



ICAO DAKAR UNITING AVIATION

AFI Region AIM-e AIP Implementation Workshop (Dakar, Senegal, 3-5 October 2016)

George BALDEH

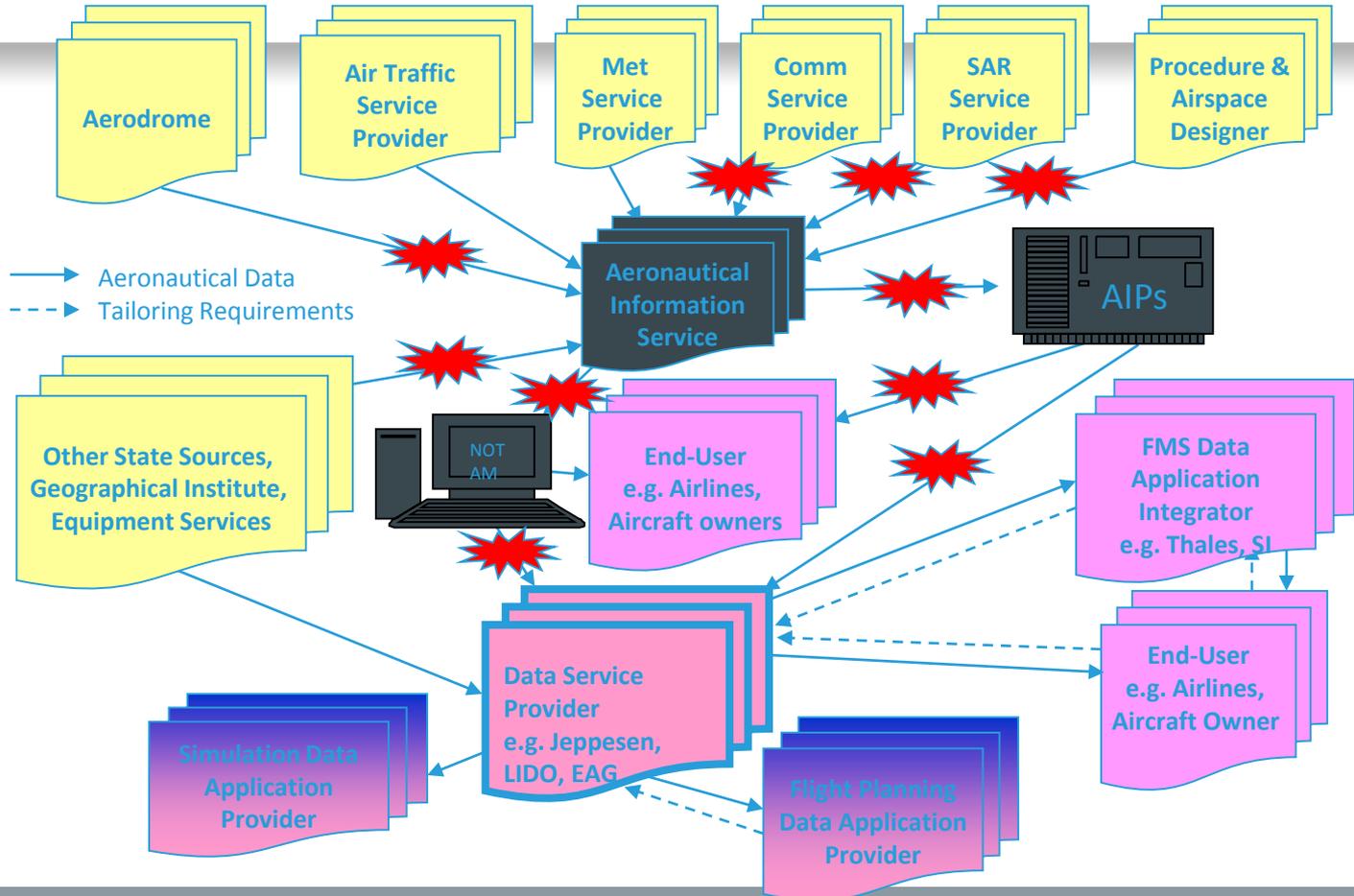
RO/AIM

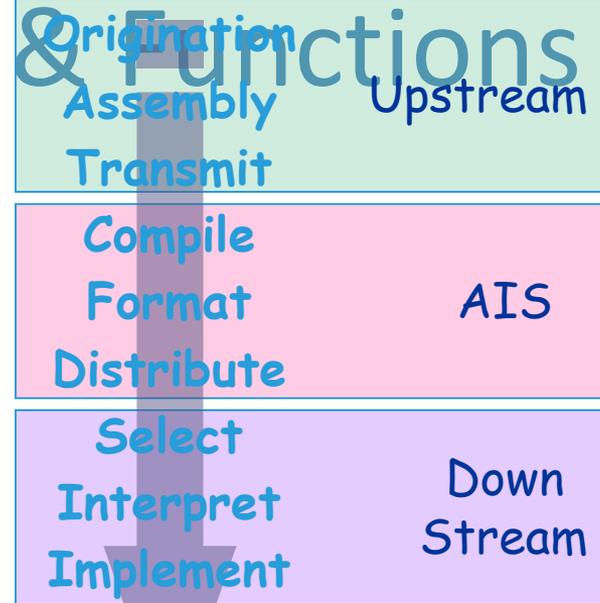
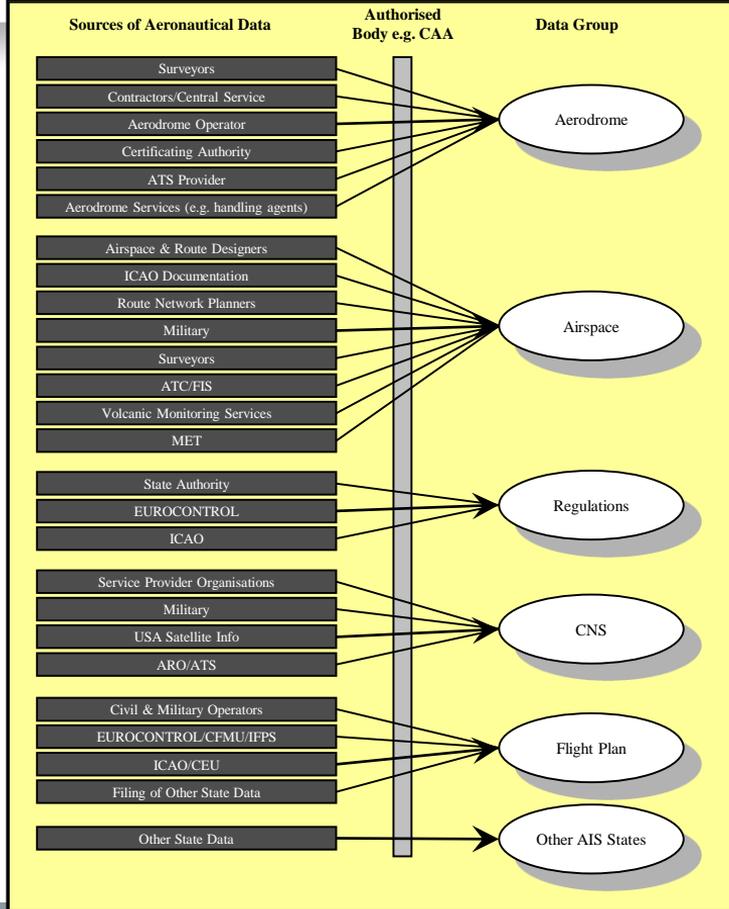
Agenda Items 3b,c and d





ICAO DAKAR UNITING AVIATION The Data Chain ref. DO-200A/ED76







Function > Actor	Origination	Transmission	Preparation Publication	Data Application Integration	End Use
Survey	X	X			X
Airport Administration	X	X			X
Technical Department	X	X			X
Procedure/Airspace Design	X	X			X
AIS Provider (ANSP)		X	X		X
EAD		X	X		X
Data Provider (Datahouse/Packer)		X		X	X
End Users		X			X
Airline Operation		X		X	X
ATC		X		X	X
CFMU		X		X	X
Military		X		(x)	X
General Aviation, etc		(x)			X
Applications (NAV)		X		X	X
Military ANSP		X	X		X
Regulator	(x)	(x)	(x)	(x)	X



DATA 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***
(ICAO Annex 15)

Accuracy: a degree of conformance between the estimated or measured value and the true value

Resolution: a number of units or digits to which a measured or calculated value is expressed and used

Integrity: a degree of assurance that aeronautical data and its value has not been lost or altered since the data origination or authorized amendment.



- Accuracy - How close to reality
- Resolution - The amount of decimal places
- Integrity - How good is the data

👉 Routine 10^{-3}

👉 Essential 10^{-5}

👉 Critical 10^{-8}

👉 Casual Data (Integrity not important for Navigation)



CRITICAL

Runway threshold, runway holding position etc.

Require an integrity value of 10^{-8}

1 error in 100 mio

ESSENTIAL

Coordinates of en-route nav aids, aerodrome elevation, significant obstacles in approach / take-off area etc.

Require an integrity value of 10^{-5}

1 error in 100 tsd

ROUTINE

FIR points, Aircraft stands, Airway segments etc.

Require an integrity value of 10^{-3}

1 error in 1000



Participants

- State AIS
 - Already issuing an eAIP
 - In advanced implementation
 - Who intend to issue an eAIP in the near future
- Industry
 - Technical experts : Avitech; Thales; IDS; Eurocontrol
 - After 1500hrs each day Free time for Informal discussions/meetings between States or States/Industry

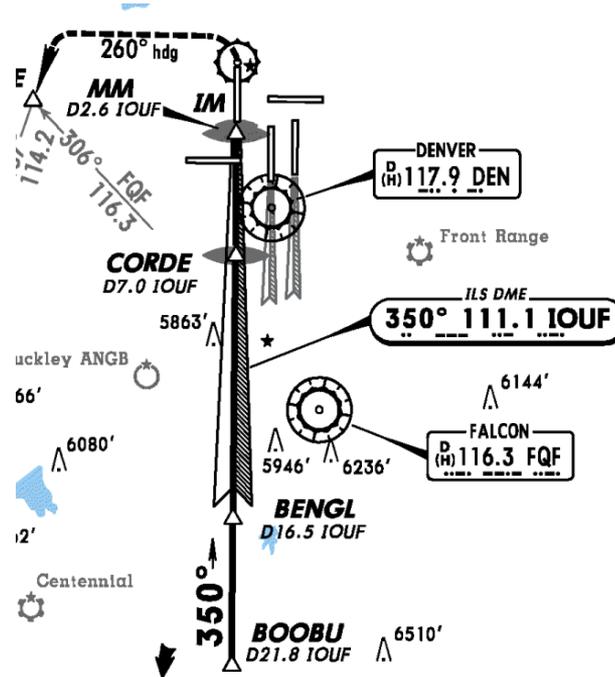


- Optimum ‘human processes’ achieves an error rate, at best 1 in 1000 or 1×10^{-3}
 - nowhere near that required for flight critical data
- In the best case
 - we achieve criteria for ROUTINE data, if:
 - Quality controlled environment e.g. QMS
 - Multiple input/control.

APPENDIX 7. AERONAUTICAL DATA QUALITY REQUIREMENTS

Table A7-1. Latitude and longitude

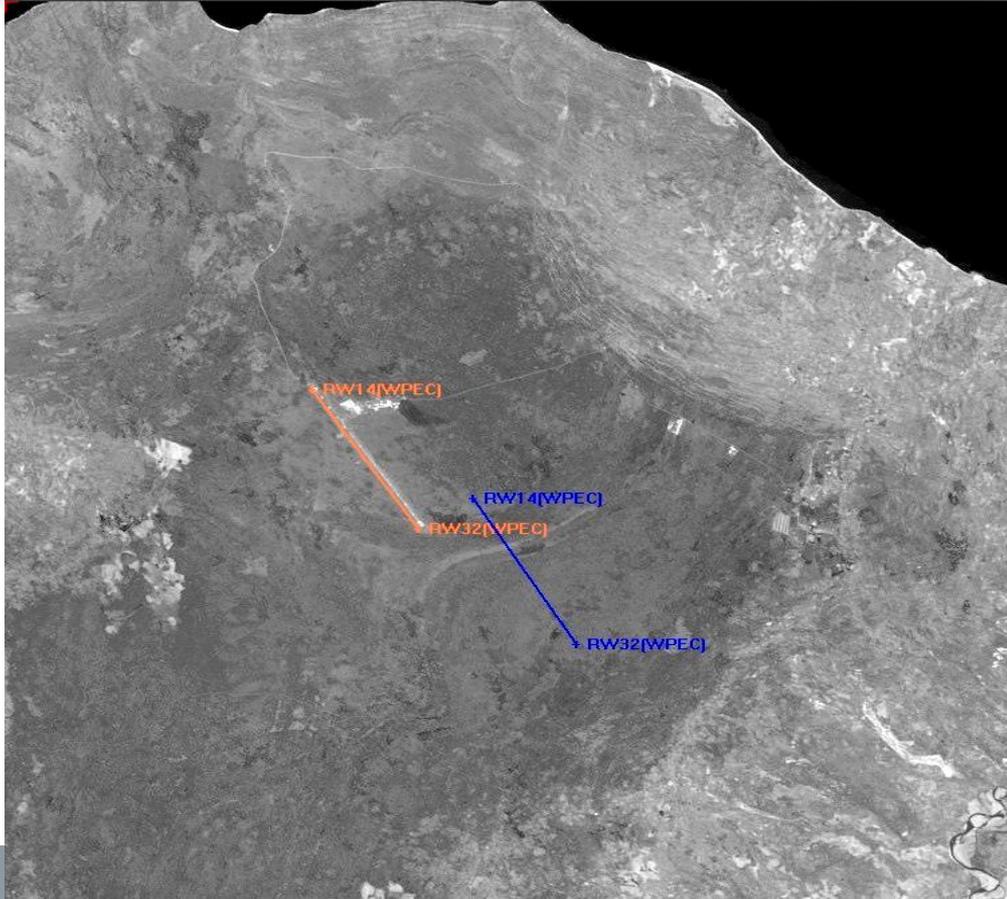
Latitude and longitude	Publication resolution	Integrity Classification
Flight information region boundary points	1 min	1×10^{-3} routine
P, R, D area boundary points (outside CTA/CTZ boundaries)	1 min	1×10^{-3} routine
P, R, D area boundary points (inside CTA/CTZ boundaries)	1 sec	1×10^{-5} essential
CTA/CTZ boundary points	1 sec	1×10^{-5} essential
En-route NAVAIDS and fixes, holding, STAR/SID points	1 sec	1×10^{-5} essential
Obstacles in Area 1 (the entire State territory)	1 sec	1×10^{-3} routine
Aerodrome/heliport reference point	1 sec	1×10^{-3} routine
NAVAIDS located at the aerodrome/heliport	1/10 sec	1×10^{-5} essential
Obstacles in Area 3	1/10 sec	1×10^{-5} essential
Obstacles in Area 2	1/10 sec	1×10^{-5} essential
Final approach fixes/points and other essential fixes/points comprising the instrument approach procedure	1/10 sec	1×10^{-5} essential
Runway threshold	1/100 sec	1×10^{-8} critical



FMS: Navigation Databases became important

But relative Accuracy was still OK without GNSS

Degree of conformance between the estimated / measured value and the true value



Blue:

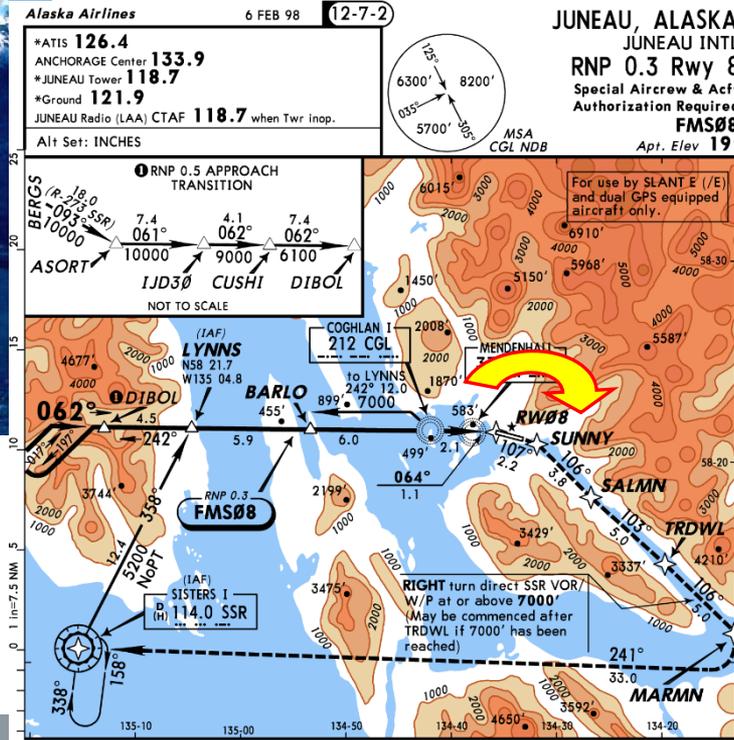
RWY PSN
ref AIP.

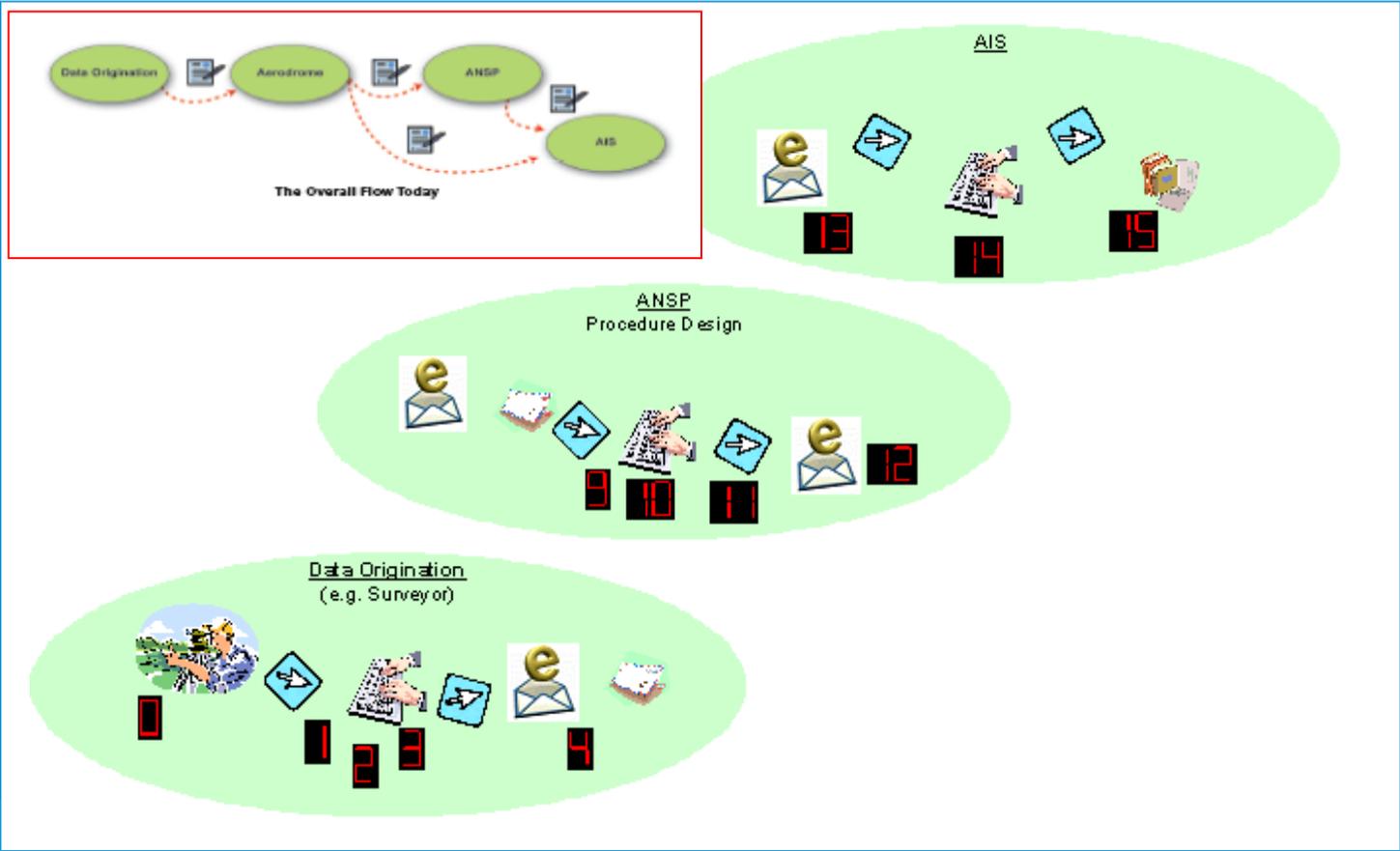
Red:

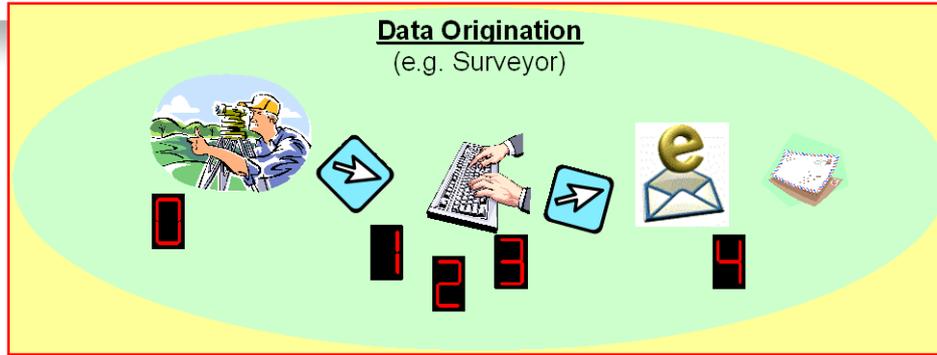
Actual RWY PSN
/ satellite
image.



Satellite based RNAV procedures will gradually replace Conventional procedures.







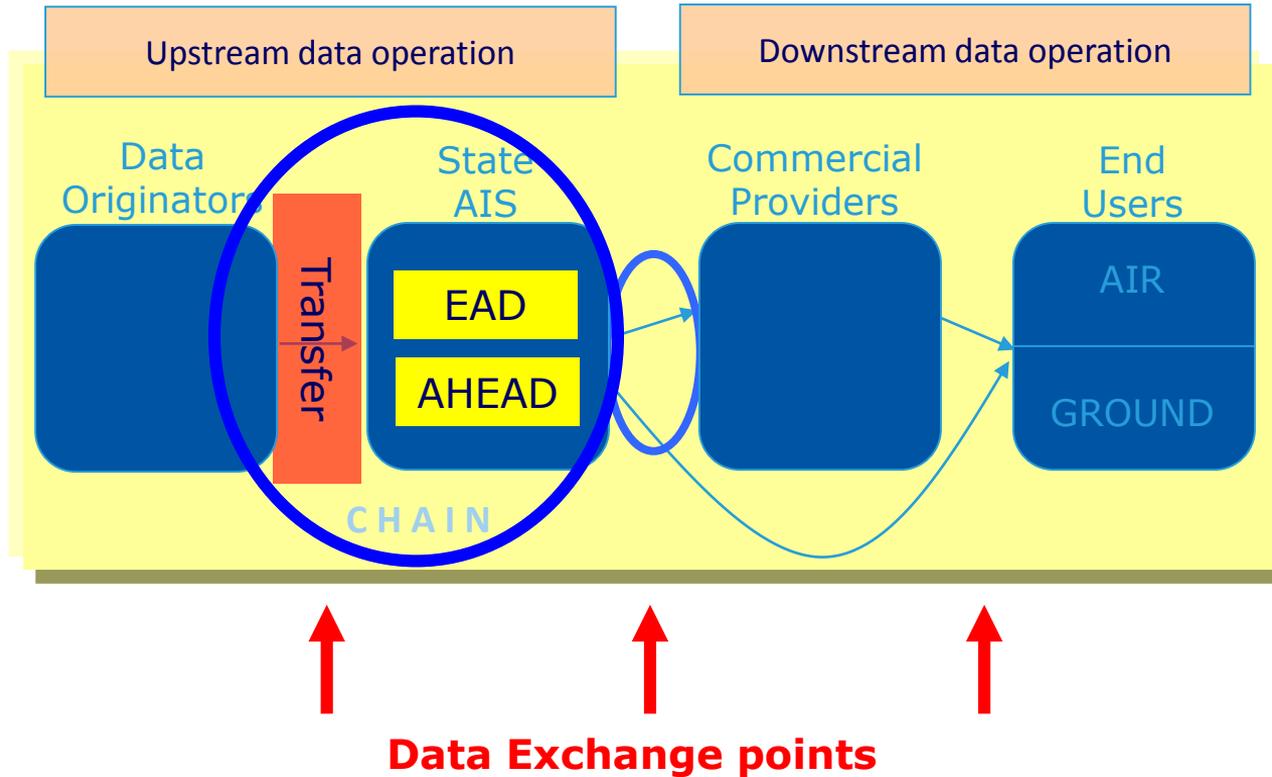
- Survey uses complex equipment, such as GPS survey equipment
 - electronically captures the recorded point
 - the original value, for which integrity must be maintained
 - information is then either electronically uploaded to a computer at the surveyors' offices or manually extracted [**Risk 1**]
 - Quality processes may check extracted data is correct [**Mitigation 1**].
- Survey creates a Survey Report for the contracting authority e.g. an AD
 - Survey report: typically word proc doc. (or similar), manually created
 - Resulting file is often not provided in a computer literate form
 - Survey data either being 'cut and paste' [**Risk 2**] or manually retyped [**Risk 3**].
 - Quality processes may be used to check the values entered [**Mitigation 2**].
- Survey report is transmitted
 - through postal service or as printed report or by electronic mail [**Risk 4**]
 - ensuring both of these methods [**Mitigation 3**]

- Repeated input at each function “media break”
 - Multiple checking
 - Multiple (re-)entry
 - Risk of error
 - Loss of integrity & audit trails
- Lack of interoperability
 - Data exchange
 - Data formats
 - Harmonised procedures & processes
- Inefficient, fragmented data supply chain

Safety
Impact ?

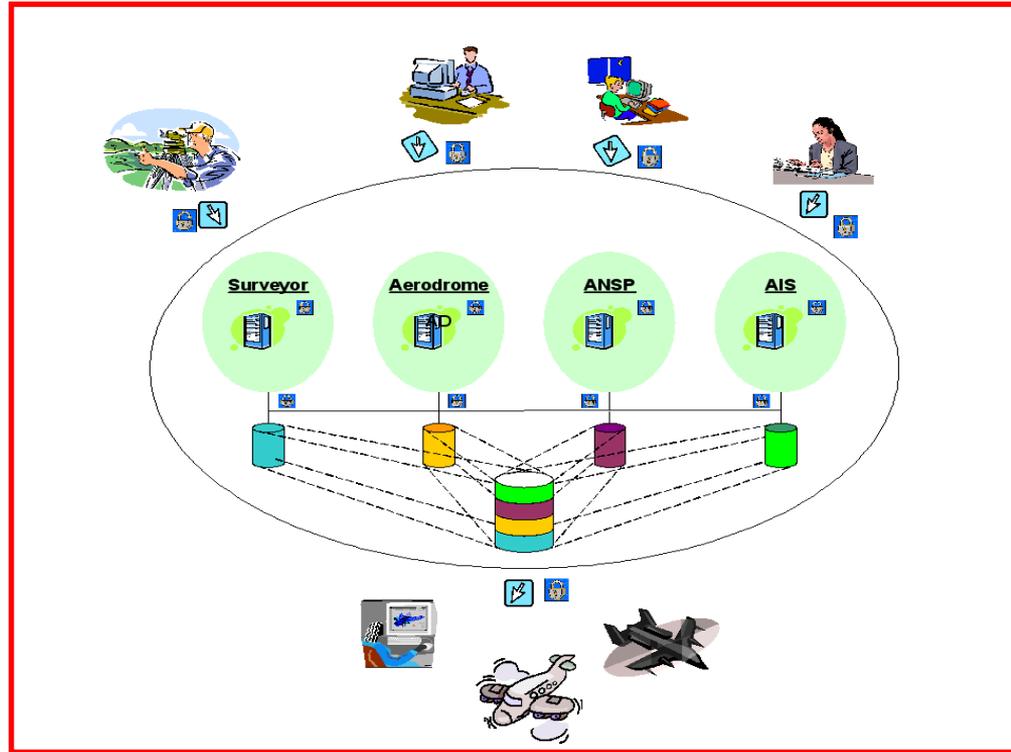
Inefficient
Processes !

Not just a problem of AIS/AIM
=> Duty of care for all actors! >



- **Enhanced Safety**
 - Due to higher quality & reliability
 - **Increased operational & economic Efficiency**
 - Reduced costs through the reduction/elimination of repeated processing, multiple quality checks
 - Improved data processing chain
 - Improved timeliness of data dissemination
- **Security**
 - Prevention from unauthorized corruption
- **Other**
 - Framework for Regulators > enforcement of SARPS
 - Enabling actors to comply with Standards
 - Long term improvement on other data.







ICAO DAKAR UNITING AVIATION



ICAO

North American
Central American
and Caribbean
(NACC) Office
Mexico City

South American
(SAM) Office
Lima

ICAO
Headquarters
Montréal

Western and
Central African
(WACAF) Office
Dakar

European and
North Atlantic
(EUR/NAT) Office
Paris

Middle East
(MID) Office
Cairo

Eastern and
Southern African
(ESAF) Office
Nairobi

Asia and Pacific
(APAC) Sub-office
Beijing

Asia and Pacific
(APAC) Office
Bangkok



THANK YOU