Performance Based Information Management

Federal Aviation Administration

Safeguarding Aeronautical Information

Presented to: NACC Region Seminar on PANS-AIM
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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?

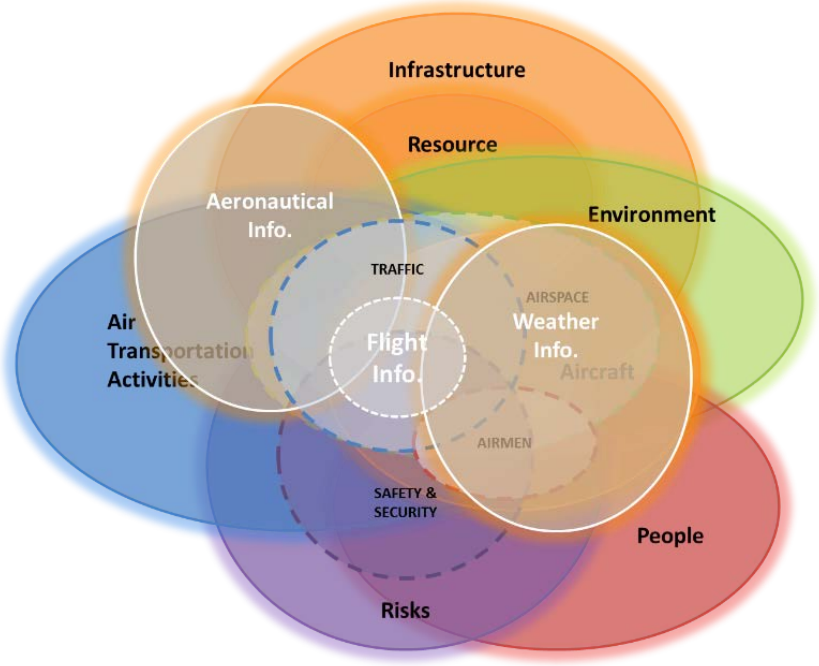
Performance Based Information Management (PBIM)
The systematic approach used to achieve desired, measurable outcomes

Data/Information Domain

ICAO Information Areas

This is how we collect and manage data

Information Domains

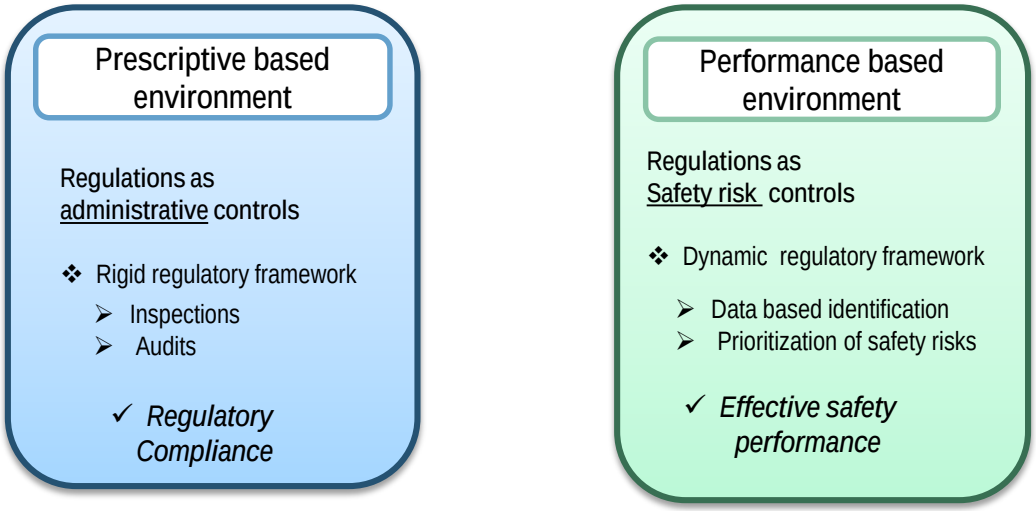


This is how users see information

Significant overlap with traditional areas

Safety Management Pillars

Prescriptive and Performance Based Information Management



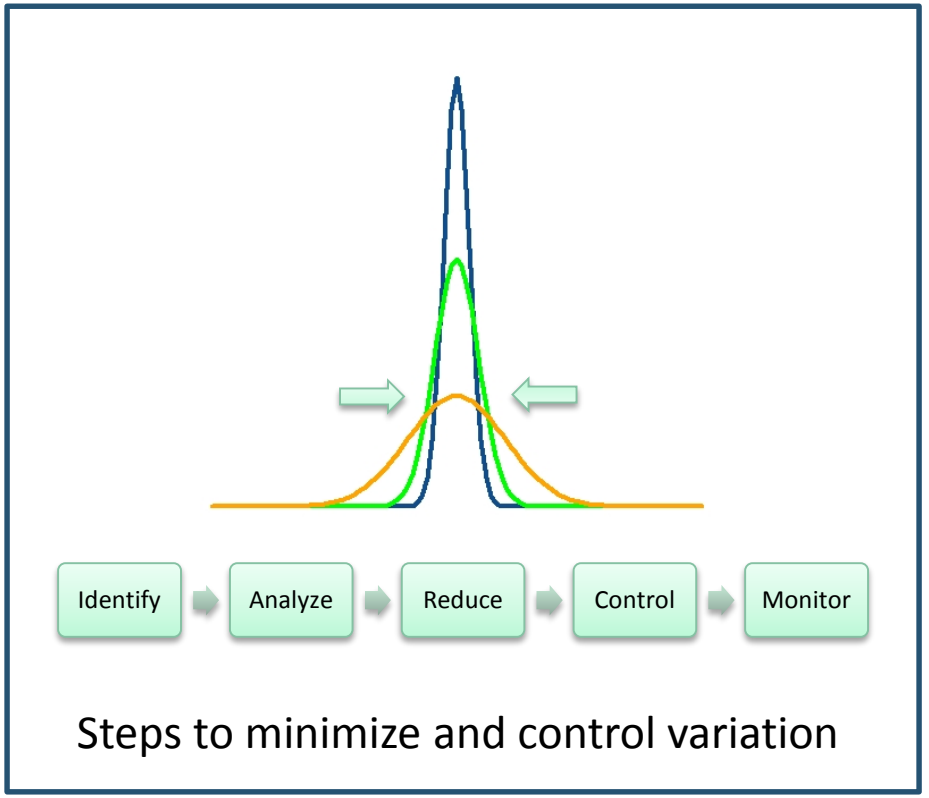
- **Prescriptive regulations establish "what" is to be achieved and "how" it must be achieved**
  - Example – An operator shall not conduct fuelling procedures when passengers are embarking, on board or disembarking

- **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

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

Minimize Variation

- ✓ **Create standards** and 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

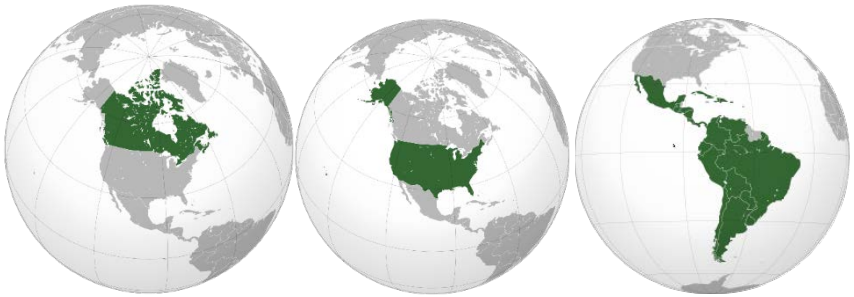


Steps to minimize and control variation

Convergence through Collaboration

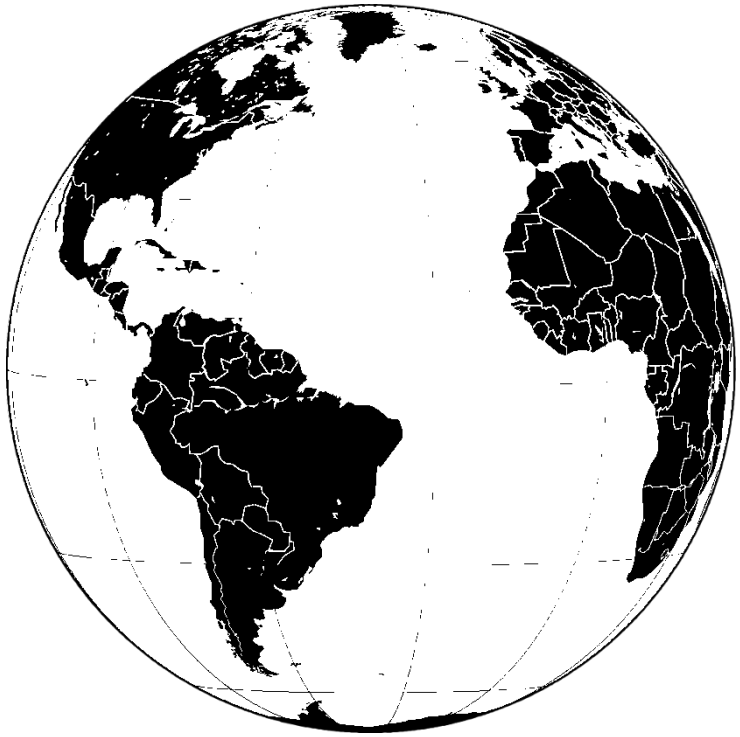
- Standards/Rules
- Common processes
- Shared principles
- Knowledge base foundation
- Best practices
- Scenarios/templates
- Competencies

Geographical Domain



This is how we manage <u>data</u>

This is how users want to see <u>information</u>



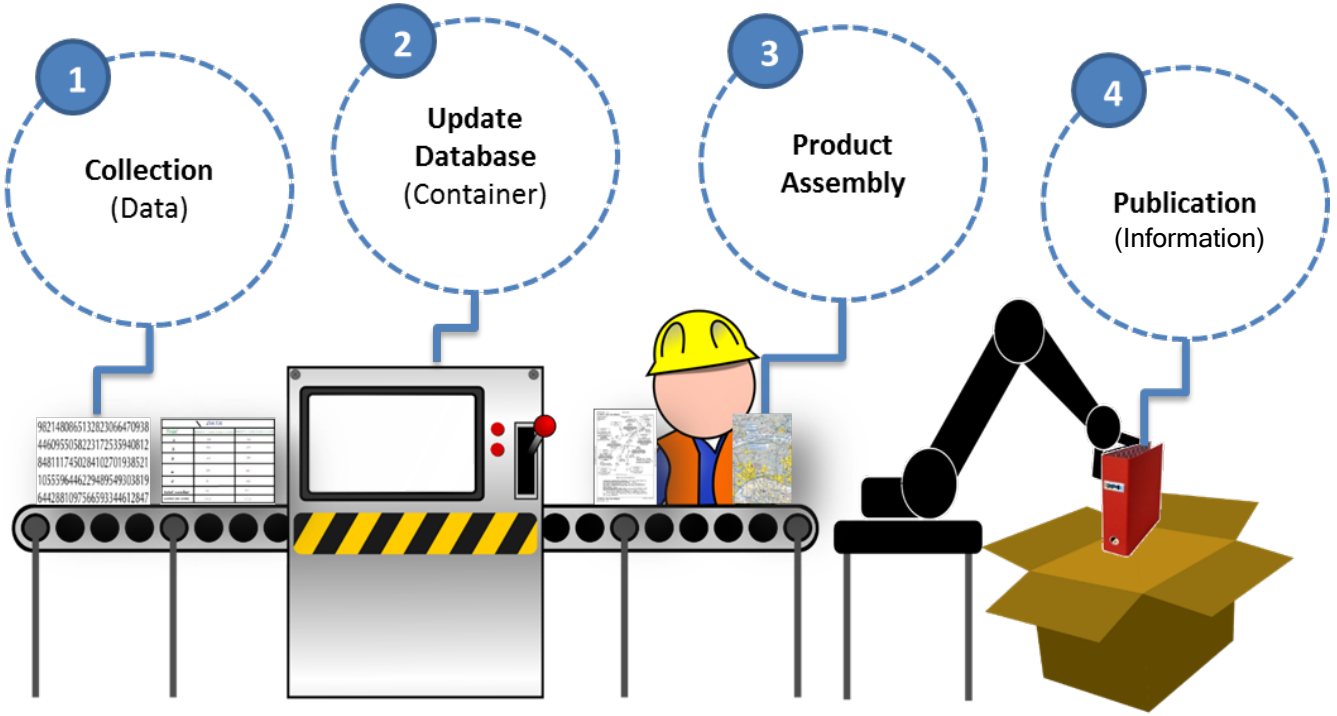
State Responsibilities for AIS

- 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

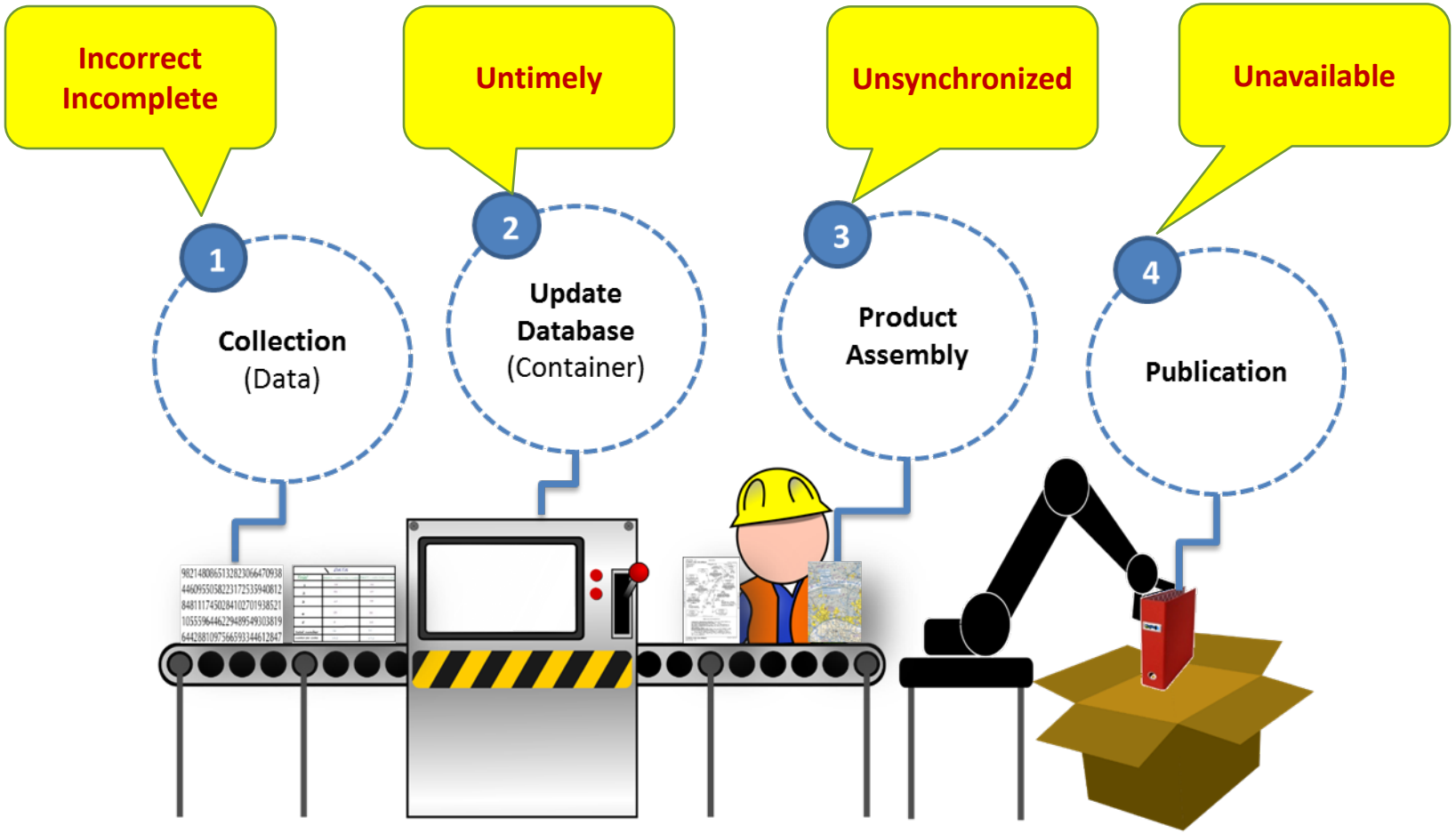
State Responsibilities for AIS

- **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

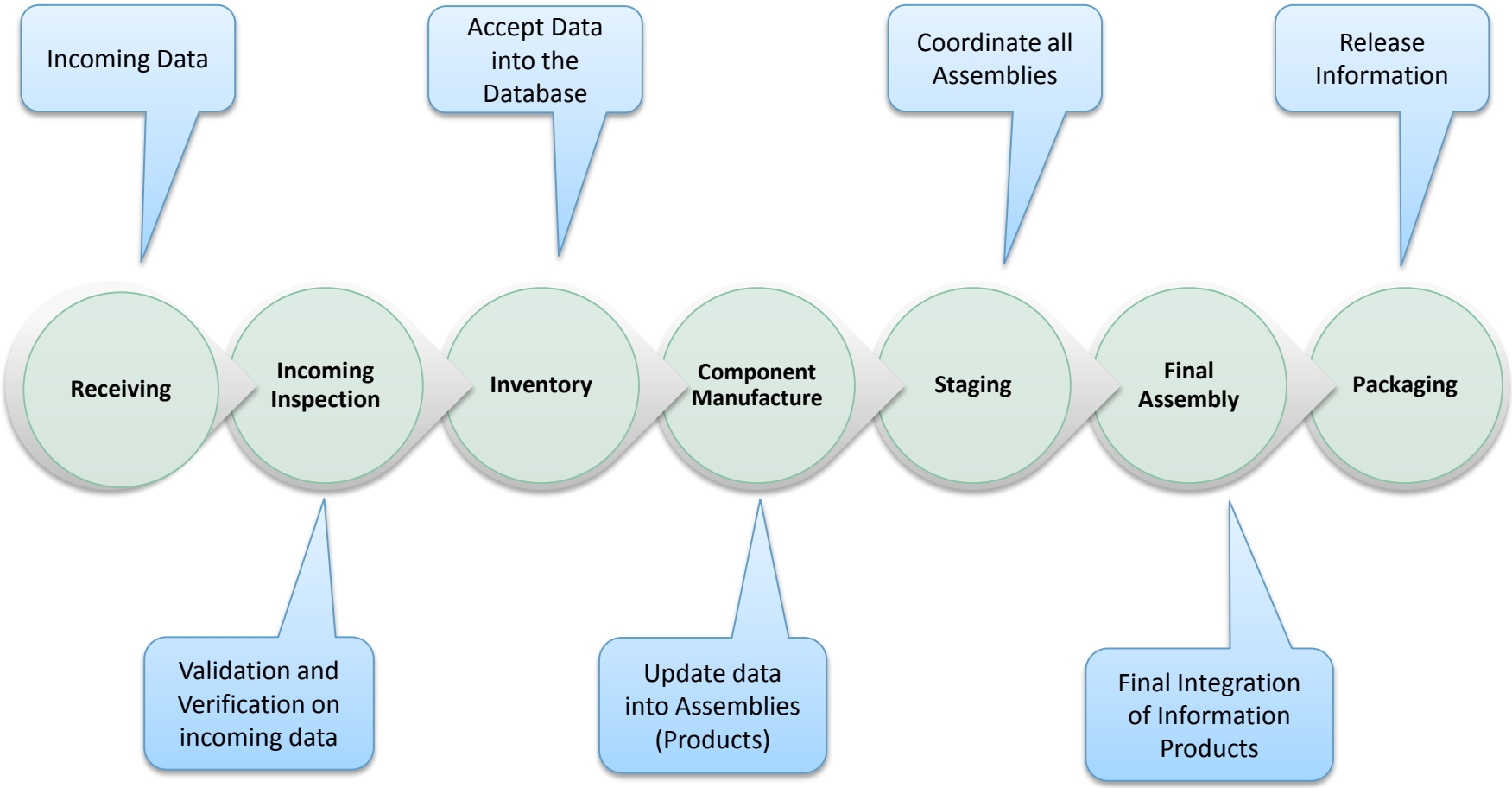
The Information Factory



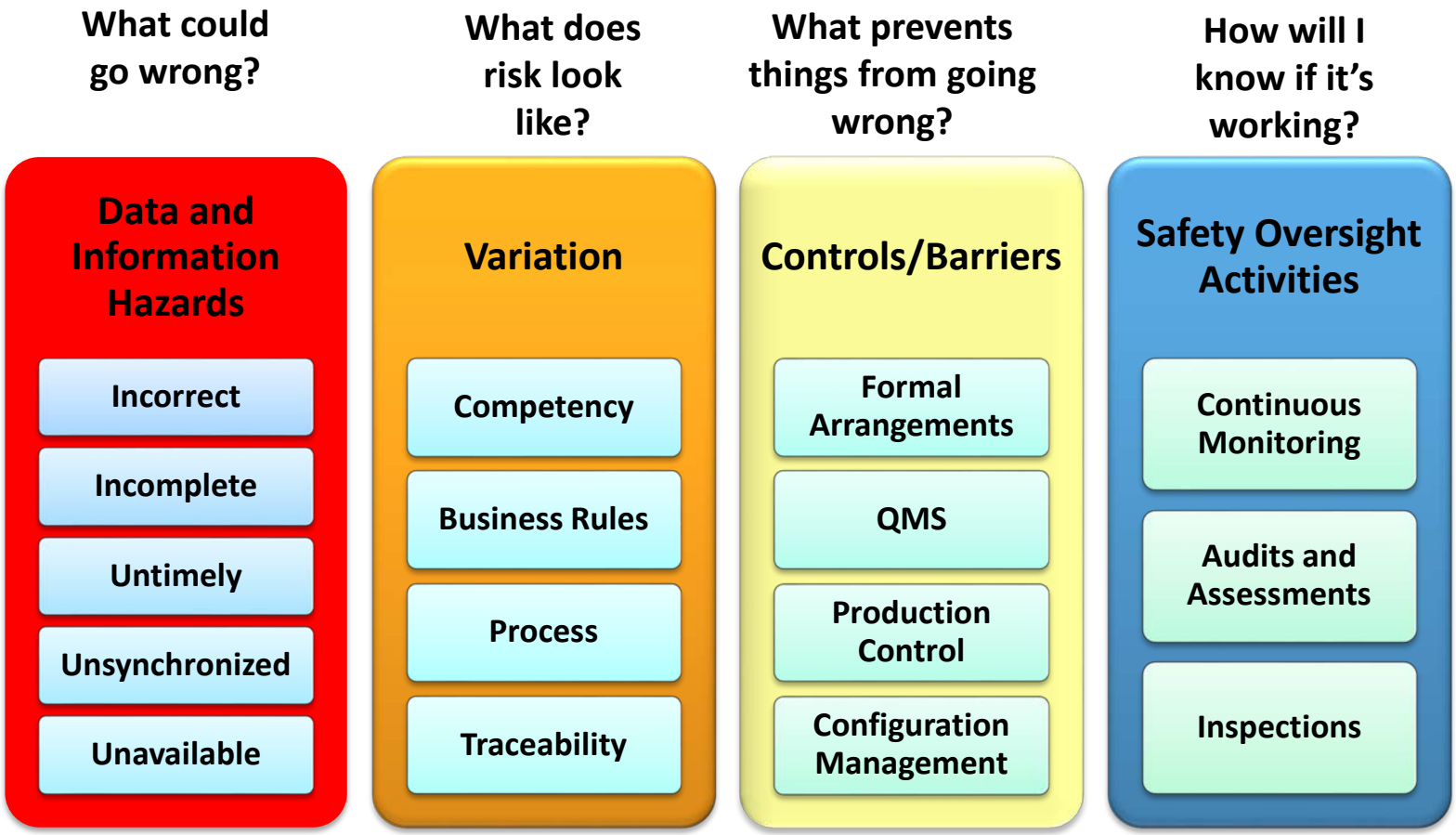
What Could Go Wrong?



Fundamental Processes



The Safety Oversight View of AIS



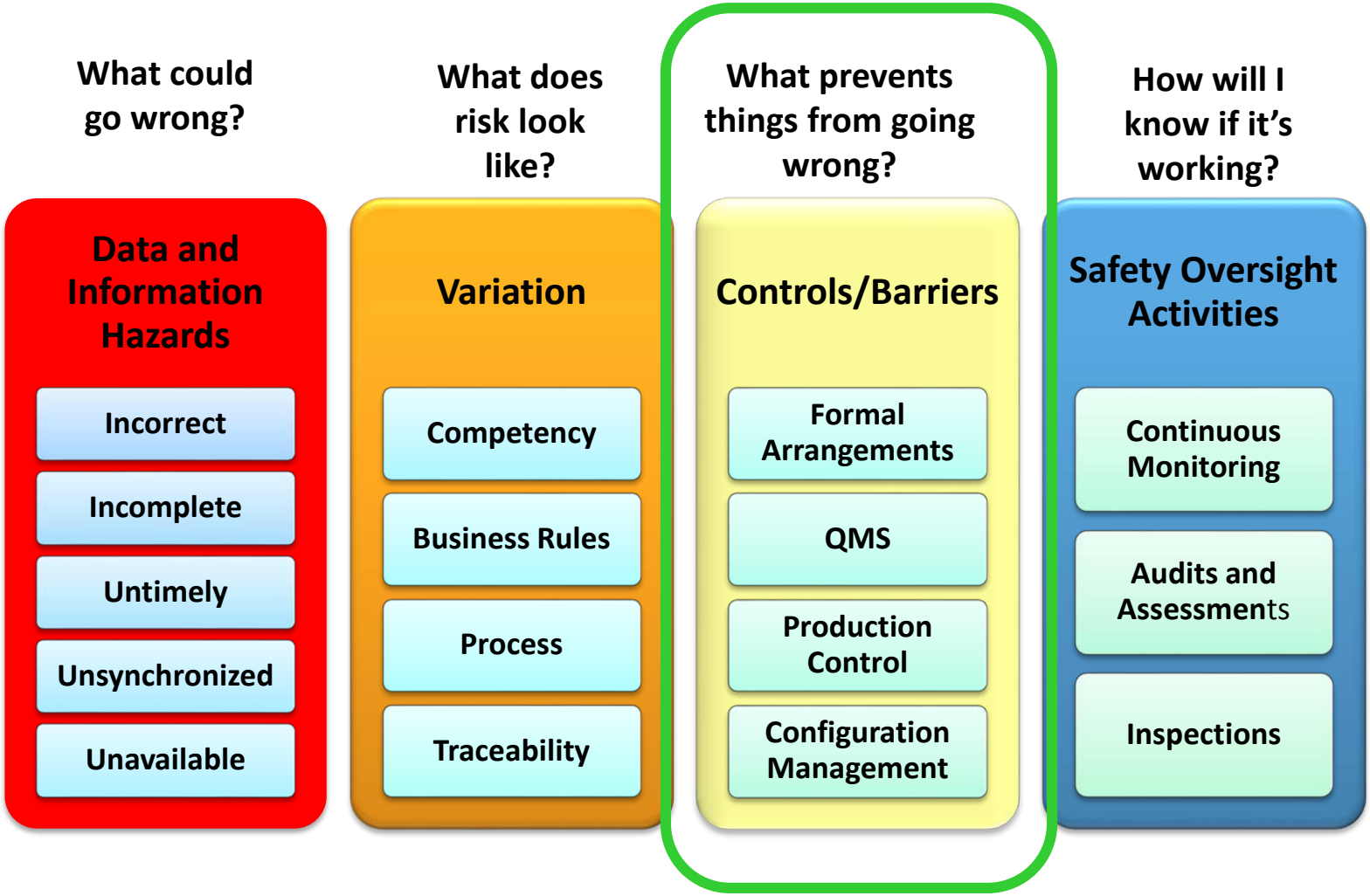
Good Data, Bad Information

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

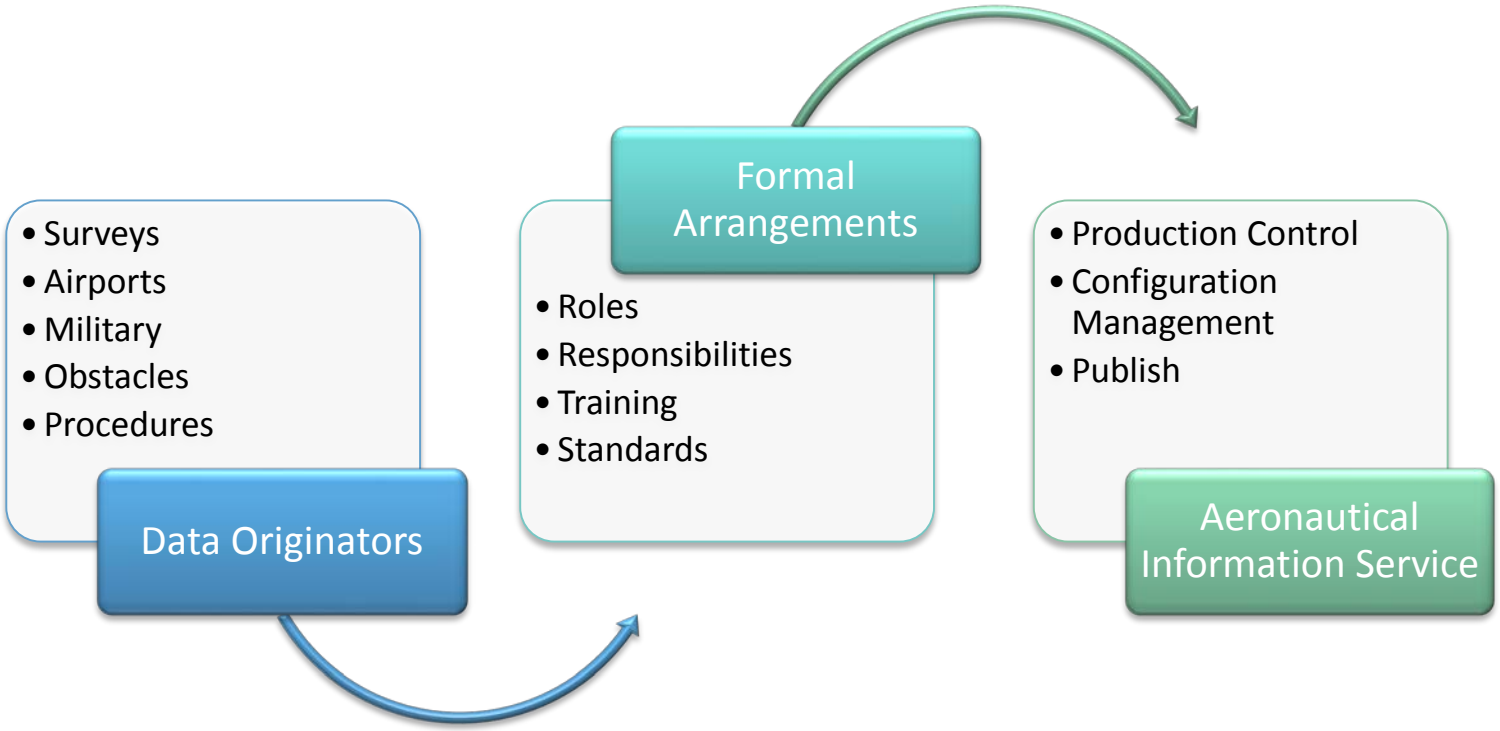
ABC7NY (WABC-TV) August 24, 2015

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.

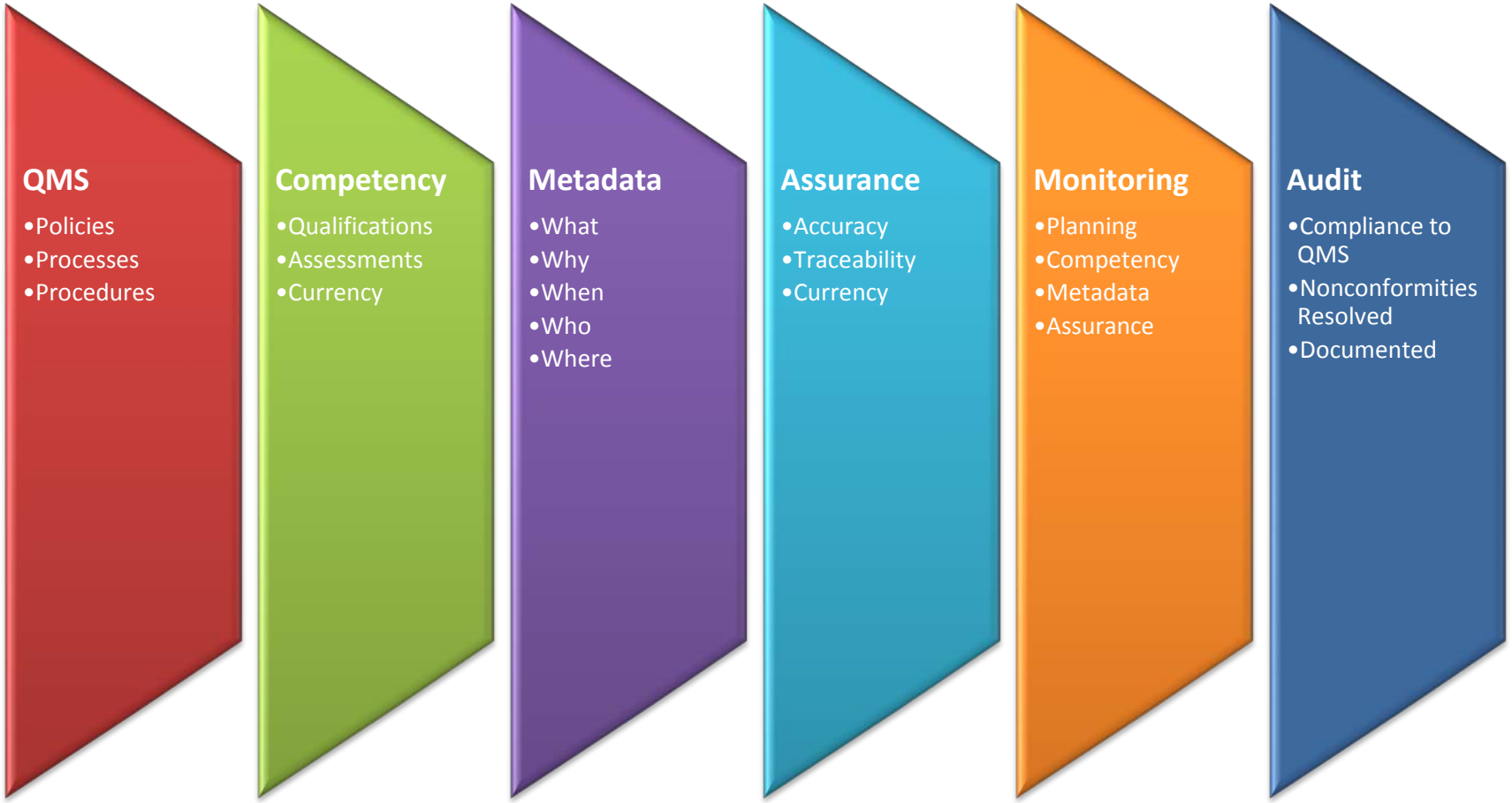
The Safety Oversight View of AIS

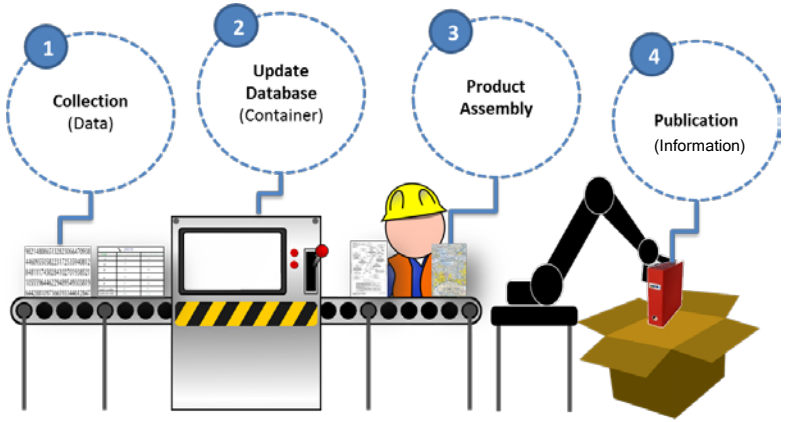


Formal Arrangements



Quality Management System





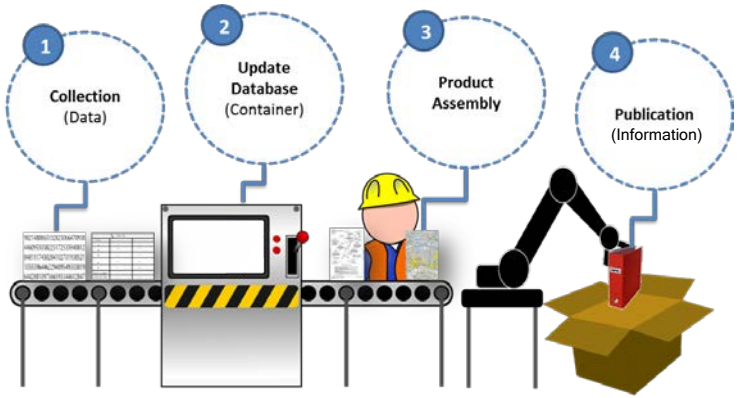
Production Control of Workflow

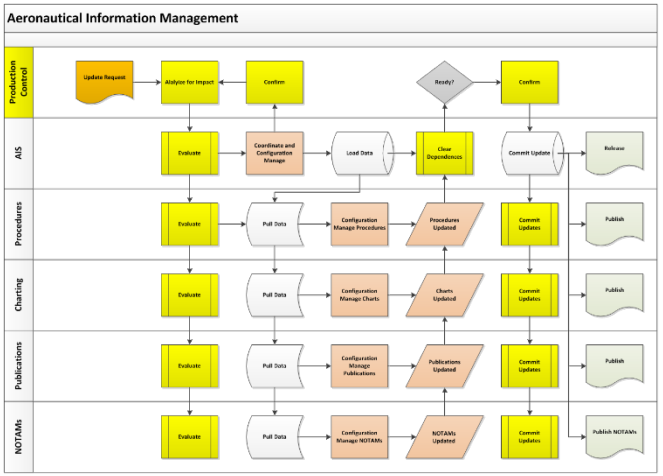
Configuration Management of Products and Services

Production Management

Production Management

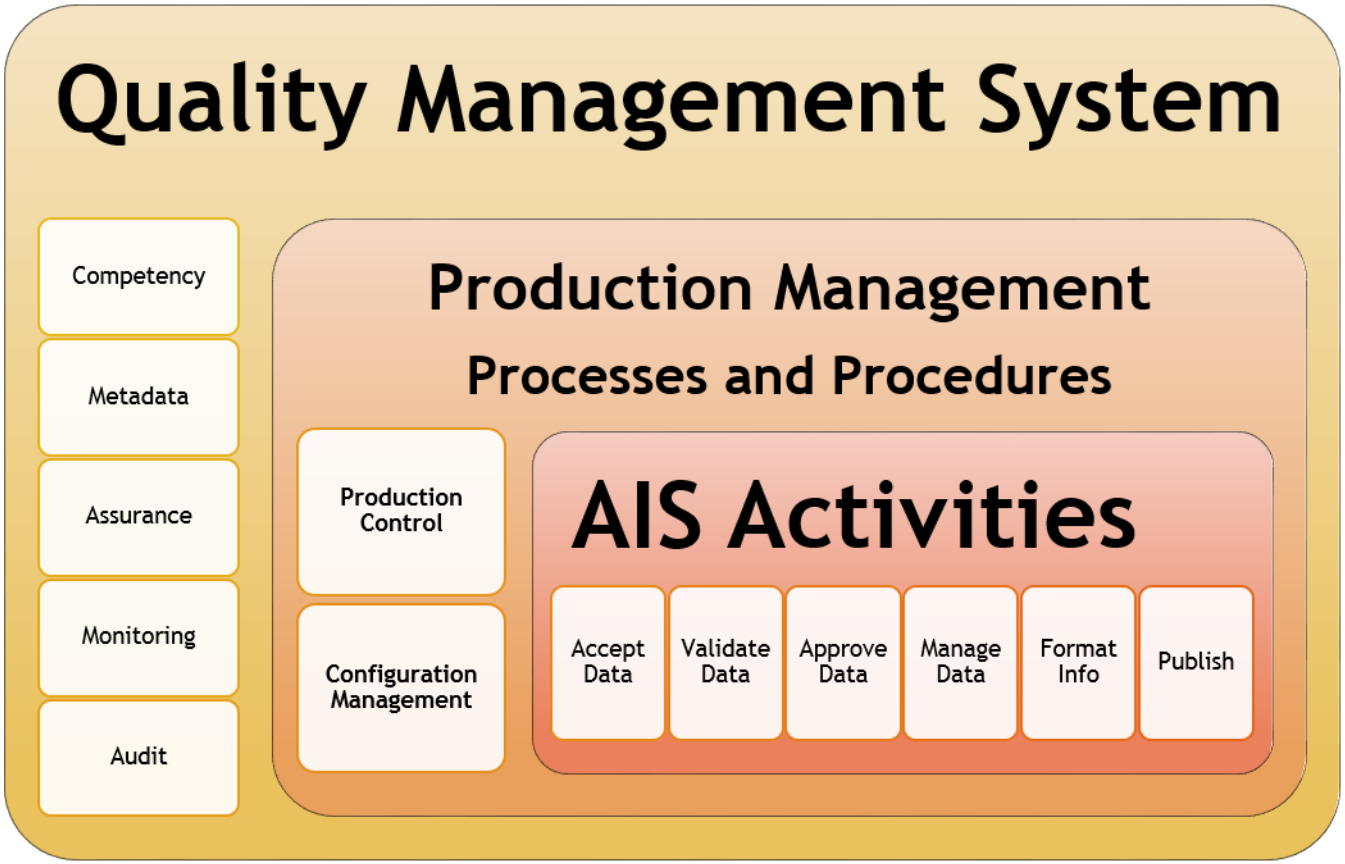
Managing the Factory





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

Production Control

Data/Information Hazards

Incorrect

Incomplete

Unsynchronized

Untimely

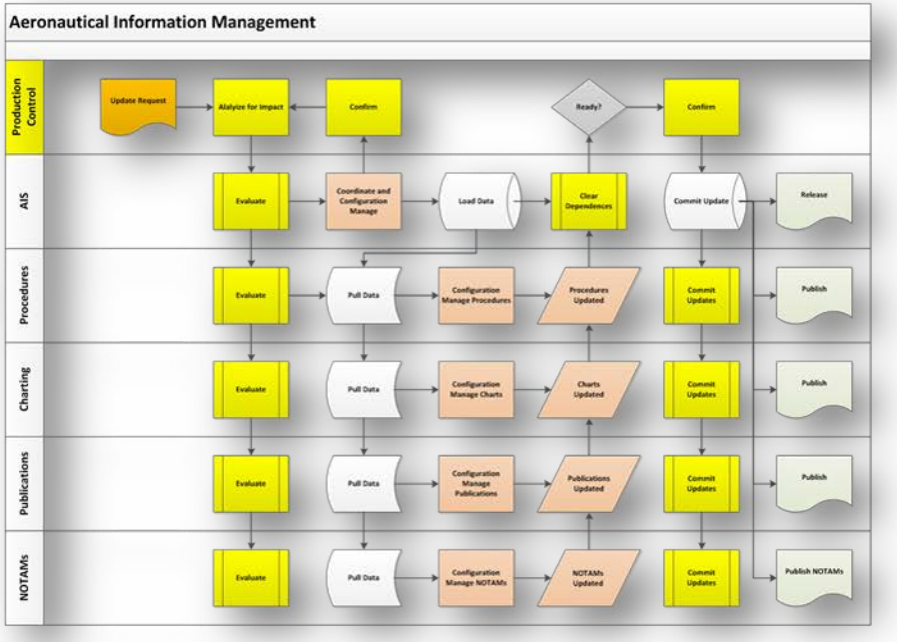
Unavailable

Production Control

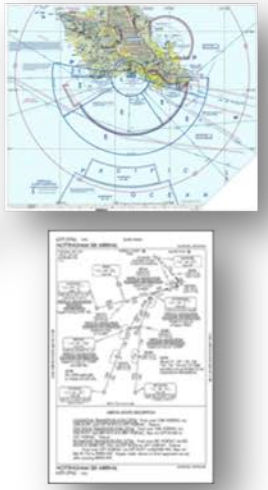
Management of the production workflow to coordinate the configuration management of deliverable or outcomes

How to Synchronize Data Across Multiple Products?

Data

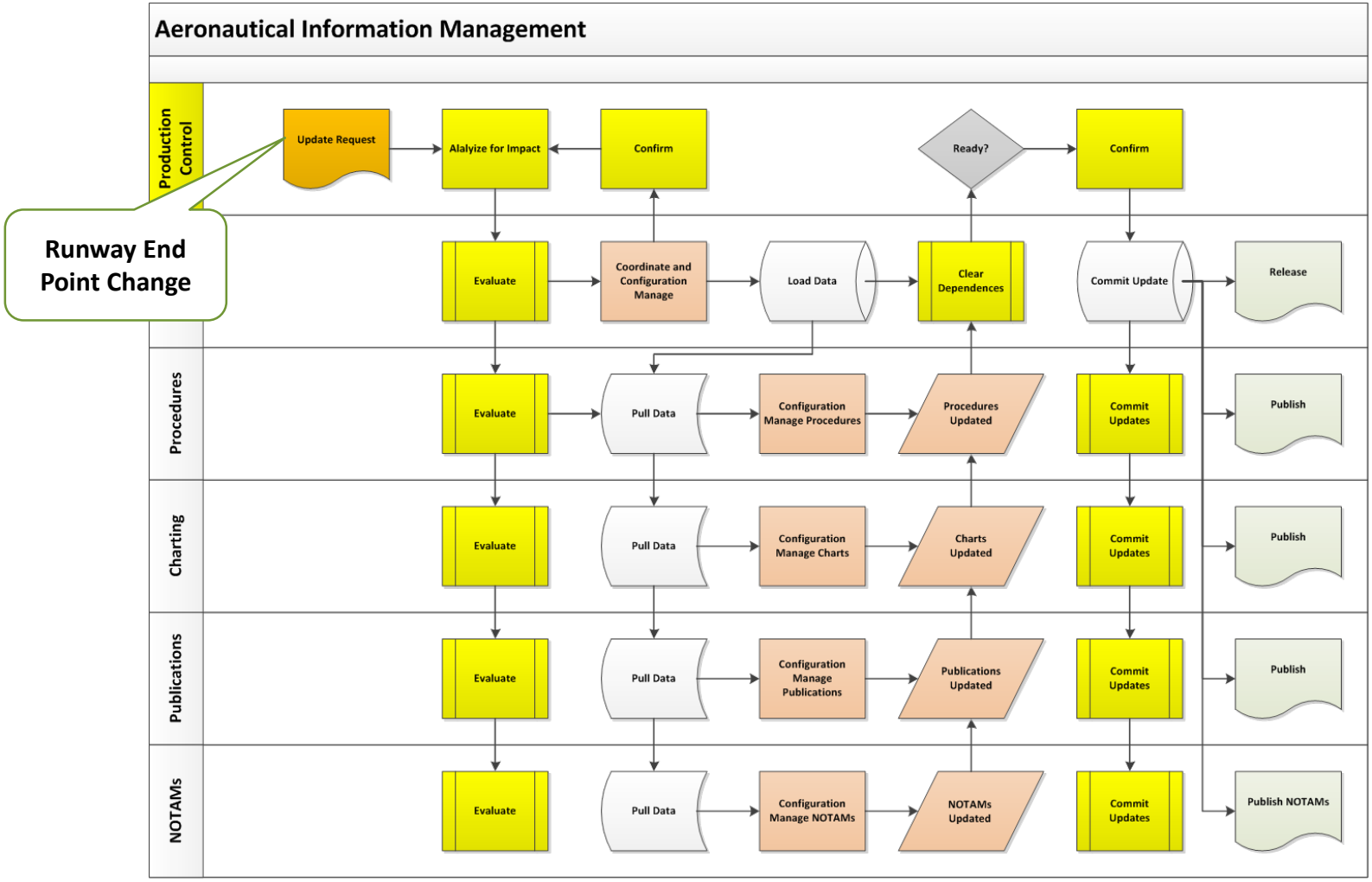


Production Control



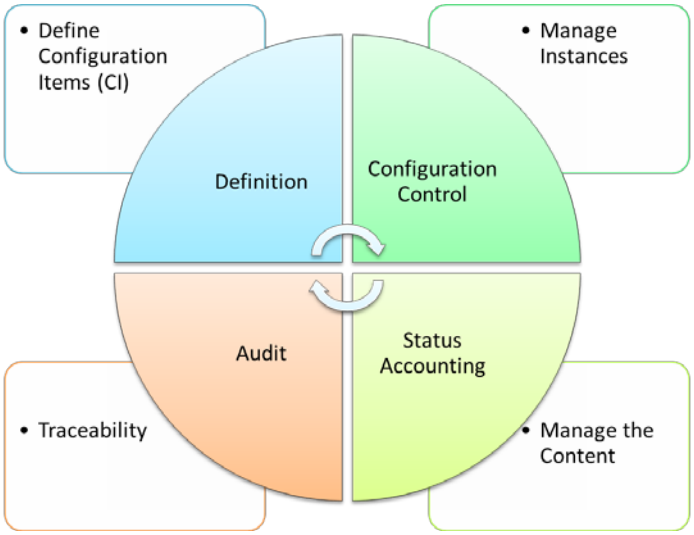
Products

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



Managing Configuration Items

Change Management

Configuration Management

Production Management

Configuration Management

Data/Information Hazards

Incorrect

Incomplete

Unsynchronized

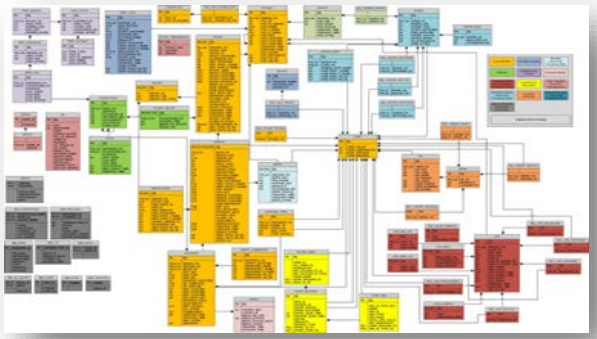
Untimely

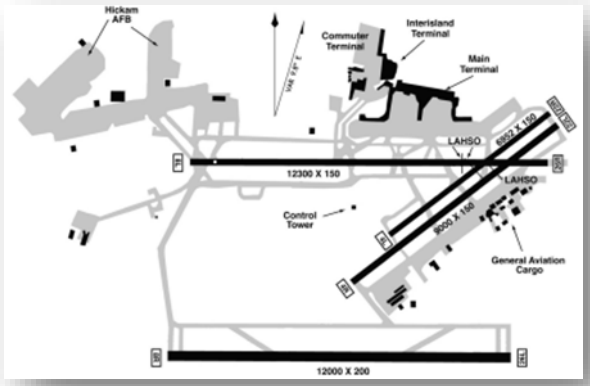
Unavailable

Production Control

Management of the production workflow to coordinate the configuration management of deliverable or outcomes

What is Managed?



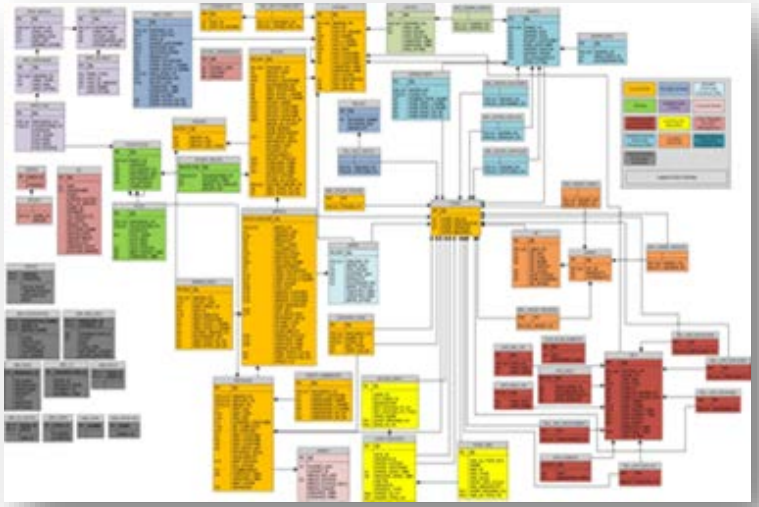


Configuration Item (CI)

- 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?

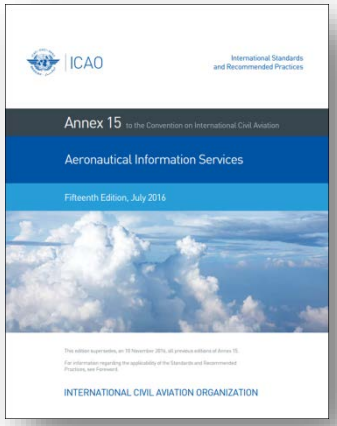
Chart (Container)

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

Feature (examples)

- Airspace
- Airport
- Navaid
- Obstacle
- Route

Documents & Publications

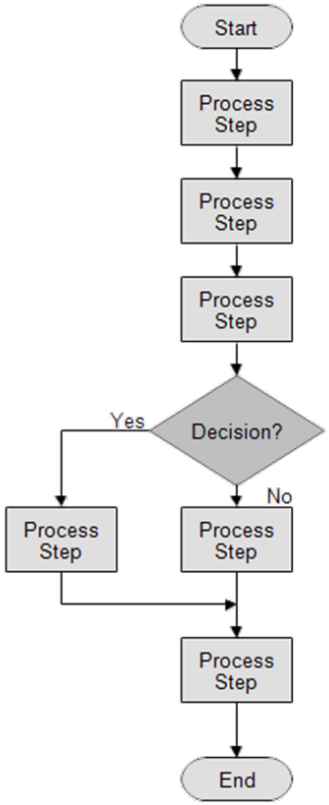


A document is a container

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

BusinessRules

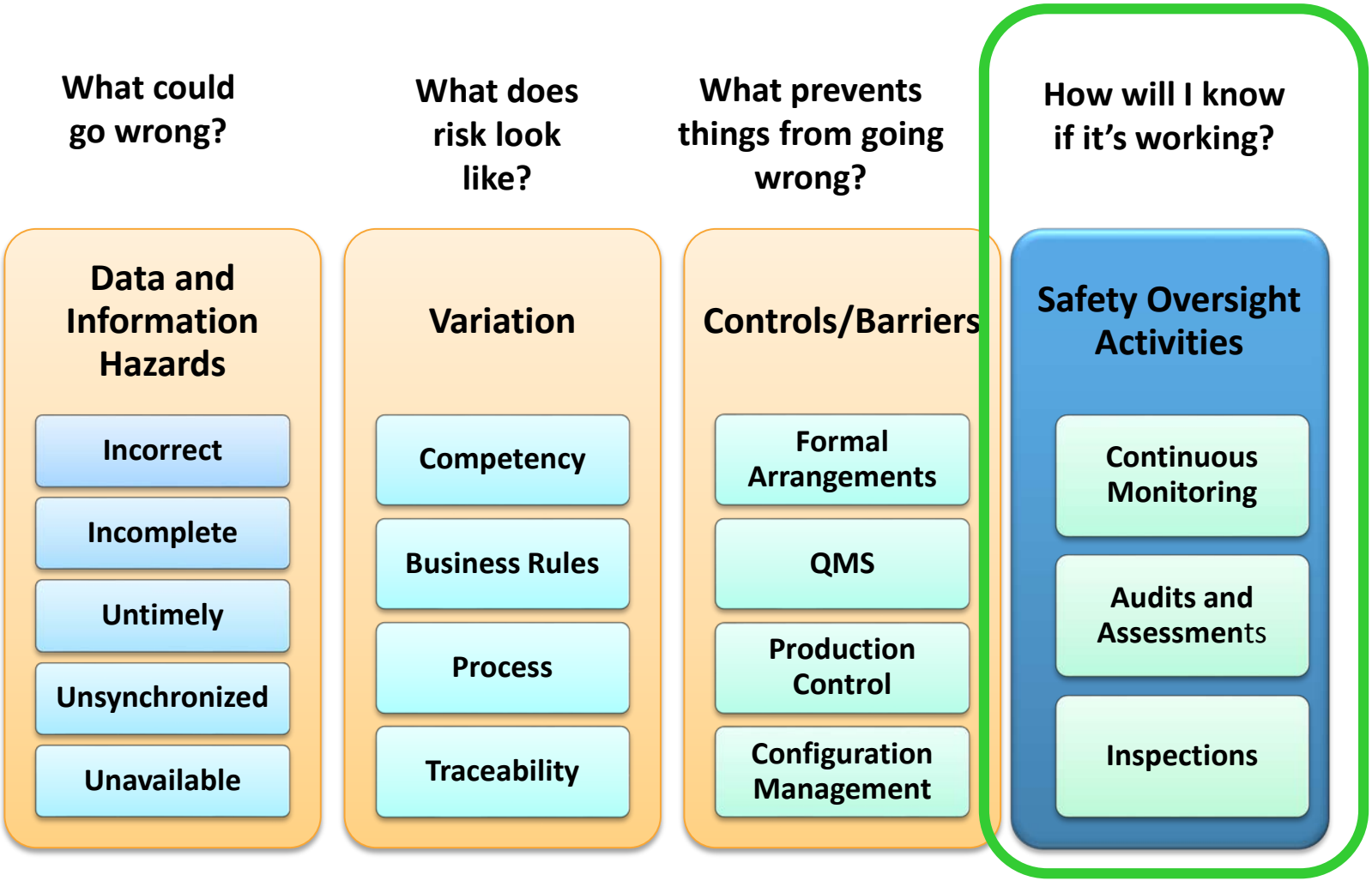
CONDITIONS				ACTIONS
CompanyInfo.type	CompanyInfo.initialListingStandard	CompanyInfo.approval	CompanyInfo.totalRevenue	CompanyInfo.violationCode = {value}
"company"	"PriceStandard"	true	*	"APS"
		false	*	"DPS"
	"ValuationStandard"	true	< 10000	"ALVS"
			>= 10000	"AHVS"
		false	< 10000000	"DD"
			>=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

A **rule base** is the container of rules

Summary: Configuration Management

- 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



¡Gracias!

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