Building Effective Safety Oversight of AIS and AIM

Day 4: AIS Oversight

Federal Aviation Administration

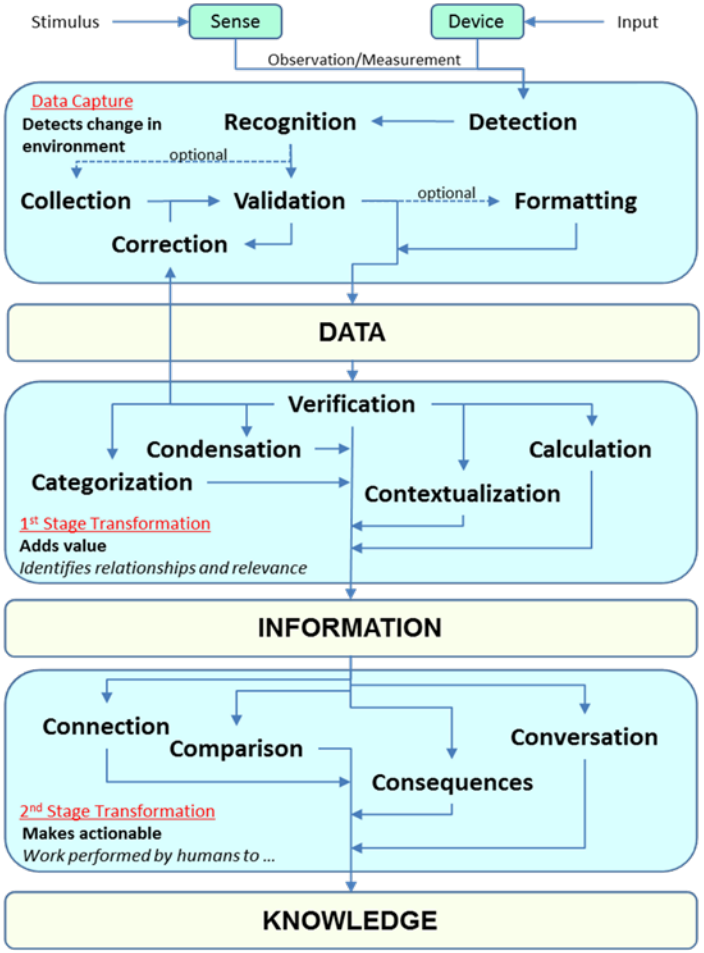
Objectives

Recap Day 3

- Data, information and knowledge
- The information factory
- QMS
- Linking AIS and QMS activities
- Production management review

Introduce today's topics

Data, Information and Knowledge Review

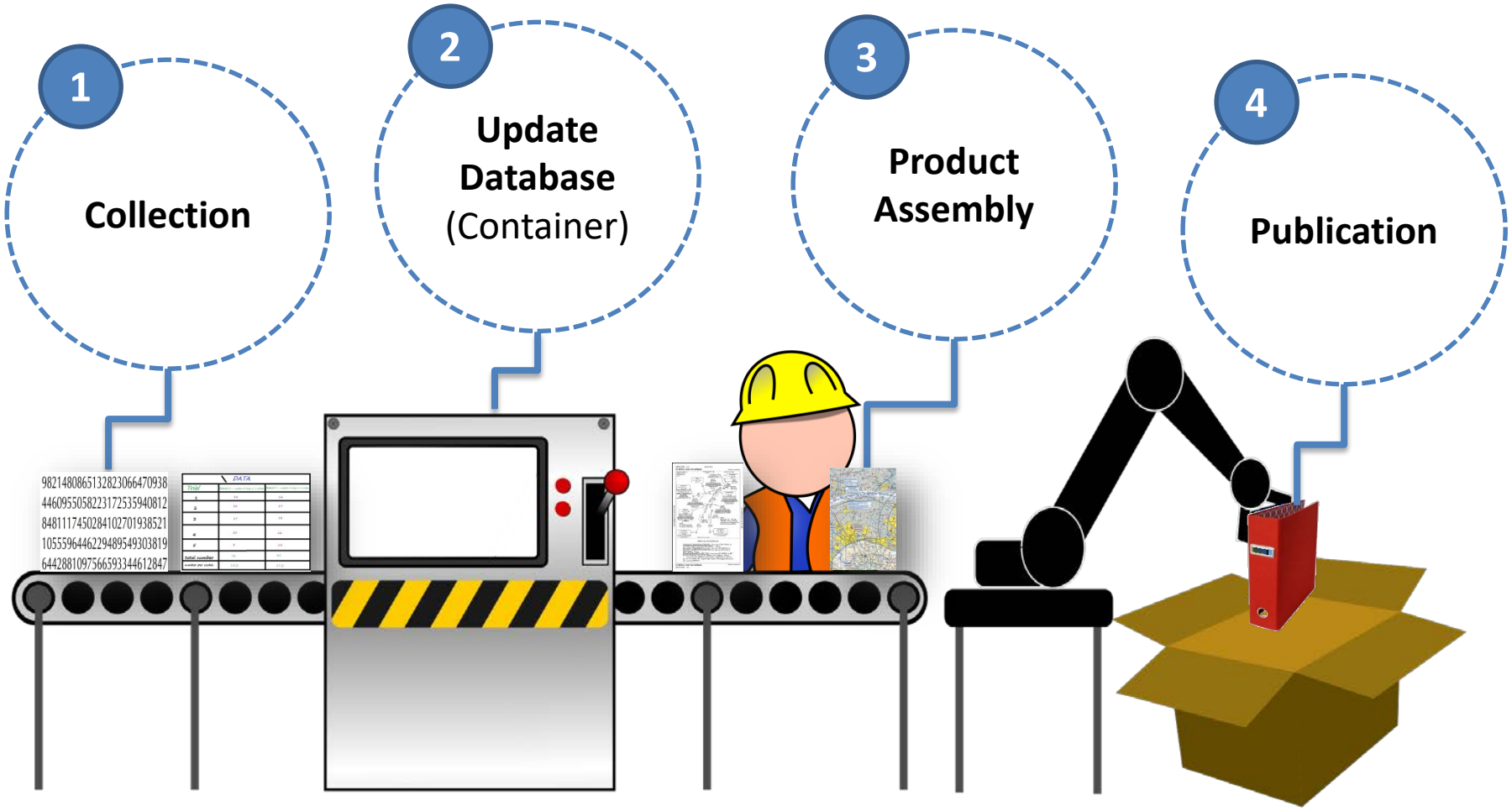


Data Management is about management of data elements

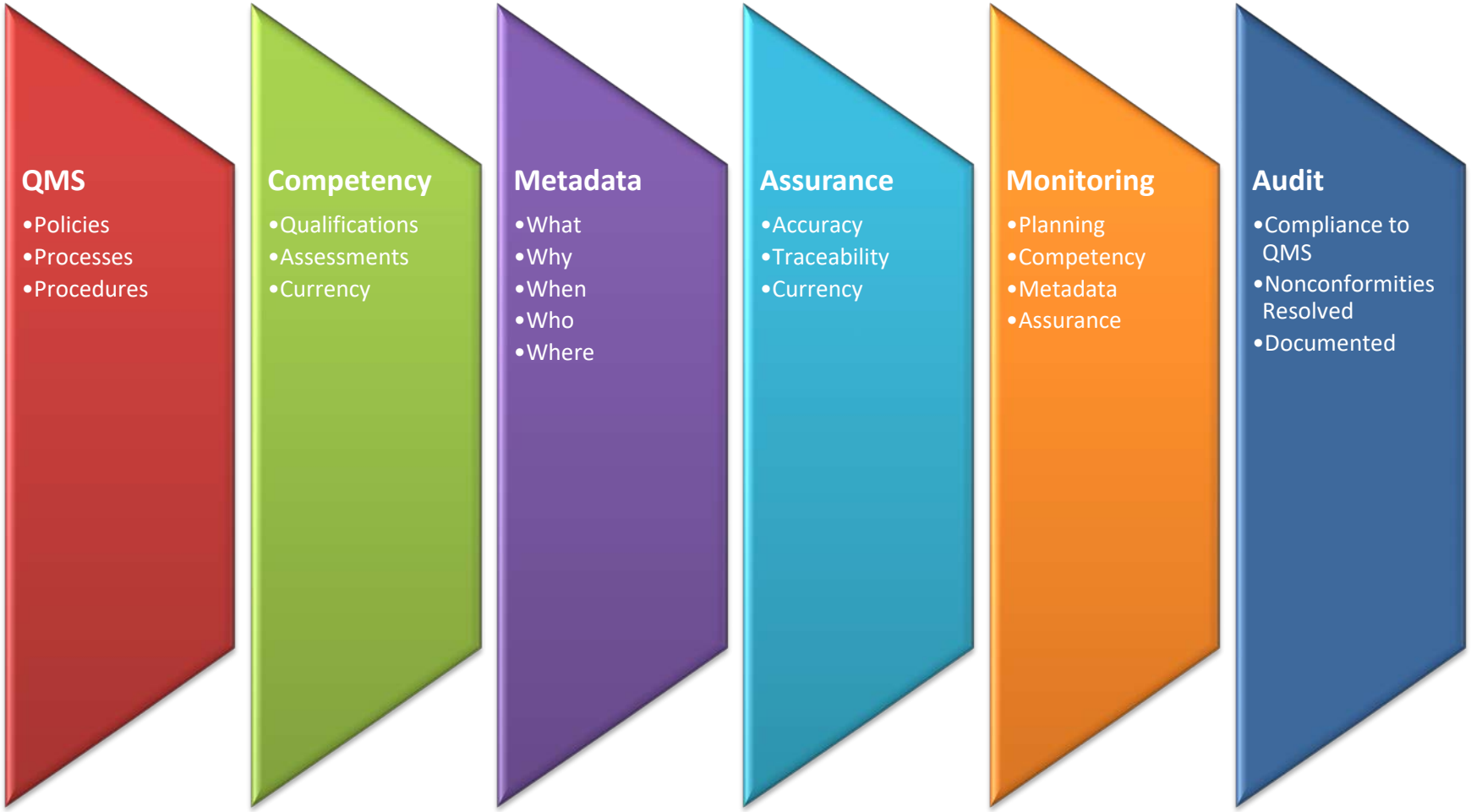
Information Management is about managing the value chain to create context to data

Knowledge Management is about managing the relationship between information and **actions**

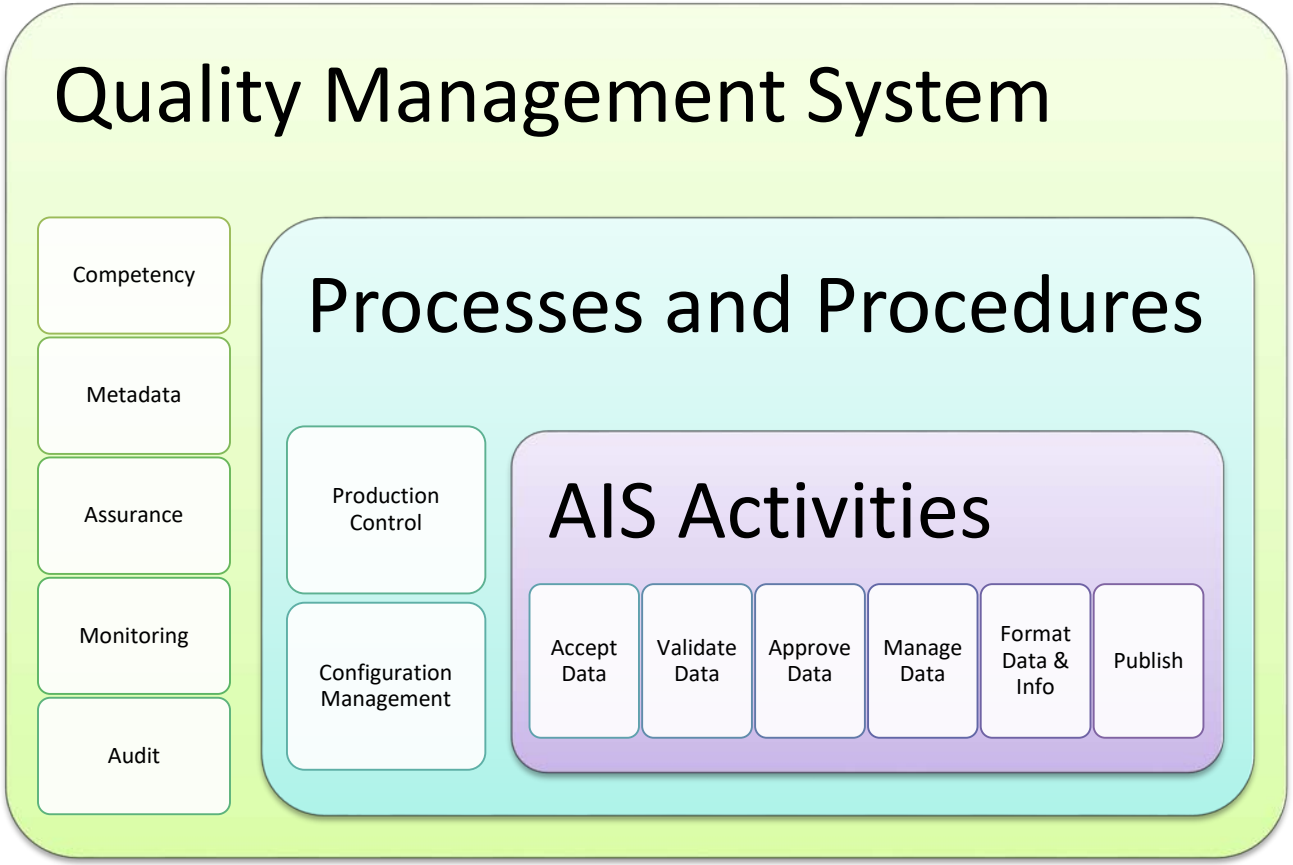
The Information Factory Review



QMS Review


QMS
•Policies
•Processes
•Procedures
Competency
•Qualifications
•Assessments
•Currency
Metadata
•What
•Why
•When
•Who
•Where
Assurance
•Accuracy
•Traceability
•Currency
Monitoring
•Planning
•Competency
•Metadata
•Assurance
Audit
•Compliance to QMS
•Nonconformities Resolved
•Documented

Linking QMS and AIS Activities Review



Production Management Review

Information Hazards

- Incorrect Data
- Incomplete Data
- Unsynchronized Data
- Untimely Data
- Data Availability

Production Control

- Management of the production workflow to coordinate the configuration management of deliverables or outcomes

Configuration Management

- Management of changes to a system (data/products) to ensure the performance requirements of the system are maintained

Today's Topics

- AIP audit exercise
- Validation of observations exercise
- Develop a surveillance strategy
- Self-assessment and action plan exercise

Workshop Exercise

AIP Audit

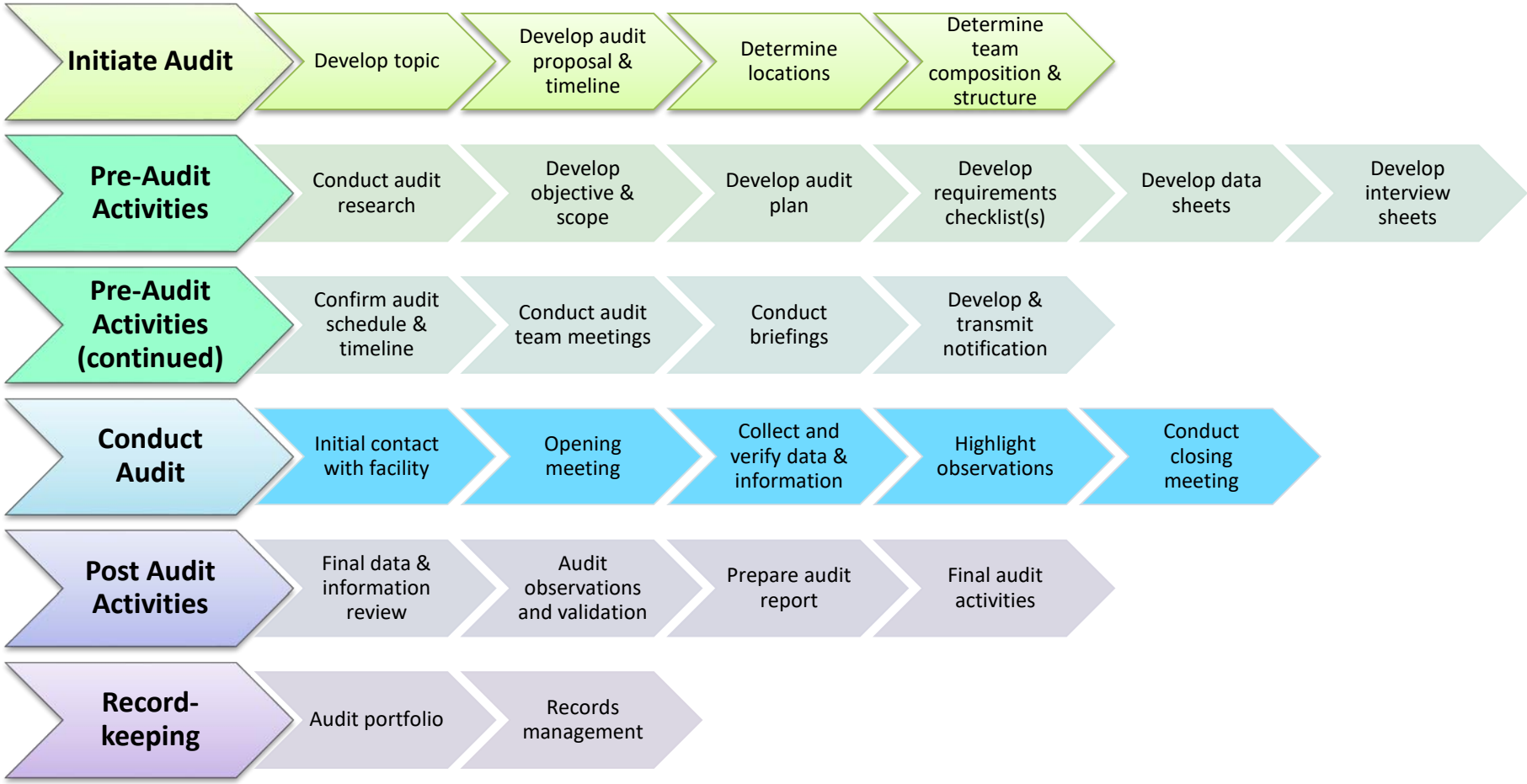
Federal Aviation Administration

AIP Audit

- Review
  - Develop an AIS/AIM audit
  - Pre-audit
  - Data collection
- Tips for a successful audit

- Checklist exercise

Develop an AIS/AIM Audit



How many red jelly beans do you see?

Pre-Audit

- Does management agree with the audit objective, scope, and focus areas?
- Does the checklist reflect the objective, scope, and focus areas?
- Does the team understand what they are looking for?
  - What evidence is needed?
  - Will you know if something is incorrect or missing?

Data Collection

- Observations
- Interviews
- Records/documentation review

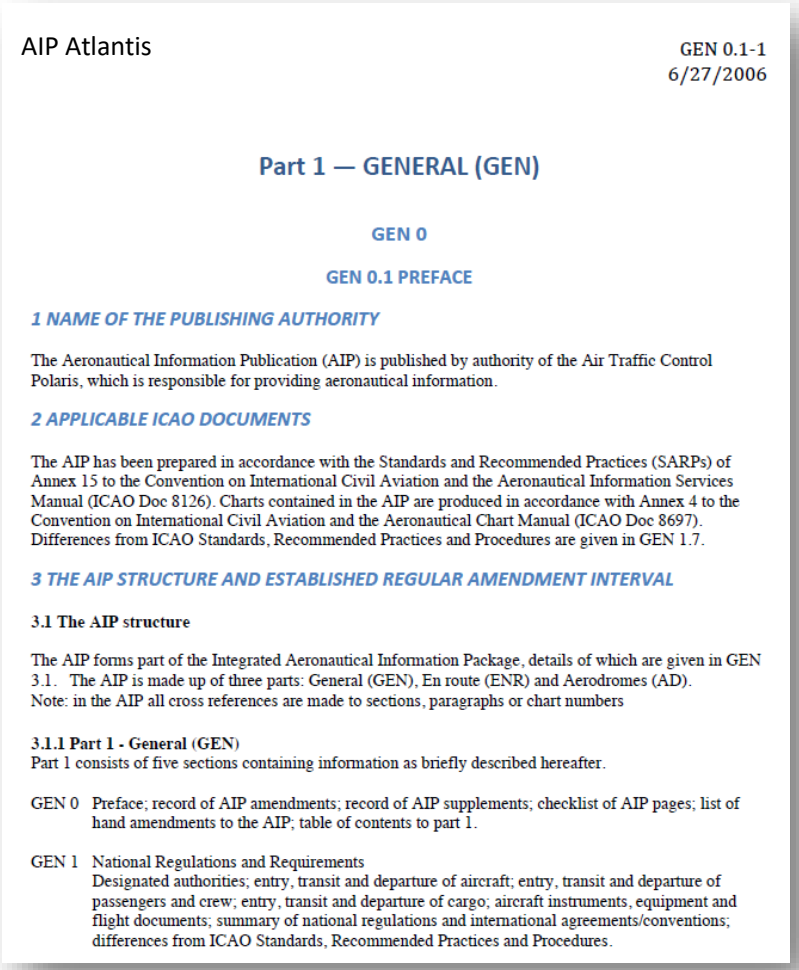
Tips for Successful Audits

- Remember, the focus as auditors is to look for evidence
- Always verify your data/observations
- Keep thorough records of what you observed or reviewed and use checklists and data sheets
- Analyze and review the data/information and objective evidence gathered to determine whether anything is missing
- Protect ANSP materials and documents

Audit the AIP

EXERCISE

AIP Audit Instructions



AIP Atlantis

GEN 0.1-1
6/27/2006

Part 1 — GENERAL (GEN)

GEN 0

GEN 0.1 PREFACE

1 NAME OF THE PUBLISHING AUTHORITY

The Aeronautical Information Publication (AIP) is published by authority of the Air Traffic Control Polaris, which is responsible for providing aeronautical information.

2 APPLICABLE ICAO DOCUMENTS

The AIP has been prepared in accordance with the Standards and Recommended Practices (SARPs) of Annex 15 to the Convention on International Civil Aviation and the Aeronautical Information Services Manual (ICAO Doc 8126). Charts contained in the AIP are produced in accordance with Annex 4 to the Convention on International Civil Aviation and the Aeronautical Chart Manual (ICAO Doc 8697). Differences from ICAO Standards, Recommended Practices and Procedures are given in GEN 1.7.

3 THE AIP STRUCTURE AND ESTABLISHED REGULAR AMENDMENT INTERVAL

3.1 The AIP structure

The AIP forms part of the Integrated Aeronautical Information Package, details of which are given in GEN 3.1. The AIP is made up of three parts: General (GEN), En route (ENR) and Aerodromes (AD).
Note: in the AIP all cross references are made to sections, paragraphs or chart numbers

3.1.1 Part 1 - General (GEN)
Part 1 consists of five sections containing information as briefly described hereafter.

GEN 0 Preface; record of AIP amendments; record of AIP supplements; checklist of AIP pages; list of hand amendments to the AIP; table of contents to part 1.

GEN 1 National Regulations and Requirements
Designated authorities; entry, transit and departure of aircraft; entry, transit and departure of passengers and crew; entry, transit and departure of cargo; aircraft instruments, equipment and flight documents; summary of national regulations and international agreements/conventions; differences from ICAO Standards, Recommended Practices and Procedures.

In your teams:

- Review and update checklist questions as needed
- Access the Atlantis AIP folder in the Activities > AIP Audit folder on your flash drive
- Audit the AIP using your team's checklist
  - Record compliance observations and evidence in the checklist

References

- ICAO Annex 15

Questions and Discussion

Workshop Exercise

Validation of Observations

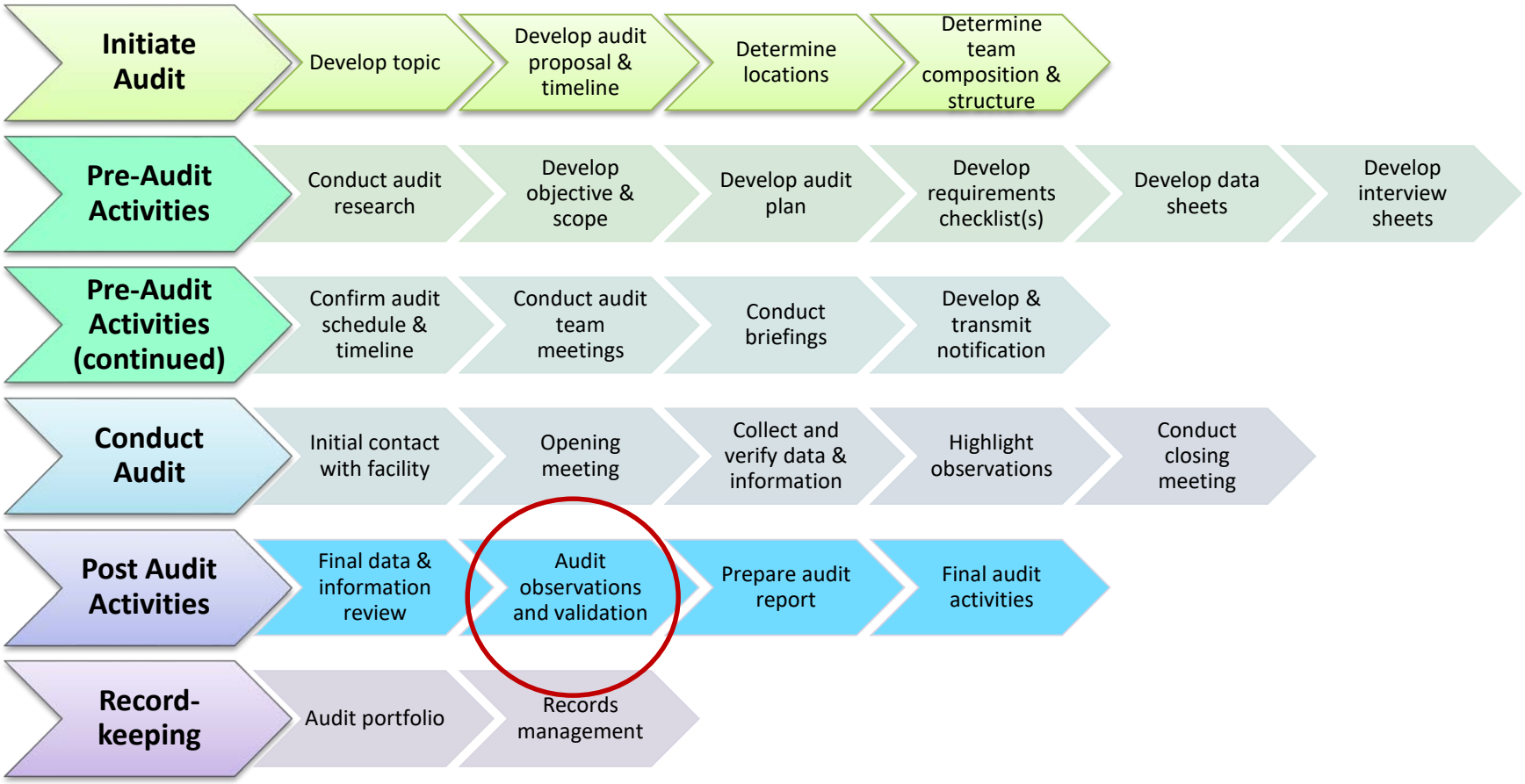
Federal Aviation Administration

Validation

- Review
  - Develop an AIS/AIM audit
  - Analysis and Validation
  - Analysis
  - Types of Observations
- Tips for a successful audit

- Validation exercise

Develop an AIS/AIM Audit



Analysis and Validation

- Analyze consolidated data
  - Establish cause and effect relationships
- Validate findings with management
- Prepare Audit Report and send to ANSP
- Track and follow-up on responses and corrective actions

Analysis

- Compile data and observations
- Compute percentages, where applicable
  - Example: Of the 400 records reviewed, 40 or 10% indicated that personnel had not received the required training.
- Assess the potential safety implications of the results
  - What is the impact of non-compliance?
  - What is the risk?

Types of Observations

- Observations of Non-Compliance
- Observations of Adverse Safety Impact
- Comments
  - Observations of Compliance
  - Positive Observations
  - Other

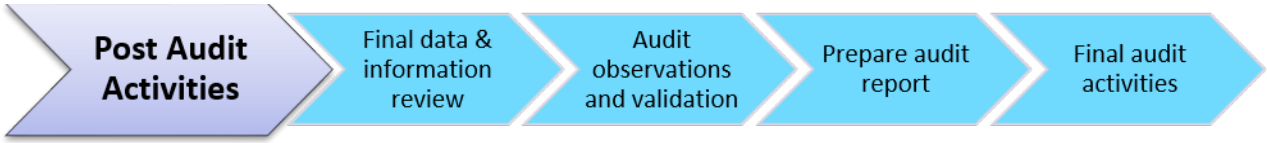
Observations of Non-Compliance

The FAA Air Traffic Safety Oversight Service uses the following framework to address compliance issues identified by audits

Compliance Level	Description	Action
C0	Low-Risk, Non-Repeat Observation	Informally reported to ANSP managers
C1	Low-Risk, Repeat Observation	ANSP is notified and requested to take the necessary steps to bring the issue back into compliance
C2	Medium-Risk	ANSP must submit Corrective Action Plan to return to compliance *and* prevent recurrence
C3	High Risk	Requires verifying the effectiveness of the CAP, such as a follow-up audit

Observations of Adverse Safety Impact

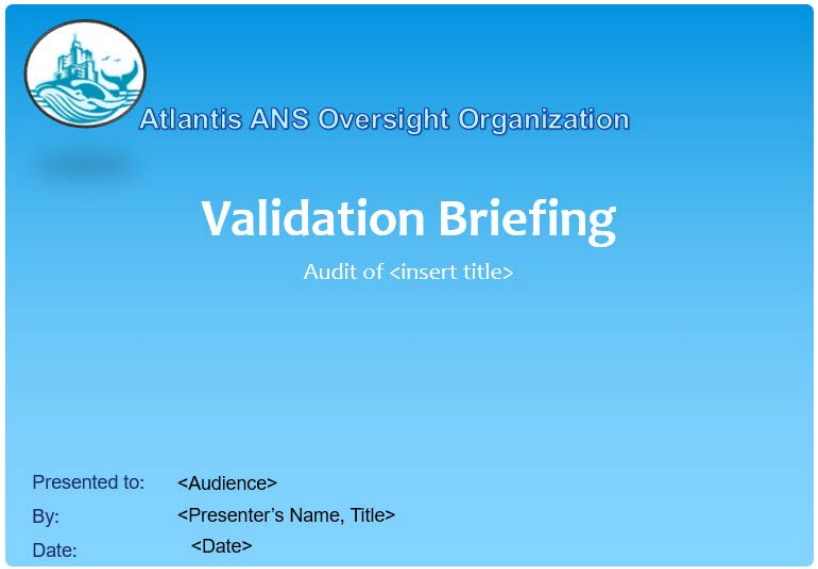
- The audit team may make observations of conditions that may have an adverse impact on the safety of the airspace system but that do not relate to specific requirements
  - Safety issues not related to compliance
- Examples may include:
  - Break in continuity of management controls or requirements
  - Discrepancy in procedures



Data Assessment and Validation of Observations

EXERCISE

Validation Briefing Instructions



In your teams:

- Review the evidence recorded during your audit and identify observations
- Access the Audit Validation Briefing file in the Activities > AIP Audit folder on your flash drive
- Prepare and present a briefing

Questions and Discussion

Develop a Surveillance Strategy

Federal Aviation Administration

Module Objectives

- Review safety oversight surveillance obligations
- Discuss strategies to prioritize and conduct ongoing surveillance activities
- Develop a plan
- Build a risk-based program
- Develop a risk-based AIS surveillance program summary
- Surveillance process example
- FAA information oversight strategy

What are we required to do?

A REVIEW OF SAFETY OVERSIGHT SURVEILLANCE OBLIGATIONS

Surveillance Program Review

A surveillance program is a system of ensuring continuing competency of:

- Organizations (certificate/approval holders)
- Individuals (license/rating holders)
  - Includes ensuring continuing validity of licenses/ratings/certificates/approvals
- Continuing capacity to maintain a safe and regular operation

Resource: Concepts discussed in ICAO Safety Oversight Manual, Doc 9734-A

Surveillance Program Review

A surveillance program should:

- Be continual or on-going
- Be thorough
- Ensure an ANSP's capability and competency are equal to or exceed those required at the time of original certification
- Require the ANSPs' demonstrate operations and maintenance are conducted in accordance with requirements, including a comprehensive and conclusive assessment of competencies

Resource: Concepts discussed in ICAO Safety Oversight Manual, Doc 9734-A

AIS Surveillance Objective

The ANSP safety oversight organization carries out a program of ongoing surveillance of AIS service providers to determine compliance with aeronautical data and information requirements

- Surveillance identifies safety concerns and deficiencies
- Surveillance includes regular monitoring of AIS provider activities

How do we develop strategies?

STRATEGIES TO PRIORITIZE AND CONDUCT OVERSIGHT ACTIVITIES

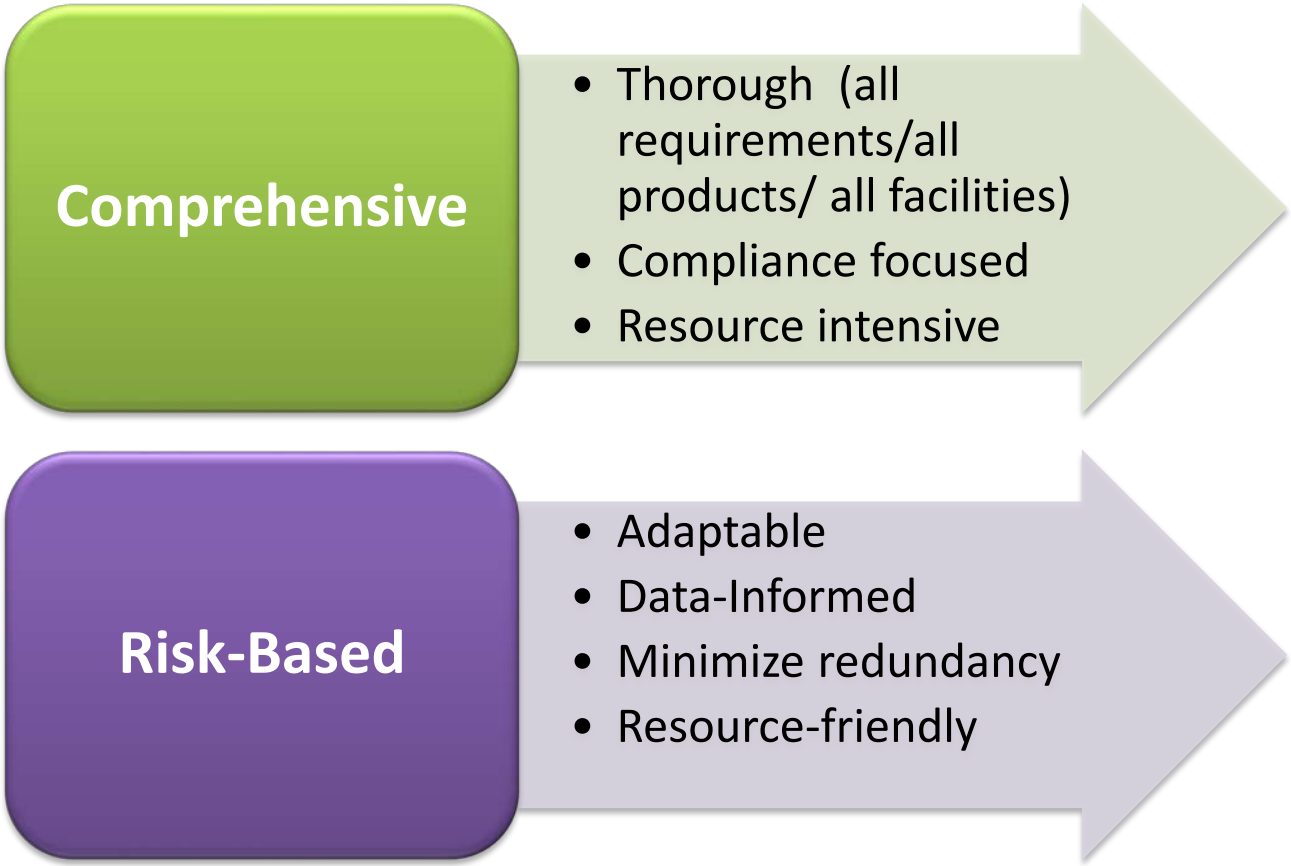
What is Strategy?

A strategy is a high-level solution to achieve one or more goals

- Strategy determines direction and scope over a period of time
- Strategy determines how resources should be configured to meet needs

Resources: What is Strategy? MindTools (https://www.mindtools.com/pages/article/what-is-strategy.htm)
The Difference Between a Strategy, a Plan, and a Process by Duncan Bucknell
(https://duncanbucknell.com/2013/04/12/the-difference-between-a-strategy-a-plan-and-a-process/)

Surveillance Strategies



Risk-Based Surveillance Strategy

- Meet safety oversight responsibilities through a performance-based, risk-focused, and data-supported surveillance system
- Proactively identify hazards and risks related to mandatory requirements and weak controls
- Address emerging issues in the ANSP(s)

Develop a Surveillance Plan

- A plan supports the strategy by describing how objectives will be achieved
- Key questions to consider in developing a surveillance plan:
  - What will you observe?
    - Why?
  - How will you observe?
    - Which techniques will you use?
    - Will you conduct scheduled or unscheduled surveillance?
  - When will you observe?
    - How frequently will you conduct surveillance activities?
  - Who will observe?

Develop a Surveillance Plan (Continued)

- Consider a multi-year plan
- Establish an annual surveillance target (incremental progress)
  - Consider available resources
  - Try to increase or expand on the previous year
- Prioritize surveillance topics according to estimated risk
- Include follow-up of identified compliance issues

How can we do surveillance of aeronautical information organizations?

BUILD A RISK-BASED PROGRAM

Build a Risk-Based Surveillance Program

How do we analyze risk?

ANALYZE REQUIREMENTS

Analyze Requirements

- Map State statutes and directives to ICAO Standards and Recommended Practices
  - Identify specific requirements documents to establish a basis for surveillance
- Aeronautical data and information requirements:
  - Annex 15 – Aeronautical Information Services
  - Annex 4 – Charting
  - PANS-AIM/Data Catalog (Doc 10066)

How do we identify risk?

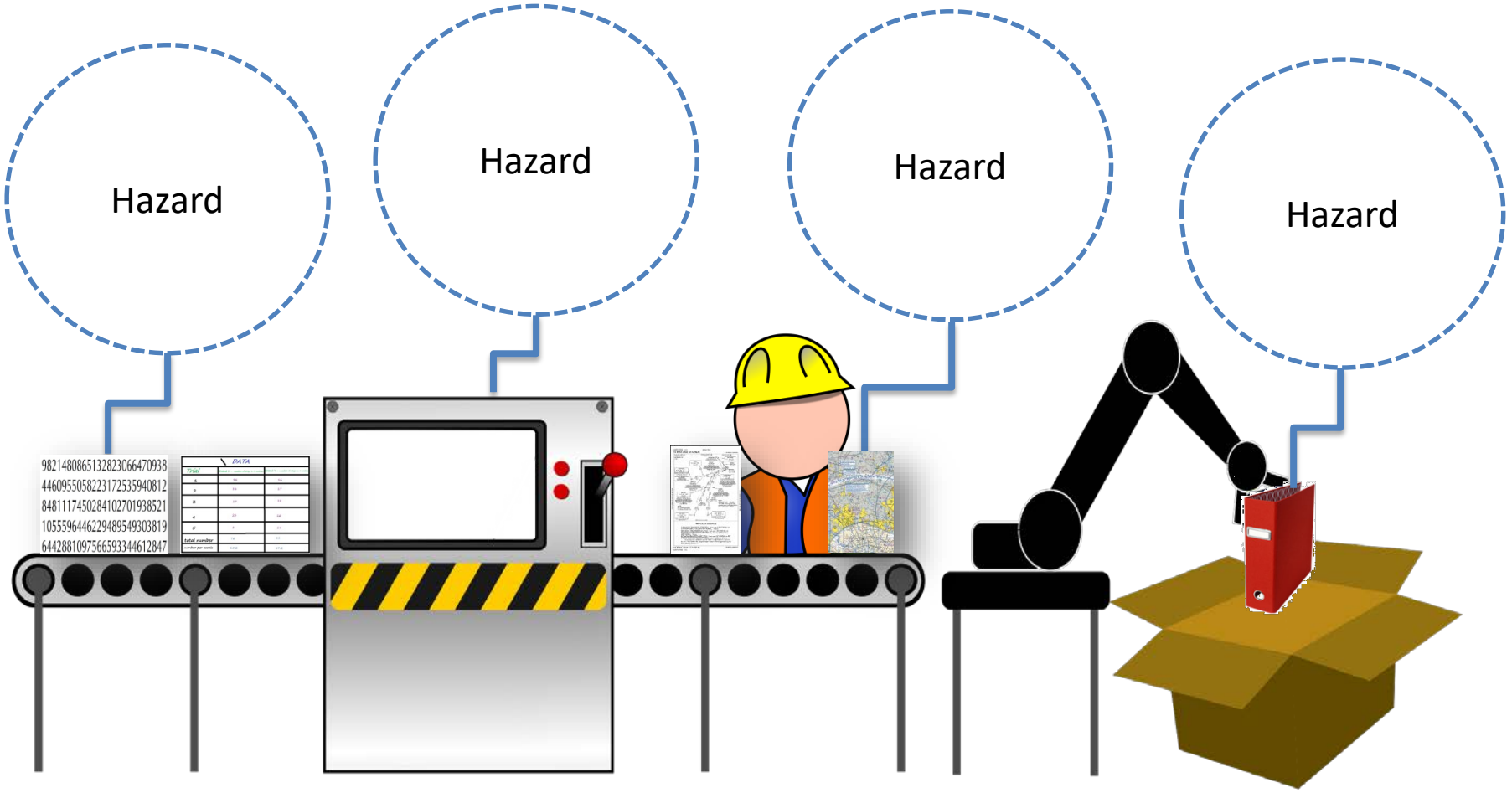
IDENTIFY RISK

Identify Risk

- Corrupt, erroneous, late or missing aeronautical data/information can potentially affect the safety of air navigation
- Information/data may be:
  - Incorrect
  - Incomplete
  - Untimely
  - Unsynchronized
  - Unavailable

Resource: ICAO Annex 15, Amendment 40

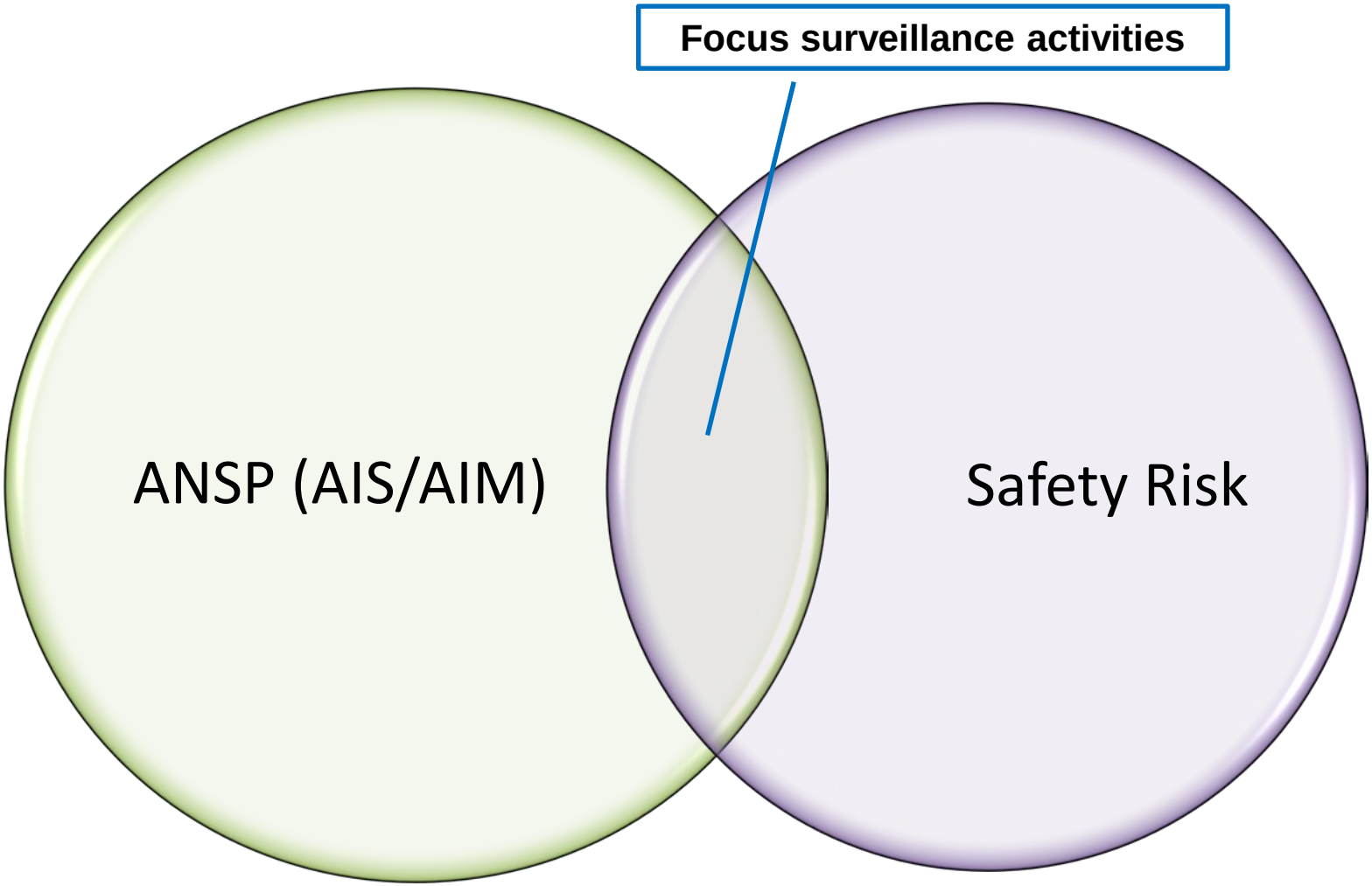
Risks in the Information Factory



How do we prioritize risk?

PRIORITIZE SURVEILLANCE

Prioritize Surveillance



Possible AIS Surveillance Topics

Responsibilities

Requirements
- Information Management
- Quality Management
- Data Protection
- Automation
- Human Factors
- Validation and Verification

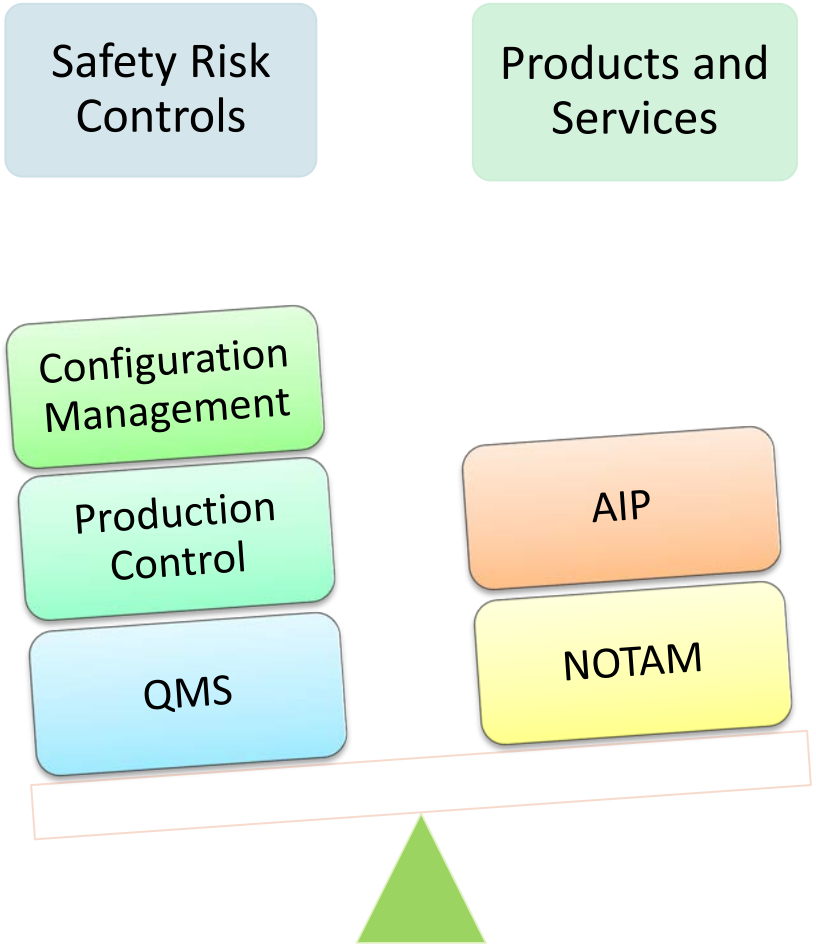
Products
- AIP
  - AIP Amendments
  - AIP Supplements
- Aeronautical charts
- Terminal Procedures
- Aeronautical Information Circulars

Services
- NOTAM
- Pre/post flight information
- Telecommunications
- Distribution

Data
- Terrain and Obstacles
- Aerodrome/Heliport
- NAVAIDs
- Airspace
- Routes
- Points
- Terminal Procedures

People
- Technical qualification
- Competency
- Training

Controls vs. Products and Services



- Which products and services are most essential (biggest impact)?
- Which processes control the products and services?

Analyze and Assess Risk

Responsibilities

Requirements	Products	Services	Data	People
•Information Management •Quality Management •Data Protection •Automation •Human Factors •Validation and Verification	•AIP •AIP Amendments •AIP Supplements •Aeronautical charts •Terminal Procedures •Aeronautical Information Circulars	•NOTAM •Pre/post flight informati •Telecomm ons •Distributi	•Terrain and Obstacles	•Technical qualification

Risk probability		Risk severity				
		Catastrophic A	Hazardous B	Major C	Minor D	Negligible E
Frequent	5	5A	5B	5C	5D	5E
Occasional	4	4A	4B	4C	4D	4E
Remote	3	3A	3B	3C	3D	3E
Improbable	2	2A	2B	2C	2D	2E
Extremely improbable	1	1A	1B	1C	1D	1E

How do we do continuous monitoring?

MONITOR

Monitor

Continuous monitoring is a surveillance activity that enables a safety oversight organization to:

- Follow-up on resolution of compliance issues identified through system surveillance activities (audit)
- Identify changes or inconsistencies in ANSP/AIS activities or processes (variation)
- Determine future risk-based surveillance activities

Monitor and Surveille

- Surveillance is a system-level activity conducted to determine ANSP/AIS compliance with requirements
  - Surveillance objectives:
    - Demonstrate compliance or identify gaps
- Monitoring is a form of surveillance that involves routine measurement or scrutiny of ANSP/AIS activities to detect changes and identify possible trends
  - Monitoring supports system surveillance
  - Surveillance activities support resolution of safety concerns (ICAO Critical Element (CE) 8)

Build a Monitoring Plan

Key questions to consider in developing a monitoring plan:

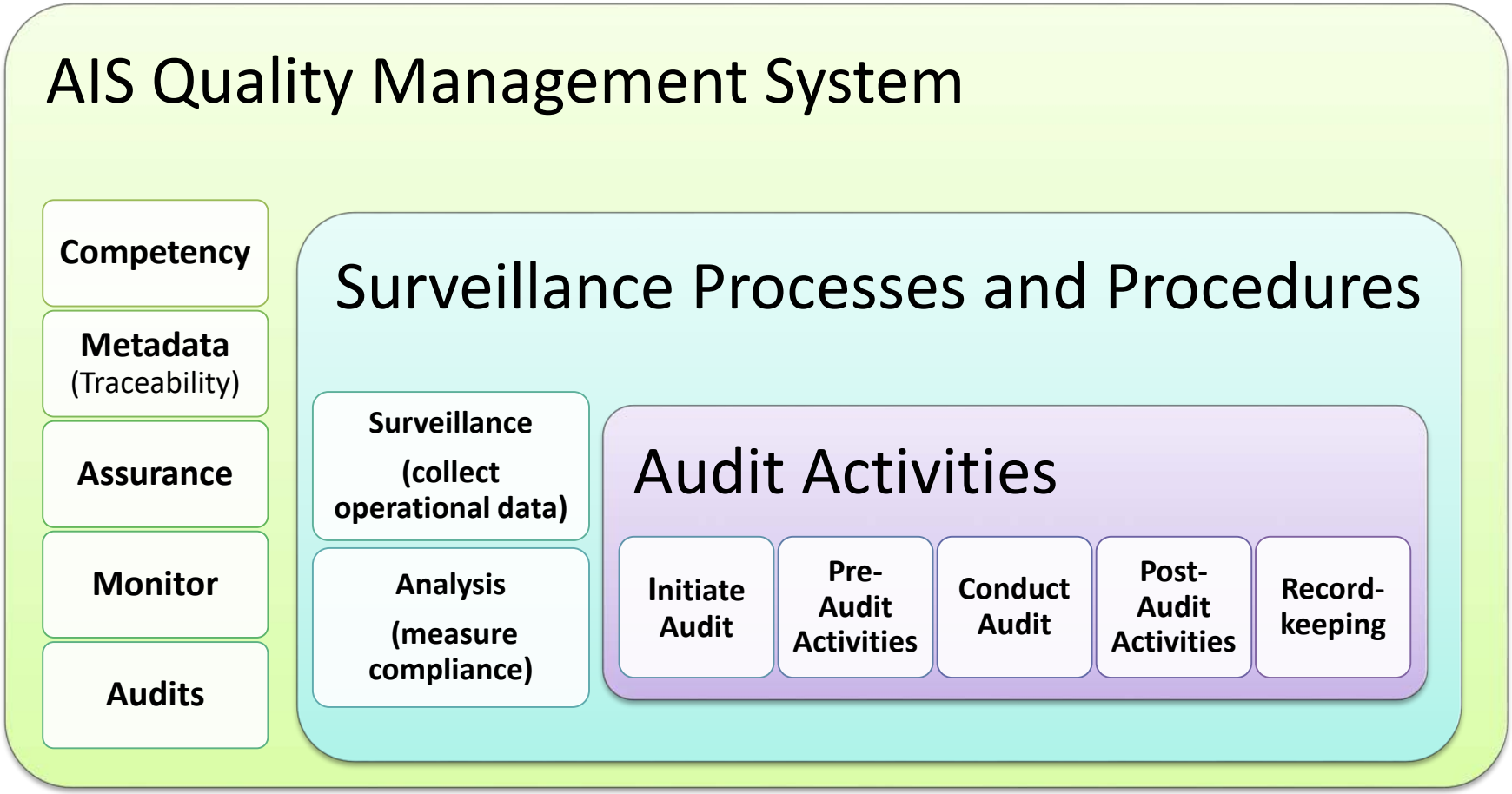
- What will you monitor?
  - Why?
- How will you monitor?
  - What techniques will you use?
  - How will you measure monitoring results?
  - How will you identify possible issues of concern?
- When will you monitor?
  - How frequently will you conduct monitoring activities?
- Who will monitor?

Vertical Obstacle Key Performance Indicator (KPI) Example

Plan	Measure
Performance	Publication of obstacles
Measure	Backlog of submissions
Measurement Cycle	Monthly
Reasoning	Obstacles have been submitted for analysis and publication but not published (timeliness)

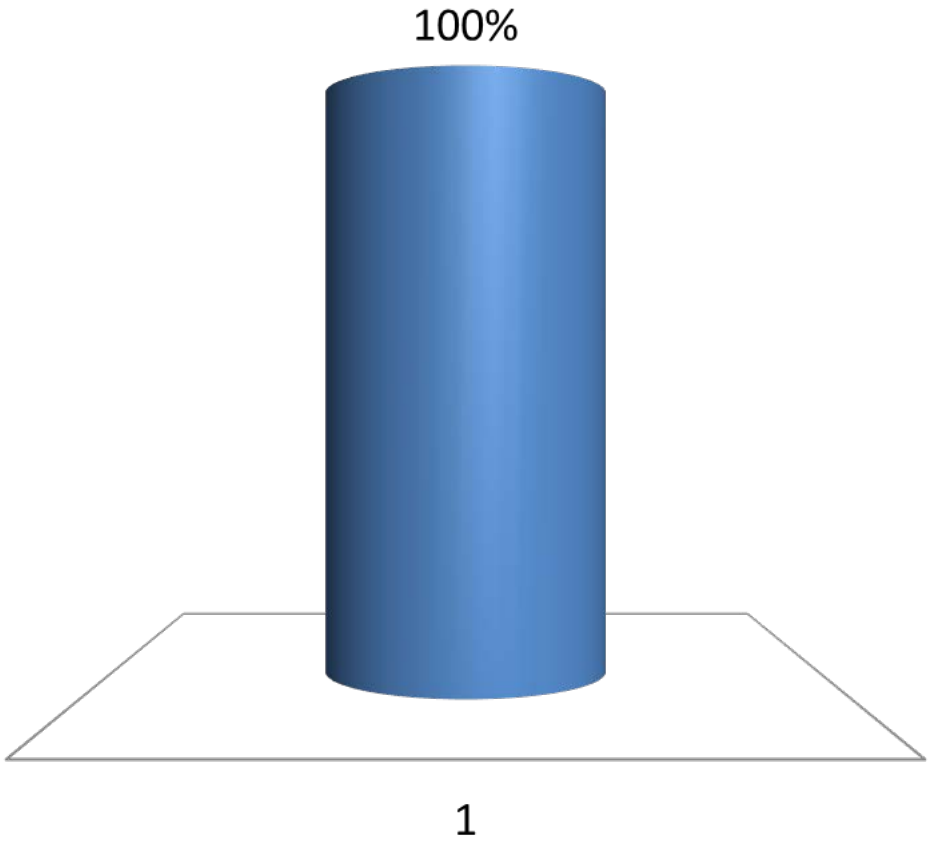
Safety Oversight Surveillance

Connecting AIS Topic and Process

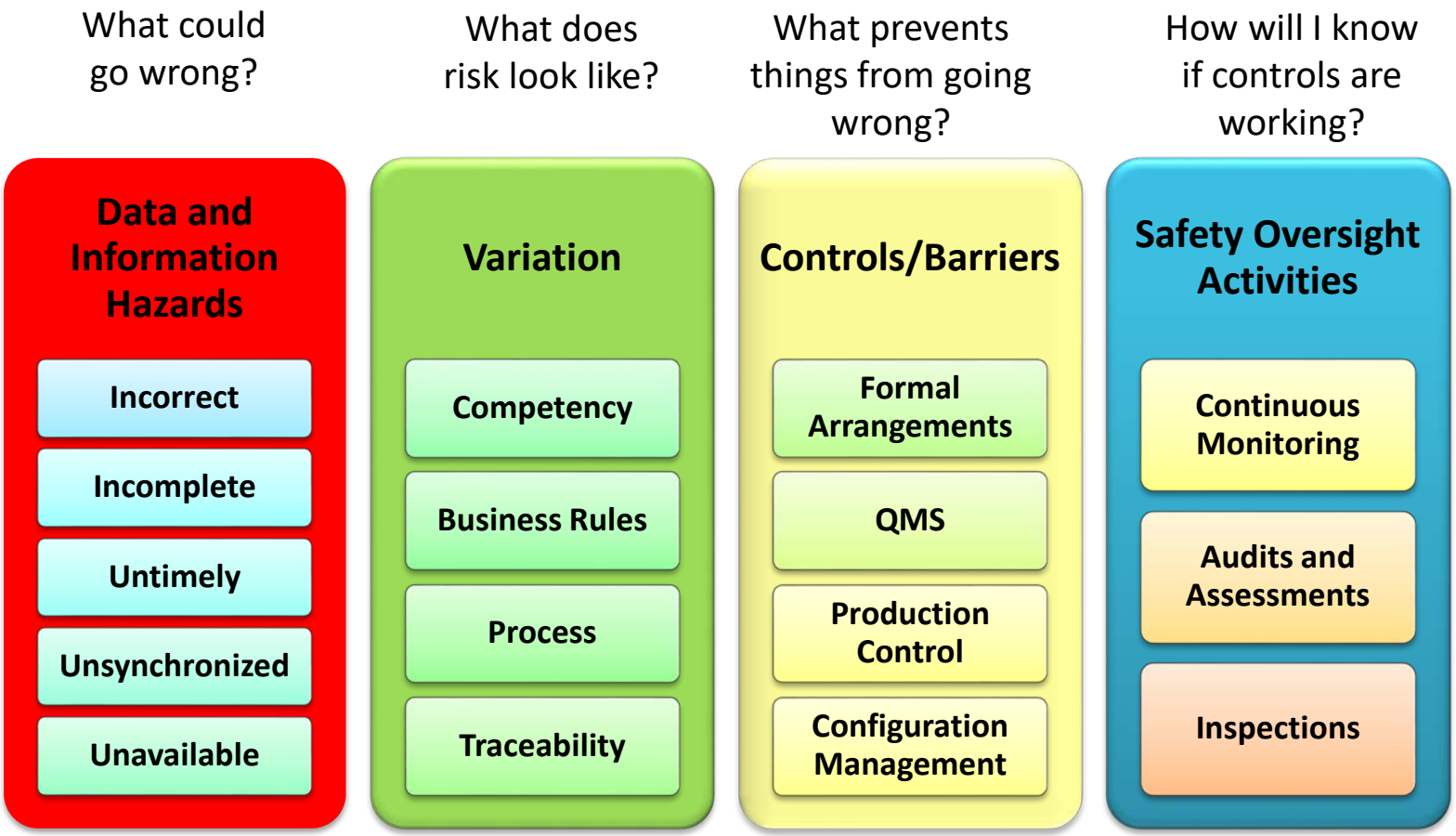


What could you monitor on a regular basis to ensure the quality of aeronautical information products (e.g. AIP)?

Rank	Responses
1	
2	
3	
4	
5	
6	Other

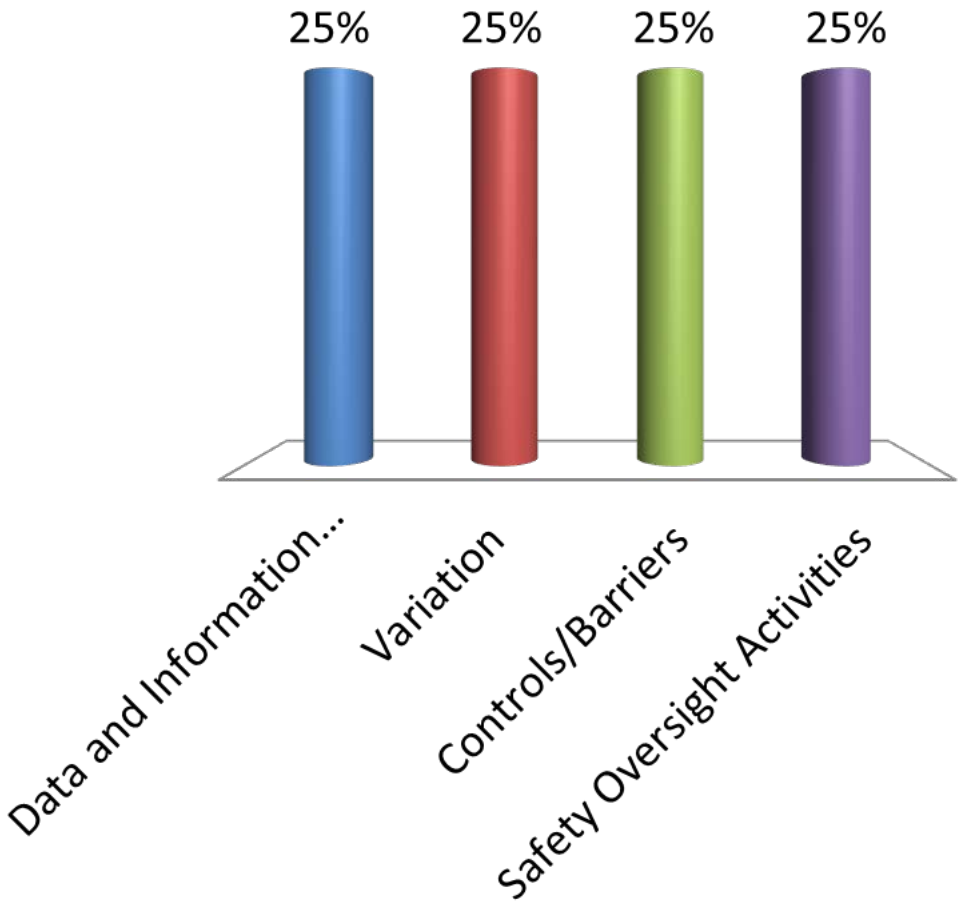


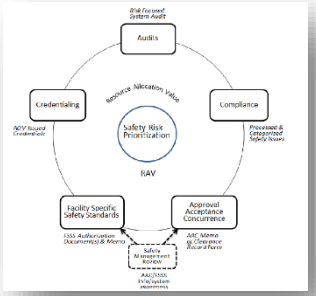
Develop a Risk-Based AIS Surveillance Program Summary



How could an AIS safety oversight organization prioritize surveillance activities to focus on risk associated with aeronautical information products and services?

A. Data and Information Hazards
B. Variation
C. Controls/Barriers
D. Safety Oversight Activities



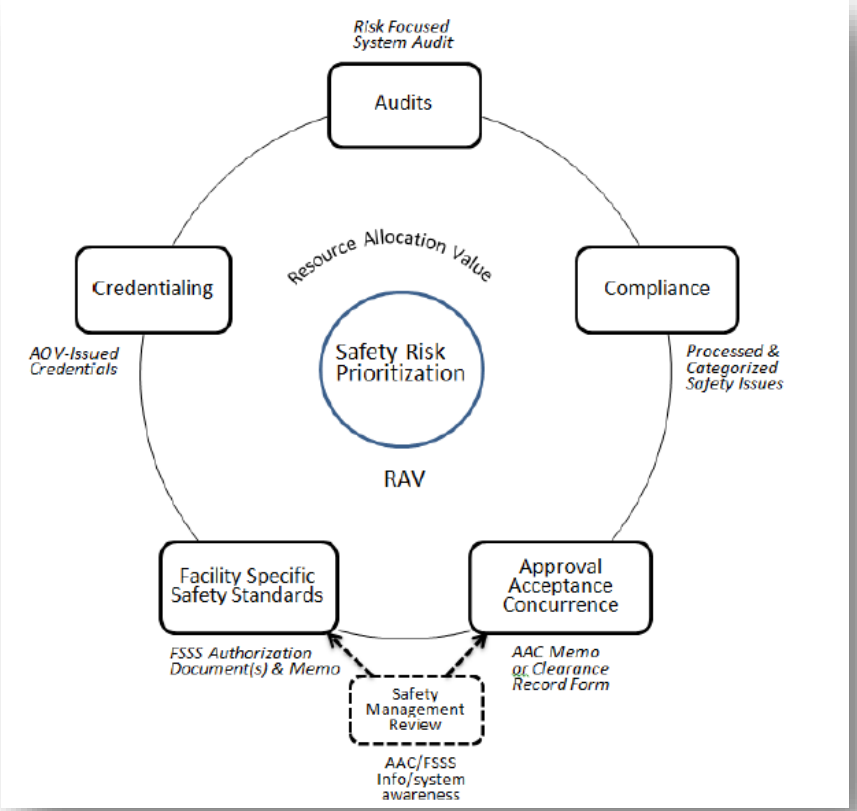


SURVEILLANCE PROCESS EXAMPLE

Surveillance Process Example

The Air Traffic Safety Oversight Service uses a risk-focused system of oversight

- Integrated suite of surveillance activities



Surveillance Process Example (Continued)

Surveillance activities across the spectrum of ANSP

- Recurring issues should be included, as appropriate, in every audit/assessment
- Operations oversight will be provided using safety risk indicators, assessment checklists, and traditional audit methods
- National standards oversight will be provided through traditional audits and assessments

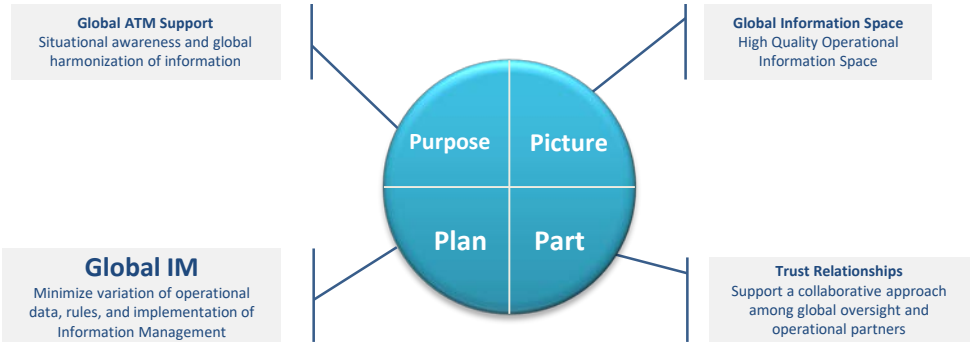
AIS/AIM Surveillance Priorities Example

The Air Traffic Safety Oversight Service identified and completed the following AIS/AIM priorities for surveillance:

- AIP
- NOTAM issuance/cancellation
- Obstacles
- Instrument flight procedures
- Competency (credentialing)

Strategies for Effective Surveillance

- Standardize surveillance processes and procedures
  - Develop supporting tools for safety oversight inspectors
- Document surveillance and monitoring plans and results
  - Regularly review and update plans
  - Include follow-up surveillance plans



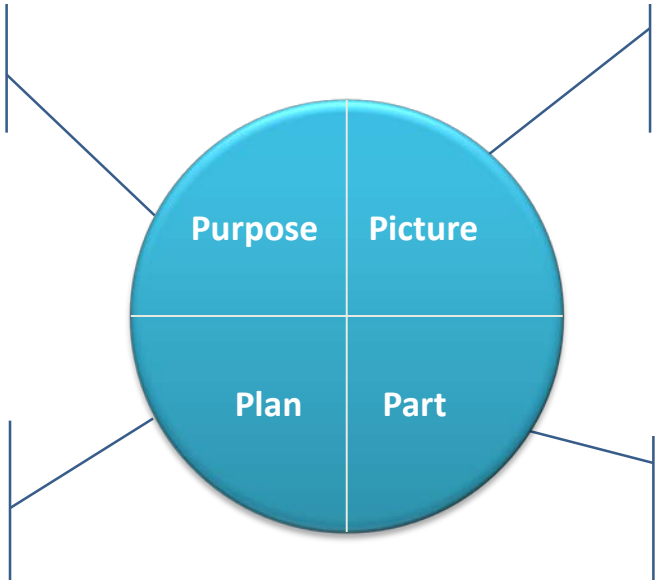
FAA INFORMATION OVERSIGHT STRATEGY

Global Strategic View

Safe and seamless user experience with respect to information

Global ATM Support
Situational awareness and global harmonization of information

Global Information Space
High Quality Operational Information Space



Global IM
Minimize variation of operational data, rules, and implementation of Information Management

Trust Relationships
Support a collaborative approach among global oversight and operational partners

FAA Oversight Objectives

- Business Objective
  - Reduce the risk of an information-induced incident
  - Compliance and compatibility with ICAO/FAA standards
- Performance Objective
  - Reduce variation in products and services
  - Integrated products and services
    - Integrated database
    - Integrated workflow
  - Mature QMS across all applicable FAA aeronautical products and services
- Priority
  - Risk-based

Data/Information Hazards and Variation

- Data/information hazards
  - Incorrect data and information
  - Incomplete data and information
  - Untimely data and information
  - Unsynchronized information
  - Unavailable information
- Where does variation get into products?
  - At all phases of the life cycle
- How does variation get into products?
  - People (control is competency)
  - Tools (control is business rules/automation)
  - Process (control is SOP)

AIS Products and Services

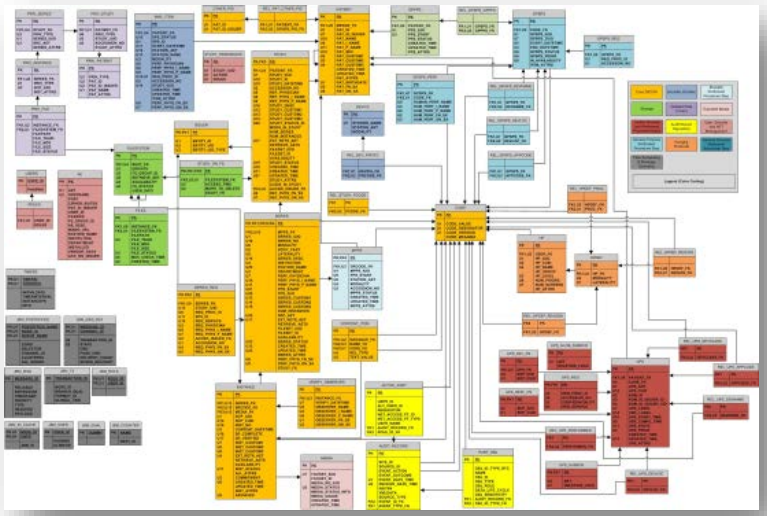
Safety Controls

…from here (data)…

People
Tools
Process

Knowledge

…to here (product/service)?



Primary Safety Controls

Safety Controls

People
Tools
Process

Knowledge

Can we reduce the variation in the primary safety controls using:

- Competency Management (People)
- Business Rules (tools)
- Standard Operating Procedures (Process)

Can we use workflow management to synchronize information products and services?

Data/Information Safety Controls

Data/Information Hazards

- Incorrect data
- Incomplete data
- Untimely data
- Unsynchronized
- Unavailable

Risk Mitigations/Controls

- Formal arrangements
- Integrated Products and Services
  - Integrated database
  - Production control
- Quality Management System
  - Competency
  - Metadata
  - Assurance

Final Thoughts…

- Surveillance activities support effective safety oversight and resolution of safety concerns (CE-7 and CE-8)
- Surveillance should be:
  - Ongoing (continuous)
  - Evidence-based
  - Standardized
- Risk-based surveillance requires data and information collection and analysis (monitoring) to address emerging issues

References

- ICAO Annex 4
- ICAO Annex 15
- ICAO Safety Oversight Manual, Doc 9734-A
- PANS-AIM/Data Catalogue, Doc 10066
- What is Strategy? MindTools (https://www.mindtools.com/pages/article/what-is-strategy.htm)
- The Difference Between a Strategy, a Plan, and a Process by Duncan Bucknell (https://duncanbucknell.com/2013/04/12/the-difference-between-a-strategy-a-plan-and-a-process/)

Questions and Discussion

Workshop Exercise

Federal Aviation Administration

Self-Assessment and Action Plan

Objectives

- Review knowledge of your organization's capabilities for the safety oversight of AIS/AIM
- Identify gaps in key information and focus on key performance requirements and results
  - If you identify topics for which conflicting, little, or no information is available, use these topics for future action planning
- Complete self-assessment
- Develop an action plan to address one of the gaps identified in the self-assessment
  - Prioritize gaps to determine the most important focus area(s) for the plan

Activity Instructions

- Access the Self-Assessment Worksheet folder in the Activities > AIP Audit folder on your flash drive
  - Work individually or in small groups representing your organizations
  - Type your responses into the Worksheet
- Complete the Air Navigation Safety Oversight Action Plan in the Activities > AIP Audit folder on your flash drive

What is an Action Plan?

- An action plan is a sequence of steps that must be taken, or activities that must be performed well for a strategy to succeed
- An action plan has three key elements:
  - Specific tasks
    - What will be done and by whom?
  - Time horizon
    - When will it be done?
  - Resource allocation
    - What will you need to do it?

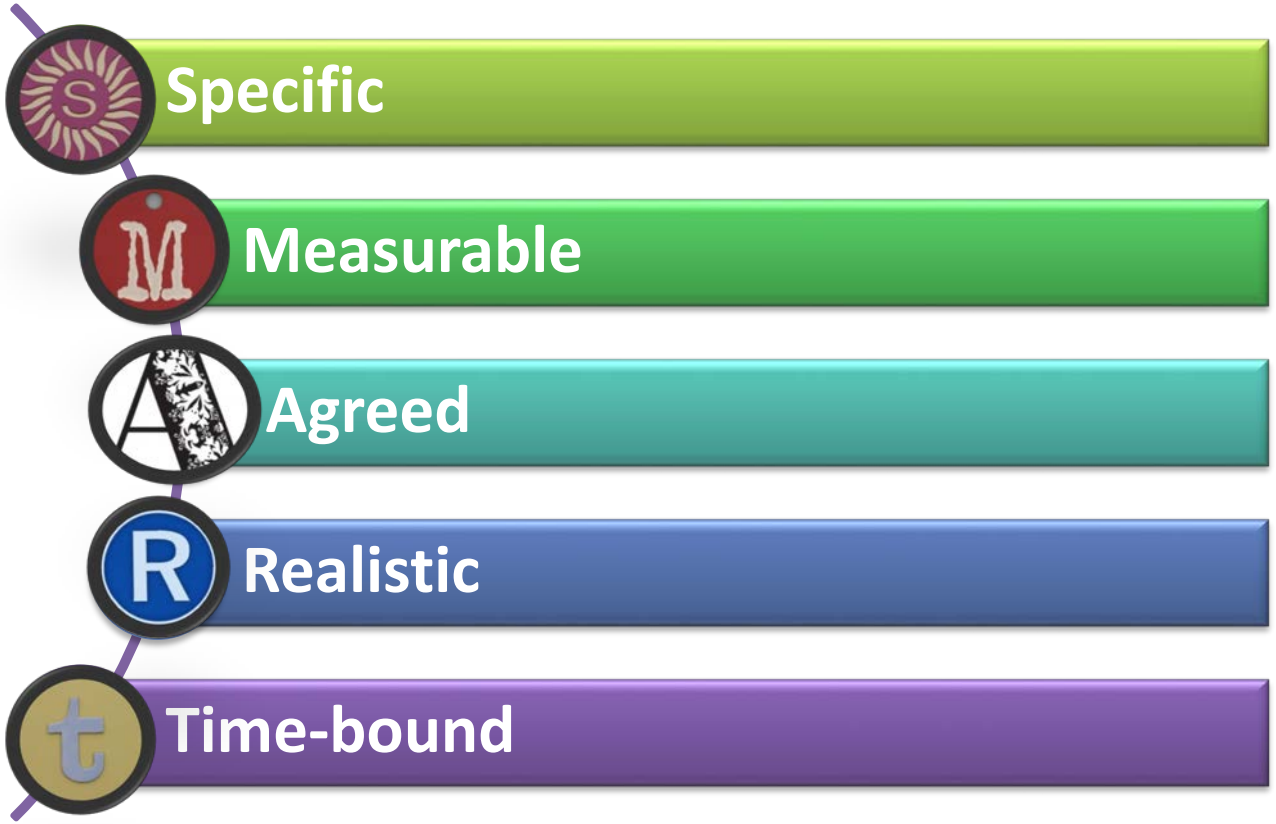
Resource: Action Plan (http://www.businessdictionary.com/definition/action-plan.html)

Strategies for Successful Action Plans

- State the problem and desired outcome
  - Be mindful of project scope
- Identify a responsible person
  - Who will be responsible for the plan?
  - Who will be responsible for specific tasks?
- Set SMART targets
- Update plans regularly
  - Action plans are not static!

SMART Targets

SMART targets are:



Resource: SMART Goals, by Duncan Haughey, PMP (http://www.projectsmart.co.uk/smart-goals.php)

Discussion

- Do you think that the self-assessment will help your organization carry out its safety oversight responsibilities going forward?
- If you represent an ANSP, did this activity help you to understand regulatory requirements?
  - Might it help you to improve your AIS/AIM products and processes?
- How long will it take to complete your action plan?
- What did you learn from developing your plan?

References

- Action Plan (http://www.businessdictionary.com/definition/action-plan.html)
- SMART Goals, by Duncan Haughey, PMP (http://www.projectsmart.co.uk/smart-goals.php)
- Action Plans, Small Scale Planning (http://www.mindtools.com/pages/article/newHTE_04.htm)