AIM Chain Workflow

By Samuel BEGOUIN

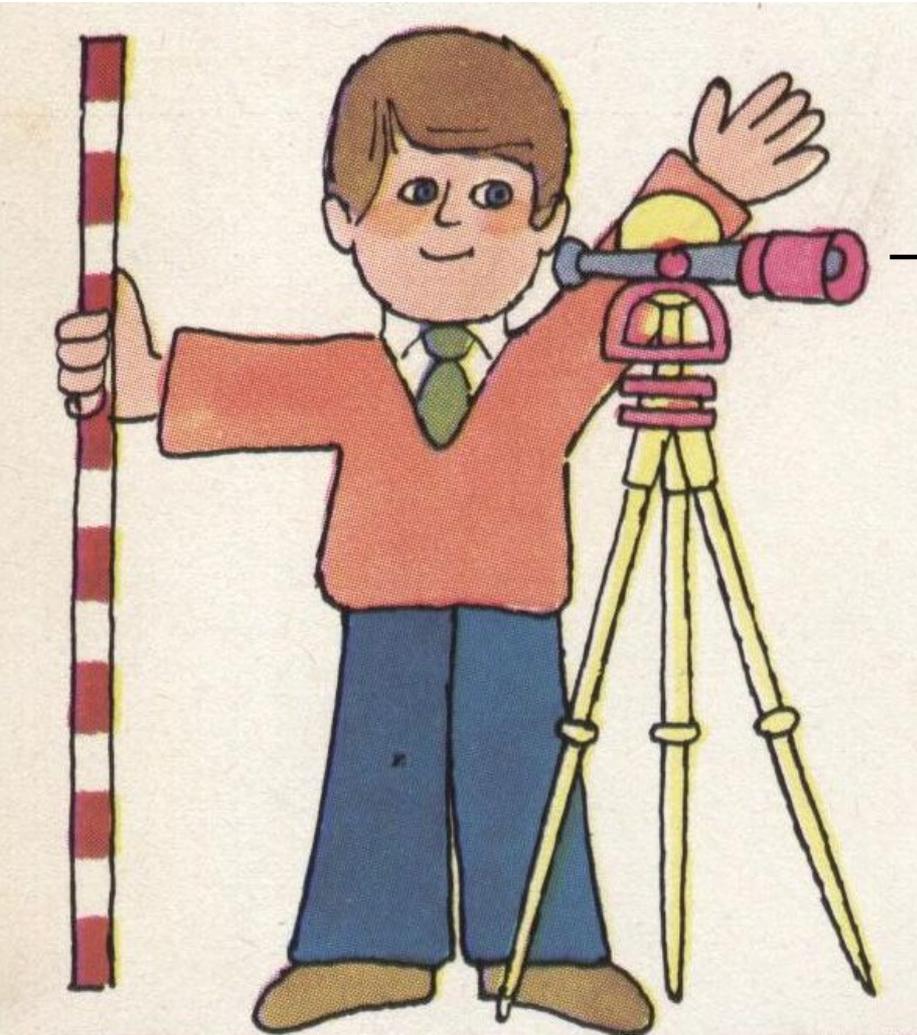*Expertise & Innovation in GIS and Data Management*

A Story

♦ **Once upon a time…**

Story

Data surveyor

- Measures
- Computes
- Provides a report
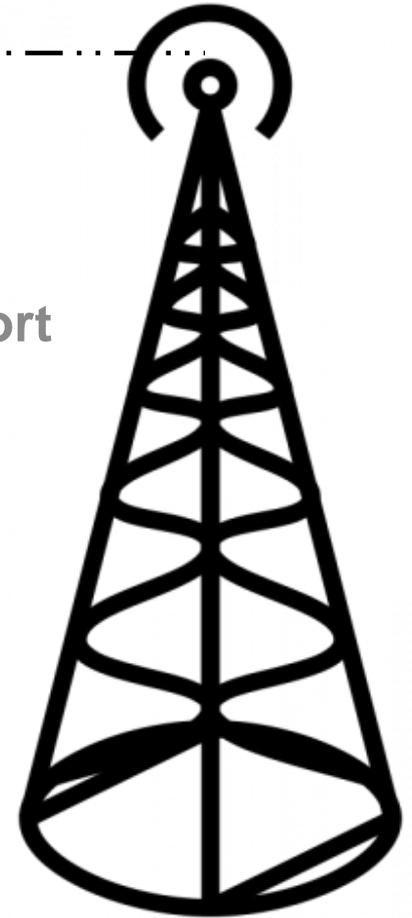
Story

	Point	Latitude	Longitude
Measured coordinates	THR09	9°44'33.78256"N	118°44'48.80521"E
Provided By data surveyor	THR09	9°44'33"N	118°44'48"E

No Data Product Specification

Story

Procedure design office

- IFPD office receives the data from the surveyor
- Uses the bad threshold coordinates.
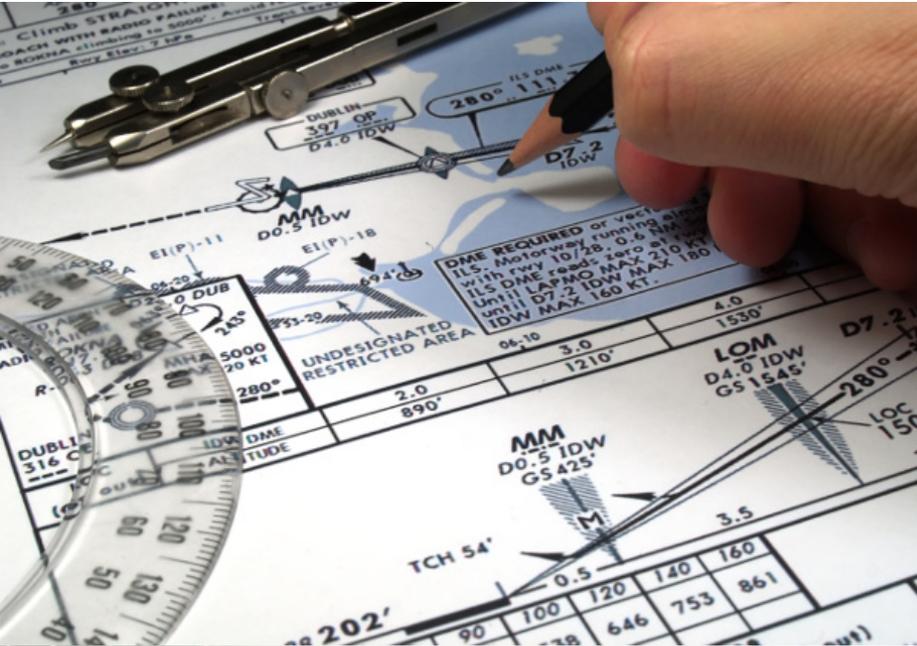- Then provides the procedure design package to AIS (including data).

Story

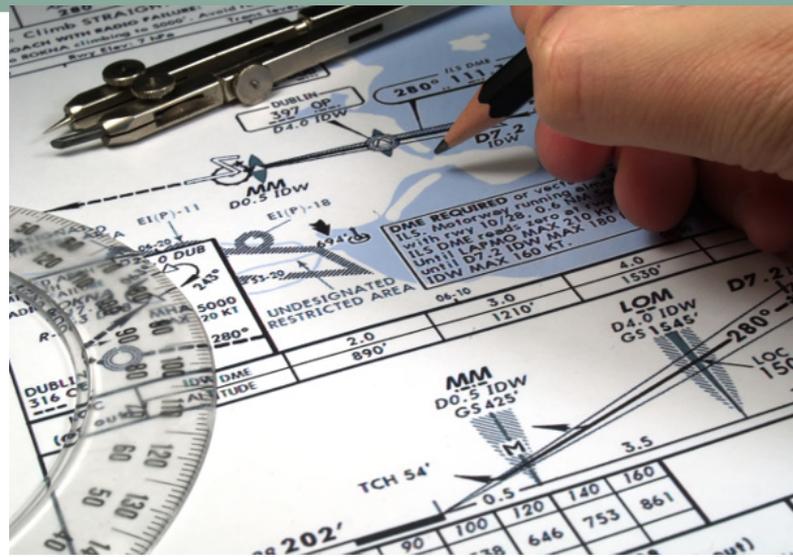|	Point	Latitude	Longitude
Measured coordinates	THR09	9°44'33.78256"N	118°44'48.80521"E
Provided by data surveyor	THR09	9°44'33"N	118°44'48"E
Used by procedure designer	THR09	9°44'32.00"N	118°44'48.00"E

Error introduction

Story

AIS

- AIS receives the data from surveyor office
- One operator publishes the threshold coordinates in A/D part by hand method
- And another operator publishes the charts with other threshold coordinates

Story

Mistake on the coordinates publication

	Point	Latitude	Longitude
Measured coordinates	THR09	9°44'33.78256"N	118°44'48.80521"E
Provided By data surveyor	THR09	9°44'33"N	118°44'48"E
Used by procedure designer	THR09	9°44'32.00"N	118°44'48.00"E
AIP A/D Part	THR09	9°44'31.00"N	118°44'44.80"E
AIP Charts	THR09	9°44'32.00"N	118°44'48.00"E

Story
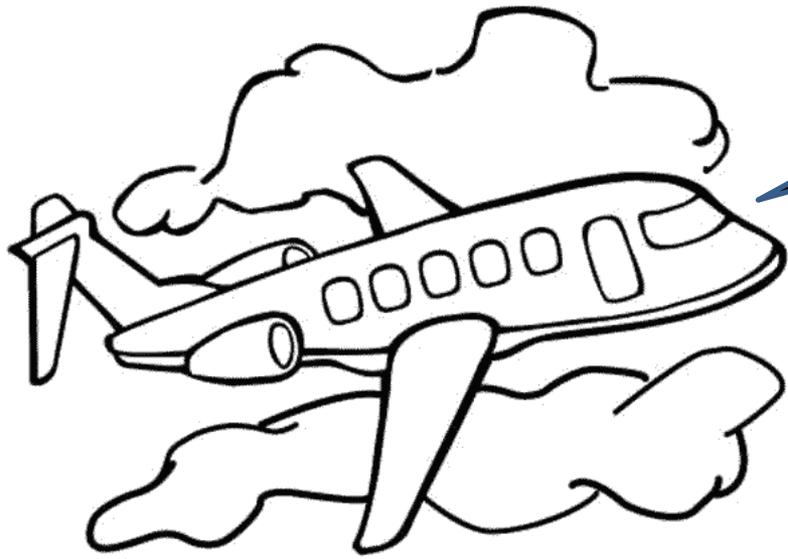
Go around!
We are not aligned with the runway!

How to avoid this kind of story?

Data creation	Quality	AIP

Automation by software
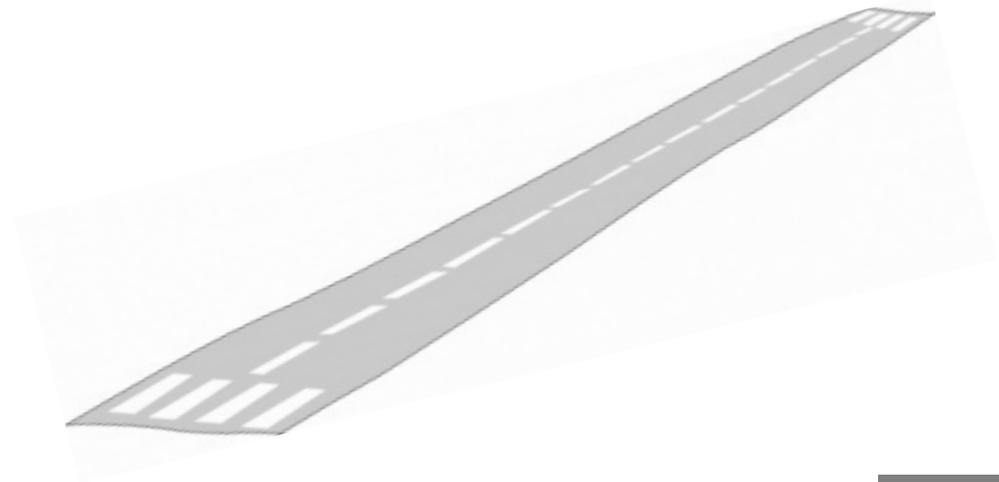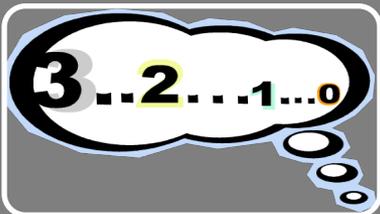
Definitions (Source Annex 15)

Quality

- a degree or level of confidence that the data provided meets the requirements of the data user in terms of accuracy, resolution and integrity;

Accuracy

- means a degree of conformance between the estimated or measured value and the true value;

resolution

- means a number of units or digits to which a measured or calculated value is expressed and used;
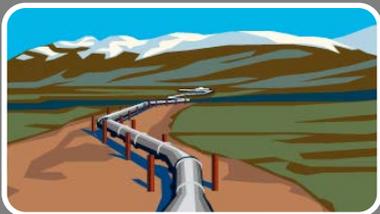
Integrity

- means a degree of assurance that a data item and its value have not been lost or altered since the data origination or authorized amendment;

How to avoid this kind of story?

♦ **Each actor at each step has**

  ▪ To be aware of the next actor's needs in the process

  ▪ To be sure to provide all needed data with right quality

Data origination concept

STEP
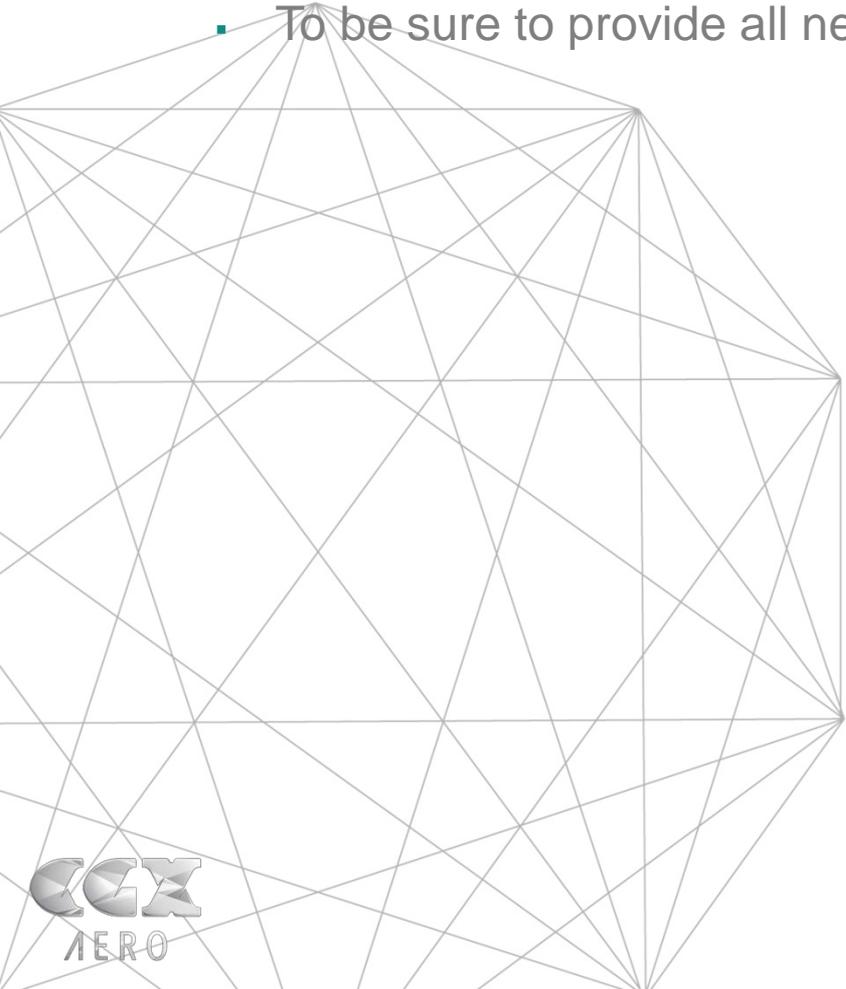
INPUT Data

- ♦ **Data set**
- ♦ **Associated quality**
  - Metadata
  - Validation report
  - DPS*

Operator
- Surveyors
- Procedure Designers
- Aerodrome Authorities
- ANS
- AIS
- Civil Aviation Authorities
- Industries (System providers)

OUTPUT Data

- ♦ **Data set**
  - Transformations
  - Records
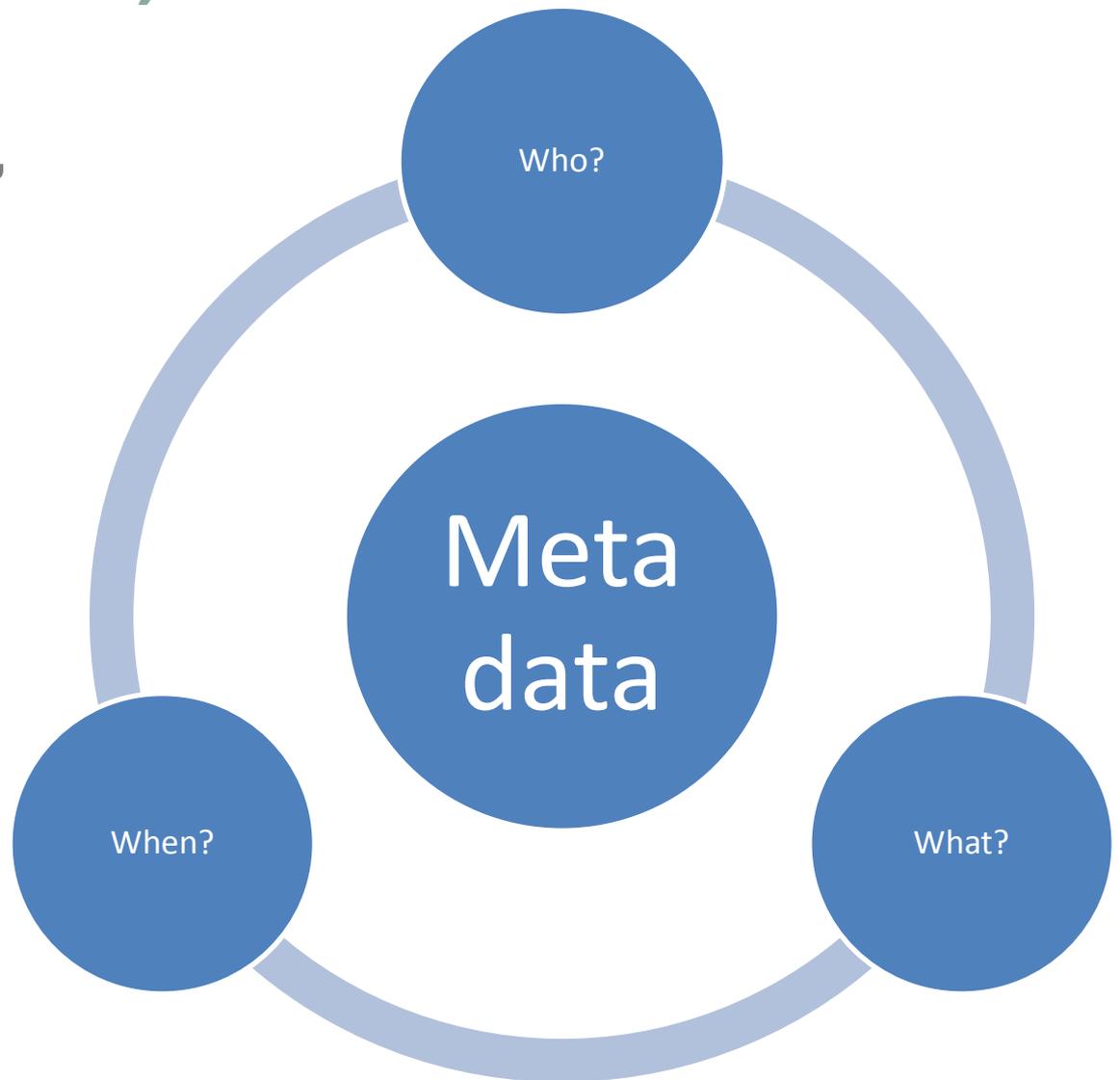- ♦ **Associated quality**
  - Metadata
  - report

* Data Product Specification

Metadata (ISO 19115)

♦ **The metadata to be collected shall include, as a minimum:**

- **[Who?]** the name of the organizations or entities performing any action of originating, transmitting or manipulating the data.

- **[What?]** the action performed

- **[When?]** the date and time the action was performed**.**
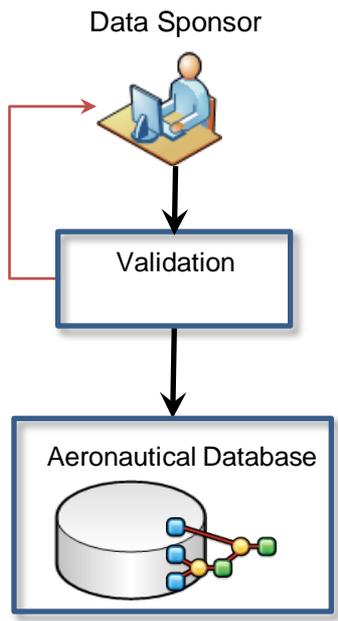
Metadata (Source EU 73-2010, ADQ)

- (a) the data originator of the data;
- (b) amendments made to the data;
- (c) the persons or organisations that have interacted with the data and when;
- (d) details of any validation and verification of the data that has been performed;
- (e) effective start date and time of the data;
- (f) for geospatial data:
- — the earth reference model used,
- — the coordinate system used;
- (g) for numerical data:
- — the statistical accuracy of the measurement or calculation technique used,
- — the resolution,
- — the confidence level as required by the ICAO standards referred to in points 1 and 12 of Annex III and in other relevant ICAO standards;
- (h) details of any functions applied if data has been subject to conversion/transformation;
- (i) details of any limitations on the use of the data.

INPUT Data

- ♦ **Data set**
- ♦ **Associated quality**
  - Metadata
  - Validation report
  - DPS*

STEP

- ♦ **Operator**
  - Surveyor

OUTPUT Data

- ♦ **Data set**
  - Transformations
  - Records
- ♦ **Associated quality**
  - Metadata
  - report

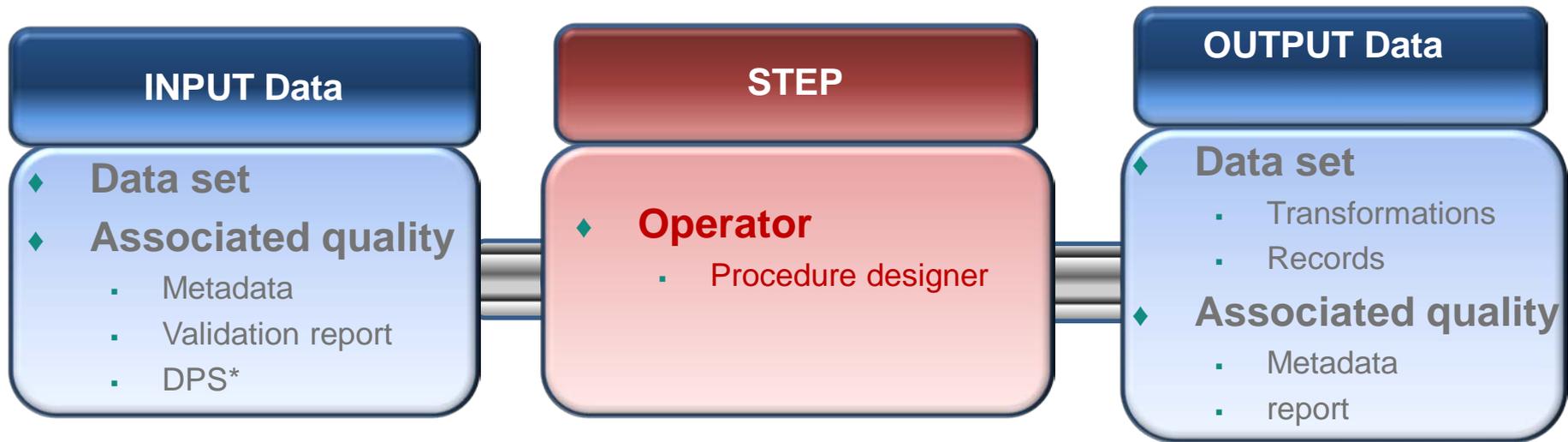|	Point	Latitude	Longitude
Measured coordinates	THR09	9°44'33.78256"N	118°44'48.80521"E
Provided By data surveyor	THR09	9°44'33.783"N	118°44'48.805"E

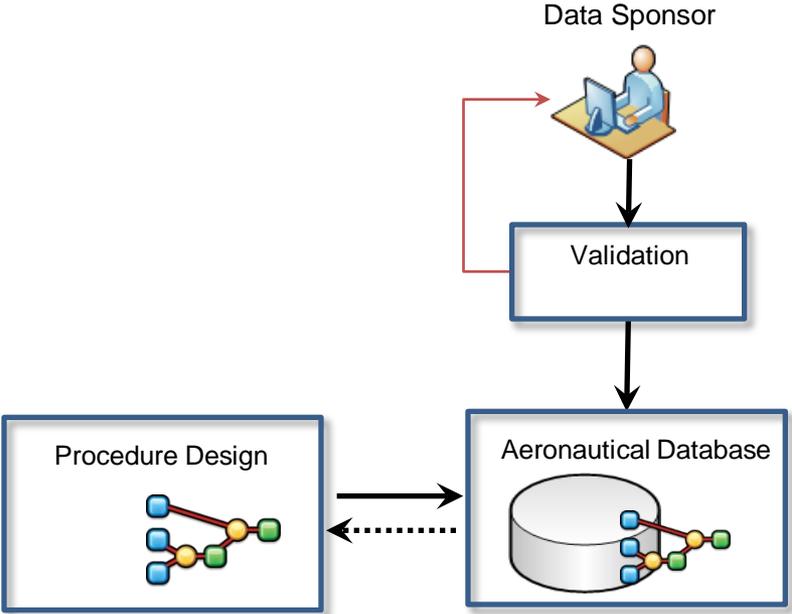* Data Product Specification

Data Chain Workflow

Data Sponsor

Validation

Aeronautical Database

INPUT Data	STEP	OUTPUT Data

◆ **Data set**
◆ **Associated quality**
  ▪ Metadata
  ▪ Validation report
  ▪ DPS*
	◆ **Operator**
	  ▪ Procedure designer
		◆ **Data set**
		  ▪ Transformations
		  ▪ Records
		◆ **Associated quality**
		  ▪ Metadata
		  ▪ report

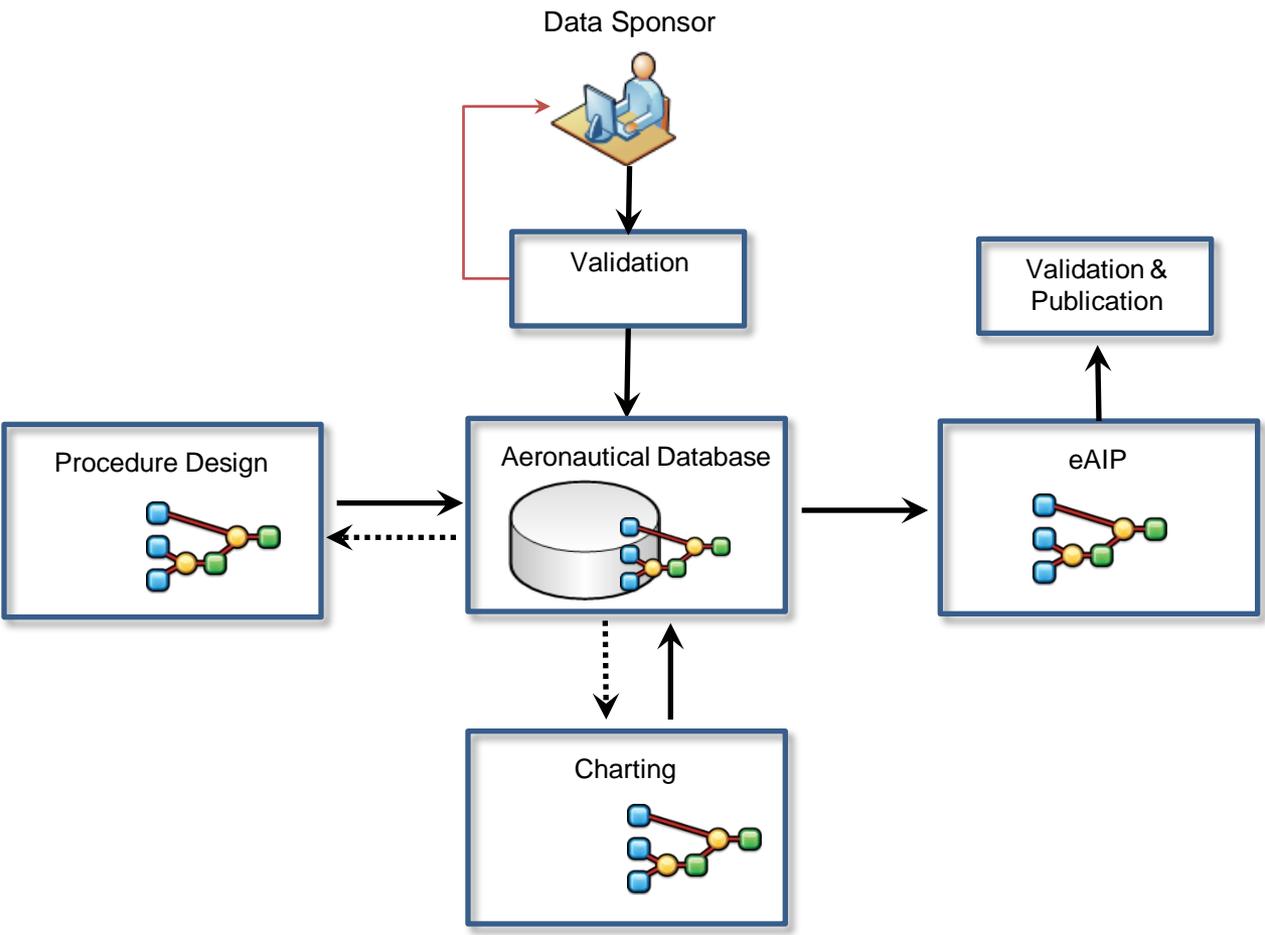|	Point	Latitude	Longitude
Measured coordinates	THR09	9°44'33.78256"N	118°44'48.80521"E
Used by procedure designer	THR09	9°44'33.783"N	118°44'48.805"E

* Data Product Specification

Data Chain Workflow

Data Sponsor

Validation

Procedure Design

Aeronautical Database

INPUT Data	STEP	OUTPUT Data
♦ **Data set**		♦ **Data set**
♦ **Associated quality**	♦ **Operator**	▪ Transformations
▪ Metadata	▪ AIS	▪ Records
▪ Validation report		♦ **Associated quality**
▪ DPS*		▪ Metadata
		▪ report

	Point	Latitude	Longitude
Measured coordinates	THR09	9°44'33.78256"N	118°44'48.80521"E
Publications	THR09	9°44'33.78"N	118°44'48.81"E

* Data Product Specification

Data Chain Workflow

Data Sponsor

Validation

Validation & Publication

Procedure Design

Aeronautical Database

eAIP

Charting

How to prove that the production chain is compliant with ICAO Doc9906 requirements?

- ♦ **Using :**
  - Centralized data base
 - Metadata environment

- ♦ **Challenges:**
  - Check means / Error detection means
  - Traceability
  - Communication
  - Interoperability

How to prove that the production chain is compliant with ICAO Doc9906 requirements?
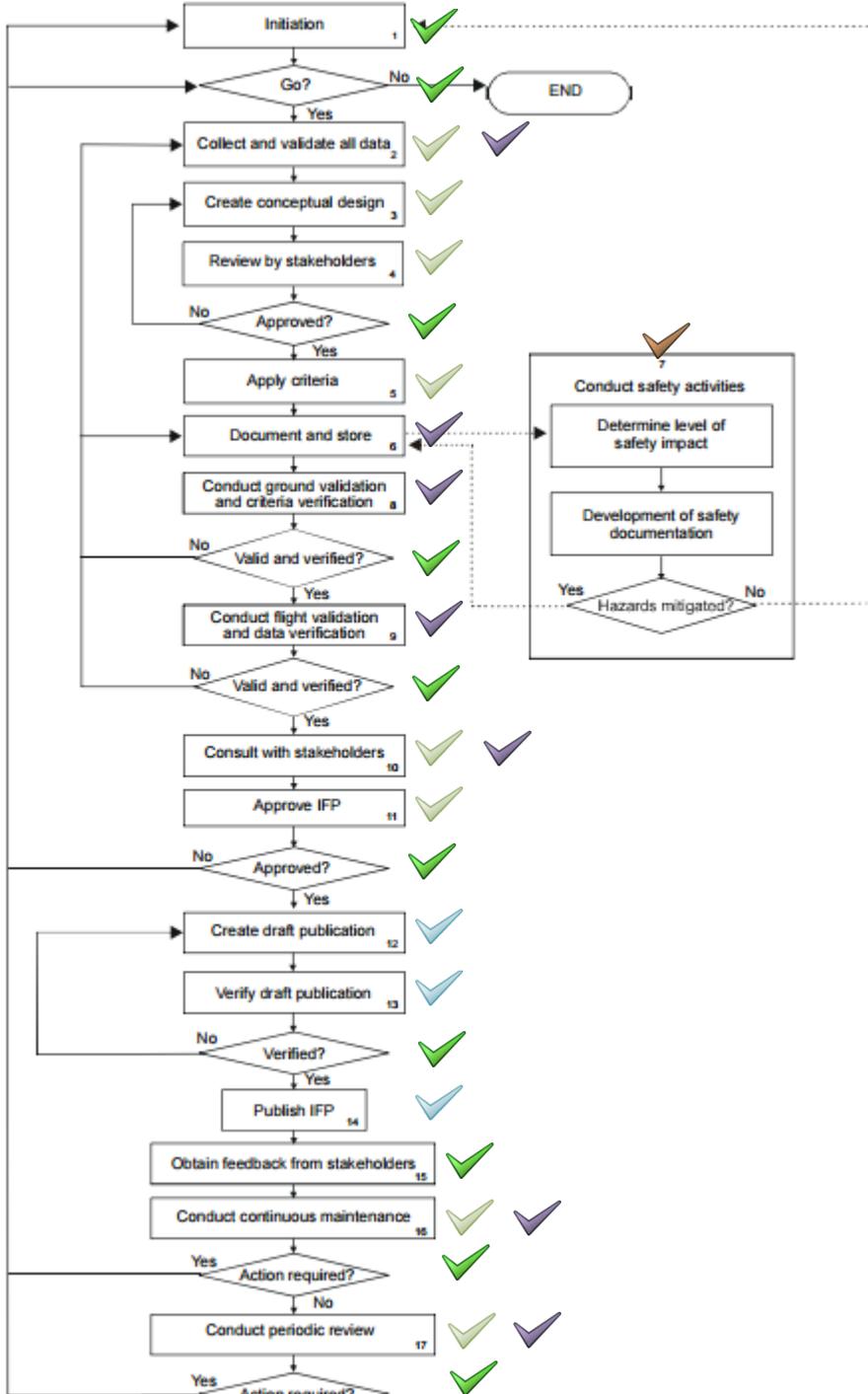
♦ **Using workflow**

- Automation of communication between operators
- Automation of check means
- Automation of error detection means
- controls and validation milestone
- Metadata automatic completion
- Recording of whole of interactions

Data Chain Workflow
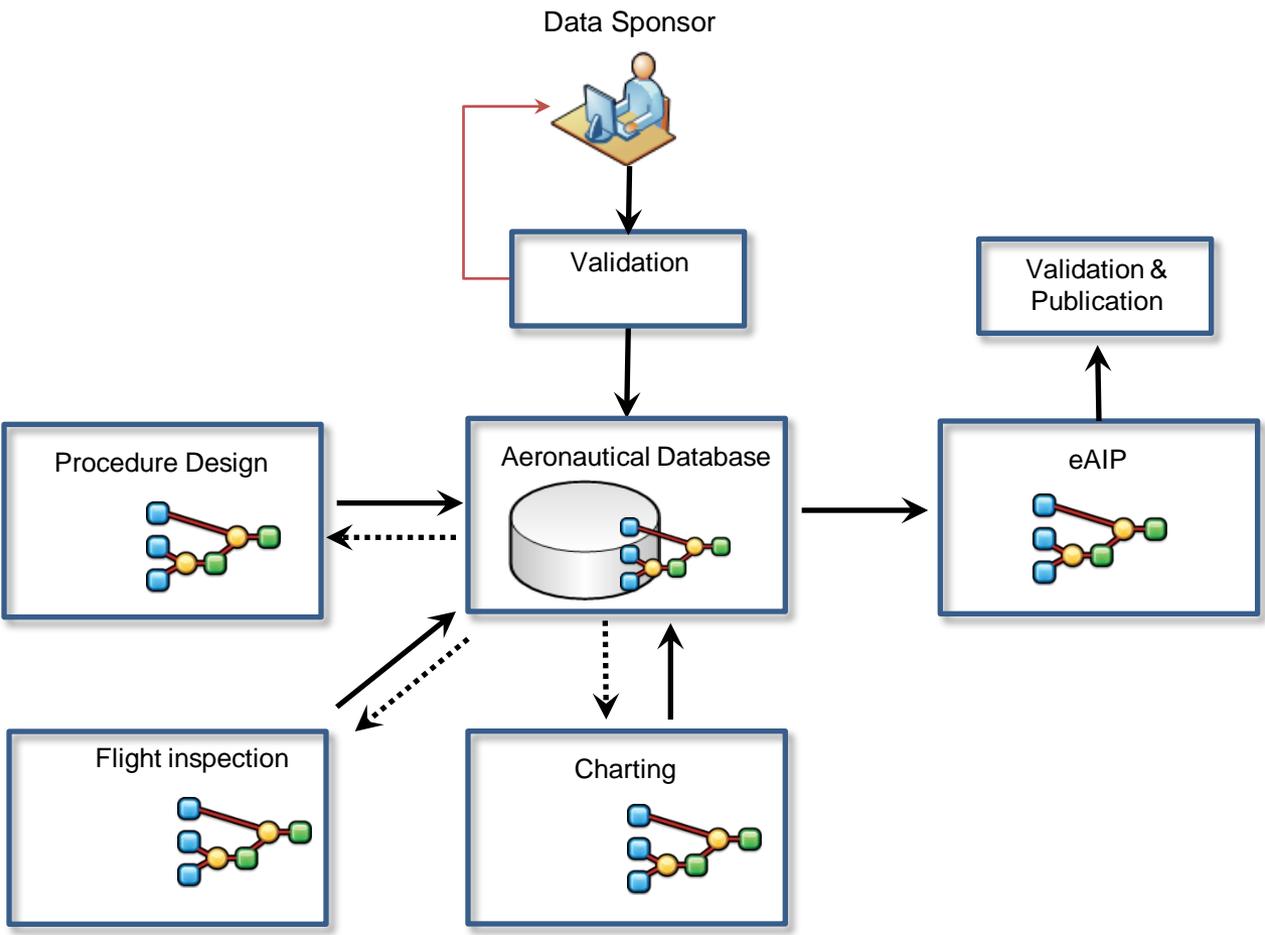
IFP Design Process

- **Procedure design** ✓
- **Data management** ✓
- **Charting** ✓
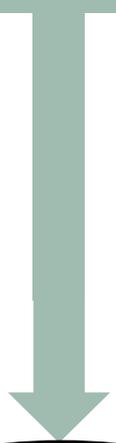- **Flight inspection** ✓
- **Workflow** ✓

Summary

	Annex 15 -AMDT 37	
Before		**Now**

- **Integrity based on statistics**
- **Data digitalization: Should**
- **Use of automation: Should**

- **Integrity based on process**
- **Data digitalization: Shall**
- **Use of automation: Shall**

- **Traceability**
- **Metadata**
- **Automation**
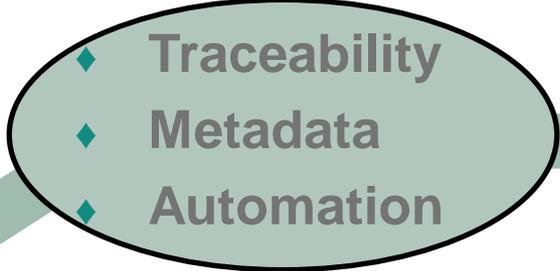
Are the guardians of the quality

- **Means:**
  - Data digitalization
  - Mean automation
  - Workflow
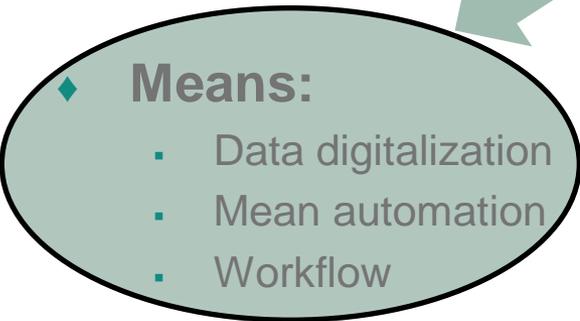
Regulation references

♦ **Roadmap for Transition from AIS to AIM**

♦ **Annex 15**

Aeronautical Information Services

♦ **Doc 9906**

Quality Assurance Manual for Flight Procedure Design

♦ **Doc 8126**

Aeronautical Information Services Manual

♦ **Doc 9881**

Guidelines for Electronic Terrain, Obstacle and Aerodrome Mapping Information

♦ **EU73/2010 (ADQ)**

Aeronautical Data Quality

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Thank you for your attention

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