AFI AIM TF/2 – DP/7
13/12/12

INTERNATIONAL CIVIL AVIATION ORGANIZATION

FIRST MEETING OF THE AFI REGION AIM IMPLEMENTATION TASK FORCE

(Nairobi, Kenya, 17 – 19 December 2012)

Agenda Item 7: **Updates on the implementation of the AFI-CAD Business Plan as per Appendix 3.6 I (AFI-CAD Doc. 007) of the APIRG/17 Report**

(Presented by the Secretariat)

Summary

This Paper presents the Summary review on updates of the AFI-CAD Business Plan as per Appendix 3.6 I (AFI-CAD Doc. 007) of the APIRG/17 Report further to the APIRG/19 on AFI-CAD pursuant to the implementation of APIRG/16 Conclusions 16/41, 16/42, 16/43, 16/44 respectively.

The AIM-Task is required to review and note the developments of ADI-CAD emanating from this Paper.

References :

APIRG/17 and 18– Report

ANC 12 Report related to SWIM and AIM

1. Introduction

1.1 The APIRG/17 Meeting held in Ouagadougou, Burkina Faso from 2-6 August 2011 reviewed the AFI-CAD Business Plan as per Appendix 3.6 I (AFI-CAD Doc. 007) of the APIRG/17 Report further to the Fourth AFI-CAD Informal Consultative meeting pursuant to the implementation of APIRG/16 Conclusions 16/41, 16/42, 16/43, 16/44 respectively, pertaining to AIS-AIM Transition in the AFI Region.

2. Discussion

2.1 The APIRG/17 meeting noted the adoption of the framework and guidance material for the AFI-CAD by the APIRG 16th meeting (APIRG Conc.16/41 refers), the main objective of the Fourth informal consultative meeting was for States and Stakeholders to provide inputs to assist the ICAO designated consultant in the consolidation of the draft Business Plan. However, the meeting revised the AFI-CAD Guidance material in order to include new additional Recommendations endorsed by the Study Group.

2.2 The meeting also noted that the rough timeline for the implementation of the AFI-CAD Project covers about the next four years 2009 to 2014 until the first Centre /Area could move into operational use. The meeting noted that the timeline culminates with the implementation of phase 2 of

the Roadmap of the transition from AIS to AIM on migration to digital databases which calls for establishment of database driven processes for the production of the current products in all States.

2.3 The Study Group in collaboration with the designated ICAO Consultant submitted the results of the project which is the final AFI-CAD Business Plan to the APIRG/17 Meeting which was subsequently endorsed and the Secretariat submitted the AFI-CAD Business Plan to the ICAO TCB for assistance in funding its implementation.

3 Follow-up on developments:

3.1 Following a review of the Action agreed by the Air Navigation Commission on 8 March 2011 (ANC 186-6 refers); the Commission noted that the transition in the AFI Region will benefit if a robust communication infrastructure exist. The Commission further called upon the Secretariat to support/monitor the transition of AIS to AIM through region mechanism.

3.2 Following the recent review of the revised AFI Plan by the 12 AN Conference, it was agreed that the Concept of AFI-CAD when implemented, will offer all AIM related tasks including even the classic AIM services to reduce the ANSP's efforts and timelines needed by the States on their way to the AIS/AIM Transition process. This has also been re-confirmed by Recommendation 3/8 (c) of the 12th AN Conference which states:

ANC 12 Rec.3/8 (c):

> *That States engage in intra-regional and interregional cooperation for an expeditious transition from aeronautical information service (AIS) to aeronautical information management (AIM) in a harmonized manner and to using digital data exchange and consider the regional or sub regional AIS databases as an enabler for the transition from AIS to AIM.*

3.3 To this effect, ASECNA is progressively developing and plans to implement in accordance with the AFI-CAD Concept, a Regional AIS Database to accommodate all the States in the Western and Central African Region. In accordance with the AFI-CAD Concept, South Africa has invited AFI States to join the South African Regional AIS Database as an alternative to enhance the AIM implementation process with the AFI Region.

4. ACTION BY THE MEETING

4.1 The meeting is invited to:

a) note the information provided in this working paper;

b) Consider the possibility of AFI States migrating to the ASECNA Regional AIS Database in accordance with the AFI-CAD Concept as per Recommendation 3/8 (c) of the 12th AN Conference.

c) Consider the possibility of AFI States migrating to the South African Regional AIS Database in accordance with the AFI-CAD Concept as per Recommendation 3/8 (c) of the 12th AN Conference.

d) Note the information provided in Attachment- A under this paper which the AFI-CAD Business Plan, and noting that the AFI-CAD Framework has been endorsed as the AFI-CAD Concept in the current AFI ANP.

Attachment-A to DP-8

APPENDIX 3.6-I

AFI-CAD Doc 007

Business and Financial Plan -

ICAO Centralised AFI Region AIS Data Base

Version: 0.5

Draft – Subject to Endorsement by APRIG/17

Name of Project	ICAO AFI Region Centralised AIS Database (AFI CAD)	
Project Leader	<Project Leader>	
Responsible	<Responsible Person> Requirements Engineer (Acquirer)	
Created on	<Creation Date>	
Last changed	13.12.2012 09:41	
Processing status	X	in Process
		submitted
		completed
Document File	J:\1_Document_Management\3_External_Issues\4_Committees-Organisations\ICAO\00-Regional-Offices\AFI-Region\APIRG-17\ICAO-AFI-CAD-Business-&-Financial-Plan-Doc-007-v0.5.doc	
V-Modell Version	Version 1.2.1 English	

Further Product Information

Participating	[not involved] [not involved] [not involved]	User Executive Project Leader
Creation		

Change Listing

Change			Changed Chapters	Description of the Change	Author	State
No	Date	Version				
1	05.09.08	0.1	All	Initial Product creation	Rudolph	Draft
2	01.10.08	0.2	All	Input from WACAF	Rudolph	Draft
3	01.11.08	0.3	All	Input from AFI CAD SG/3	Rudolph	Draft
4	01.06.09	0.4	All	Adjustments befor Informal Consultative AFI CAD SG/4	Rudolph	Draft
5	25.07.10	0.5	All	Version for APIRG/17	Rudolph	Draft
6						

Content

1 - INTRODUCTION

Executive Summary

This Business Plan is intended to describe and summarise the Strategic Objectives, Financial Implications, Organisational Framework, Management Structure, Procurement and Implementation Concept and Schedule, general Planning, and, in its Appendix, the User Requirements for the African Centralised AIS Data Base (AFI-CAD). It shall form the basis for the next steps to be undertaken towards implementation after endorsement by APIRG/17.

The Business Plan is an action based on APIRG Conclusions 16/44 and 16/42[1] and a subsequent Special Implementation Project (SIP)[2].

The Business Plan is written based on the data and information made available until today by the various actors and is therefore under review cycle on a regular process based on the schedule suggested in the Business Plan itself (cf. 0).

The Plan tries to follow the structure of the ICAO Business Plan as far as possible.

Background

The Reports of the four meetings[3] of the AFI Region Study Group on the Establishment of a Centralised AFI Region AIS Data Base have been taken into account. The Special AFI Regional Navigation (RAN) Meeting 20084 has noted the AFI-CAD study work under way.

The Business Plan considers the Framework and Recommendations of the AFI-CAD Study Group as latest provided in the Appendix H to APIRG/16 Report[1] and in Appendix 11 of the ATS/AIS/SAR SG/11 Report[5]. It is provided in Annex B) to this Business Plan as reference material.

Structure of the Business Plan

Chapter 2 - Vision and Mission Statement and Strategic Objectives

This chapter describes the vision and mission of the AFI-CAD which is then further detailed in strategic objectives.

Chapter 3 – AFI-CAD Strategic Profile

This chapter describes the operational focus, the services and products, stakeholders and strategic factors for successful implementation.

Chapter 4 – Organisation, Management, Milestones

This chapter describes the legal framework, management issues, ownership issues milestones and organisational options.

Chapter 5 - Financial Plan

This chapter describes the business model, value propositions, cost and other financial issues.

Chapter 6 - Benefits and Disadvantages

This chapter describes benefits and disadvantages.

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[1] APIRG/16 Meeting 19-23 November 2007
[2] ICAO WACAF Office T 2/8.1 – 0778 09 September 2008
[3] (1) 8-10 November 2006, (2) 3-5 October 2007, (3) 7-9 October 2008, (4) 26 June 2009
[4] SP AFI/08 24-29 November 2008
[5] 26-30 April 2010

Chapter 7 - Action Plan

This chapter contains the action plan.

Chapter 8 – Summary and Conclusions

This chapter gives a short summary and conclusions.

Chapter 9 – Appendix

This chapter contains supporting information like abbreviations, literature and others

Annexes

The annexes contain the requirements (URD), the guidance material (recommendations), the V-Model overview and the questionnaire for current AIS costs.

2 - VISION AND MISSION STATEMENT AND STRATEGIC OBJECTIVES

VISION AND MISSION (ICAO)[6]

The International Civil Aviation Organization, a United Nations Specialized Agency, is the global forum for civil aviation.

ICAO works to achieve its vision of safe, secure and sustainable development of civil aviation through cooperation amongst its Member States.

The AFI-CAD assists the achievement of better civil aviation safety and enhanced efficiency of aviation operations in the ICAO AFI Region for flights within, to/from or crossing the region.

Strategic Objectives[7]

The following Strategic Objectives exist:

A: Enhance global civil aviation safety,

B: Enhance global civil aviation security,

C: Minimize the adverse effect of global civil aviation on the environment,

D: Enhance the efficiency of aviation operations,

E: Maintain the continuity of aviation operations,

F: Strengthen law governing international civil aviation.

The AFI-CAD undertaking is related to ICAO Strategic objectives "Safety (A2)" and "Efficiency (D1):

A2) Ensure the timely implementation of ICAO provisions by continuously monitoring the progress toward compliance by States.

D1) Develop, coordinate and implement air navigation plans that reduce operational unit costs, facilitate increased traffic (including persons and goods), and optimise the use of existing and emerging technologies.

Safety	Security	Environment Protection	Efficiency	Continuity	Rule of Law
Supporting Implementation Strategies					

Table 1: Relationship between Objectives and Supporting Implementation Strategies

Therefore the AFI-CAD undertaking is one of the major Supporting Implementation Strategies in the AFI Region to reach the ICAO Strategic Objectives A) and D1) in the Region.

[6] approved by the Council (C-DEC 174/13) on 11 March 2005
[7] approved by the Council (C-DEC 173/13) on 17 December 2004

3 - AFI CAD STRATEGIC PROFILE

Basis for Strategic Profile

The two Strategic Objectives described in 1 of the Business Plan and the AFI-CAD Guidance Material form the basis of the Strategic Profile that will enable the AFI part of the ICAO (WACAF and ESAF Office) to position itself vis-à-vis its primary audience.

The predominant driving forces are the Criteria and Services of the Guidance Material Recommendations the AFI-CAD (cf. Annex B) and the financial limiting factor that the Cost Recovery must ensured as a minimum requirement of the continues Operation, shown in Recommendation 10, b) i. (cf. Annex B).

Strategic Positioning

The strategic positioning of AFI-CAD detailed below consist of four major thrusts: the operational focus of AFI-CAD, the scope of the programmes, services and products, the scope of customers, users, and partners, and the strategic skills need for success.

They need to take into account efficiency, performance criteria and need to be linked to budgets.

Operational Focus

The advantages for users and the value propositions of the AFI-CAD are the most important factors which must be driven by an Operational Focus. The AFI-CAD initiative is a very advanced approach to fulfil the airspace user needs in aeronautical data, aeronautical obstacles, and terrain data requirements. It will built, in a large extend, the basis for and assist the implementation and usage of the Global Satellite Navigation System (GNSS) technology on the African continent. Therefore the ICAO ATM Operational Concept (doc 9854-AN/458) 1st Edition 2005 and ICAO Global Air Navigation Plan (Doc 9750-AN/963) 3rd Edition 2007 should be taken into account.

Because of its far reaching influence the AFI Operational Concept (OCD) and the User Requirements Document (URS) to takes into account that the 1st Edition 2005 of the ICAO ATM Operational Concept views Aeronautical Information with its temporality, intelligent information management, with unlimited access, limited bandwidth and optimised transfer of information, with fully electronic and network environment with printouts used only as needed for reference, temporary memorisation and visualisation support to human operators (paragraph 2.9.12 to 2.9.16).

The ICAO ATM Operational Concept views seven ATM concept areas components in paragraph 2.1.6, Figure 2-1:

1. Airspace organisation and management (AOM),
2. Demand/capacity balancing (DCB),
3. Aerodrome operation (AO),
4. Traffic synchronisation (TS),
5. Conflict management (CM),
6. Airspace user operations (AUO),
7. ATM service delivery management (ATM SDM),

The AFI-CAD will contribute to all of those new components which show that the aeronautical information in form of aeronautical data, aeronautical obstacle data, terrain data and others (e.g. NOTAM) is a key enabler for the new ATM concept. It should be carefully analysed during the finalisation of the OCD and URS that the new requirements stemming from this concept are reflected in the OCD and URS.

The ICAO Global Plan Initiatives (GPI) of the 3rd Edition of the Global Air Navigation Plan will also be taken into account, namely GPI-18 "Aeronautical Information" and GPI-20 "WGS-84" to ensure that the scope of both GPIs "to make available in real-time quality assured electronic information (aeronautical, terrain and obstacle)" and "to implement WGS-84 by all Sates".

The two GPIs address also the quality of aeronautical information as made available by data originators and to be maintained during its process through national AIS in the AFI Region and AFI CAD to end users. Therefore the whole electronic uninterrupted aeronautical data chain will be addressed in the Operational Concept for the AFI-CAD.

It will be noted that GPI-18 "Aeronautical Information" is the only GPI[8] which provides input to all seven ATM concept components. This underlines the importance of Aeronautical Information and the set-up of the AFI-CAD.

In addition to that the finalisation of the OCD and URS will take into account the ICAO Roadmap from AIS to AIM[9] and the outcome of the work of the ICAO AIS to AIM Study Group which will continue its work until 2016. The ICAO AIS/MAP Divisional Meeting, planned for 2014, will be taken into account in the milestone planning and the organisational frame (4).

Scope of Services and Products

Based on ICAO Annex 4 and 15, the related Manuals, and the AFI-CAD Recommendations 2 and 8 (cf. Annex B)) the AFI-CAD shall have the following operational scope:

AFI CAD services (Recommendation 2)

a) the International NOTAM Operation (INO) providing facilities for world-wide NOTAM, SNOWTAM, ASHTAM and AFTN or equivalent message handling and for pre-flight Information Bulletins (PIB) generation.
b) the Static Data Operation (SDO) providing facilities for AFI Static Aeronautical Data/information handling and reporting. Moreover, a minimum set of data is also maintained to allow the correct functioning of the INO system.

Scope of Services Provided (Recommendation 8)

a) Regarding the data operations service domains, the services provided shall ensure:
    a. Co-ordination of the resolution of data conflicts detected by the system data checking processes ;
    b. for non-participating States (world wide) :
        i. - NOTAM processing (verification, validation, etc…)
        ii. - entry of the statistic data required by the system NOTAM function.

b) b) As currently defined, the service does not include the provision of AIS services on behalf of participating States, i.e. the service shall not comprise the following activities :
    a. creation of NOTAMs
    b. origination and publication of AIP, AIP supplements, AIP amendments, AIC and charts.

c) c) As part of the provision of the service, the service provider will deliver to the centralized AFI Region AIS Data Base client the following services :
    a. 24 hour operational and technical help desk
    b. Client training
    c. Management and monitoring of the delivery of aeronautical information and AIP elements.

This scope of services and products will be covered in the URS. The finalisation of the URS will include the following requirements:

[8] See Table 1-1 of ICAO Global Air Navigation Plan (Doc 9750-AN/963) 3rd Edition 2007
[9] 1st Edition 2009

1. from the Guidance Material for the AFI CAD, as per Annex B) to this document,
2. from the Eurocontrol URS Documents (General, Commons Services, Static Data, NOTAM, AIP, Charting),
3. from the AFI States based on a filled Questionnaires[10],
4. from AFRAA[11], AACO[12], and IATA[13] as user representatives,
5. additionally to be considered from the Roadmap from AIS to AIM.

Scope of Customers / Users / Partners

The main existing stakeholders and entities which will have or might have an influence on the planning are the following:

Name	Role
African Airlines Association (AFRAA)	User representation
Arab Air Carrier Organisation (AACO)	User representation
International Air Transport Association (IATA)	User representation
Organization of African Unity (OAU)	Political will and acceptance
African Development Bank (AFDB)	Financing, Procurement (?)
African Civil Aviation Commission (AFCAC)	Promoting, organising, depositing of the AFI CAD agreement between AFI States
ICAO AIS/MAP Divisional Meeting planned for 2014	Planning for next decade
ICAO Study Group AIS to AIM	Studying new requirements and restructuring of the Annex 4 and 5. Preparing the AIS/MAP Divisional Meeting and eventually the PANS-AIM
ICAO AFI Planning and Implementation Regional Group (APIRG)	Coordination and amendment AFI Regional Plan, Regional Coordination
APIRG ATS/AIS/SAR Sub-Group	Identify shortcomings and problems and review, the adequacy of requirements
APIRG AIS/MAP Task Force	Specialist Input for AFI CAD
AFI Region Study Group on AFI CAD	Concept development for AFI CAD
Agency for the Safety of Aerial Navigation in Africa and Madagascar (ASECNA)	Major AIS Service Provider
AFI CAD Company (owned by the AFI States)	Procurements (?), System operation, Service operation

[10] Ref.: T2/8.1 – 303, 15 April 2009 and T2/8.1 – 308, 21 April 2009
[11] African Airlines Association
[12] Arab Air Carrier Organisation
[13] International Air Transport Association

The activities and already planned meetings of those stakeholders should be explored before finalising the Schedule, COD, and URS in order to ensure the common acceptance and decision process for the AFI CAD.

It will be very important to promote and present the AFI-CAD and its advantage to those stakeholders and to gather their expertise and assistance.

Strategic Factors for Successful Implementation of the Business Plan

Important strategic success factors for the AFI-CAD are:

1. Ownership and commitment from all Stakeholders,
2. Compliancy with ICAO Air Navigation Services Economics,
3. Establishment of a Legal Framework,
4. Establishment of an Initial Program Team.

These factors will be further explored in 4 and 5.

4 – ORGANISATION, MANAGEMENT, MILESTONES

Organisation, Legal Framework

To pave the way for a Legal Framework the initial establishment of an organisational kernel of the AFI-CAD is very important to be able start continues work on the program and to establish initial funding. Users and all African countries can benefit from the AFI CAD establishment therefore it could be an initiative assisted by the African Organisation of Unity (OAU) and managed under the auspices of the African Civil Aviation Commission (AFCAC). From 53 African countries, 39 have signed the AFCAC Constitution, 44 have ratificated, and 44 have deposited it. This is a big majority. AFCAC has in its constitution already the functions of "fostering arrangements between States", "contribute to ICAO Regional Plan implementation", and close consultation and cooperation with OAU and ICAO.

According to article 13 of the AFCAC Constitution, AFCAC shall prepare and approve a budget for the direct cost; indirect costs are handled under the practice of Chapter XV of the Chicago Convention. This would give the possibility to fund the set-up of the AFI CAD Office with defined and planed costs by AFCAC. During this set-up time a legal entity is inaugurated where all African States have the eligibility to joint. This legal entity will be funded by the members and, as to be identified in the financial model, eventually by alternative funding (see 1.27 to 1.34 of ICAO Global Air Navigation Plan). The alternative funding could be organised through the African Development Bank Group, where all African countries are members.

Figure 1 shows an initial legal framework which needs further development, but it is intended to give an initial overview and to open discussion.

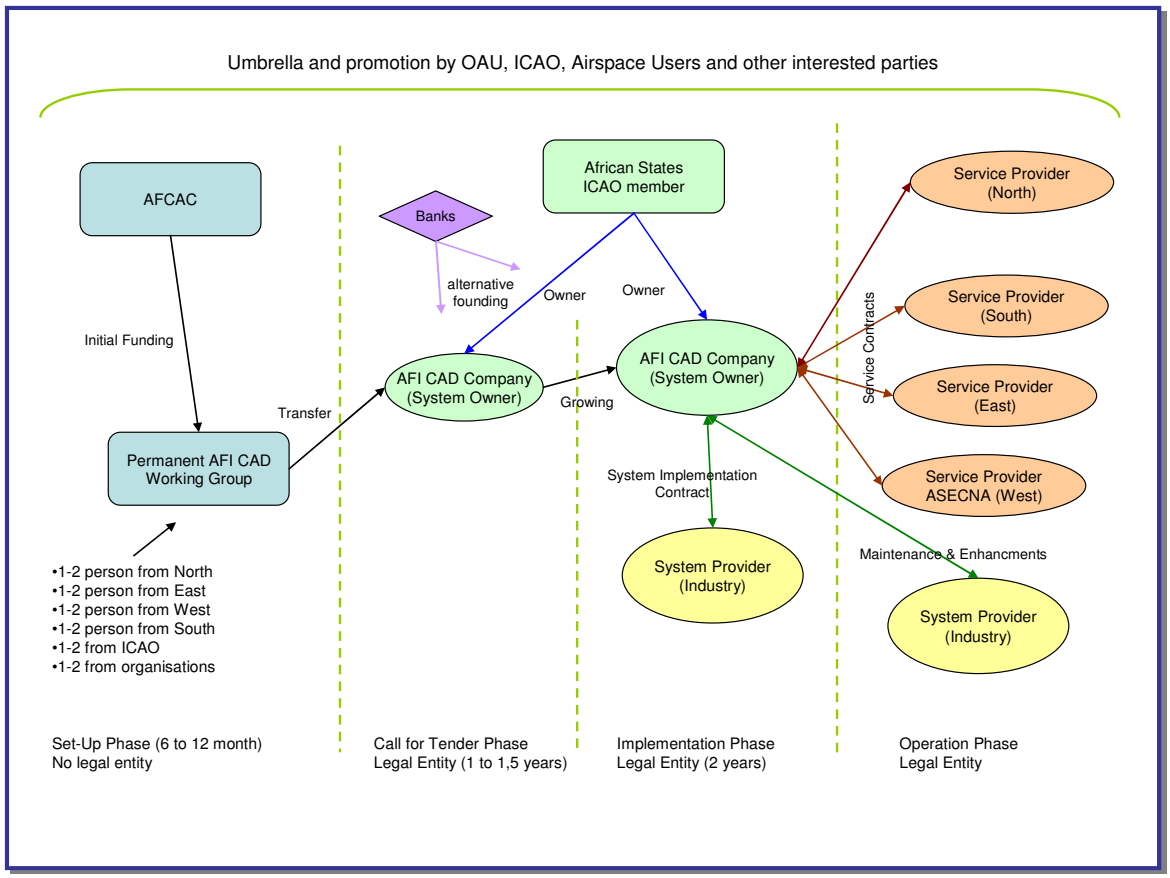

Figure 1: Legal Framework Set-Up

Management

The initially set-up Permanent AFI CAD Working Group (Program Team) will grow over the time (cf. Figure 1). It is important to set-up a team which understands the process from initial schedule and applicable documentation planning, making working plans including initial principle thinking about procurement and call for tender preparation. The team members need to be aware with the latest ICAO developments and need operational know and experience in the Aeronautical Information areas. The team needs founding and the right composition of representatives. The representatives shall represent:

1. the four indented areas of responsibility (North, West, East and South),
2. the three intended language groups (Arabic, English, French),
3. ICAO HQ, and ICAO AFI,
4. Organisations in a position to contribute.

Initially the team can be set-up by ICAO AFI but as soon as the procurement agency is inaugurated the team shall be responsible to that entity.

The responsibility of the Permanent AFI CAD Working Group (Program Team) shall cover the following ten principle phases:

1. Preparation Phase,
2. Set-Up Phase,
3. Call for Tender Preparation Phase,
4. Call for Tender Phase,
5. Contract Negotiation Phase,
6. System Implementation Phase,
    a. Each Area/Centre (North, east, South, west) can follow a separate Implementation Plan,
    b. Those Phases can move in parallel,
7. Service Implementation Phase,
    a. Each Area/Centre (North, east, South, west) can follow a separate Implementation Plan in conjunction with the system implementation,
    b. Those Phases can move in parallel,
8. Service Migration Phase,
9. Operation Phase (System and Service),
10. Maintenance and Enhancement Phase.

The methodology to organise this process shall be according to the V-Model ® XT[14]. This model is used by the German Government for all its civil and military procurements of software products and systems. The V-Model is designed as guidance for planning and executing development projects, taking into account the entire system life cycle. It defines the results to be achieved in a project (or program) and describes the actual approaches for developing these results. In addition the V-Model specifies the responsibilities of each participant. Thus, the V-Model describes in detail, "who" has to do "what" and "when" within a project.

These standardized, methodical guidelines permit a systematic execution even of complex and extensive projects. Thus, projects get more planable, traceable and lead to high-quality results with greater reliability, which is advantageous for acquirer and supplier.

The cooperation between acquirer and supplier is an essential factor of success. Thus, it is regulated by the V-Model. The responsibilities of both sides are specified. Thus, the V-Model standards are an important basis for contracts between acquirer and supplier. In addition, the V-Model improves the comparability of Offers.

Thus, the V-Model can be used as basis for contracting, as process guidance and as basis of communication.

The big advantage of the V-Model is that it includes a process of tailoring the model for specific needs like the AFI CAD procurement. The V-Model is fully documented in PDF and HTML in English and German language, is available free of charge and includes electronic Java based tools for tailoring, customisation, document generation. The V-Model uses free Open Source Editors (Open Office) but the documents are also compatible to commercial editors like Microsoft Word.

The V-Model also contains the procurement cycle in total which is a big advantage for the AFI CAD as the modelled procurement rules can be considered in setting up the AFI CAD program even when the procurement entity is not yet know.

Important for the AFI CAD is the fact that the organisation who will finally issue the call for tender is not yet existing. This means that the process needs to cover, from the professional point of view, nevertheless all phases including Set-up Phase, Tender Preparation Phase until Maintenance Phase and not only identifying user requirements. This is necessary in order to have a holistic approach to the methodology of the whole program process. If a mapping of the chosen methodology and process to a other methodology and process is needed at the end because of legal and/or liability requirements, then the mapping shall be done in total and not only for a limited part. However, when the whole process is chosen at the beginning of the work then it is very likely that the work can be re-used in total.

The phases will need to be executed basically in sequence where the work result of one phase is the prerequisite for beginning the next phase. To support the phases the team will need to compile the following documents because of its size and complexity from the beginning.

The minimum set of Documents could be viewed as follows in Table 2:

No	Doc Group	Doc Title	Audience	Priority
1.1	Planning and Control	Program Manual	Internal	-
1.2		Program Plan	Internal	High

[14] According to paragraph 4.4 of AFI-CAD Study Group Meeting No. 2 Report

No	Doc Group	Doc Title	Audience	Priority
2.1	Requirements and Analyses	Program Proposal	Internal	High
2.2		Legal Framework of the operation of the AFI CAD	Internal	High
2.3		Operational Concept	External	High
2.4		Requirements Specification Overall Project	External	High
2.5		Requirements Evaluation	External	-
2.6		Service Provision Requirements	External	High
3.1	Acquisition and Contracting	RFP Concept	Internal	High
3.2		Criteria Catalogue for Assessment of Offers	Internal	-
3.3		Request for Proposal	External	-
3.4		Offer Assessment	Internal	-
3.5		Contract	External	-
3.6		Contract Addendum	External	-
3.7		Statement of Acceptance	External	-
4.1	Configuration and Change Management	Problem Report - Change Request	External	-
4.2		Change Status List	Internal	-
4.3		Problem Change Evaluation	Internal	-
4.4		Change Decision	External	-

Table 2: AFI-CAD Program Documents

The documents marked in the Audience Column as "Internal" are important for setting up the internal process of the procurement team, the documents marked "External" need to be sent to the potential bidders during the tender process or to be used during program execution process. The documents marked in the Priority Column as "High" shall be developed in parallel to the Requirements Specification.

The documents with no priority shall be developed when the process for the set-up of the AFI CAD is more settled.

Ownership

It is very important that all stakeholders and representatives of the intended AFI areas are taking ownership in the idea of the AFI CAD at the earliest possibility. This means that those areas shall be formed as first provisional step very soon. Otherwise a real ownership and representation is not easy to achieve. If a program team starts working without representing the intended areas of responsibility and being not from the language groups' then special care needs to be taken by regular interviews and presentations to allow the areas to follow along the preparation of the concept and documents and to ensure input.

Timeline and Major Milestones

The Timeline and Schedule for setting up and implementing the AFI CAD need careful planning because of its complex legal, organisation, technical, and political nature.

The Timeline and Schedule needs to be divided into phases which contain well defined and clear working packages each with clear:

1. pre-requisites (required input),
2. term of references (statement of work),
3. requested output (result).

This is needed to be able to decide at the end of each phase what the next steps which can be initiated are.

The Timeline and Schedule will be influenced by existing planning and timelines of the major stakeholders. This needs to be reflected during planning. The contents of the phases can be described as follows in Table 3:

No	Phase	Contents	Result/Deliverable
1	**Preparation Phase**	• Program Plan • Schedule • Gather interest by State • Document Concept	• AFI CAD Study Group presents work result to APIRG/16 • APIRG/16 inaugurates Permanent AFI CAD Working Group (CADWG)
2	**Set-Up Phase**	• AFCAC plans AFI CAD meeting • Discussions with AFDB about financing • States deciding about financing • CADWG finalises documentation concept • Legal establishment of AFI CAD Company (Service Provider Company - SPC)	• State Groupings (North, East, South, West) are fixed • Legal frame are finalised • Service Provider company (SPC) are founded • CADWG gets part of the Service Provider company • Financing agreed with AFDB
3	**Call for Tender Preparation Phase**	• SPC prepares Call for Tender based on the CADWG documentation • SPC develops pre-qualification criteria • Call for pre-qualification • Assessment companies/consortia which have interest to be pre-qualified	• Call for Tender finalised • Publication of Call for Pre-Qualification • Decision on list of pre-qualified companies/consortia • International Call for Tender published (either by SPC or AFDB)
4	**Call for Tender Phase**	• Call for Tender • Public clarification meeting with interested bidders • Tender Closing • Development of the list of shortlisted bidders • Individual clarification with shortlisted bidders • Call for provisional final offer from shortlisted bidders • Decision about preferred final bidder • Call for definitive final offer from preferred bidder	• Decision about preferred bidder (company/consortia)
5	**Contract Negotiation Phase**	• Negotiation of system and service contract	• Signed System Contract • Signed Service Contract
6	**System Implementation Phase**	• Area/Centre 1 implementation • Area/Centre 2 implementation • Area/Center 3 implementation • Area/Center 4 implementation • System Training and Training Centres implementation	• Each Area/Centre (North, East, South, West) separate implementation schedule acceptance
7	**Service Implementation Phase**	• Service implementation Area/Centre 1 • Service implementation Area/Centre 2 • Service implementation Area/Centre 3 • Service implementation Area/Centre 4 • Service Training	• Each Area/Centre (North, East, South, West) separate service acceptance
8	**Service Migration**	• Service migration Area/Centre 1 • Service migration Area/Centre 2 • Service migration Area/Centre 3 • Service migration Area/Centre 4	• Operational usage (cut over) separate for each Area/Centre
9	**Operation Phase (System and Service)**	Operation of the System and delivering the service	AIS Services
10	**Maintenance and Enhancement Phase**	• Identification of changes • Decision about changes • Implementation of changes	Acceptance of System and Service changes

Table 3: AFI CAD Program Phases

The contents description of the Phases needs continuous reassessment.

The timeline covers about the next four years 2010 to 2014 until the first Centre/Area could move into operational use. Figure 2 gives an overview.

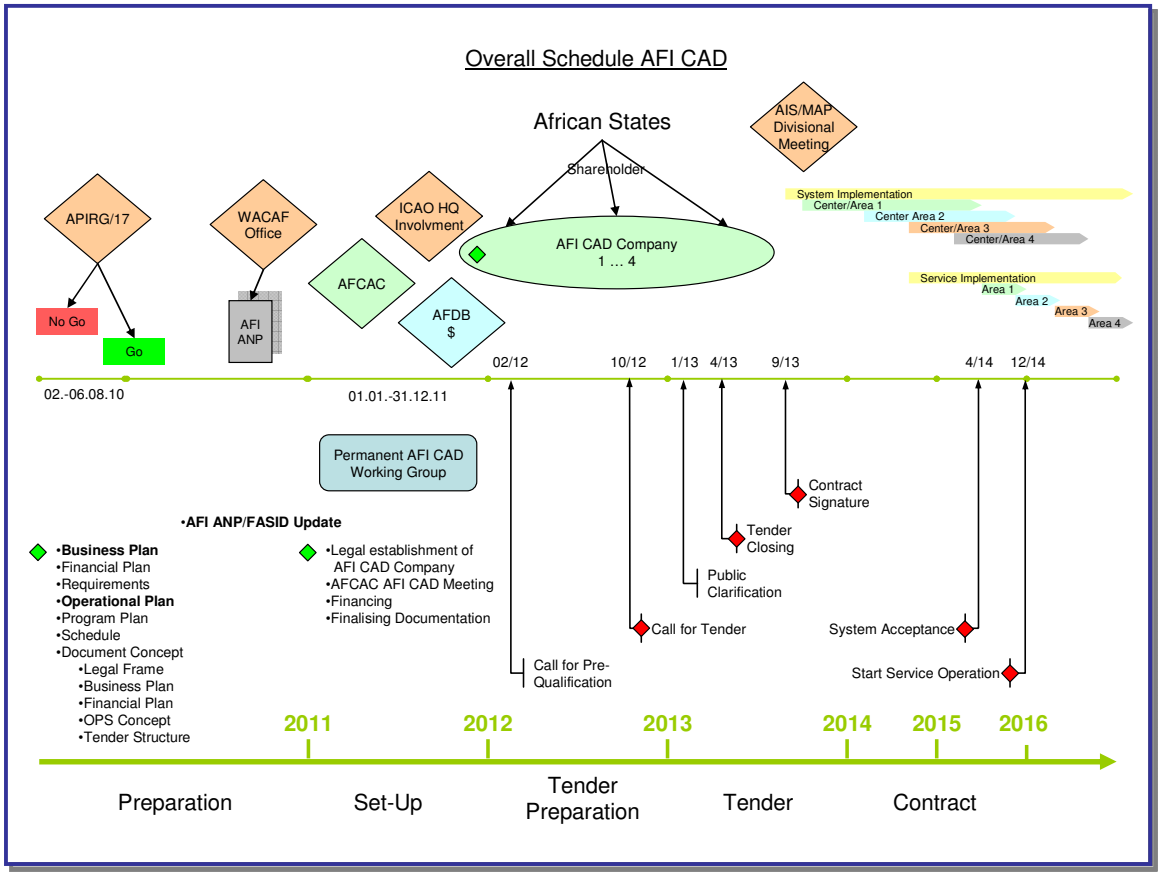

Figure 2: Timeline/Major Milestones

To meet the Timeline depends mostly on the agreement about the AFI CAD Company (Service Provider Company) and the financing.

Organisational Options

Existing International Cooperation's and International Operating Agencies need to be taken into consideration as nucleuses for the AFI-CAD as those have experience in international working relationships for air navigation service provisions.

The Agency for Air Navigation Safety in Africa and Madagascar (ASECNA) is an recognised International Operating Agency of Air Navigation Services[15],) and the Roberts FIR Organisation is an recognized International Cooperation in the frame of an sub-regional activity[16].

In the coming discussions and the Set-Up Phase the position of ASECNA and Roberts FIR Organisation shall be exploited and it could be assessed how the experience of ASECNA and the Roberts FIR Organisation can be leveraged for the AFI CAD.

Both are possible candidate to operate one of the Operation Centres and/or Training Centres because they have experience in working based on agreements for the mutual benefit.

From this perspective it is necessary to discuss the area of responsibility of the East, North, South, and West centre in the not so far future. A possible initial idea is shown in Figure 3[17].

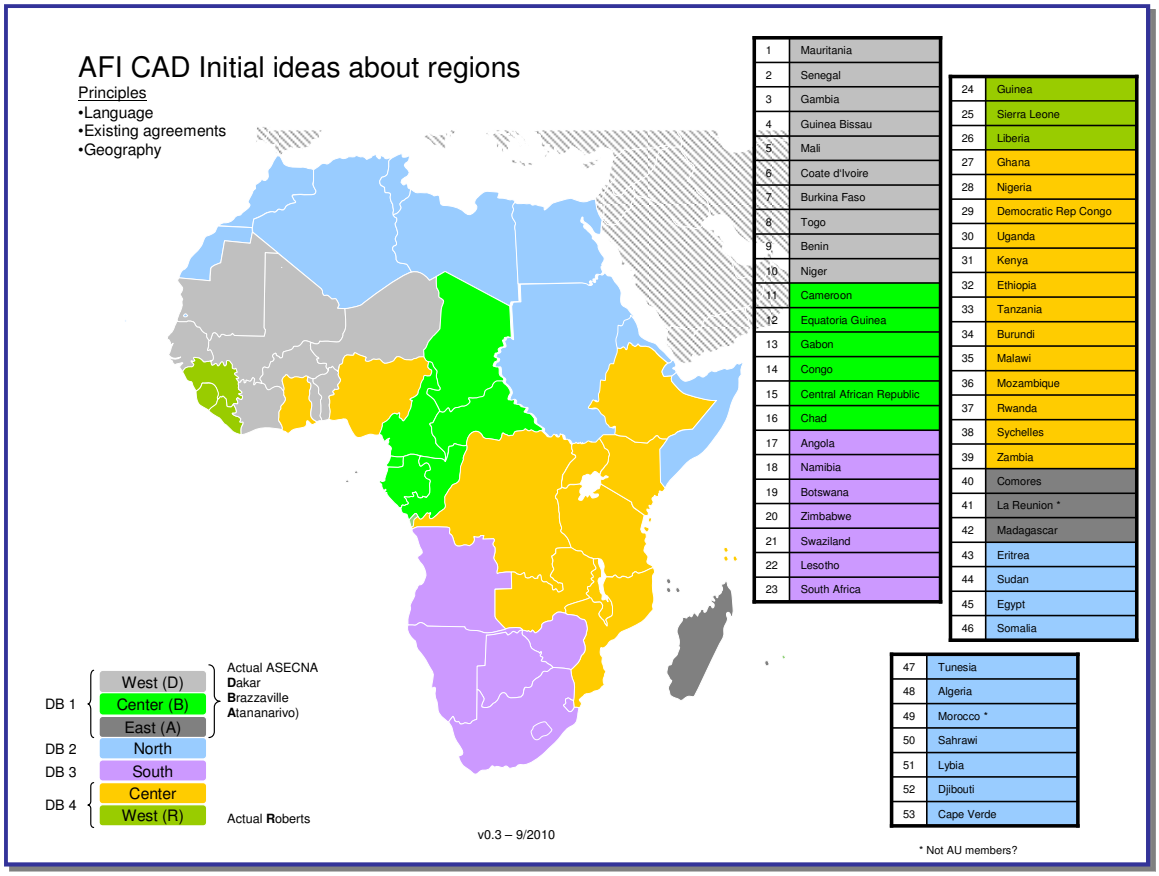

Figure 3: AFI-CAD Initial Regions

AFI-CAD Focal Points

The future coordination of AFI-CAD through the whole AFI Region requires continues coordination and

[15] See ICAO Global ANP (Doc 9750-AN/963), 3rd Edition – 2007, page App D-7 and D-8
[16] See ICAO Global ANP (Doc 9750-AN/963), 3rd Edition – 2007, page App D-5.
[17] Reference AFI-CAD Study Group Meeting No. 3

ownership in each state who is interested to participate. Therefore eac stae shall appoint a Focal Point as contact for the ICAO WACAF Office and later for the Project Team.

5 - FINANCIAL PLAN

Business Model

The classical business model requires defining of the Value Proposition, the Added Value and the Earnings of the AFI CAD. In the non profit environment of cost recovery of the ICAO model, in which the AFI CAD shall be operated, the cost planning is very important.

The Cost assessment can be done generally in the following structure:

1. Identification of direct set-up cost (set-up phase, funding by AFCAC),
    a. Setting up the legal structure according to Figure 1,
    b. Office, management, specialists from regions, administration,
    c. Writing the concept, preparing the documents (cf. 0),
2. Identification of the Call for Tender Cost (company operating cost, e.g. Ltd.),
    a. Company cost structure planning: personnel cost, infrastructure cost, travel, etc.,
    b. Personnel cost (staffing) related to the Call for Tender planning,
    c. Co-financing by banks possible (e.g. loan),
    d. Planning of the budget for the:
        i. Systems Contract, including training centres,
        ii. Service Contract, including training (Operating cost at 10 years),
        iii. Maintenance and Enhancement (10 years).
3. Identification of Implementation Phase cost (company operating cost),
    a. Company cost structure planning: personnel cost, infrastructure cost, travel, etc.,
    b. Personnel cost (staffing) related to the Call for Tender planning,
    c. Co-financing by banks possible (e.g. loan),
    d. Re-planning/update Operation Phase:
        i. Systems Contract, including training centres,
        ii. Service Contract, including training (Operating cost at 10 years),
        iii. Maintenance and Enhancement (10 years).
4. Update of Operation Phase cost.

The Business Cost Model is the basis before doing the next steps. It forms the basis for the set-up. It will need to be shown that the capital needed to cover the cost will bring earnings. There for the Value Proposition, the Added Value and Earnings will be carefully developed. Also non financial advantages which can not be valued in cost advantage for users shall be identified and described.

Value Proposition

The Value Proposition for the AFI CAD is probably the most important part for the users of the AFI CAD. Examples for the Value Propositions are:

1. electronic aeronautical data, obstacle data, terrain data from one source,
2. single access point,
3. consistent data,
4. online availability,
5. higher availability of services,
6. better quality,
7. etc.

The Added Values of the AFI CAD for the African States are for instance:

1. Sharing of cost,
2. Sharing of know,
3. Harmonisation of planning and work,
4. Better trained personnel,
5. etc.

Earnings

The Earnings of the AFI CAD for the African States are for instance:

1. Cost saving through common operation,
2. Cost saving through common training,
3. Cost saving through common procurement,
4. May be later selling of additional service as far as ICAO's Policies on Charges for Air Navigation Services allows this.

Joint Financing

Aeronautical Information Services (AIS) fall by definition under "Air navigation services" in sense of Charges[18]. Therefore the ICAO Manual on Air Navigation Services Economics (Doc 9161) is applicable for identifying the cost for AFI CAD. The organisational and international cooperative aspects of Appendix D to the Global Air Navigation Plan (Doc 9759) shall be taken into account as the AFI-CAD:

1. will be an multinational facility and service implementation,
2. will need an international operating agency,
3. will need an joint charges collecting agency,
4. will need joint financing arrangements.

[18] See ICAO's Policies on Charges for Airports and Air Navigation Services (Doc 9082/7), Appendix 3.

The AFI CAD activity is therefore full in line with Assembly Resolution A35-14, Appendix X, where Sates are expected to give consideration to cooperative efforts for introducing more efficient systems and services.

Current Cost

It was planned to identify the current cost of the AIS operations in all AFI countries by means of a questionnaire[19], which was sent by the WACAF Office to all 53 countries and territories. The reply from countries was not sufficient to determine the current costs.

In order to identify the current cost an awareness campaign shall be initialised and the current costs shall be then collected by means of telephone interviews using the same questionnaire as for State Letter. The questionnaire is reproduced in Annex D).

ICAO Approach

For the further work on the Financial Plan the Appendix E "Cost-Benefit and Economic Impacts" and Appendix F "Financial Aspects" of the ICAO Global ANP (Doc 9750-AN/963, 3rd Edition 2007) shall be used as guidance material by the Program Team.

The text below from 0to 0is therefore heavily taken from this document and tries to relate the ICAO approach to the AFI-CAD where it seems to be relevant.

Cost- Benefit Methodology

The cost-benefit analysis is used to estimate the economic viability of the planned AFI CAD investment project, i.e. the extent to which the total benefit from the investment exceeds the total cost. The AFI CAD is complex and consists of a package of investments. Measures of the viability of the new investment package (the project case) are based on a comparison with the existing systems (the base case). The existing systems are defined to include their normal and expected maintenance and possible development over the planning horizon. The new facilities replace the existing facilities, and as the latter are phased out, the reduction in their costs can be regarded as benefits from installing the new systems. The most important benefits of the AFI CAD are the cost reductions from more efficient flight operations, reduced flight times, and enhancing safety and security which are expected to emerge as AFI CAD is implemented.

A rigorous approach to developing a measure of the expected economic performance of an investment project is the net present value (NPV) or life-cycle approach, which focuses on the annual flows of costs and benefits (cash flows) related to the project. The costs and benefits in cash flow terms are not distributed evenly over time. Typically, there are large capital expenditures in the early years of a new project followed by many years of benefits, and also of operating and maintenance costs. There could be significant costs during the period of transition from the existing to the new systems, and these must be included in the analysis. The benefits will normally be in the form of cost savings. The net benefit in each year is equal to the sum of all the benefit items minus the sum of all the cost items expected in that year. The NPV (i.e. current year capitalized value) of the stream of net benefits (net cash flows) can be determined by a process of discounting the future cash flows. This process takes into account the effect of the rate of interest on the present value of each future cash flow.

Estimation of the future flows of the costs and benefits, and hence the NPV associated with the implementation of the AFI CAD requires many assumptions about the prices and quantities of communications, equipment, services, and about the amount of potential savings in aircraft operating costs. Therefore, there is an element of uncertainty and risk in the NPV results. The

[19] State Letter WACAF Office T2/8.1 - 0309

financial risks can be appreciated by studying the effects on the NPV estimate resulting from changes in the assumptions. A particularly important assumption is that the transition to the AFI CAD by the AFI CAD provider and its owners (the AFI States) and aircraft operators occurs in a coordinated fashion so that net benefits are maximized.

Comprehensive guidance material to assist States in carrying out cost-benefit studies of the implementation of CNS/ATM systems was made available by ICAO in relation of Economics of Satellite-based Air Navigation Services in Circular 257. This circular focuses on the NPV methodology, which is widely recognized and used by financial institutions such as those potentially involved in funding AFI CAD.

Business Case Evaluation

The development of a business case for the implementation of the AFI CAD systems by a service provider or an operator (owned by the AFI States) involves taking the financial cost-benefit analysis a step further. In particular, changes in revenues resulting from changes in the price of the product/services sold must be taken into account. It is generally expected that the AFI CAD systems will facilitate reduced operating costs and a lower price for the service provided. From the point of view of a specific organization, assessment of the net financial impact, in present value terms, must include not only the implementation cost and operating cost savings, which are included in the cost-benefit analysis, but also consequent changes in revenues.

For a service provider, a business case evaluation must include the impact on revenues of changes in charges associated with the implementation of the AFI CAD systems. Assuming that the AFI CAD service provider is an autonomous organization (owned by the AFI States) operating on a commercial basis and is currently covering its costs with the present technology systems, the basic issue is for the service provider to be satisfied that the changes in revenues expected from the planned changes to AIS charges will match the net change in costs, measured by the cost-benefit analysis. However, if the relationship between costs and revenues is not being monitored (e.g. if costs are met from the government budget and revenues are treated independently as general government revenues), then the AFI CAD services are not being provided on a commercial basis. Even in these circumstances it is recommended that a business case evaluation be conducted to assess the financial impact of the new systems on the service provider.

For an airline and other airspace users, a business case evaluation would include, among other factors, assumptions about the impact on its costs of expected changes in route charges and operating costs and the impact on revenues of changes in airline fares and rates or operating cost of other airspace users (like business aviation, military, etc.), where these changes are associated with the implementation of the AFI CAD systems. These impacts are in addition to the direct investment costs and operating cost savings attributable to the new AFI CAD systems and identified in the cost-benefit analysis described above.

The AFI-CAD Program Team will use the ICAO CNS/ATM Business Case Analysis Tool (DFACS)[20] to assist the current cost collection.

[20] ICAO Catalogue 2007, CD-109.

The ICAO Africa-Indian Ocean Regional Traffic Forecasts, 2004–2020. (Doc 9879) will be considered as input to the Financial Model to underline the necessity to build the AFI CAD. This report contains long-term air traffic forecasts for the major route groups to, from and within the Africa/Indian Ocean area, in terms of both passengers and aircraft movements. It also contains movement forecasts at city-pair level for the top 25 city-pairs and an analysis of the year 2005 FIR traffic data for the airspace controlled by ASECNA including various peak period parameters. This Traffic Forecast will be used as an indicator for the rollout plans and stepwise coverage of the AFI CAD.

Other Economic Effects

States may be interested in the broader economic and social impact of the AFI-CAD systems as well as the financial viability of the new systems. For example, implementation of the new systems should produce passenger time savings, improve safety, produce environmental benefits and may also lead to some industry restructuring and changes in skills required.

CNS improvements, which produce benefits for ATM such as more direct flight paths and less delay from airspace congestion, will reduce the passenger travel time for a given journey. If passengers value these time savings, they represent an additional benefit.

An understanding of the contribution of air transport to general economic activity can increase the political commitment to the process of transition to the AFI-CAD systems. National accounting and industry data and employment surveys may be used to determine the share of air transport in total economic activity and its importance as an employer. The input/output tables of a State's national accounts can illustrate the interrelationships among the various elements of the air transport industry and other industries and economic sectors. Other industries purchase air transport services or supply products and services to the air transport industry. From a national or regional economic planning perspective, it is especially important to appreciate the role of air transport in generating employment and incomes and in supporting other non-aviation economic activities. This will put into perspective the value of supporting and investing in state-of-the art national and regional air transport facilities.

Summary of Economic Effects of CNS/ATM

1. Financial benefits and lower fares and rates,
2. Improved safety,
3. Passenger time savings,
4. Environmental benefits,
5. Transfer of high-tech skills,
6. Productivity improvements and industry restructuring,
7. Higher traffic and stimulation of related industries.

ICAO Policy on Cost Recovery

Whatever approach is taken by a State or group of States collectively to provide the AFI-CAD systems services within the airspace for which responsibility has been assumed, the resultant cost recovery through charges must be in conformity with basic ICAO policies on charges for airports and air navigation services. This policy is contained in Article 15 of the Chicago Convention and is supplemented by ICAO's Policies on Charges for Airports and Air Navigation Services (Doc 9082/7). The implementation of the AFI CAD systems should not require any basic changes to that policy.

The Statement of ICAO Policy on CNS/ATM Systems Implementation and Operation, approved by the ICAO Council in March 1994, addresses cost-recovery as follows: "In order to achieve a reasonable cost allocation between all users, any recovery of costs incurred in the provision of

CNS/ATM services shall be in accordance with Article 15 of the Convention and shall be based on the principles set forth in ICAO's Policies on Charges for Airports and Air Navigation Services (Doc 9082), including the principle that it shall neither inhibit nor discourage the use of the satellite-based safety services. Cooperation among States in their cost-recovery efforts is strongly recommended."

In ICAO's policies set out in Doc 9082, the following four general principles should particularly be noted with regard to CNS/ATM systems:

in paragraph 36, " . . . as a general principle, where air navigation services are provided for international use, the providers may require the users to pay their share of the related costs; at the same time, international civil aviation should not be asked to meet costs that are not properly allocable to it . . .";

paragraph 38 i), "The cost to be shared is the full cost of providing the air navigation services, including appropriate amounts for cost of capital and depreciation of assets, as well as the costs of maintenance, operation, management and administration";

in paragraph 38 ii), "The costs to be taken into account should be those assessed in relation to the facilities and services, including satellite services, provided for and implemented under the ICAO Regional Air Navigation Plan(s) . . ."; and

in paragraph 47, ". . . the providers of air navigation services for international use may require all users to pay their share of the cost of providing them regardless of whether or not the utilization takes place over the territory of the provider State."

Particular attention also needs to be given to the following principle in paragraph 41 iii) of Doc 9082: "Charges should be determined on the basis of sound accounting principles and may reflect, as required, other economic principles, provided that these are in conformity with Article 15 of the Convention on International Civil Aviation and other principles in this document. The application of economic principles to setting charges which are consistent with ICAO's policy should emphasize the need to recover costs in an efficient and equitable manner from the users of air navigation services. Within an economic context, charges should be set to recover costs, provide a reasonable return on investment where appropriate and provide additional capacity when justified."

In ICAO's policies on charges, pre-funding of projects is considered as a possible source of financing and the following policy guidance is included in paragraph 42 of Doc 9082: "notwithstanding the principles of cost-relatedness for charges and of the protection of users from being charged for facilities that do not exist or are not provided (currently or in the future) that, after having allowed for possible contributions from non-aeronautical revenues, pre-funding of projects may be accepted in specific circumstances where this is the most appropriate means of financing long-term, large-scale investment, provided that strict safeguards are in place, including the following:

(i) Effective and transparent economic regulation of user charges and the related provision of services, including performance auditing and "bench-marking" (comparison of productivity criteria against other similar enterprises).

Comprehensive and transparent accounting, with assurances that all aviation user charges are, and will remain, earmarked for civil aviation services or projects.

Advance, transparent and substantive consultation by providers and, to the greatest extent possible, agreement with users regarding significant projects."

Cost Determination

Charges for the AFI CAD systems services should not be imposed unless these services are actually being provided according to the regional ANPs concerned. Consequently, it is important that

regional plans be promptly amended to incorporate the AFI-CAD once the States involved have agreed that the element(s) should form part of the plan or plans concerned.

The regional ANPs should provide a schedule for the phase-out of facilities made redundant by the provision of the AFI-CAD systems services. This is also of major importance because significant financial benefits from AFI-CAD systems implementation will not be realized if the facilities and services made redundant continue to be listed in the regional plans and charged for.

As AFI CAD systems components are implemented, the costs are added to the costs of the AFI CAD multinational system and service cost base for charges.

From an organizational viewpoint, it is important, with regard to cost recovery of the AFI CAD system and services costs, the States concerned should assign, to one entity, the responsibility for ensuring that the costs attributable to the provision of AFI CAD systems and services by the different entities in the States are included in the cost basis for any cost-recovery programme or mechanism. This assignment can be made to the AFI CAD services provider.

Costs, in the form of payments made by a State to the service provider offering AFI CAD systems services, will need to be allocated amongst the different participating States, which are potential, all AFI States. That, in turn, will require an agreement between the parties concerned as to how such an allocation should proceed. Assuming a uniform level of service, such allocation could be based on either distance flown or the number of flights in the airspace for which each State has accepted responsibility, or others. Both are viable options. Distance flown would offer more precision while using number of flights as the basis would be simpler to administer. Other schemas could relate number of airports to be provided or similar.

Cost Recovery during Development and Implementation

One particular issue that needs to be addressed in the implementation of the AFI CAD systems is the treatment of costs and cost recovery during the three initial stages: (1) Set-Up Phase, (2) Call for Tender Phase, (3) Implementation Phase.

The implementation of the AFI CAD systems will, in many cases, lead to the retirement of existing AIS facilities before the end of their economic life. In such circumstances, the balance of the undepreciated portion of the facilities concerned could be included in the cost basis for charges. The same procedure could apply to such costs that may be incurred because of premature retirement or training of personnel made redundant by the implementation of the new systems. Such costs, however, should be limited to termination settlements, costs attributable to early retirement and costs of retraining and/or relocation. These costs could be capitalized and thereafter written off gradually, with the portion written off each year being included in the cost basis for charges. These factors would need to be taken into account in any related cost-benefit analysis or business case study.

Consultation with Users

Particular attention should be drawn to Doc 9082, paragraphs 49 to 51, and the emphasis placed on (direct) consultation with users regarding increased or new air navigation services charges, where AIS charges are part of it; and also on users being consulted as early as possible when major air navigation services are being planned. This would call for such consultations to be carried out when plans are being developed for the implementation of the AFI CAD systems.

The involvement of IATA can be leveraged for this.

Financing Plan

The purpose of the financing plan is to provide basic information as follows:

(i) estimates of the element costs (labour, materials, equipment, etc.) of each distinct part of the overall project;

(ii) the funds required to make disbursements at various stages in the project's progress;

(iii) the currencies in which payments are to be made; and

(iv) the sources from which the funds are to be forthcoming, whether from:

a. sources generated by the entity providing the AFI CAD services from its operations, which would primarily include user charges, and possibly retained earnings, but could in some circumstances also include contractual payments; or

b. other sources, including information on the applicable conditions, i.e. interest rate, repayment period, etc.

Also to be emphasized is the importance of the availability of data showing the financial situation of the air navigation services provider over recent years, as well as anticipated developments over the period of debt repayment. Of particular relevance is the recording of revenues and expenses by major item. Estimates regarding future financial developments would emanate from budgets and longer-term financial plans. In the absence of such financial data, it would be much more difficult to decide whether or not the loan or financing sought should be granted and, if so, what terms should be offered.

Sources of Financing

A survey of potential sources of funds and which of them to approach should be done as early as possible in the planning process. Potential sources of funds will vary considerably from project to project and State to State. The sources to be approached should be studied and decided upon individually for each project and could be grouped as follows: direct contributions from government(s); loans or debt financing; internally generated resources; equity financing; and leasing.

Direct Contributions from Governments

The extent to which direct contributions will be required from the government depends on a number of factors. Chief among these is the organizational form under which the AFI CAD systems services will be provided, i.e. will the government be directly involved, either alone, or in a joint effort with other governments, or will it primarily involve a commercial corporation? Yet another factor is whether the traffic volume within the airspace concerned is sufficient to support the AFI CAD systems component in financial terms, including servicing debt.

For most States, the foreign sources of financing are principally government operated. Such foreign financing may be available from foreign governments in the form of loans negotiated directly with the government of the recipient country or may otherwise be facilitated by particular agencies of government which have been established for the primary purpose of promoting the nation's export trade. Of particular importance among the possible sources of foreign financing available to developing States are the international banks and funds that have been established to assist in the financing and execution of projects promoting national economic development.

Project costs payable in foreign funds constitute a demand on the State's reserves of foreign exchange and as such their financing will usually have to be arranged through or with the approval of the appropriate government authorities. Nevertheless, foreign sources should always be explored as a matter of course, since financing may be available from them on more favourable terms than those obtainable from domestic institutions (e.g. lower interest rate, repayment over a longer period). However, there are also some risks involved in foreign exchange, such as currency fluctuations.

Debt Financing

The feasibility of debt financing will depend on whether the traffic to be served by the AFI CAD systems to be financed is of sufficient volume and strength to service the debt, including interest and repayment of capital. Where an international agency or corporate entity would be providing basic AIS systems services, its costs of financing could be reduced if the States for which the basic services are being provided were to guarantee the servicing and repayment of the loans concerned. This in turn should reduce the costs to be recovered from these user States.

Internally Generated Resources

Depreciation and retained profits from the operation of air navigation services may become a supplementary source of financing for the AFI CAD systems facilities. However, with regard to profits, an important qualification that needs to be recalled is the principle outlined in Doc 9082, paragraph 38:

> "Air navigation services may produce sufficient revenues to exceed all direct and indirect operating costs and so provide for a reasonable return on assets (before tax and cost of capital) to contribute towards necessary capital improvements."

Reference should also be made to the text on pre-funding of projects in 0 of this document.

Equity Financing

Equity financing may be a viable alternative in some instances. For example, if the AFI CAD systems services were acquired under contract from a commercial service provider, that operator could finance the investment required partially or completely through increased equity.

Leasing

Leasing rather than outright ownership could become an important alternative in the AFI CAD systems and service provision. The possibility could also be explored of applying leasing to local units at AFI CAD Centres, possibly through the establishment of leasing companies, which would operate in a manner similar to those purchasing and leasing out, for example, computer systems, communications systems and/or others under long-term leases.

Summary

The aspects of the financial plan have been included in this extend in the Business Plan as the Current Cost collection and subsequent financial planning needs still to be done after the Questionnaires in Annex D) are returned respectively the interviews have been finalised.

6 – BENEFITS AND DISADVANTAGES

Benefits

Benefits have been presented in 0 under Other Economic Effects.

Disadvantages / Risks

Disadvantages as such have not been identified until now.

Potential risks associated with the AFI-CAD undertaking are:

a) **Investment risks,**

b) **Legal complexity,**

c) **Organisational complexity,**

d) **Technical complexity,**

e) **Non availability of sufficient human resources.**

7 - ACTION PLAN

The following actions shall be taken by the responsible parties.

No.	Action	Responsible	Deadline	Remarks
1	Return of the questionnaires in Annex D	States	31.10.10	
2	Participation in the cost interviews	States	31.10.10	
3	Appointment of the Focal Points	States	30.11.10	
4	Finalisation of the Business Plan with APIRG/17 input	Consultant	30.09.10	
5	Finalisation of Financial Part after input from the cost questionnaire	Consultant	20.12.10	
6				
7				

Table 4: Action Plan

8 - SUMMARY AND CONCLUSION

The AFI-CAD Business Plan summarises the Requirements and all planning and management activities for AFI-CAD. It shall form a living document to be used by the Program Team and updated on a regular basis until the Program Team has established the Project Manual mentioned in paragraph 0.

9 – APPENDIXES

List of Abbreviations

Abbreviation	Explanation
Empty in this version	

List of Literature

To be added.

List of Figures

List of Tables

ANNEX A) REQUIREMENTS SPECIFICATION OVERALL PROJECT

The Requirements Specification is provided as a separate Annex to this document under “AFI-CAD Doc 008”.

ANNEX B) AFI-CAD GUIDANCE MATERIAL

The Guidance Material for the establishment of AFI-CAD emanated from the Recommendations of the AFI-CAD/Study Group/1 meeting, subsequently endorsed by ICAO under Conclusion 16/41 of the APIRG/16 Meeting, and further developed by AFI-CAD/Study Group/3 and 4. Consequently, the Guidance Materials are listed herewith in the form of Recommendations as lastly published by Appendix A to the ATS/AIS/SAR SG/11[21] .

Recommandation 1:	**Basic Criteria** The AFI AIS/MAP TF/4 meeting then concluded that : a) whether the service provision is subcontracted or not: i. the service shall at all times be AFI States owned service. The service provider shall ensure the service is at all times perceived and recognized as being an AFI States provided service. ii. the service provision shall be an activity of cost-recovery nature and shall not generate profit on its own behalf (bearing in mind that the AFI CAD facilitates the safety, regularity and efficiency of international air navigation); iii. the service provision shall be subjected to a " trial phase" of operation at the end of which the service may be reviewed if there has been insufficient take-up by clients and/or if the service levels have not been met; iv. all clients' service level agreements shall be between the client and the Agency entrusted by the AFI States. v. the Agency shall not be allowed to sell, trade or commercialize the data and/or services of the AFI CAD on its own behalf and/or profit.
Recommendation 2:	**AFI CAD services** That AFI CAD should provide the following major services: a) the International NOTAM Operation (INO) providing facilities for world-wide NOTAM, SNOWTAM, ASHTAM and AFTN or equivalent message handling and for pre-flight Information Bulletins (PIB) generation. b) the Static Data Operation (SDO) providing facilities for AFI Static Aeronautical Data/information handling and reporting. moreover, a minimum set of data is also maintained to allow the correct functioning of the INO system.
Recommendation 3:	**AFI CAD Clients** That the recommended AFI CAD clients are the following: a) the Data Providers which are AIS Organizations providing aeronautical information to the Centralized AFI Database; b) the Data Users which are Air Transport Community and beyond.
Recommendation 4:	**Proposed AFI CAD System Design** That the proposed AFI CAD System should be designed to provide the following: a) a single repository for aeronautical information and IAIP elements of participating States; b) data questioning enhancement through multilevel consistent data checking processes, including cross border data verification; c) a secure channel/vehicle for timely and efficient electronic

[21] 26-30 April 2010

	distribution of aeronautical information and IAIP elements; d) harmonization and interoperability will be ensured by common and standardized: - System interface and data exchange model (AIXM), - Static data model (AICM).
Recommendation 5:	**AFI CAD System Data Operations Services** That the proposed System Data Operations Services will then provide the Centralized AFI Database clients with the following system services: a) support to edit and provide (to the system) aeronautical information; b) electronic access to and delivery of aeronautical information; c) browsing and downloading of participating State's aeronautical information; and d) generation of reports.
Recommendation 6:	**Access to AFI CAD** That the Data Operations System Services will be accessed by clients via direct electronic interface in one or more of the following three ways: i. The Client Interface terminal (CIT). A terminal located at the client site, connected to the AFI CAD, and allowing download, modification (only by data providers) and reporting of aeronautical information as determined by the clients Service Level Agreement (SLA); ii. The Client Interface (CI). A technical toolkit allowing clients' own systems to access and interact with the AFI CAD to upload, download, modify (only Data Providers can modify) and report aeronautical information as determined by the clients' SLA; iii. INTERNET: Access to the Centralized AFI AIS Data Base will also be allowed via the Internet.
Recommendation 7:	**Development of AFI CAD user requirements specifications** That States and/or Organizations in a position to do so, provide the required technical expertise to assist the Study Group to develop user requirements specifications (URS) for AFI CAD.
Recommendation 8:	**Scope of Services Provided** That : a) Regarding the data operations service domains, the services provided shall ensure: i. Co-ordination of the resolution of data conflicts detected by the system data checking processes ; ii. for non-participating States (world wide) : - NOTAM processing (verification, validation, etc…) - entry of the statistic data required by the system NOTAM function. b) As currently defined, the service does <u>not</u> include the provision of AIS services on behalf of participating States, i.e. the service <u>shall not comprise</u> the following activities : i. creation of NOTAMs ii. origination and publication of AIP, AIP supplements, AIP amendments, AIC and charts.

	c) As part of the provision of the service, the service provider will deliver to the centralized AFI Region AIS Data Base client the following services : i. 24 hour operational and technical help desk ii. Client training iii. Management and monitoring of the delivery of aeronautical information and AIP elements.
Recommendation 9:	**Institutional Arrangements** That AFI States shall: a) Identify or set up an agency to develop, establish and operate the centralized AFI CAD; b) Determine the most effective and appropriate ways of funding, implementing and delivering the service. c) Commit to the timely provision of the required information to the AFI CAD; *Note: This shall not preclude them from providing the same data to other agents and/or entities.* d) Continue to be responsible for providing an AIS singularly or jointly with one or more other States or by delegating the authority for the provision of the service to a non-governmental agency in accordance with Annex 15 of the Chicago Convention; e) Maintain the intellectual property rights for the data provided to the AFI CAD; f) Provide advice and other appropriate support to any administration outside the AFI Region to consider the introduction of an aeronautical information database system compatible with the AFI CAD; g) Promote the use of the AFI CAD by taking active steps to provide appropriate information to the public on the services available from the AFI CAD and encourage the use of the service; h) Define a legal and financial framework to be applied to States participating in the AFI CAD, and non members of the AFI Region States, covering contribution to the funding of the data operations service provision; i) Define a charging policy that: - complies with the principle of free exchange of aeronautical information amongst States AIS, in accordance with Annex 15 of the Chicago Convention; - Continues to allow recovery by States of the costs incurred for the provision of AIS services; - Avoids double charging of the Data Users.
Recommendation 10:	**Suggestions for Financial Model** **a) Business Plan** i. Setup Capital: The business plan to be adopted must define the total set-up costs and where this capital will be obtained (eg Loans, Donations/Aid, State Contributions). Each states responsibility in this regard must be defined and be enforceable in any AFI CAD membership agreement ii. Financial Sustainability: The business plan to be adopted must also define how financial sustainability will be ensured (eg by State Contributions, fees to be charged for access by users, en-route charges, etc). This must also show how continuous improvement and safety monitoring systems will be maintained and funded. iii. Service Provider: The resources that the Service Provider will bring to the

	project must be defined and enforced in the Service Providers contract. It should not be the sole responsibility of the member states or the Agency to fund this project as it should be based on the User/ Beneficiary Pays principle. b) **Financial Plans**: The financial model for AFI CAD as discussed above also needs to address the following operational considerations i. Continuous Operational Cost Recovery: Continuous Operational Cost Recovery must be ensured as a minimum requirement. If this does not occur AFI CAD will not be a viable concern. ii. Cost Benefit Analysis: A Cost Benefit Analysis reflecting the advantages and disadvantages of all business models discussed above needs to be performed before a particular model can be recommended and accepted by AFI CAD member states. iii. Future Cost Benefits: To AFI CAD (eg via provision of services additional to what is presently being provided) will need to assessed to ensure organizational structuring to take advantage of these future benefits.
Recommendation 11:	**Evaluation criteria for the identification of the AFI-CAD Operating Centers:** 1. Geographical Location 2. Communication Infrastructure 3. Sustainability of Economy 4. Political Stability 5. Information Technology – currently available and sustainable 6. Provision of training – Training ability / infrastructure 7. Power supply : – availability – reliability – sustainability 8. Human Resource availability – i. AIM ii. Management iii. Project Management iv. Information Technology v. Training 9. Financial availability / sustainability 10. Previous experience – Track record 11. Common consensus 12. Infrastructure – Buildings 13. Evaluation to be conducted by an International Organization with a proven track record of successfully completing similar evaluations (e.g. ICAO/ United Nations/ EUROCONTROL, etc.)
Recommendation 12:	Introduction of QMS by AFI-CAD States That each contracting AFI – CAD Member State shall take all necessary measures to introduce a properly organized QMS containing procedures, processes and resources necessary to implement the quality management at each function stage. The execution of such quality management shall be in accordance with Annex 15, Chapter 3 paragraph 3.2.1.
Recommendation 13:	Measurement tool for evaluation of AIS Services That Appendix K to APIRG/15 report as per Attachment A to DP/7 be adopted by AFI States as a measurement tool for evaluation of services in order to provide room for improvement and the prevention of non-conformity.

Recommendation 14:	**Framework for development of the QMS** That AFI – CAD member States adopt the template for a project proposal in Appendix XX to Attachment A of DP/7(AFI-CAD/2) as a framework for development of the QMS in terms of defining scope, assessing the potential benefits, continuing the program, determining the roles and responsibilities of those involved in the development and implementation of the QMS, and specifying deliverables, target dates and the resources needed.
Recommendation 15:	**Timelines for the development and implementation of the AFI – CAD** That ICAO would synchronize the most suitable timelines for the development and implementation of the AFI – CAD based on the evolution of events.
Recommendation 16:	**Development of the required training modules** That AFI – CAD through the cooperation with GroupEAD develops the required training modules for AFI-CAD member States.
Recommendation 17:	**Development of the required format of a service level agreement** That AFI – CAD through the cooperation with GroupEAD develops the required format of a service level agreement for the AFI – CAD member States.
Recommendation 18:	**Compilation of the URS Document :** That it is therefore necessary to compile the user and other requirements in one document based on the input from: - the Framework and Guidance Material of the AFI-CAD, as per Appendix H of the APIRG/16 Report, - the EUROCONTROL URS Documents (General, Common Services, Static Data, NOTAM, AIP, Charting), - the AFI States based on a filled Questionnaires (cf. DP/04) to include further AFI Requirements.
Recommendation 19:	**Institutional Framework:** a. Establishment of a supervisory management board composed of Technical Representatives appointed by the Civil Aviation Directors. They should also be empowered to make decisions. b. Appoint a Technical team competitively, to participate in the project processes from its initiation stage to completion, so that all members gain an understanding of the project tasks and objectives c. Appoint Service Provider competitively to develop, implement and manage the AFI-CAD. The Service Provider may also take responsibility for Hardware and Software maintenance
Recommendation 20:	**Procurement Process:** • That the Business plan includes the development of procurement procedures acceptable to participating member states. • That the Business Plan includes the development of a logical acquisition system, which would include an efficient and transparent procurement process for implementation of the AFI-CAD • That participating states should ensure that the procurement is done in a transparent manner acceptable to the participating states.

Recommendation 21:	**Location of AFI-CAD** That the Technical Board should determine the centre and sub-centers location subject to the agreed set criteria listed in Recommendation11 . There is need to take into account the geographical locations and requisite infrastructure currently available.
Recommendation 22:	**Realization of the AFI-CAD** That in order to realize the maximum benefits of the AFI Region centralized AIS Database all AFI Region States need to fully participate in its development, implementation and operations.

ANNEX C) V-MODEL PROCESS FOR ACQUIRER AND SUPPLIER

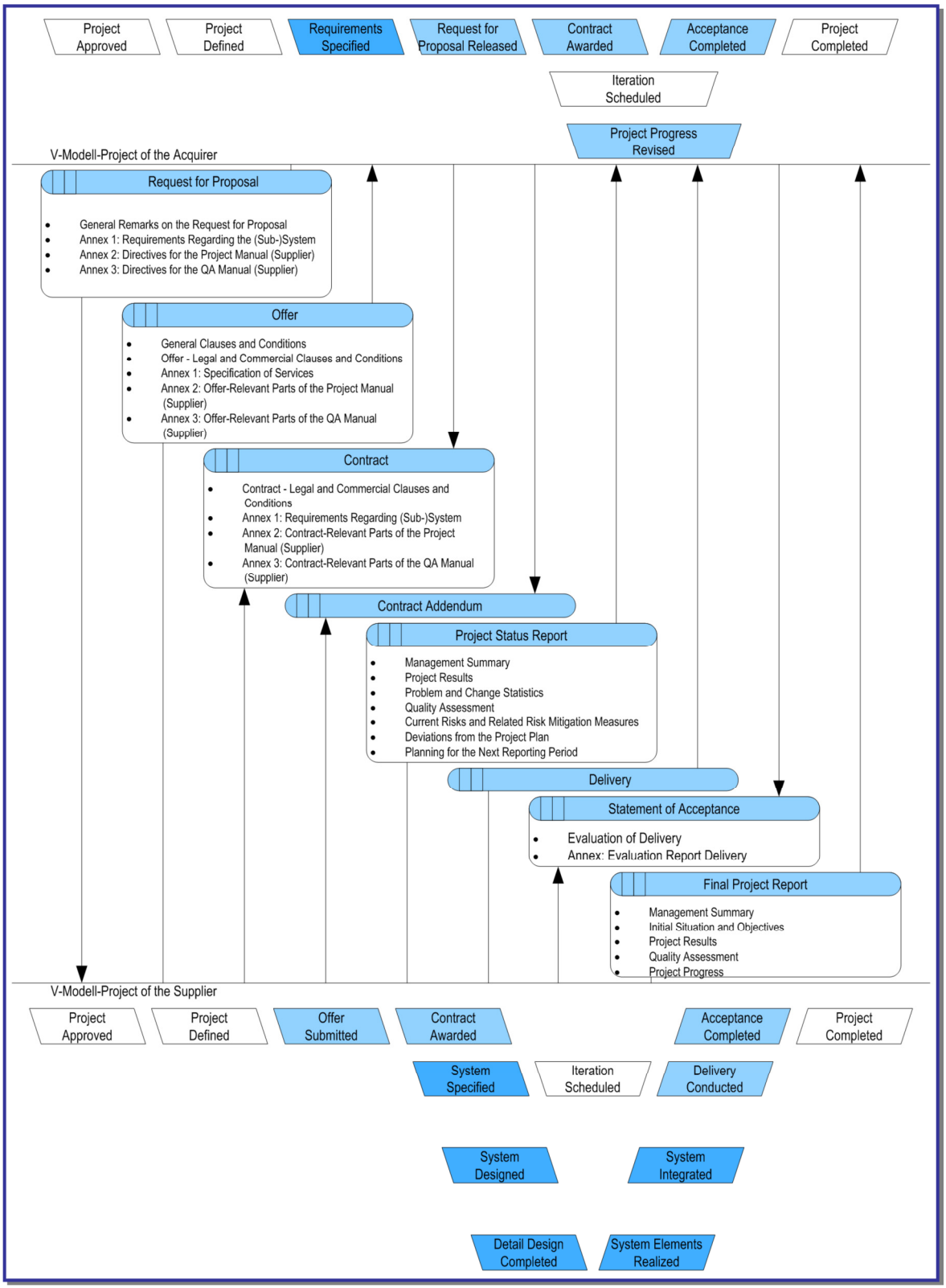

Figure 4: V-Model

ANNEX D) QUESTIONAIR ABOUT CURRENT AIS COST

ATTACHMENT to State letter AN T2/8.1-309/2009

QUESTIONNAIRE ABOUT EXISTING COST AND INFRASTRUCTURE FOR THE AFI CENTRALISED AERONAUTICAL DATABASE BUSINESS AND FINANCIAL PLAN

Name of State/Organisation: ……

Experts have attended the AFI CAD Study Group meeting(s) ❒ *if applicable please tick - ✓-*
If necessary, please add additional pages.

1. Existing Cost:

Purchase Cost	…… USD
Installation Cost	…… USD
Maintenance and Inspection Cost	…… USD
Annual Communication Cost	…… USD
Refurbishment Cost	…… USD
Decommissioning Cost	…… USD
Life Cycle	…… Years

2. General Additional Cost:

2.1	Communication	…… USD
2.2	Training	…… USD
2.3	Restructuring	…… USD
2.4	Staffing	…… USD
2.5	Others	…… USD

3. Infrastructure:

Number of Personnel	……
Number of Servers	……
Number of Working Positions	……
AIS Centres Served	……
Aerodrome AROs Served	……

4. Comments and additional information

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