Aeronautical Information Management (AIM)

AIM TRAIN DEVELOPMENT

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ASSUMPTIONS

In creating the ICAO Training Guidance Manual (Draft ver.), the following assumptions should be made:

- The AIS/AIM organization:
  - has specific job descriptions/profiles for staff performing providing AIS/AIM functions (regardless of whether the individuals are employees, contractors, or other named providers)
  - can clearly define who (person or organization) provides each of the required services, and whether they take place within their AIS/AIM organization or elsewhere
  - has access to the appropriate physical training facilities (to include the appropriate technology support) needed to deliver the training

ASSUMPTIONS

Cont…

- has implemented a quality management system that includes standard operating procedures (or documented work instructions)
- will develop (or has available) an organization-wide training program that includes for example, the specified training courses, assessments, and the associated records
- has access to the services for competency-based course developers and/or competent instructors
- that in some cases, will need to accommodate the need a training requirement in order for a trainee to effectively complete a course

ASSUMPTIONS

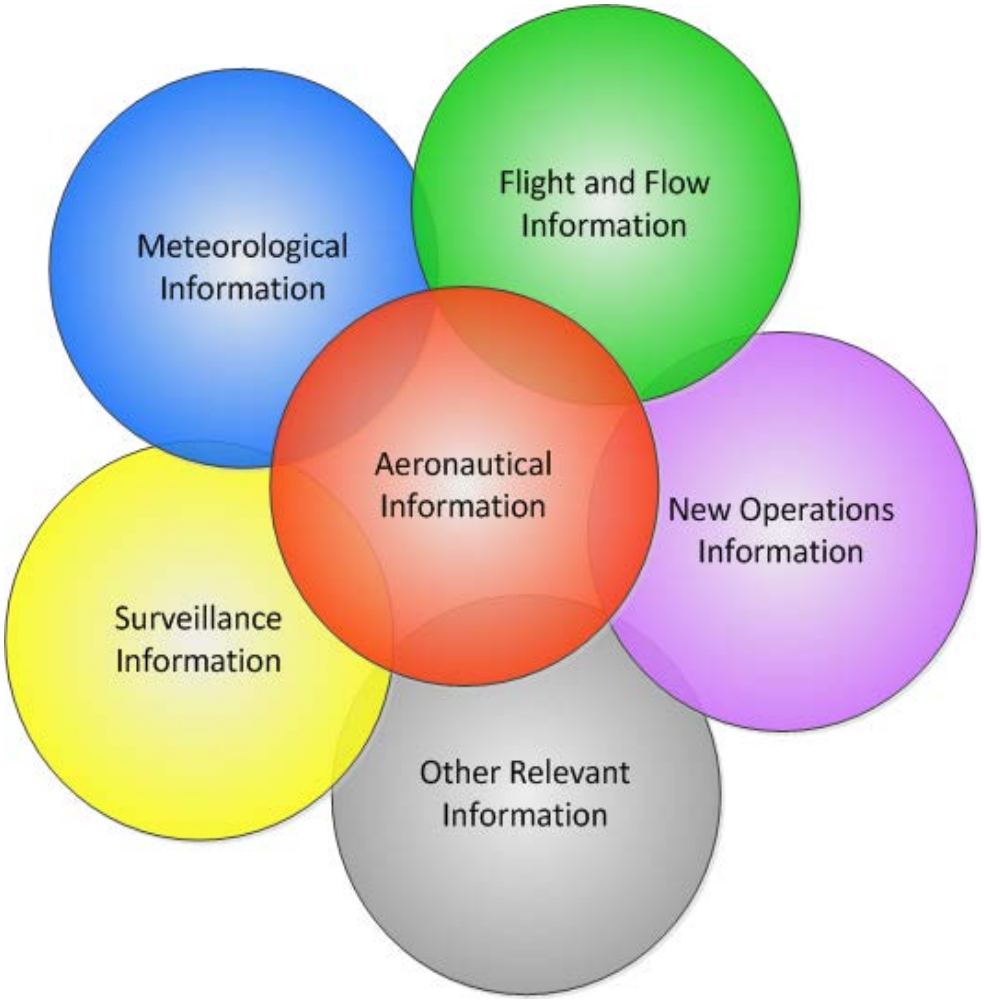
Cont…

The competency framework is aligned with the general principles of AIS as well as the ICAO Roadmap for the Transition from AIS to AIM.

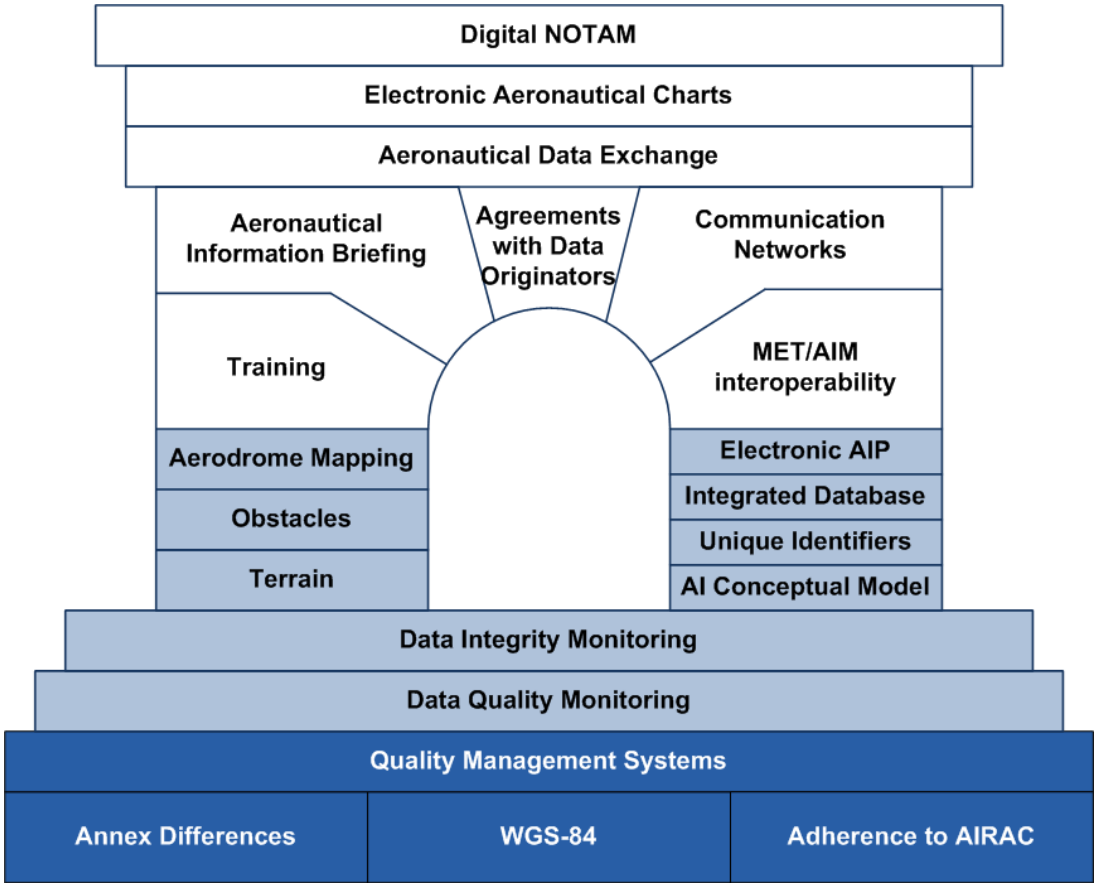
How to develop a competency-based training curriculum specifically for staff members?

Aeronautical information shown in relation to other information domains. Note that depending on one's individual perspective, that perspective becomes the “central” information domain.

The ICAO Next Generation of Aviation Professionals Task Force (NGAPTF) will provide further guidance regarding course development considerations.



The development of a new ICAO AIM Training Manual



- Competency based approach is used
- Training people from different backgrounds will become easier
- Support ANSPs' training needs in the context of the AIS-AIM transition

Guidance Material on AIS training development

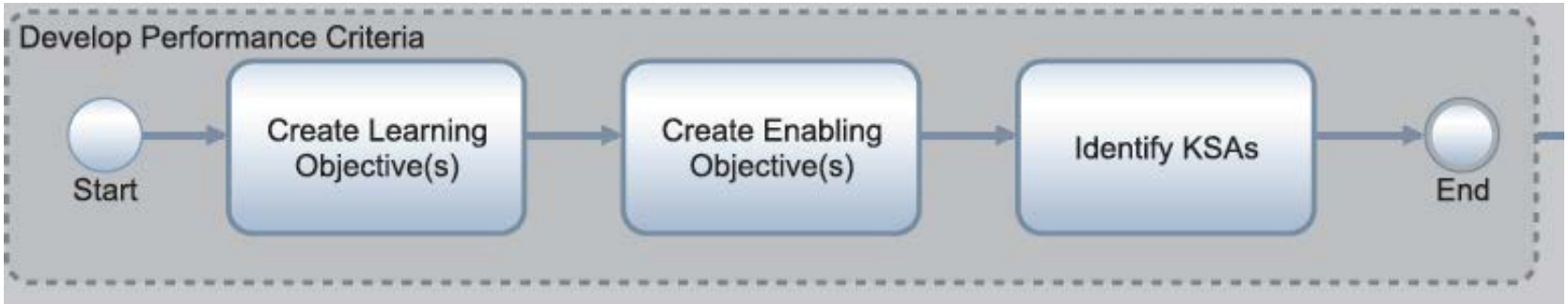
Background on AIS Officer Training:

- Original Assumptions
  - Traditional training manual assuming all AIS Officers have similar job or functional responsibilities
  - Training focus: Teaching to job or functional requirements
- Challenges
  - Multiple functions within AIS/AIM
  - No standard job descriptions or certifications
  - Technological differences among organizations

Guidance material on AIS training development - Competency

New Approach:

Enhanced training manual format to a competency-based framework in lieu of job or functional based training



Training focus:

Teach the gap of competence in the KSAs* required at individual, functional or organizational level.

*KSA=knowledge skills and abilities

Guidance material on AIS training development - Advantages of the CFM*

- Training is designed to a gap of competency in knowledge, skills and abilities/attitudes

- Allows training resources to be optimized , training is specific and does not waste resources
- Over-training does not occur

- Participants are appropriately challenged

- Training/Qualification of data originators.

- Flexible

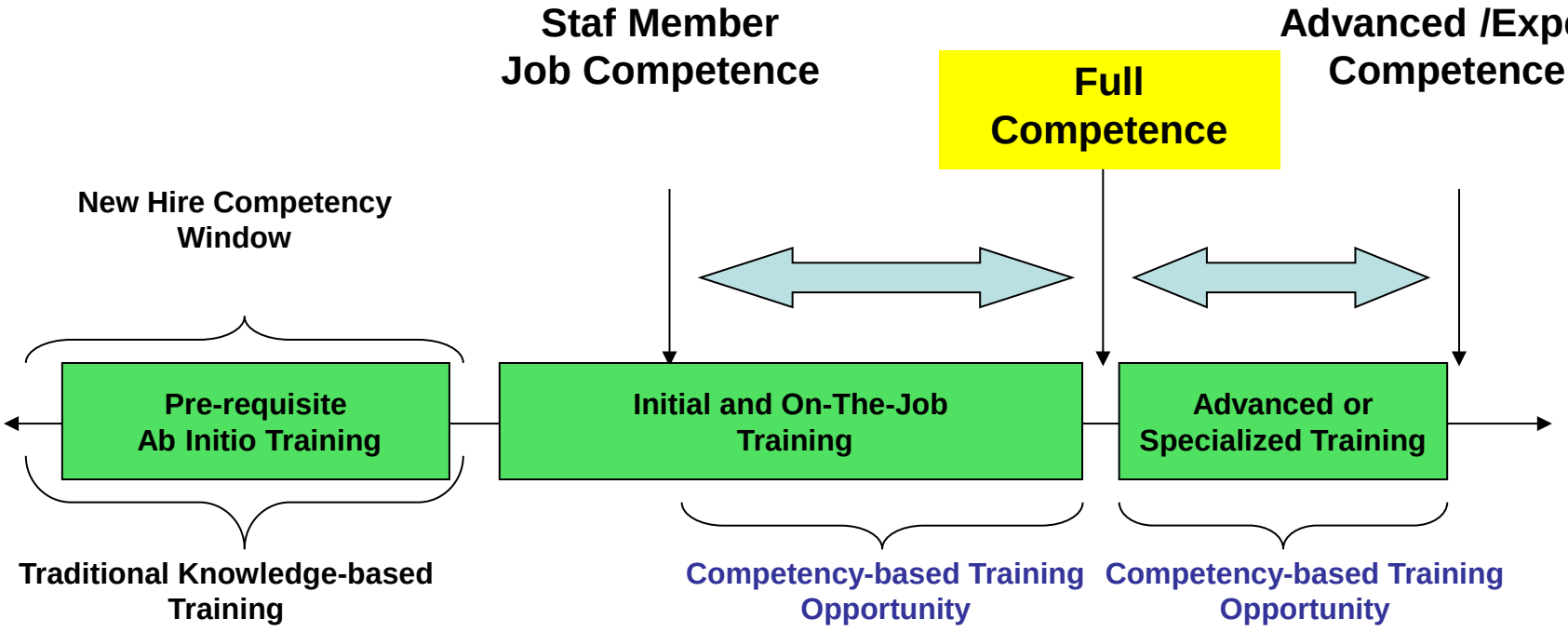
*CFM=competency framework model

Guidance material on AIS training development

- Urgent need for a development of common definitions and processes, and scope of AIS/AIM/IM in the SWIM content;
- Information Management (IM) becomes a key enabler for the future ATM System. It does not mean physically taking over all information related functions by AIM;
- The role of AIS providers will change significantly;
- AIM Seminar Recommendation - *Jamaica 2012* –

"In relation to training processes and AIM, the need for new profiles was identified and consideration was given to IT professionals and cartographers being integrated in AIM to assist phase three of the transition to AIM and SWIM requirements. It was also noted that there is a need for ICAO to provide more extensive guidance material in support of the transition"

Guidance material on AIS training development



Training Levels

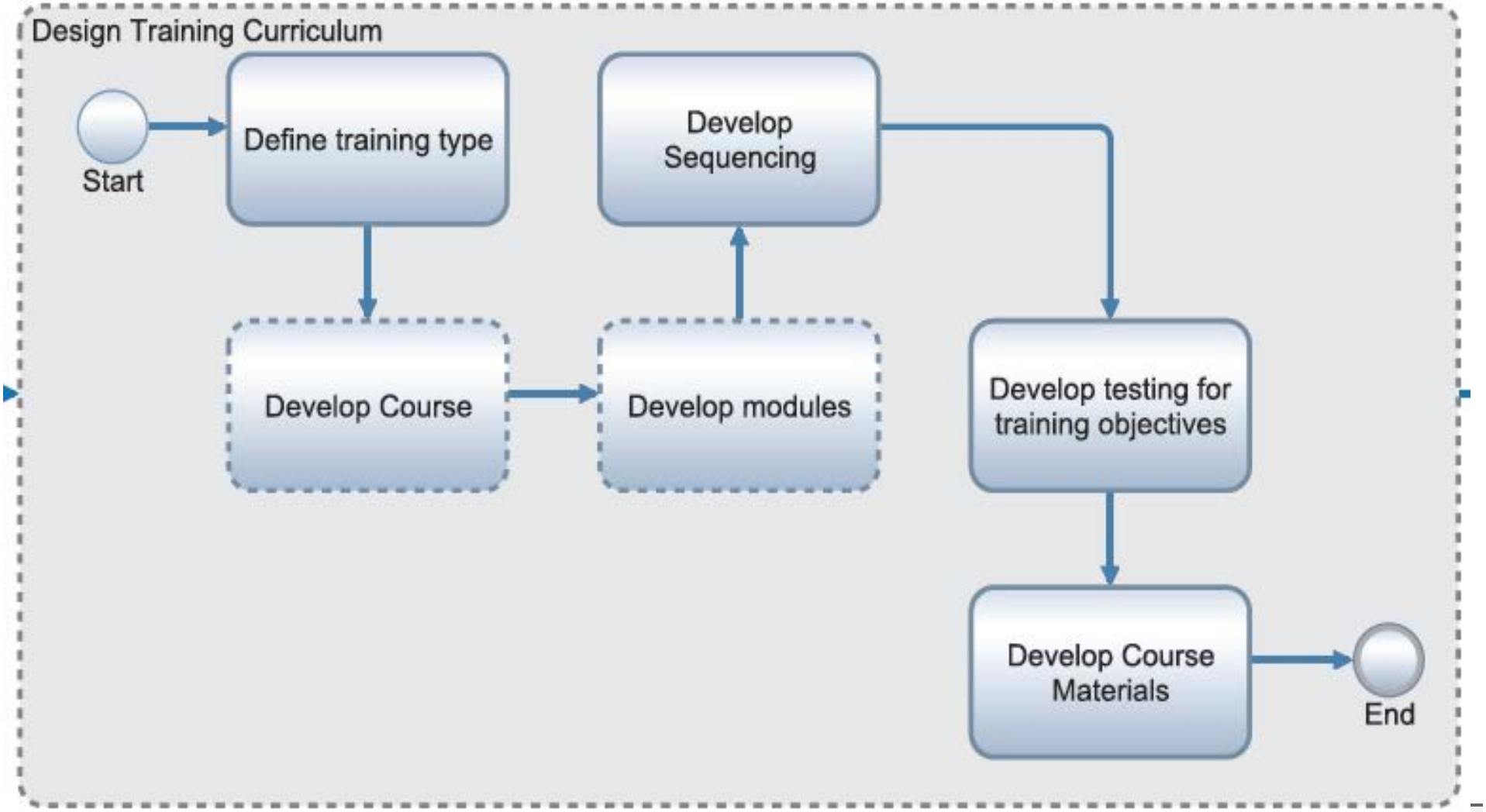
Training Levels	Description
Level 0	'To be aware of'
Level 1	Requires a basic knowledge of the subject. It is the ability to remember essential points; the learner is expected to memorize, describe or locate information.
Level 2	Requires an understanding of the subject sufficient to enable the learner to explain certain objects and events.
Level 3	Requires a thorough knowledge of the subject and the ability to apply it with accuracy. The learner should be able to make use of his repertoire of knowledge to develop plans and activate them.
Level 4	The ability to establish a line within a unit of known applications following the correct chronology and the adequate method to resolve a problem situation. This involves the integration of known applications in a familiar situation.
Level 5	The ability to analyze new situations in order to elaborate and apply one or other relevant strategy to solve a complex problem. The defining feature is that the situation is qualitatively different to those previously met, requiring judgment and evaluation of options.

From competencies to curricula and training

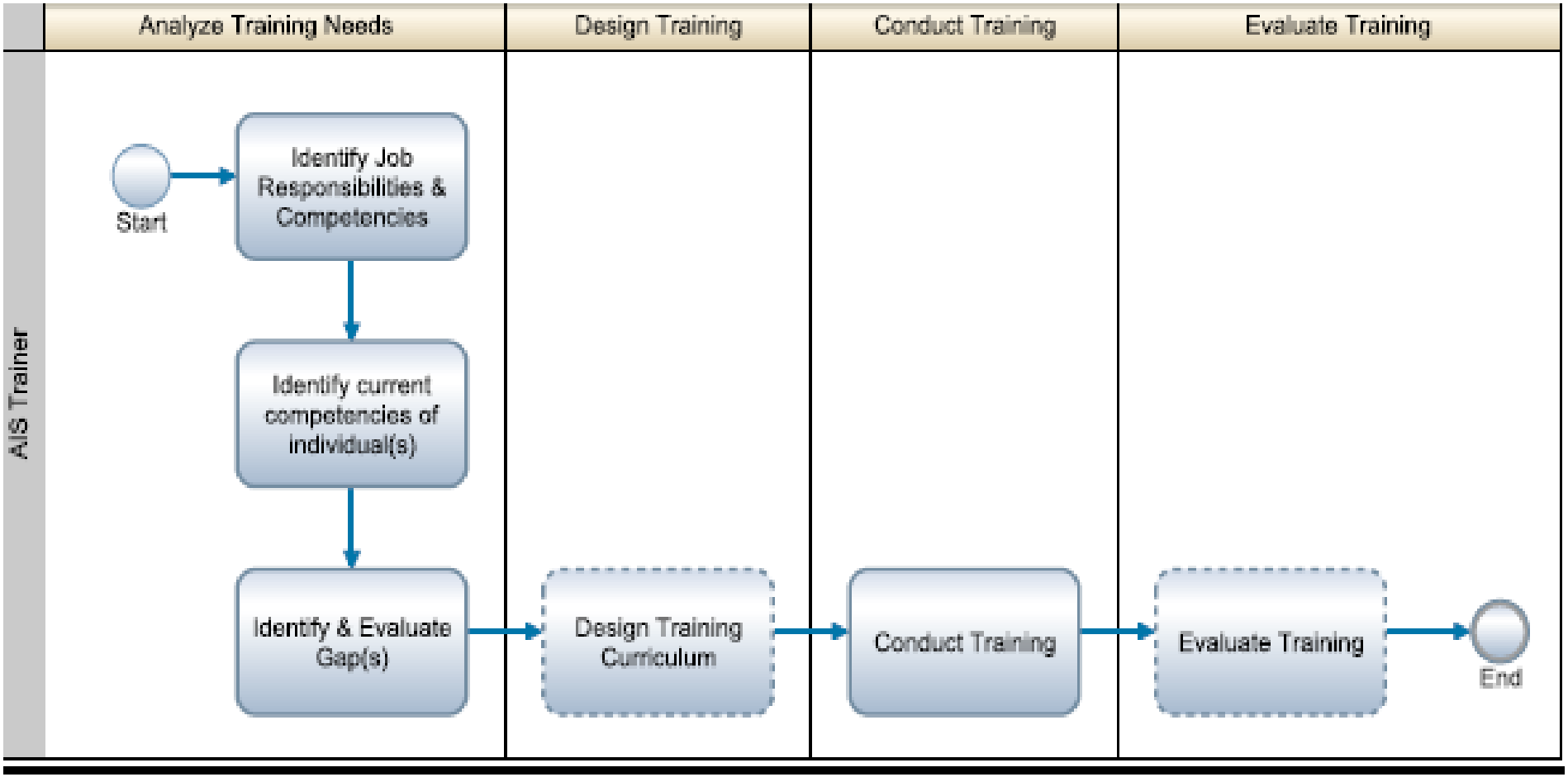
A high-level summary is as follows:

- **Step One:** Analyze/Identify the job responsibilities and associated performance and measurement criteria
- **Step Two:** Identify and document the competencies to meet the job responsibilities and performance expectations/standards
- **Step Three:** Identify and document the gaps between actual and expected competencies (performance) to the standards
- **Step Four:** Design the training to address the gaps through the development of the learning objectives for each competency that needs to be addressed
- **Step Five:** Conduct the Training
- **Step Six:** Evaluate the training and outcomes against performance on the job

Curriculum Design Process



Training Development Process



AIM Types of Training

- International, regional, and national aviation regulation
- Air Traffic Management (ATM)
- Aerodromes (AGA)
- Aircraft operations and characteristics (OPS)
- Meteorology (MET)
- Geography (GIS)
- Communication, Navigation, and Surveillance (CNS)
- Quality Management Systems (QMS)
- Safety Management Systems (SMS)
- Human factors
- Aeronautical Information Management (AIM) concepts, strategies
- Information Technology (IT)

Considerations for course development

- Duration
- Cost
- Facilities
- Training Media
- Language of Training Delivery
- Class Size
- Trainee Profiles
- Feedback
- Automation
- Organizational structure
- Complexity of the State airspace
- Resources
- Regulatory requirements
- Institutional requirements

Course Development

Components and processes needed to develop a course curriculum include:

- Assessing the pre-existing competencies of the trainees
- Design – deriving terminal objectives and the associated learning objectives from the competency framework
- Identification of KSAs – for each terminal and enabling objective
- Grouping learning objectives into course modules
- Sequencing learning objectives
- Trainee Assessment
- Course materials

Instructional Criteria

The following instructional criteria should be used throughout the course module for each enabling objective, that allows:

- presentation of the objective
- performance measurement criteria (testing) context to the terminal objective and competency element and unit
- contents presentation
- clarification and emphasis on main points
- provision of a practice opportunity or reinforcement
- provision of feedback for participants (progress test, etc.)
- performance of the objective and assessment of the achievement

Course objective(s) and description

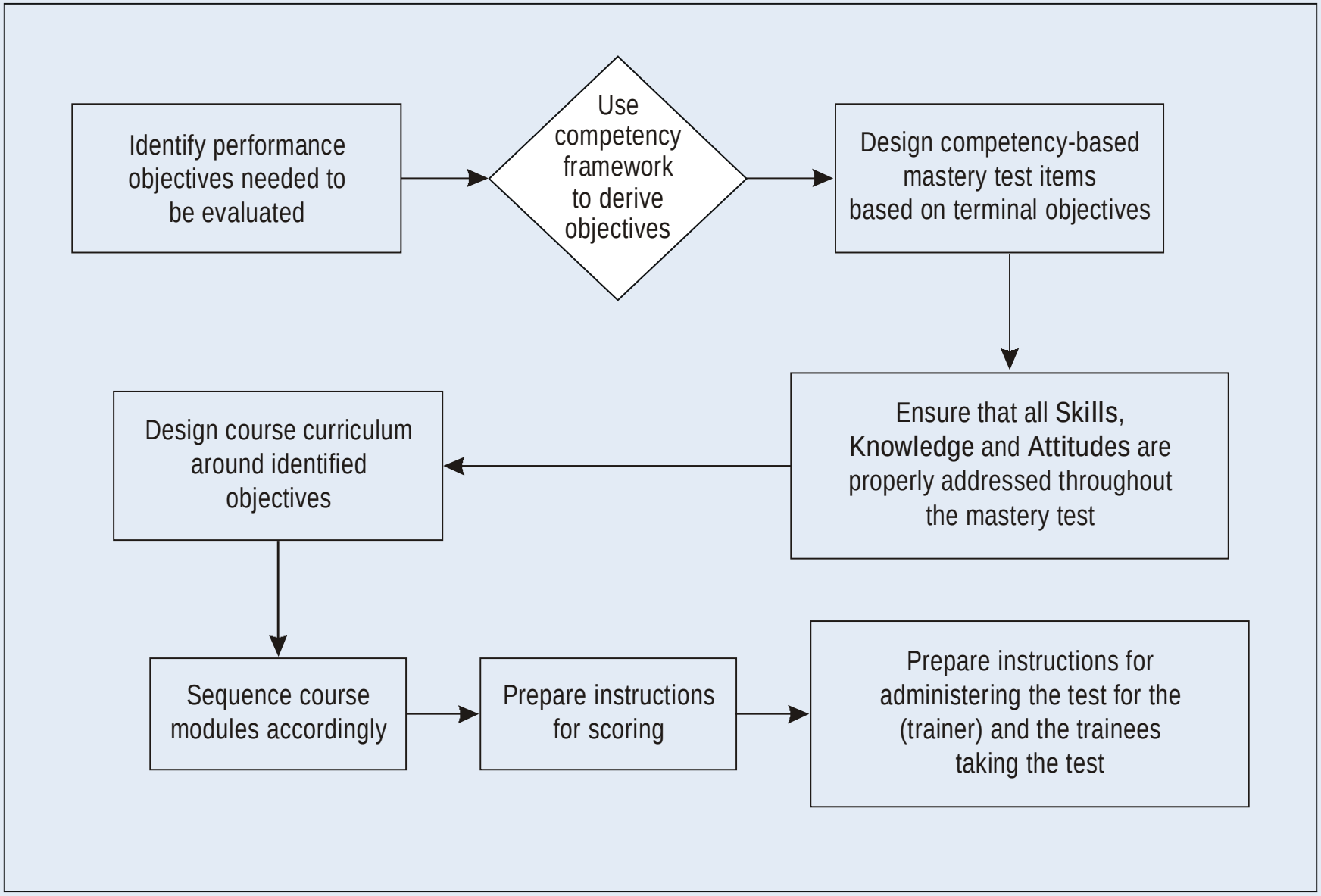
Required performance should be introduced at the beginning of the course module.

This allows trainees to know exactly what is expected of them and how they will be evaluated at the end of the course. This will also reduce the level of anxiety for trainees but also help to keep instruction focused on the desired level of performance.

At a minimum, the introduction should include:

- the presentation of terminal or end-of-module objectives and the mastery test
- intermediate objectives
- activities provided in the module
- any reference material on the subject matter and intended length of time of the module.

Mastery Test Design Process

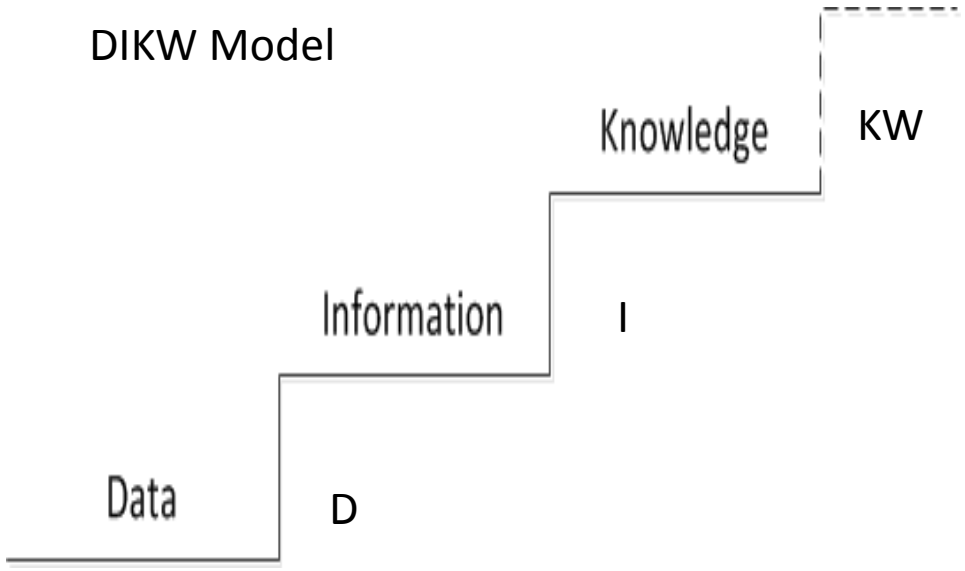


Production and Development of Material

Course Material Content	Considerations
Documentation	▪ Course materials ▪ Evaluation forms ▪ Take-home materials ▪ Defined standard ▪ Language for training delivery and materials
Reference	▪ Reference materials such as articles, texts, web pages, etc.
Media	▪ Computer-based ▪ Projectors ▪ CDs ▪ Thumb drives ▪ Videos
Records	▪ Training records ▪ Certificates for training completion ▪ Electronic vs. paper

AIS/AIM Competency Framework

DIKW Model



Each layer of the DIKW model corresponds to a higher level of awareness. With this higher level of awareness also comes the language to verbalize the corresponding abstract concepts.

X	COMPETENCY UNIT		
	X.X	COMPETENCY ELEMENT	
		X.X.X Performance Criteria	Standard
1	DATA AND INFORMATION MANAGEMENT		
	1.1	PRE-PROCESS DATA	
		1.1.1 Receive and record raw data	Local procedures
		1.1.2 Evaluate whether the raw data is from an authorized source	ICAO Annex 15, Chap. 7 and Appendix 1; Local procedures, Doc 8126
		1.1.3 Evaluate whether the data meets the protection requirements	Local procedures
		1.1.5 Identify if there is a need for translation of the raw data	ICAO Doc 9713
		1.1.6 Analyze the appropriateness of the data	Local procedures
		1.1.7 Verify the quality of the raw data	ICAO Annex 15, Chap. 3; Local procedures
		1.1.8 Analyze the data for completeness, coherence and ambiguity	Local procedures
		1.1.9 Identify any discrepancies, duplication and misinterpretations of the data	ICAO Annex 15, Chap. 4 to 7
		1.1.10 Execute corrective action	Local procedures
		1.1.11 Coordinate with data sources	Local procedures
		1.1.12 Receive external data	Local procedures
	1.2	PROCESS DATA	
		1.2.1 Perform storage of raw data	Local procedures
		1.2.2 Assess the impact of the data on existing publications, the significance and complexity of the data, and its temporality.	Local procedures
		1.2.3 Coordinate with other relevant parties	Local procedures
		1.2.4 Select the means of publication	Local procedures
		1.2.5 Schedule the publication process, taking into consideration the main milestones, proposed publication/effective date and the AIRAC cycle	ICAO Annex 15 and Local procedures, Doc 8126

X	COMPETENCY UNIT		
X.X	COMPETENCY ELEMENT		
	X.X.X	Performance Criteria	Standard
	1.2.6	Perform calculations e.g., data conversions	Local procedures
	1.2.7	Apply appropriate data formatting rules	Local procedures
	1.2.8	Enter data into application	Local procedures
	1.2.9	Assemble statistical data	Local procedures
	1.2.10	Make data available	Local procedures
1.3	OPERATE DATABASE		
	1.3.1	Apply database maintenance operations.	Local procedures
	1.3.2	Identify faults in the operation of the database and apply fault reporting procedures	Local procedures
	1.3.3	Operate the database	Local procedures
1.4	PRODUCE DATA SETS/FILES		
	1.4.1	Select the required data (internal and external sources)	Local procedures
	1.4.2	Compile data sets/file (e.g., terrain and obstacle, PIB, List of Valid NOTAM etc.)	ICAO Documents and/or Local procedures
	1.4.3	Coordinate with other authorities as necessary	Local procedures
	1.4.4	Verify data sets/file	Local procedures
	1.4.5	Obtain approval	Local procedures
	1.4.6	Make data sets/files available	Local procedures
1.5	MAINTAIN DATA/INFORMATION AND LIBRARY		
	1.5.1	Maintain external publications (e.g. AIP)	Annex 15 and Local procedures
	1.5.2	Maintain external data (static and/or dynamic)	Local procedures
	1.5.3	Maintain records	Local procedures
2	STATIC DATA OUTPUT		
2.1	GENERATE AIP/AIP AMENDMENT		
	2.1.1	Prepare content (text, tables, diagrams, and other elements)	ICAO Annex 15, Doc 8126, Local procedures
	2.1.2	Coordinate with other authorities as necessary	Local procedures
	2.1.3	Translate text into appropriate language	Local procedures
	2.1.4	Verify content	Local procedures

X	COMPETENCY UNIT		
X.X	COMPETENCY ELEMENT		
	X.X.X	Performance Criteria	Standard
	2.1.5	Obtain approval of text	Local procedures
	2.1.6	Compile and verify content (text, charts and other elements)	Local procedures
	2.1.7	Obtain approval of compiled product	Local procedures
	2.1.8	Make AIP/AIP Amendment available (paper and/or electronic form)	Annex 15 Section 3.3, ICAO (use of internet) and Local procedures
2.2	GENERATE AIP SUPPLEMENT		
	2.2.1	Prepare content (text, tables, diagrams, and other elements)	Local procedures
	2.2.2	Coordinate with other authorities as necessary	Local procedures
	2.2.3	Translate text into appropriate language	Local procedures
	2.2.4	Verify content	Local procedures
	2.2.5	Obtain approval of text	Local procedures
	2.2.6	Compile and verify content (text, charts and other elements)	Local procedures
	2.2.7	Obtain approval of compiled product	Local procedures
	2.2.8	Make AIP Supplement available (paper and/or electronic form)	Annex 15 Section 3.3, ICAO Doc. 9855 and Local procedures
2.3	GENERATE AERONAUTICAL INFORMATION CIRCULAR (AIC)		
	2.3.1	Prepare content (text, tables, diagrams, and other elements)	Local procedures
	2.3.2	Coordinate with other authorities as necessary	Local procedures
	2.3.3	Translate text into appropriate language	Local procedures
	2.3.4	Verify content	Local procedures
	2.3.5	Obtain approval of text	Local procedures
	2.3.6	Compile and verify content (text, charts and other elements)	Local procedures
	2.3.7	Obtain approval of compiled product	Local procedures
	2.3.8	Make AIC available (paper and/or electronic form)	Annex 15 Section 3.3, ICAO Doc 9855 and Local procedures
2.4	PRODUCE CHARTS		

X	COMPETENCY UNIT		
X.X	COMPETENCY ELEMENT		
	X.X.X	Performance Criteria	Standard
	2.4.1	Prepare charts	Local procedures
	2.4.2	Coordinate with other authorities as necessary	Local procedures
	2.4.3	Translate elements into appropriate language	Local procedures
	2.4.4	Verify content	Local procedures
	2.4.5	Obtain approval of chart	Local procedures
	2.4.6	Make charts available (paper and/or electronic form)	Local procedures
3	DYANMIC DATA OUTPUT		
3.1	GENERATE NOTAM		
	3.1.1	Prepare content (number, series, Q line, E field, etc.)	Annex 15 Chap. 5, ICAO Doc 8126
	3.1.2	Coordinate with other authorities as necessary	Local procedures
	3.1.3	Translate text into appropriate language	Local procedures
	3.1.4	Verify content	Local procedures
	3.1.5	Make NOTAM available	Annex 15 Chap. 5.3, ICAO Doc 8126
3.2	GENERATE CHECKLIST OF VALID NOTAM		
	3.2.1	Prepare Checklist of Valid NOTAM	Local procedures
	3.2.2	Coordinate with other authorities as necessary	Local procedures
	3.2.3	Verify content	Local procedures
	3.2.4	Make Checklist of Valid NOTAM available	Annex 15 Chap. 5.3, ICAO Doc 8126
3.3	GENERATE SNOWTAM		
	3.3.1	Prepare SNOWTAM	Annex 15 Chap. 5, ICAO Doc 8126
	3.3.2	Coordinate with other authorities as necessary	Local procedures
	3.3.3	Verify content	Local procedures
	3.3.4	Make SNOWTAM available	Annex 15 Chap. 5.3, ICAO Doc 8126
3.4	GENERATE ASHTAM		
	3.4.1	Prepare ASHTAM	Annex 15 Chap. 5, ICAO Doc 8126
	3.4.2	Coordinate with other authorities as necessary	Local procedures
	3.4.3	Verify content	Local procedures

X	COMPETENCY UNIT		
X.X	COMPETENCY ELEMENT		
	X.X.X	Performance Criteria	Standard
	3.4.4	Make ASHTAM available	Annex 15 Chap. 5.3, ICAO Doc 8126
4	ADDITIONAL PRODUCTS		
4.1	GENERATE ADDITIONAL PRODUCTS		
	4.1.1	Prepare additional products (e.g., business products, VFR flight guide)	Local procedures
	4.1.2	Coordinate with other authorities as necessary	Local procedures
	4.1.3	Verify content	Local procedures
	4.1.4	Obtain approval	Local procedures
	4.1.5	Make additional products available	Local procedures
5	PRE- AND POST-FLIGHT INFORMATION		
5.1	PRE-FLIGHT PREPARATION		
	5.1.1	Provide or make available pre-flight information e.g., AIP, PIB etc	Annex 15, Doc 8126 and local regulations
5.2	POST-FLIGHT PREPARATION		
	5.2.1	Receive and process data/information from other sources	Annex 15, Doc 8126 and local regulations
	5.2.2	Process post-flight data queries	Local procedures
	5.2.3	Distribute post-flight information to the appropriate authority	local regulations and procedures
6	ARO		
6.1	PROCESS FPL		
	6.1.1	Receive and process the FPL proposal	Local procedures
	6.1.2	Verify FPL for compliance with format and data conventions, and for completeness and accuracy	Local procedures
	6.1.3	Receive, create and process associated /supplementary messages	Local procedures
	6.1.4	Execute corrective action	Local procedures
	6.1.5	Transmit FPL, including to any regional processing systems	Local procedures
6.2	COORDINATION ACTIVITIES		
	6.2.1	Assist the pilot in the pre-flight and post-flight phase	Local procedures
	6.2.2	Coordinate with ATS	Local procedures
	6.2.3	Coordination with Search and Rescue Coordination Center	Local procedures
	6.2.4	Coordinate with other organizations	Local procedures

Training of AIS/AIM personnel, management, and users of aeronautical data AIS/AIM, is the key for the successful implementation of the new operational concepts of the aeronautical data chain and the electronic publication of the Integrated Aeronautical Information Publication (IAIP).

THANK YOU!

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