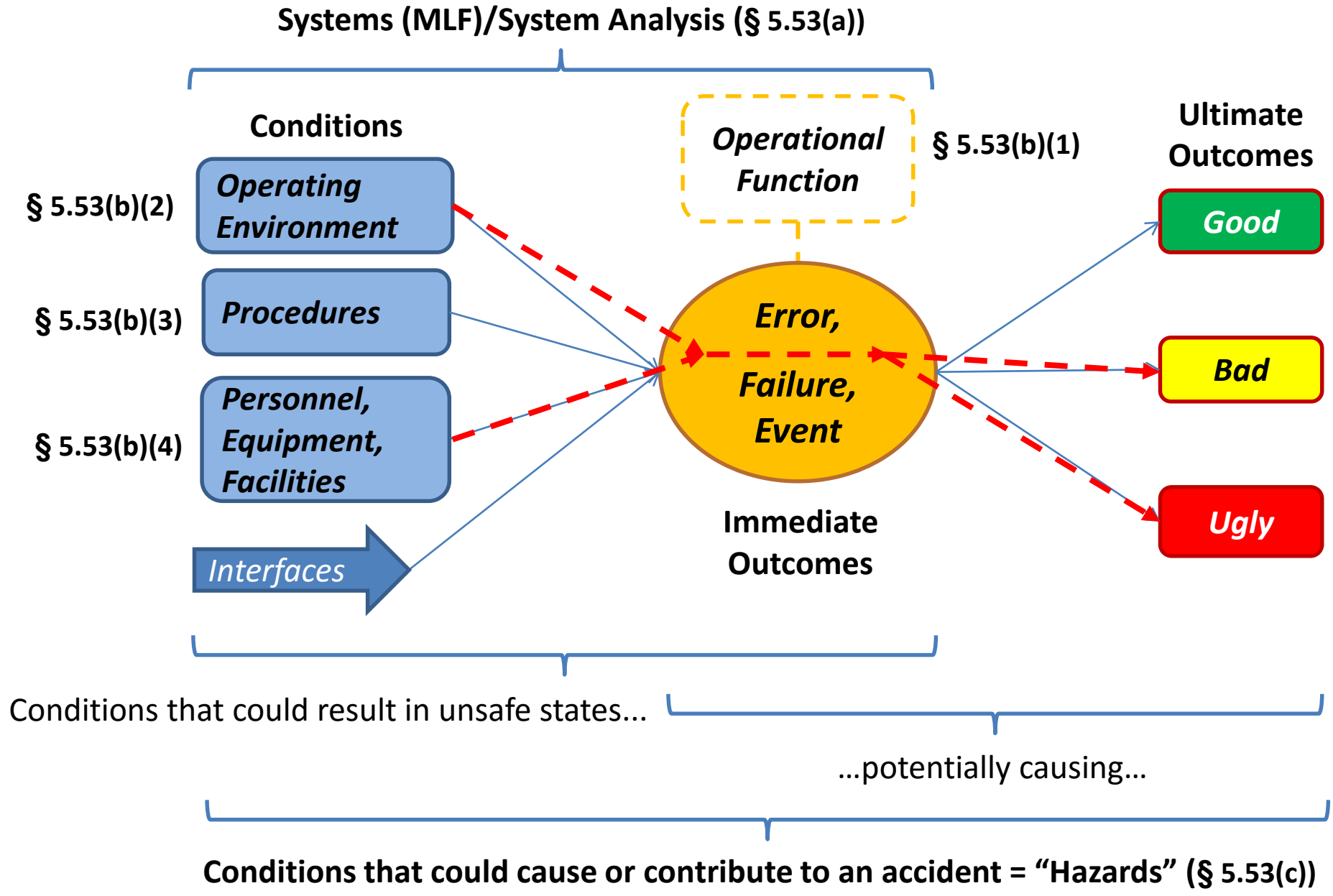


Wilbur Wright gliding, 1901
Photographs: Library of Congress



Backup Slides


Systems (MLF)/System Analysis (§ 5.53(a))
Conditions
Operational Function
§ 5.53(b)(1)
Ultimate Outcomes
§ 5.53(b)(2)
Operating Environment
Good
§ 5.53(b)(3)
Procedures
Error, Failure, Event
Bad
§ 5.53(b)(4)
Personnel, Equipment, Facilities
Ugly
Interfaces
Immediate Outcomes
Conditions that could result in unsafe states...
...potentially causing...
Conditions that could cause or contribute to an accident = "Hazards" (§ 5.53(c))