

Safeguarding Aeronautical Information



Federal Aviation
Administration



Presented to: SAM Region Seminar on PANS-AIM

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Discussion Topics



Performance Based Information Management



Information Challenge

How could we make the global airspace system perform like a single, safe, seamless operation while allowing for States to operate based on their own requirements and capabilities?

Performance Based Information Management (PBIM)

The systematic approach used to achieve desired, measurable outcomes

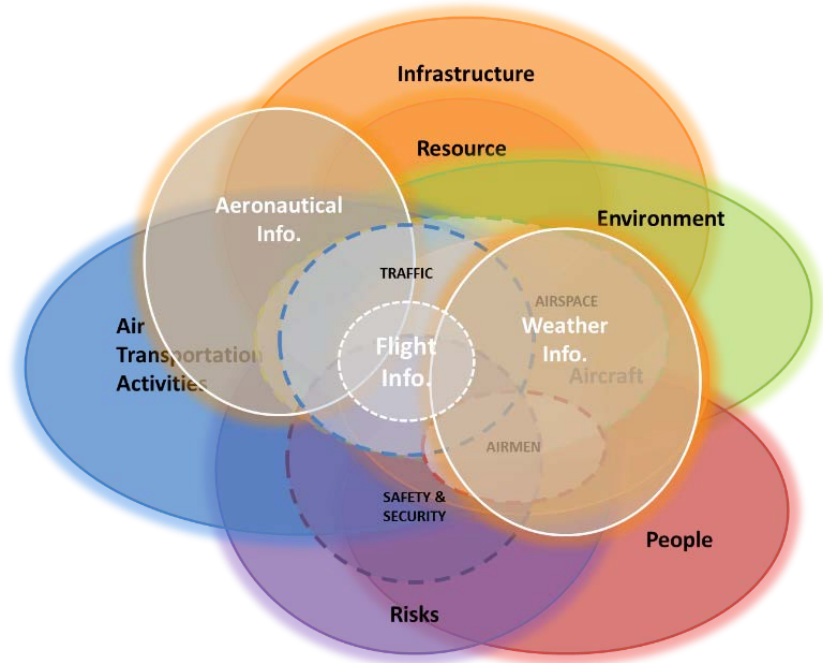
Data/Information Domain

ICAO Information Areas



This is how we collect and manage data

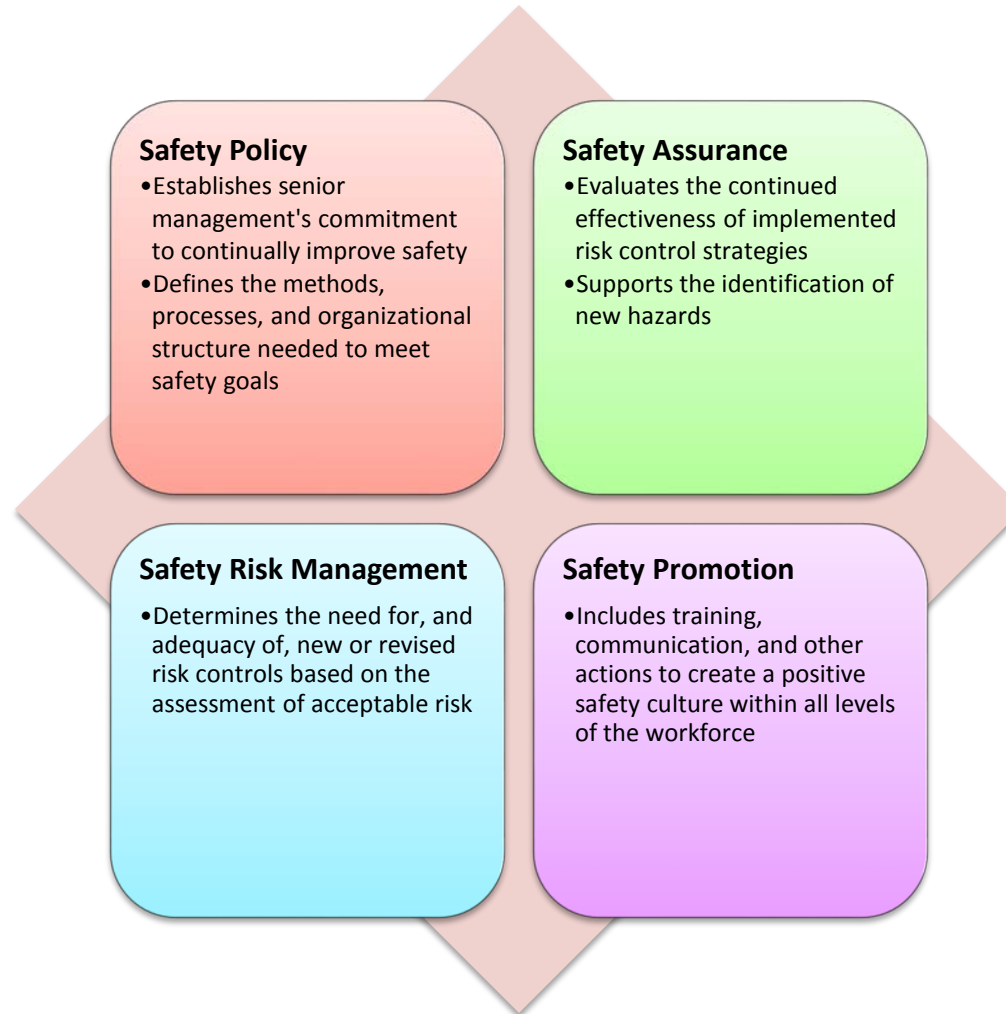
Information Domains



This is how users see information

Significant overlap with traditional areas

Safety Management Pillars

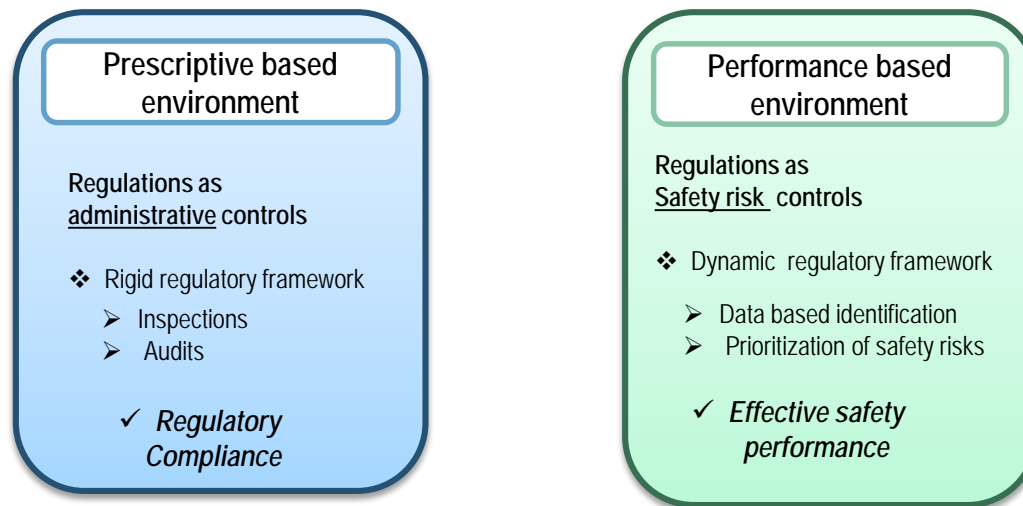


How does ICAO drive Safety?



From ICAO State Safety Program (SSP) Implementation Course – lesson 6 and 4

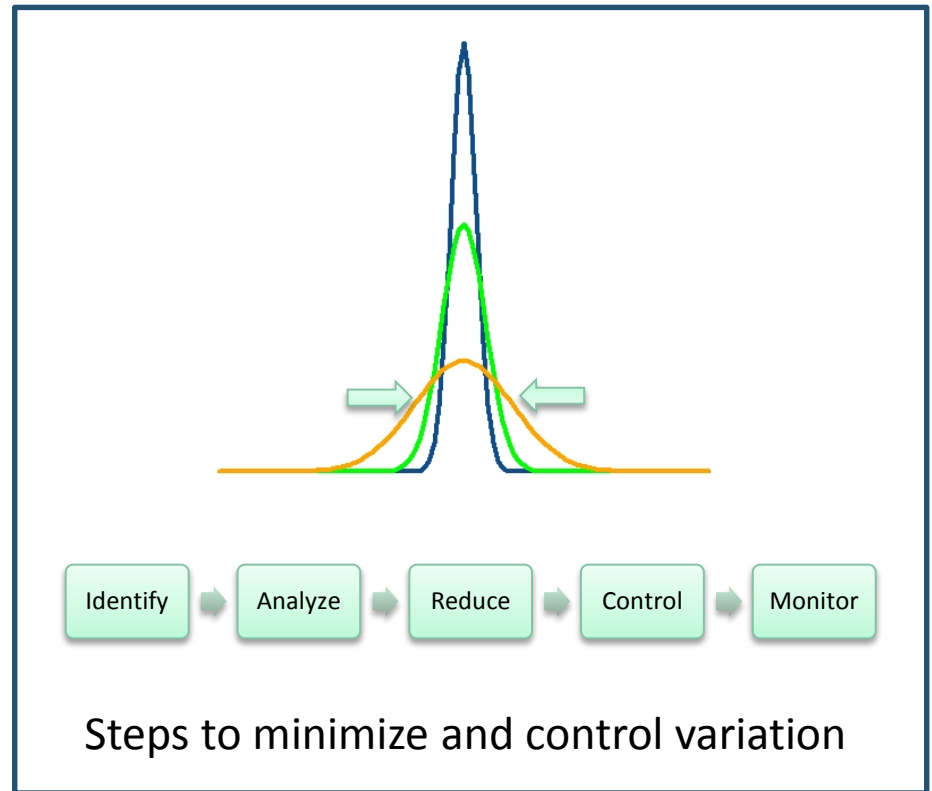
Prescriptive and Performance Based Information Management



- ❖ **Prescriptive regulations establish “what” is to be achieved and “how” it must be achieved**
 - Example – An operator shall not conduct fuelling procedures when passengers are embarking, on board or disembarking
- ❖ **Performance-oriented regulations establish “what” is to be achieved, but provide flexibility on “how” it must be achieved**
 - Example – An operator shall establish procedures for the protection against fire during fuelling operations

Minimize Variation

- ✓ **Create standards** in processes that support performance
- ✓ Proactively **identify variation** in processes
- ✓ Establish rules to keep information inside a **Tolerance = Acceptable/Intended Variation**
- ✓ Establish rules for addressing information falling **outside the Tolerance = Unacceptable/Unintended Variation**
- ✓ Protect information integrity by ensuring information variation remains within established tolerances



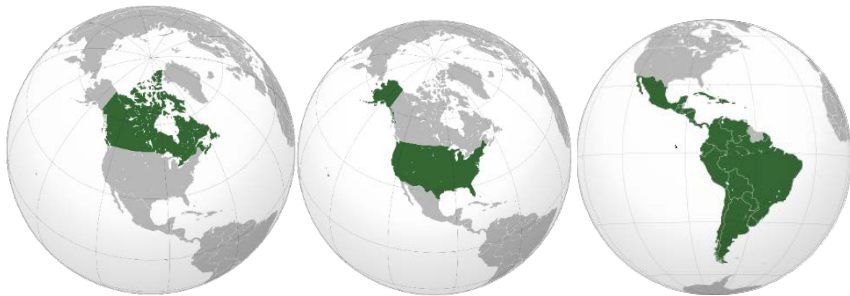
Convergence through Collaboration



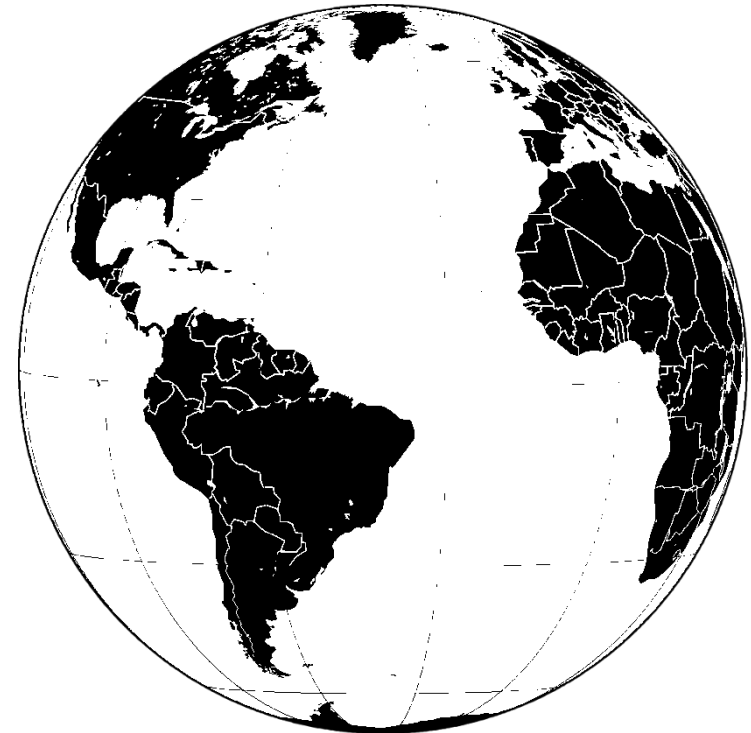
- Standards/Rules
- Common processes
- Shared principles
- Knowledge base foundation
- Best practices
- Scenarios/templates
- Competencies

Geographical Domain

This is how users want to see information



This is how we manage data



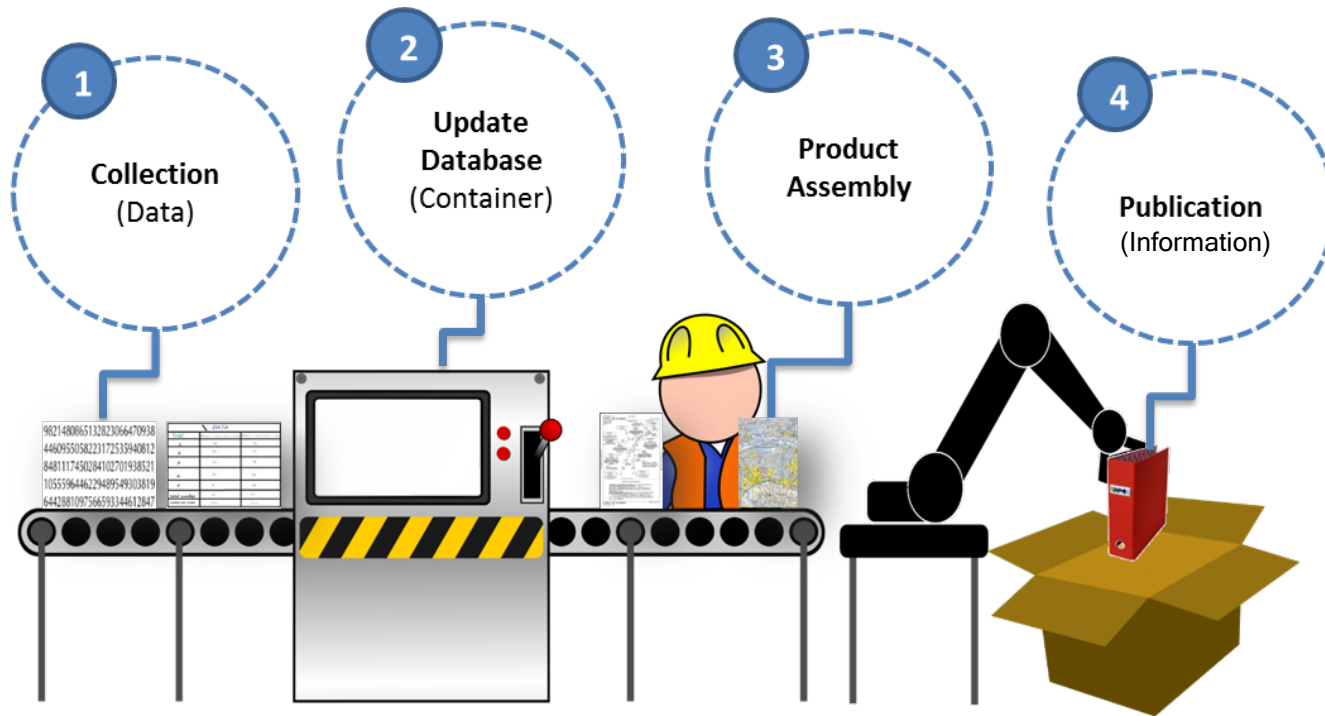
State Responsibilities for AIS

- Provide an **Aeronautical Information Service**
 - Receive, collate or assemble, edit, format, publish/store and distribute data and information of its own territory and those areas over the high seas where ATS is provided
- Aeronautical data and information are **complete, timely** and of **required quality**
- Aeronautical data and information necessary are **made available** for the operational requirements of the ATM and flight operations communities
- Issue and receive **NOTAM** information by telecommunication

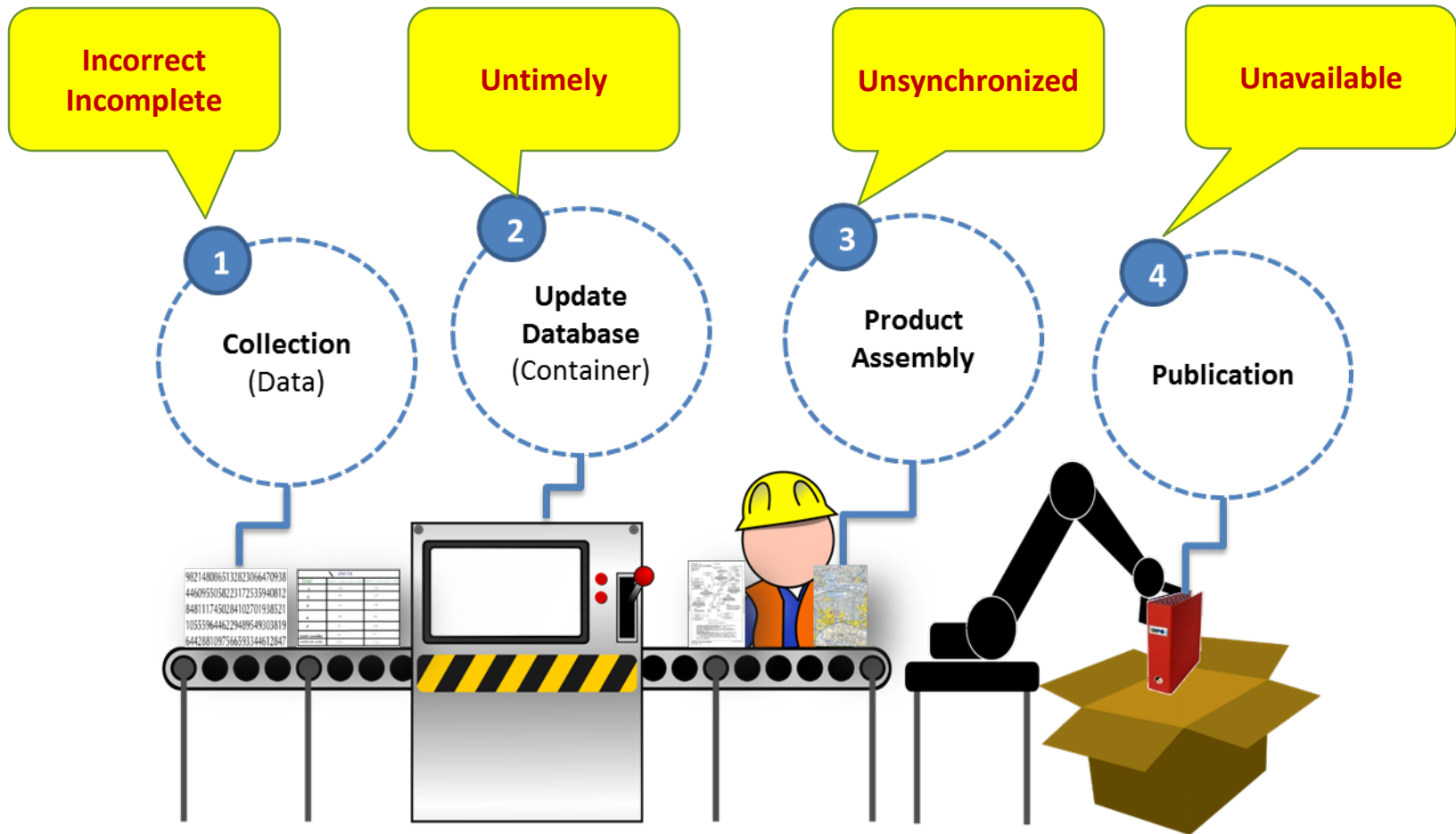
State Responsibilities for AIS

- **Exchange** aeronautical data and information with any ICAO Contracting State upon request at no charge
- **Validation** and **verification** procedures are in place
- **Metadata** is collected and maintained
- Aeronautical data and information is **protected** in accordance with data error detection, security, and authentication techniques
- **Automation** is introduced with the objective of improving the timeliness, quality, efficiency and cost effectiveness
- A **quality management system** is implemented and maintained encompassing all functions of an AIS

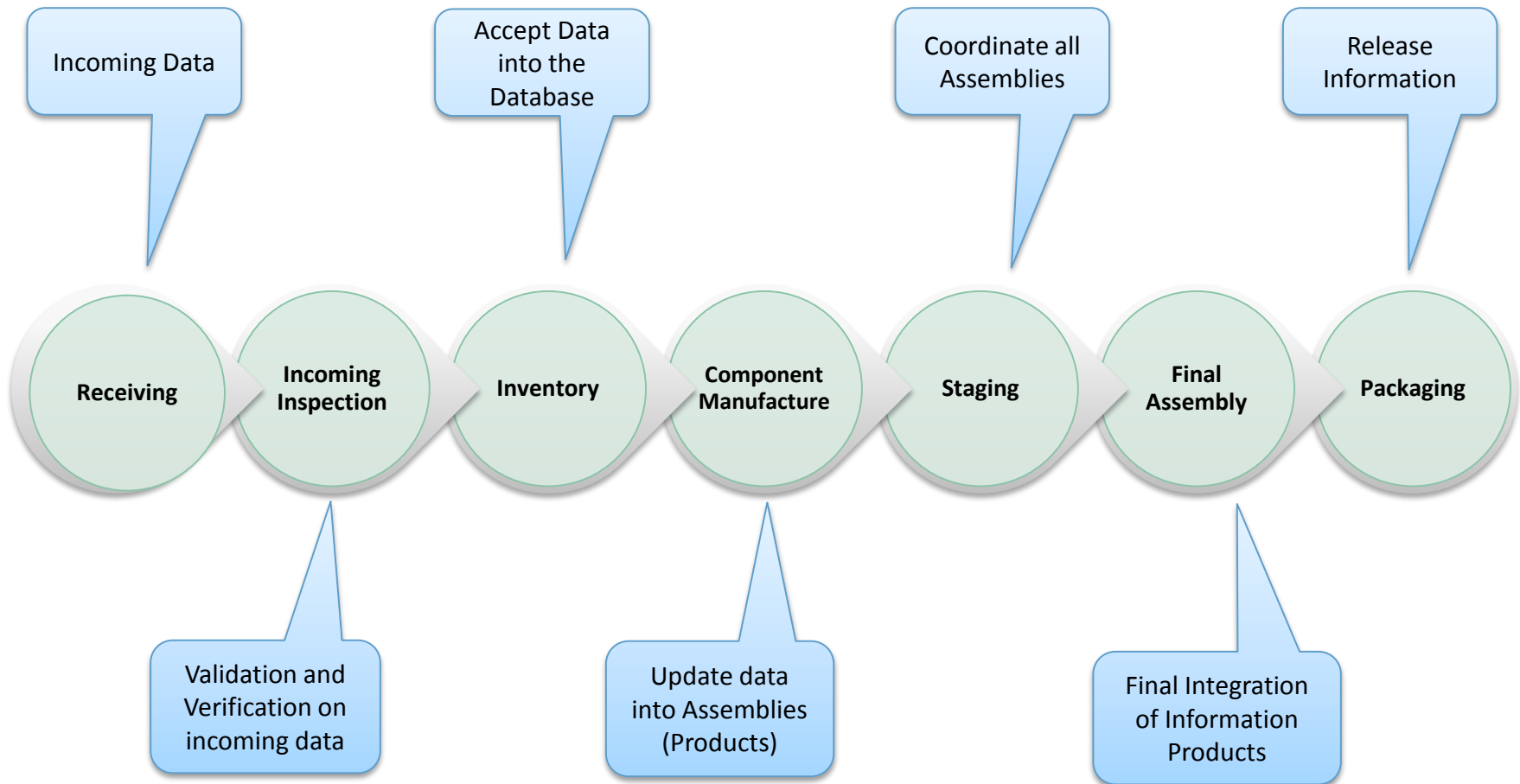
The Information Factory



What Could Go Wrong?



Fundamental Processes



The Safety Oversight View of AIS

What could go wrong?

Data and Information Hazards

Incorrect

Incomplete

Untimely

Unsynchronized

Unavailable

What does risk look like?

Variation

Competency

Business Rules

Process

Traceability

What prevents things from going wrong?

Controls/Barriers

Formal Arrangements

QMS

Production Control

Configuration Management

How will I know if it's working?

Safety Oversight Activities

Continuous Monitoring

Audits and Assessments

Inspections

Good Data, Bad Information

“NTSB: CONTROLLER SENT PILOT WHO DIED IN LONG ISLAND PLANE CRASH TO CLOSED AIRPORT”

ABC7NY (WABC-TV) August 24, 2015

Recent audits have highlighted gaps in the aeronautical data and information chain, from data origination and to collection and processing to final distribution as information products and services.

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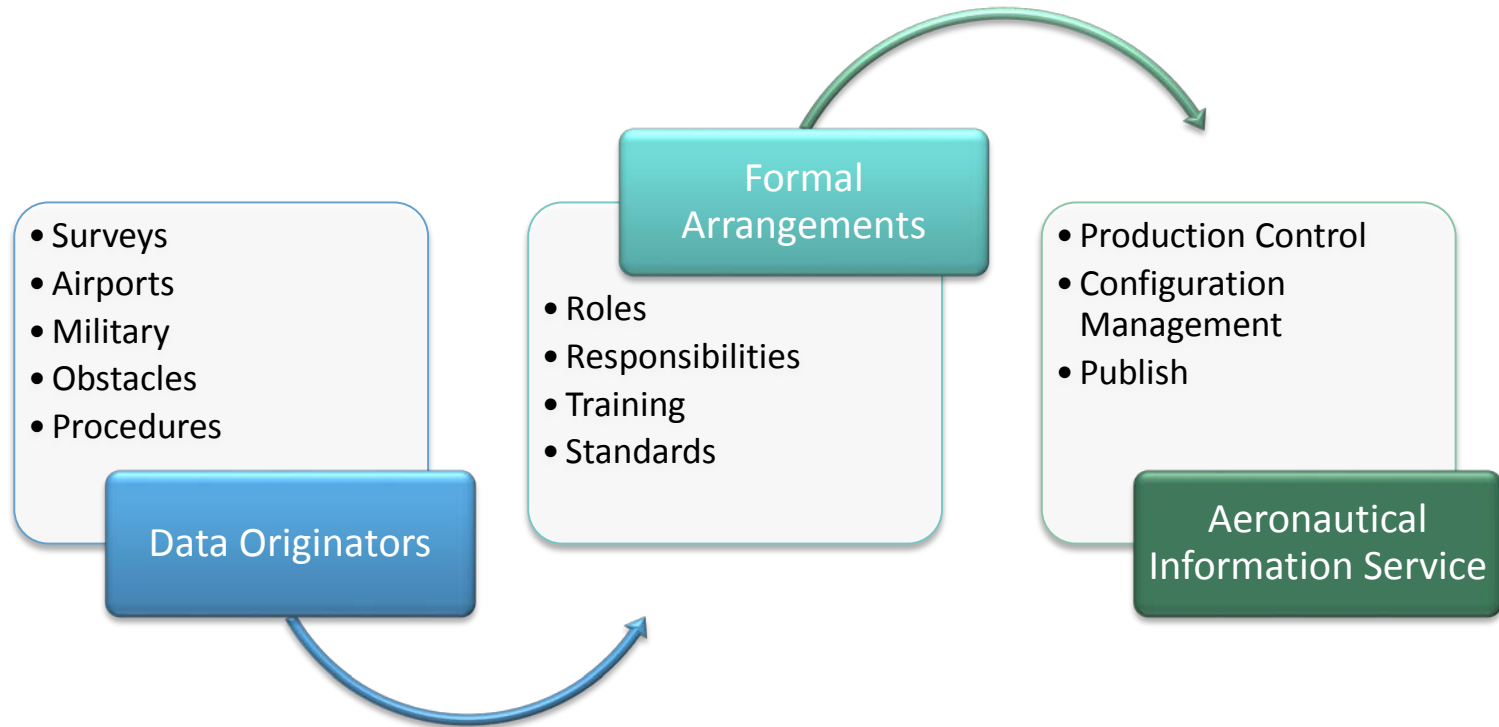
Safety Oversight Activities

Continuous Monitoring

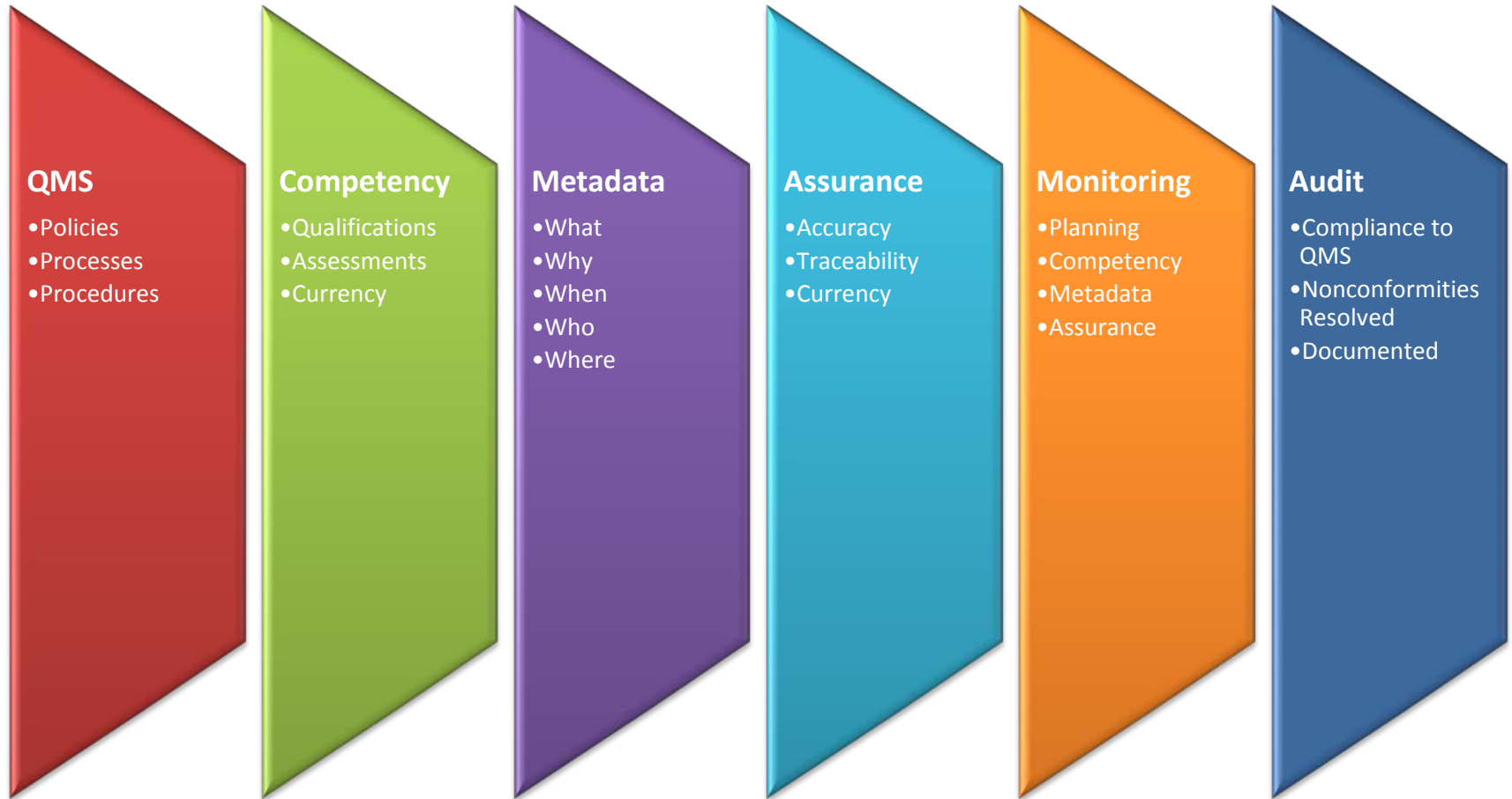
Audits and Assessments

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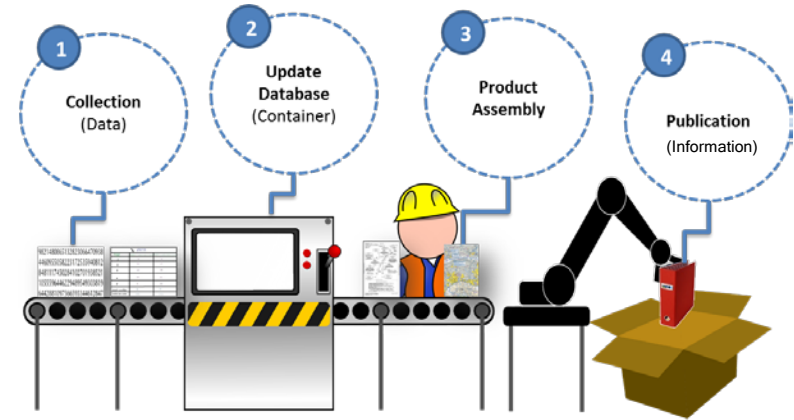
Formal Arrangements



Quality Management System



Production Management



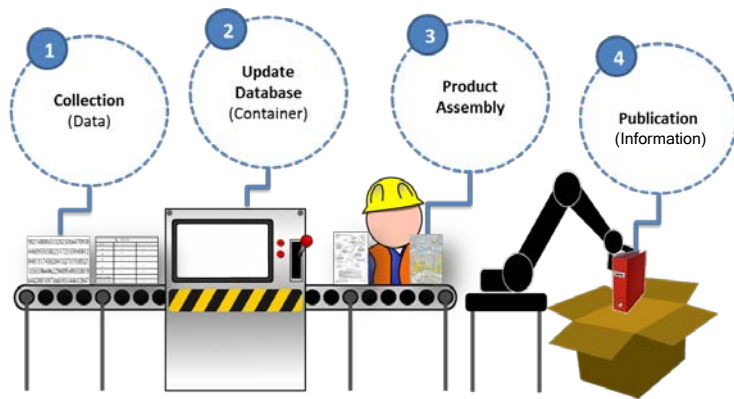
Production Control of Workflow

Configuration Management of Products and Services

PRODUCTION MANAGEMENT

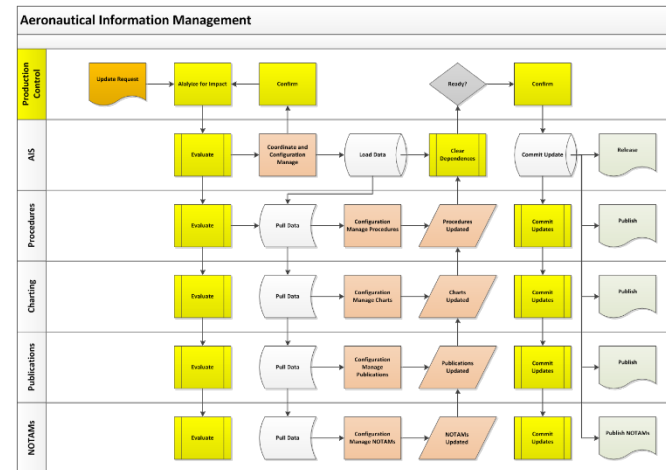
Production Management

Managing the Factory



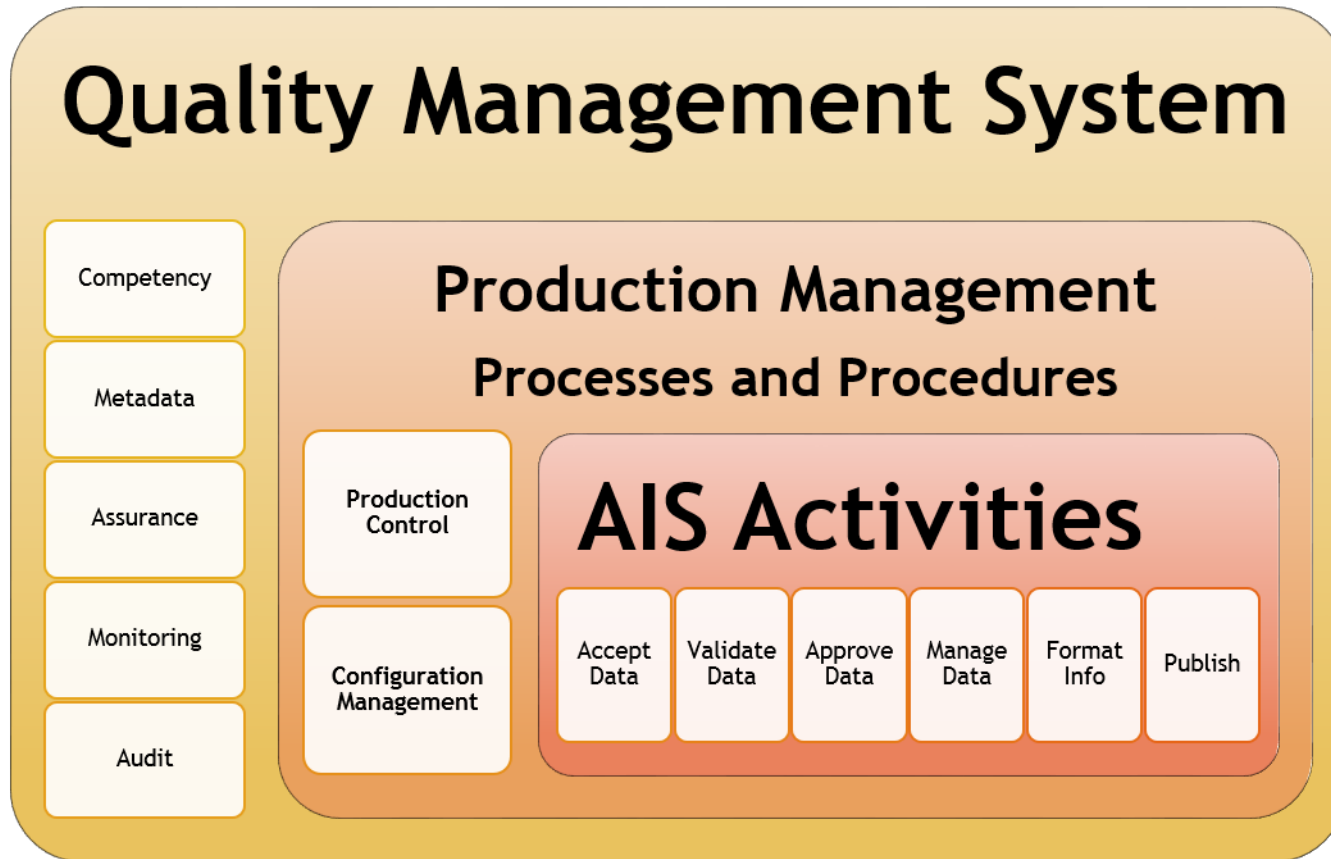
AIS Activities

Accept Data Validate Data Approve Data Manage Data Format Information Publish



Workflow

Connecting Multiple Processes



Production Control



- ▶ What products contain information about data element/feature X?
- ▶ Is there any data in product Y that is expired?
- ▶ What changes did person A make to which elements in product Y?

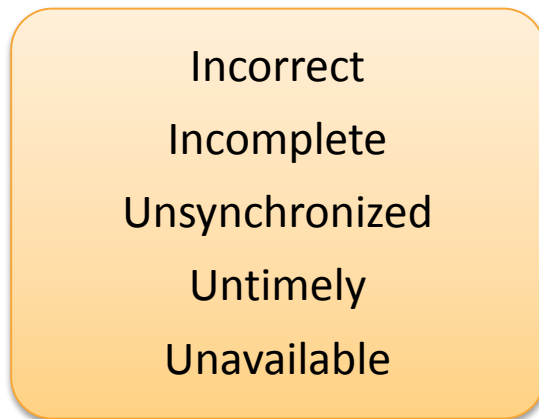


Would you expect the manufacturer of food products to be able to answer these questions?

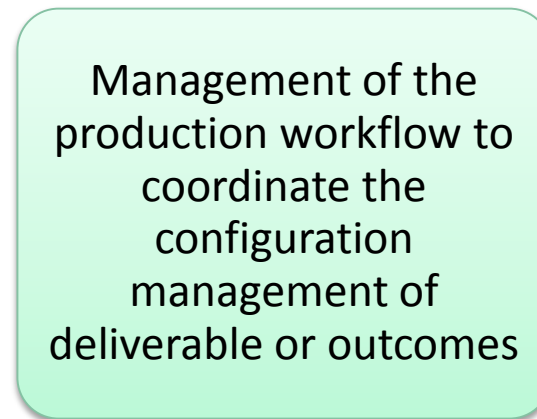
Production Management

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

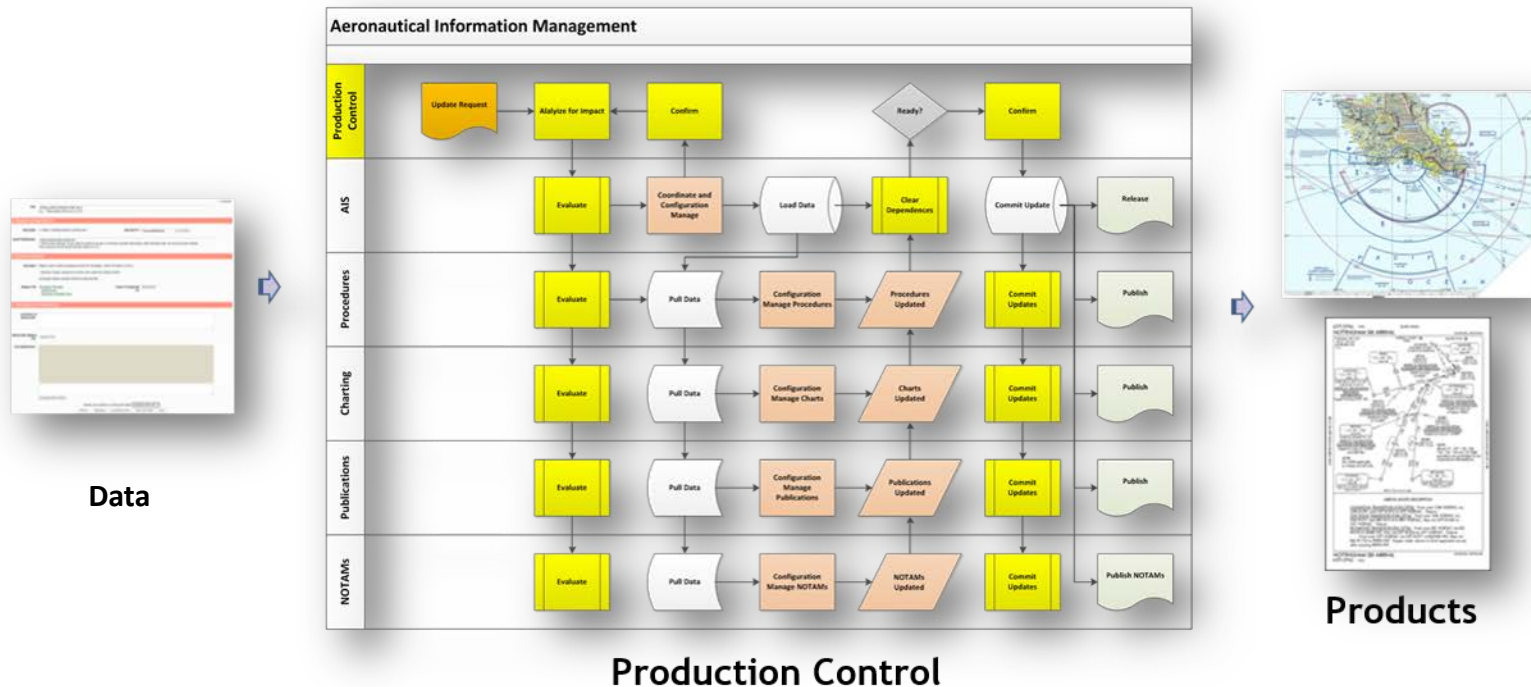
Data/Information Hazards



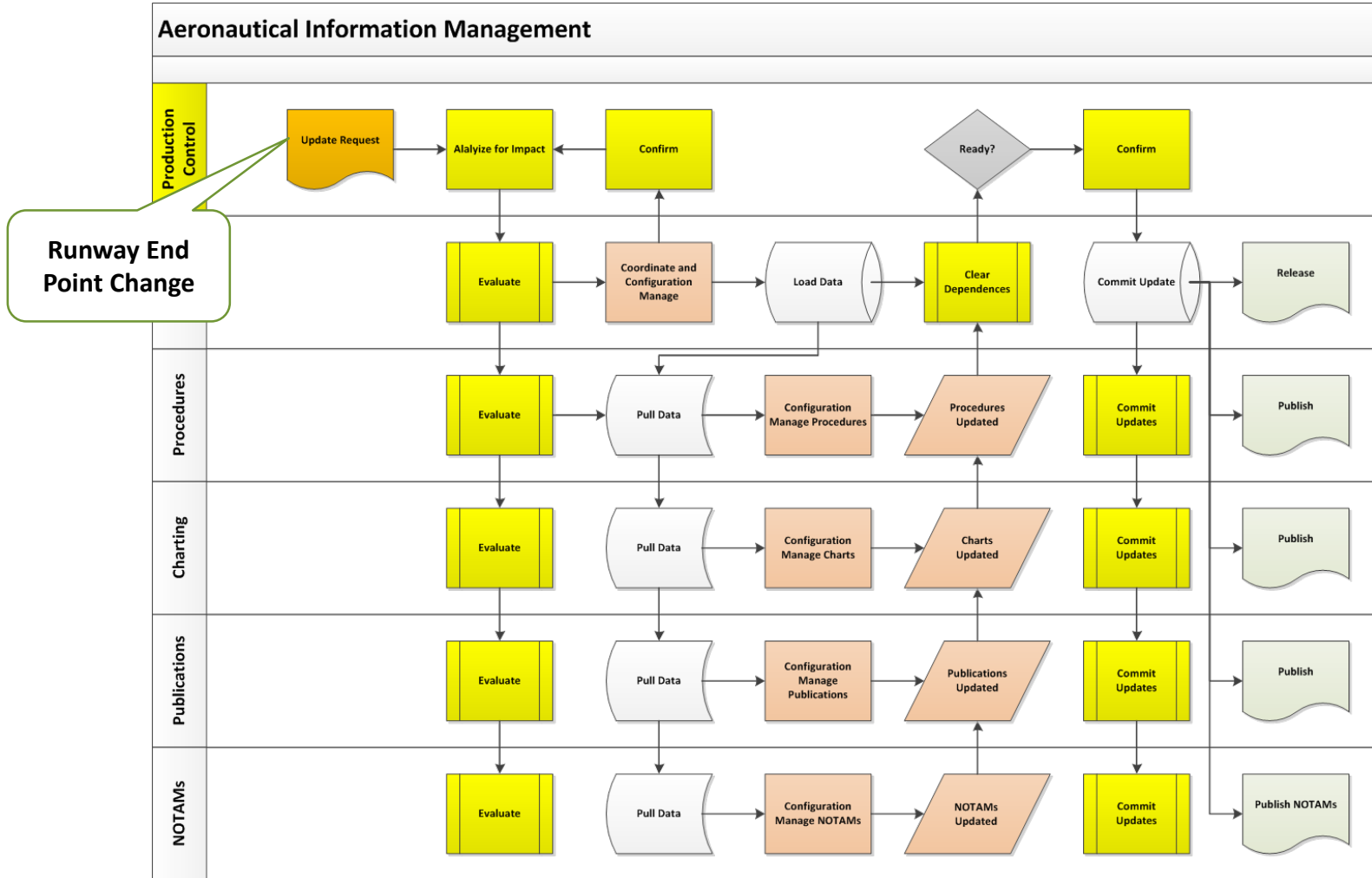
Production Control



How to Synchronize Data Across Multiple Products?



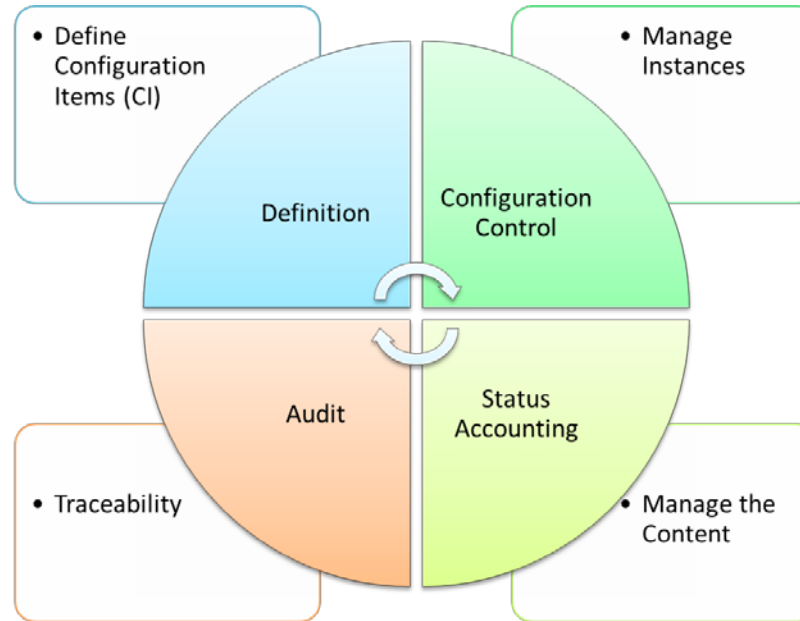
Example: Production Control



Summary: Production Control

- Production control is the management of a data chain from origination, through processing, to publication in downstream products and services
- All databases and products share a common production but have their own configuration management criteria and activities for synchronization
- There is a significant dependency on metadata for traceability
 - Remember our discussion on QMS and Metadata
- A single change can affect the content management of multiple products

Configuration Management

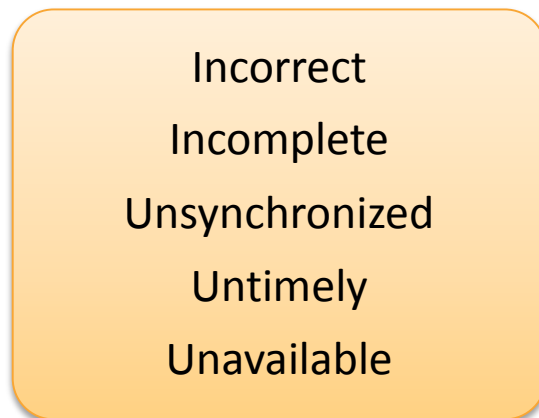


- Managing Configuration Items
- Change Management

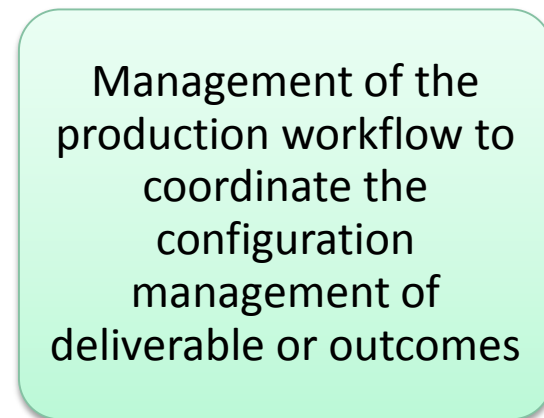
Configuration Management

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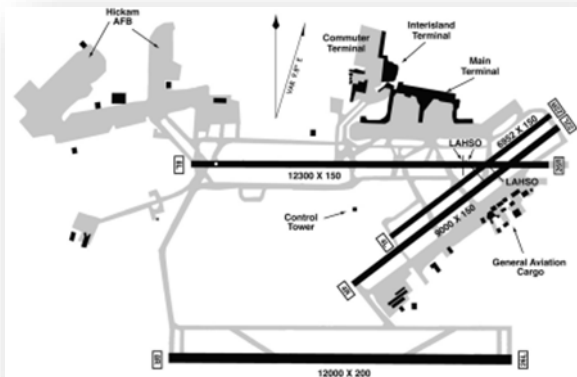
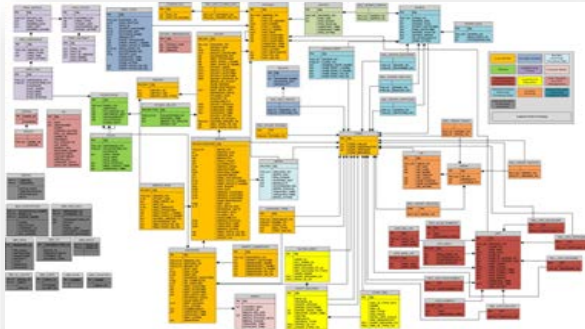
Data/Information Hazards



Production Control



What is Managed?



Configuration Item (CI)

Exchange Model

Data Field

Feature

Document

Chart

Process

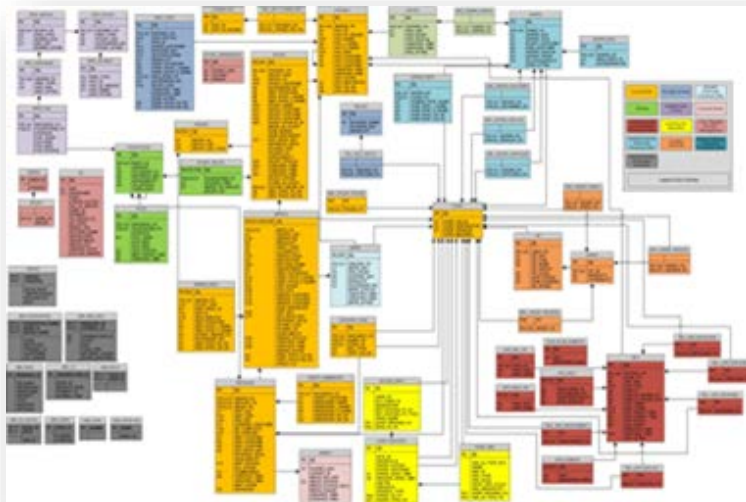
Rulebase/Rules

Database

Publication

Exchange Model, Database, and Data Field

What are we **required** to manage?



Exchange Model (Container)
AIXM

Database (Container)
Data fields

Data Field (Examples)

- Runway
- Obstacle

Features and Charts

What are we **required** to manage?



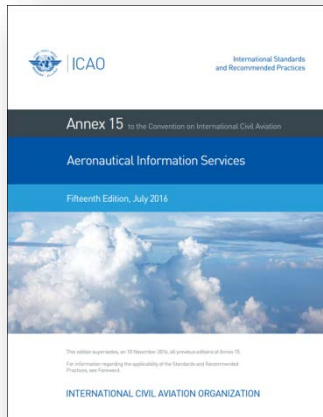
Chart (Container)

- Content depicted as features
- Feature = visual representation of data field(s)

Feature (examples)

- Airspace
- Airport
- Navaid
- Obstacle
- Route

Documents & Publications

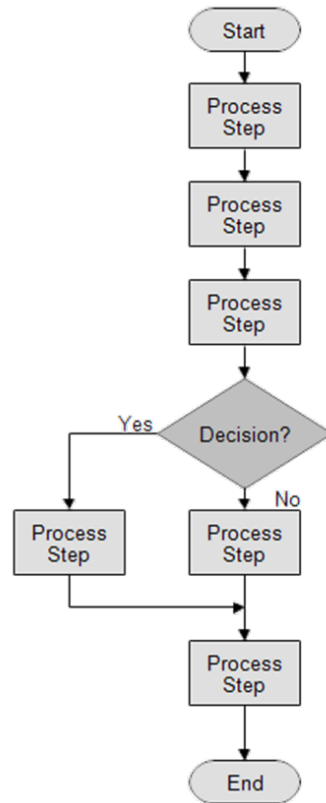


A document is a container

How do we manage revisions for documents?

What information do we keep about the different revisions?

Processes



- **Standard Operating Procedures are normally written down and stored in a document**
- **Could it be important to know information about a process?**
- **What information do we keep about the different process revisions?**

Processing Rules Example

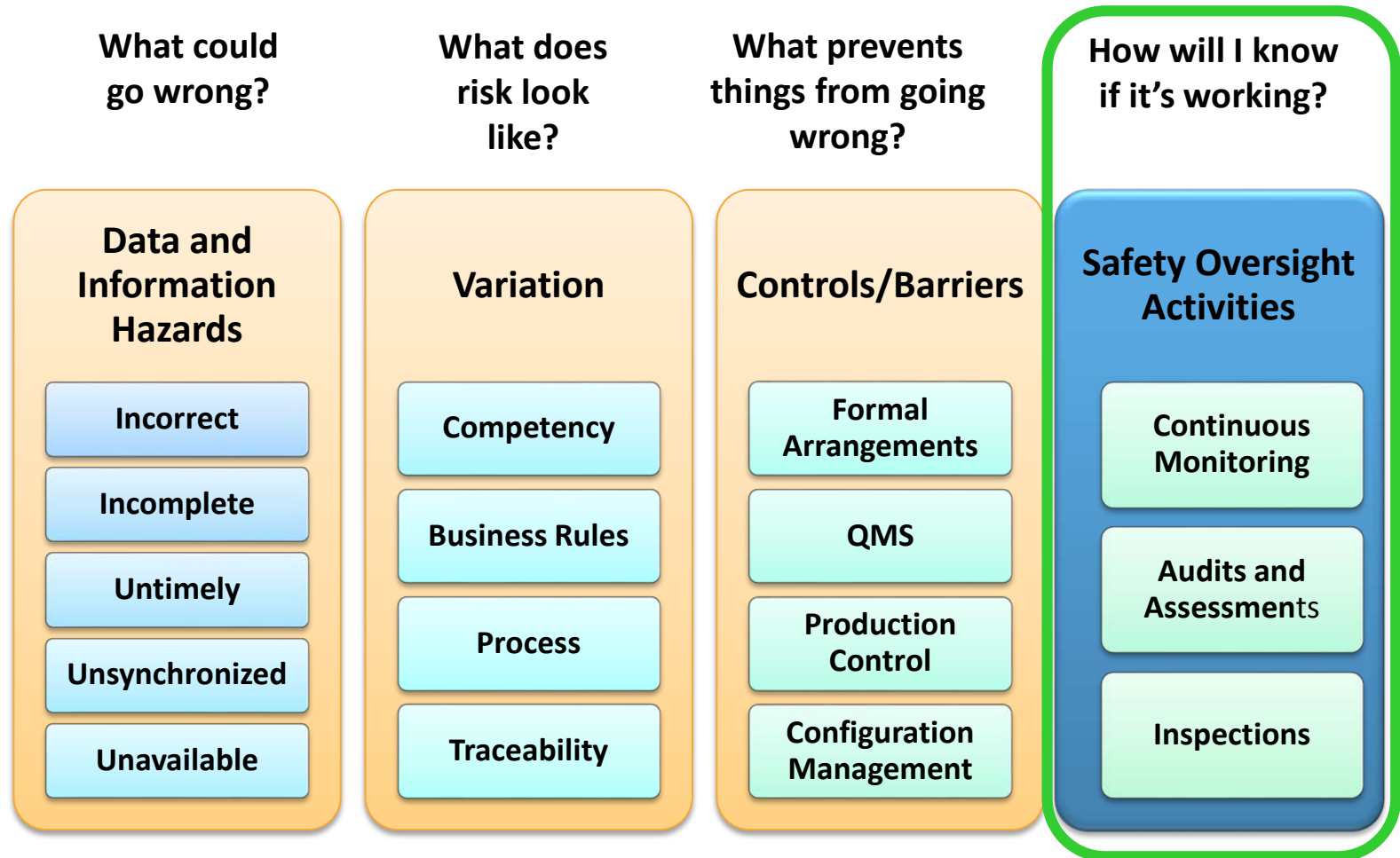
CONDITIONS				ACTIONS
CompanyInfo.type	CompanyInfo.initialListingStandard	CompanyInfo.approval	CompanyInfo.totalRevenue	CompanyInfo.violationCode = {value}
"company"	"PriceStandard"	true	"	"APS"
		false	"	"DPS"
	"ValuationStandard"	true	< 10000	"ALVS"
			>= 10000	"AHVS"
		false	< 10000000	"DD"
			>= 10000000	"TBR"
	"Equity"	true	< 20000	"E1"
			< 200000	"E1B"
			between 20000 and 2000000	"E2"
			> 2000000	"E3"
			false	"
	"PureValuation"	true	< 30000	"OP"
between 30000 and 3000000			"LOP"	
> 3000000			"HOP"	
false		< 50000000	"DOP"	
"Fund"	"Fund"	true	"	"ATF"
		false	"	"DTF"

A rule base is the container of rules

Summary

- Management of changes to a system (data/products) to ensure the performance requirements of the system are maintained
 - Managed through Configuration Items (CI)
 - CI could be a unique field or feature
 - CI could be a container
- Provides Traceability within a product or database
- Managed using Metadata, Rules and Production Control

The Safety View of AIS





iGracias!



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