



**INTERNATIONAL CIVIL AVIATION ORGANIZATION
WESTERN AND CENTRAL AFRICAN OFFICE**

**FOURTH MEETING OF THE AFI REGION AIS/MAP TASK FORCE
(Dakar, 18 - 19 April 2007)**

Agenda Item 4: Review of the Report of the First Meeting of the AFI Region Study Group on the Establishment of a Centralized AFI Region AIS Data base (AFI-CAD/Study Group/1)

(Presented by the Secretariat)

Summary

This Paper presents the report of the First Meeting of the AFI Region Study Group on the Establishment of a Centralized AFI Region AIS Data Base (AFI-CAD/Study Group/1). The Study Group reviewed and acted on Conclusion 8/22 of the ATS/AIS/SAR/SG-8 Meeting, and Conclusion 15/43 of the APIRG/15th meeting which states inter-alia , *“that IATA, in cooperation with ICAO and Air Navigation Service Providers in the AFI Region , study the establishment of a centralized AFI AIS Data Base similar to the European Aeronautical database and forward it to the AFI AIS/MAP Task Force for its consideration”*.

In carrying out this study, the Group noted that the AFI-CAD Study Group is a study Group of the AFI Planning and Implementation Regional Group (APIRG). Its Reports are therefore submitted through the APIRG mechanisms to APIRG for review and action.

Action by the Sub-Group is at paragraph 5.

References :

APIRG/15 – Report

Report on AFI AIS/MAP SIP Seminar/Workshop on Quality Systems and Automation (Dakar; 11-13 October 2005)

AIS Automation Task Force – Report of Third Meeting (Dakar, 4-5 August 2005)

1. Introduction

1.1 The ICAO Regional Office Dakar in collaboration with the IATA Regional Office in South Africa, organized the first meeting of the AFI Regional Study Group on the Establishment of a Centralized AFI Region AIS Data base (AFI-CAD/Study Group/1). The meeting was convened at the Sandown Convention Centre in Johannesburg, South Africa, from 8 to 10 November 2006. The Study Group meeting was attended by 19 participants from 6 ICAO Contracting States from the AFI Region, (Kenya, Nigeria, Senegal, South Africa, Tanzania and Zimbabwe) 3 Aviation Multi-national Organizations (ASECNA, EUROCONTROL, and ROBERTS FIR), 4 Major Aviation Stake holders (ATNS South Africa, AVIATECH AG.Germany , Groupe EAD Europe S.L , and THALES Transportation Systems France and 2 Aviation International Organizations (ICAO and IATA).

2 **Review of the Report of the First Meeting of the AFI Region Study Group on the Establishment of a Centralized AFI Region AIS Data base**

2.1 The meeting recalled Conclusion 8/22 of the ATS/AIS/SAR/SG-8 Meeting, and Conclusion 15/43 of the APIRG/15th meeting which states inter-alia , “*that IATA, in cooperation with ICAO and Air Navigation Service Providers in the AFI Region , study the establishment of a centralized AFI AIS Data Base similar to the European Aeronautical database and forward it to the AFI AIS/MAP Task Force for its consideration*”. The meeting noted that the AFI-CAD Study-Group is a Study-Group of the AFI Planning and Implementation Regional Group (APIRG), and its Reports are therefore submitted to APIRG for review and action.

2.2 The meeting addressed the main objectives of the Study Group which are to provide guidance for the establishment of a Centralized AFI Region AIS Data base similar to the European Aeronautical database, in accordance with the requirements of the AFI Air Navigation Plan, for the improvement of overall speed, accuracy, efficiency and cost- effectiveness for the development of an integrated automated AIS System concept in order to obtain a general standardization of procedures, products and services to users, and to avoid potential divergences, incompatibilities and duplication of efforts in the AFI Region.

Purpose and Scope

2.3 The meeting noted that the development of the Centralized AFI Region AIS Database Program will implement and initiate the operation of a reference database of quality assured aeronautical information from the African Civil Aviation Commission (AFCAC) Member State area for the benefit of the whole aviation community. Implementing the Centralized AFI Region AIS Database will remove service duplication and remedy current deficiencies. It will provide a reliable and cost effective service and will obviate the need for a number of national AIS investments.

2.4 The meeting also noted that the Centralized AFI AIS Database is to be used additionally to produce AIP publication (AIP), AIP Amendment, Supplement and AIC) and charts (CHART), according to the data/ information stored in the database. These documents are to be stored in a document management systems (PAMS) allowing retrieval, viewing and downloading of documents.

3. **The Current Situation : (The existing modus operandi)**

3.1 The meeting noted that within the African Civil Aviation Commission (AFCAC) member States, there are some 53 Contracting States of ICAO each of whom, in accordance with Article 28 of the Convention on international civil Aviation (Chicago Convention) and Annex 15 to this Convention, has responsibility for providing an Aeronautical Information Service (AIS) to ensure the flow of aeronautical efficiency of international air navigation within the area of responsibility of the State.

3.2 The Study Group noted that whether a State provides AIS itself, or jointly with one or more other States or by delegating the authority for the provision of the Service to a non-governmental agency, the State remains responsible and retains authority for the information/data published for and on behalf of the State itself. A State may however delegate the authority for publication and distribution of the information to a commercial agency.

3.3 The Study Group noted that the current operational structure bears several limitations and drawbacks when seen from an African perspective as deficiencies in the provision of AIS in the AFI Region as follows:

- no single African consolidated database of aeronautical information;
- lack of cross border aeronautical information coherence checking;
- inconsistent quality of data;
- duplicated, redundant and dispersed investments in the development and maintenance of systems by both Aeronautical Information services and the end users;
- high maintenance (costs) for each State and end users;
- lack of interoperability between systems;

- shortcomings in ensuring timely distribution of aeronautical information updates to all users, possibly compromising safety and/or efficiency of air navigation.

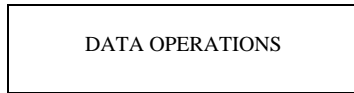
The Proposed Centralized AFI Region AIS Data Base Solution

3.4 The meeting noted that on overall, the proposed Centralized AFI Region AIS Data Base solution can be defined as comprising of the AFI Region AIS Data Base System (the System) and the AFI Region AIS Data Operations and network provision.

The Proposed Service

3.5 The meeting noted and recommended that provision of the centralized AFI CAD operations service should be designed to comprise the task and activities related to the following services domains :

-A



CORE SERVICES

- INO
- SDO
- PAMS
- DATA QUALITY ASSURANCE

PRODUCTS

- PIB / NOTAM /
- AIP / CHARTING
- AIP LIBRARY
- QUALITY LEVEL MEASUREMENT
- OF: INO DB
- SDO DB
- PAMS DM

- HELPDESK
- DOCUMENT HANDLING

SUPPORT SERVICES

- QUALITY MANAGEMENT
- SAFETY & SECURITY MANAGEMENT
- CHANGE MANAGEMENT → EVOLUTION OF THE SYSTEM WITH USER REQUIREMENTS & TECHNOLOGIES
- INFRASTRUCTURE MANAGEMENT
- INTERNATIONAL REGULATION MANAGEMENT
- DOCUMENT CONFIGURATION MANAGEMENT

MANAGEMENT SERVICES

-B



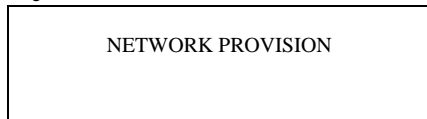
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- CORE** – IT SERVICES
- SUPPORT** – NETWORK MANAGEMENT
- CLIENT MIGRATION

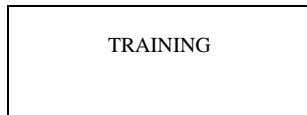
MANAGEMENT -

Infrastructure
Configuration

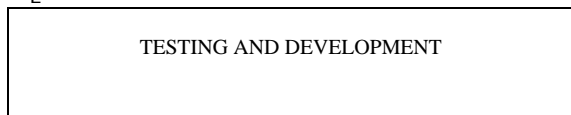
-C



-D



-E



The Proposed Server Services

3.6 The meeting adopted the following proposed client services :

a- Four Operating Centres: North; West; East; South and Central if required

b- Three Training Centres for English; French and Arabic

c- IT Server on Line Centre – (number to be defined)

d- Research Centres where Technical Capabilities Exist

Assumptions

3.7 The meeting noted that at the outset of the Service Creation certain fundamental assumptions are made and need to be already understood.

The proposed Business model

3.8 *(Appropriate business model must be developed)*

Additional Issues

3.9 The meeting noted that the implementation of the AFI CAD will improve the flow and delivery mechanisms of aeronautical information. The meeting also agreed that the appropriate business model must be developed.

3.10 The AIS of participating States will continue to be responsible for the production, maintenance and publication of aeronautical information which will be delivered and stored by them in the AFI CAD. The AFI CAD will then deliver and/or provide access to the aeronautical information.

3.11 The AFI CAD will thus act as a relay for aeronautical information, which will be delivered from the Data providers (to and from the AFI CAD to the Data users).

4. Future meetings, work programme and membership of the AFI-CAD/ STUDY GROUP

4.1 The meeting is expected to note with appreciation the work of the First meeting of the AFI Region Study Group on the Establishment of a Centralized AFI Region AIS Data Base (*AFI-CAD/STUDY GROUP/1*). The Study Group reaffirmed the validity of APIRG Conclusion 15/43 by which it was established.

4.2 However, the Meeting felt that the Study Group should continue to monitor the progress of the establishment of a centralized AFI Region AIS Data Base in its future work programme. The Study Group also expressed the need to hold a second meeting of AFI-CAD in order to cater for the presence of States from the Northern part of the AFI Region whose absence were noted in the first meeting. The study Group is also convinced that the second meeting will provide an opportunity to update and amend the adopted proposed framework for a centralized AFI Region AIS/MAP database prior to its submission to the APIRG/16th meeting for approval.

4.3 Taking cognizance of the above issues, the ICAO Regional Office Dakar, proposed a scheduled second meeting of the AFI-CAD Study Group to be held in Nairobi Kenya in August 2007.

5. Action required

5.1 The Task-Force is invited to:

- a) note the report of the First meeting of the AFI Region Study Group on the establishment of a centralized AFI Region AIS Data Base (*AFI-CAD/STUDY GROUP/1*).
- b) endorse and take action on the recommendations of the Study Group, in **Appendix-A** to this paper to be adopted as conclusions of the Task Force.
- c) endorse and take action on the adopted proposed framework for a centralized AFI Region AIS/MAP Database in **Appendix-B** to this paper.
- d) Consider the implementation of AFI-CAD Recommendation 3.4 which states that “**AFI AIS/MAP Task Force, with co-opted expertise, as required develop the user requirements specifications (URS) for the AFI CAD.**”
- e) Consider the the development of an appropriate business model for the AFI-CAD.

List of Recommendations

The Study-Group recorded its action in the form of Recommendations

Number	Title	Page
Recommendation 1.1 a) Recommendation 1.1 b)	The International NOTAM Operation (INO) providing facilities for world-wide NOTAM, SNOWTAM, ASHTAM, BIRDTAM and AFTN or equivalent message handling and for pre-flight Information Bulletins (PIB) generation. The Static Data Operation (SDO) providing facilities for AFCAC 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 1.3 a) Recommendation 1.3 b)	The Data Providers are AIS Organisations providing aeronautical information to the Centralized AFI Database; The Centralised AFI AIS Database will make available and deliver this information to the data users. The Data Users are Air Transport Community and beyond.	
Recommendation 3.1	The study group then recommended that the proposed System should be designed to provide the following: <ul style="list-style-type: none"> 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 distribution of aeronautical information and IAIP elements; d) harmonisation and interoperability will be ensured by common and standardised: <ul style="list-style-type: none"> - System interface and data exchange model (AIXM), - Static data model (AICM); 	
Recommendation 3.2	That the proposed System Data Operations Services will then provide the Centralized AFI Database clients with the following system services: <ul style="list-style-type: none"> a) support to edit and provide (to the system) aeronautical information b) electronic access to and delivery of aeronautical: c) browsing and downloading of participating State's aeronautical information; d) generation of reports; 	
Recommendation 3.3	That the Data Operations System Services will be accessed by clients via direct electronic interface in one or more of the following three ways: <ul style="list-style-type: none"> i) CIT: The Client Interface terminal. 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) CI: The Client Interface. A technical toolkit allowing clients' own systems to access and interact with the AFI CAF to upload, download, modify (only for Data Providers) and report of aeronautical information as determined by the client's (SLA); iii) INTERNET: Access to the Centralized AFI AIS Data Base will also be allowed via the Internet. 	

Number	Title	Page
Recommendation 3.4	AFI AIS/MAP Task Force, with co-opted technical expertise, as required develop user requirements specification (URS) for AFI CAD.	
Recommendation 3.5	<p>The meeting also recommended that :</p> <p>a) Regarding the Data operations service domains, the service provided shall ensure :</p> <ul style="list-style-type: none"> i) Co-ordination of the resolution of data conflicts detected by the system data checking processes ; ii) for non-participating States (world wide) : <ul style="list-style-type: none"> - NOTAM processing (verification, validation, translation, etc...) - entry of the statistic data required by the system NOTAM function. <p>b) As defined today, 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 :</p> <ul style="list-style-type: none"> i) creation of NOTAMs ii) origination and publication of AIP, AIP supplements, AIP amendments, AIC and charts . <p>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 client services :</p> <ul style="list-style-type: none"> 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 4.1	<p>The Recommended assumptions are that :</p> <p>a) The Centralized AFI Region AIS Base</p> <p>i-(System and Data Operations Services) shall enhance operational Safety by ensuring the quality of aeronautical information;</p> <p>ii-(System and Data Operations Service) shall facilitate the timely and efficient flow and provision of (electronic) aeronautical information/data necessary for the Safety, regularity and efficiency of international air navigation.</p> <p>iii-(System and Data Operations Service) shall be designed with the intention to meet the needs of the Air Transport Community;</p> <p>iv-(Data Operations Service) shall not be delegated by a State, the Authority for the provisions or execution of that States AIS .</p> <p>b) AFI Region (AFCAC) ICAO Contracting States shall:</p> <p>i) Entrust (the Agency to be set-up or endorsed by the AFI Region (AFCAC) ICAO contracting States) to develop, establish and operate the centralized AFI CAD with</p>	

Number	Title	Page
	<p>cooperating centres and the possibility of connection to the GLOBAL AIS Data base;</p> <p>ii) Commit to the timely provision of the required information to the AFI CAD (this shall not preclude them from providing the same data to other agents and/or entities);.</p> <p>iii) 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 Annexe 15 of the Chicago Convention;</p> <p>iv) Remain responsible for the information published by AIS and provided to the AFI CAD, in accordance with Annex 15 of the Chicago Convention;</p> <p>v) Maintain the intellectual property rights for the data provided to the AFI CAD;</p> <p>vi) Shall cooperate in the promotion of the AFI CAD and of its inter-faces to be adopted as a standard or as a recommendation by ICAO;</p> <p>vii) Provide, collectively and/or individually, advice and other appropriate support to any administration outside the AFI Region (AFCAC) area considering the introduction of an aeronautical information database system compatible with the AFI CAD Standard;</p> <p>viii) Promote the use of the AFI CAD by taking active steps to provided appropriate information to the public on the services available from the centralized AFI Region AIS Data base and encourage the use of the service.</p> <p>c) The Agency to be set-up for providing the service of the AFI Region AIS CAD shall:</p> <p>i) Shall fund the provision of the core service through the budget of the Agency to be set-up”. Clients’ (States and Data Users) local system and connectivity costs shall be borne by the clients themselves at all times;</p> <p>ii) Seek the mandate of the AFI Region (AFCAC) ICAO Contracting States to determine the most effective and appropriate way of implementing and delivering the service by:</p> <ul style="list-style-type: none"> - subcontracting, if it is a service provider; - providing it itself from within the Agency; or - establish a joint Agency/Private/initiative service. <p>iii) Shall define a legal and financial framework to be applied to States participating in the AFI CAD, and non members of the AFI Region (AFCAC) States, Covering contribution to the funding of the data operations service provision;</p> <p>iv) Shall define a charging policy that:</p> <ul style="list-style-type: none"> - 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 	

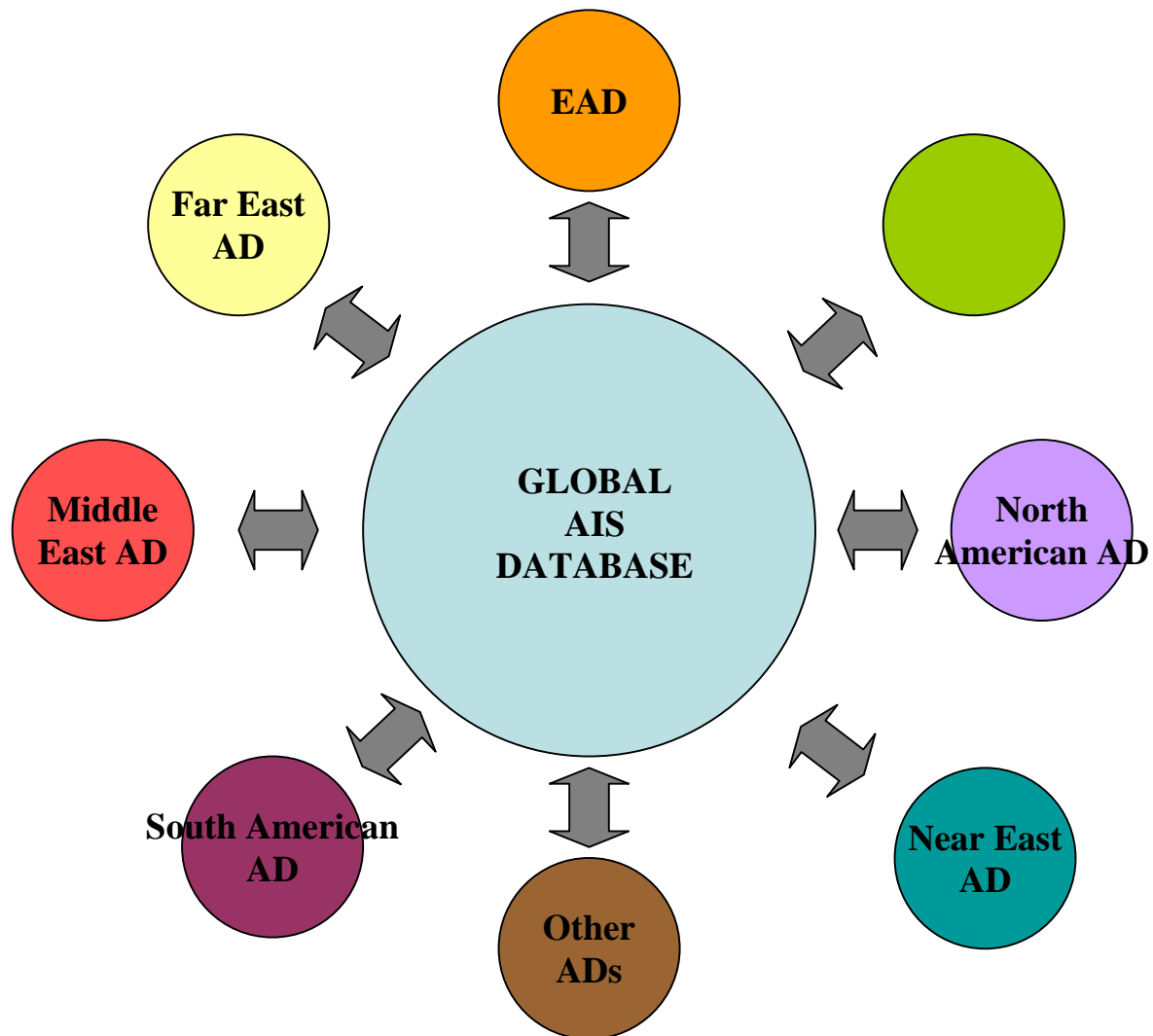
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Recommendation 4.2	<p>provision of AIS services; - Avoids double charging of the Data Users.</p> <p><u>Assumptions</u> The meeting then recommended that :</p> <p>a) whether the service provision is subcontracted or not:</p> <p>i) The service shall at all time be a AFI Region AFI CAD and AFI Region (AFCAC) ICAO contracting States owned, service. The service provider shall ensure the service is at all time perceived and recognized as being a (PAN- AFRICAN) AFI Region (AFCAC) member States provided service.</p> <p>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);</p> <p>iii) the service provision shall be subjected to a “ trial phase” of operation at the end of which the service may be reviewed it there has been insufficient take-up by clients and/or if the service levels have not been met;</p> <p>iv) all clients’ service level agreement shall be between the client and the Set-up Agency entrusted by the AFI Region (AFCAC) ICAO Contracting States.</p> <p>v) shall not be allowed to sell, trade or commercialise the data and/or services of the AFI CAD on its own behalf and/or profit.</p>	
Recommendation 5.1	<p>The meeting then Recommended that :</p> <p>a) Initially the AFI Region (AFCAC) ICAO contracting States will seek funds for the provision of the AFI CAD through a multi – donor facility to support the implementation of the project in collaboration with ICAO, AFCAC and AFI Air Navigation Service Providers.</p> <p>b) That the AFI CAD be defined as a mechanism whereby States can publish their AIS information, and as AIS information is defined as being primarily for the use of Aeronautical users, it follows that all costs incurred in the production and distribution of this information should be recovered in accordance with the ICAO manual on air Navigation Service Economics. Therefore the cost for the provision of AFI CAD service will be recovered by the States, applying the user pay principle.</p>	
Recommendation 5.2	Roberts FIR and Senegal to be included in AFI AIS/MAP Task Force	

WP 5 Appendix-B

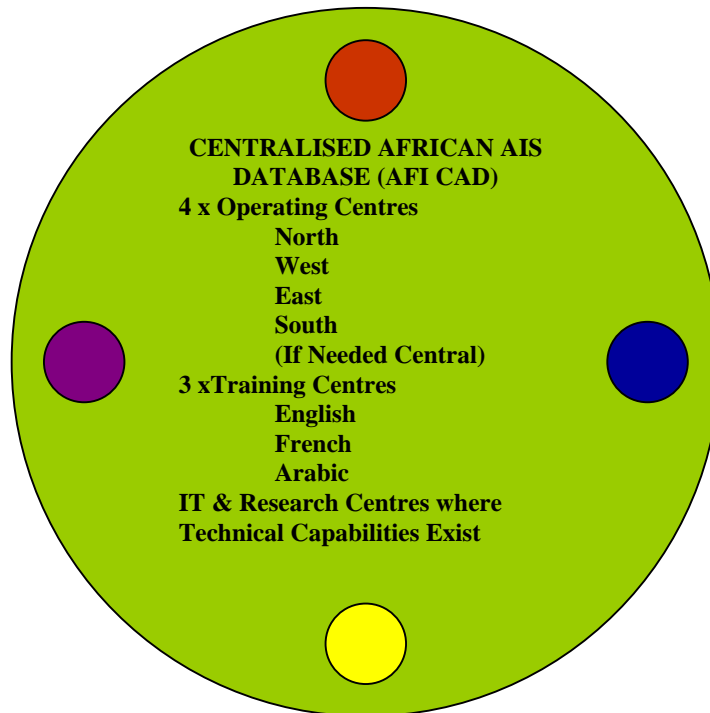
**ADOPTED FRAMEWORK PROPOSAL FOR A CENTRALISED AFI REGION
AIS/MAP DATABASE**

1. **Current Status of AIS**

- a. Infrastructure
 - b. Products
 - c. Human Resources
 - i. Skills, Competencies & Qualifications
 - d. Present ATM Community Requirements
2. Global Concept (Macro Overview)
- a. Global AIS Database



b. African AIS Database



c. Operating Centres

- i. All Mirror Images of Each Other
- ii. All contain the full Centralised African AIS Database (AFI CAD)
- iii. Each Operating Centre can replace each other if needed.
- iv. The Operating Centres are in constant communication with each other updating the databases at each Operating Centre as it is changed by the Operating Centres (possibly using a form of best suitable available communications)
- v. Countries within a region provide their data to and access the AFI CAD via their Regional Operating Centre (local communication networks to be utilised)
- vi. Each Region Responsible for the Maintenance of their regions Data in the AFI CAD.
- vii. Why Four Regional Operating Centres?
 1. Geographical Distances
 2. Communication Networks
 3. Common Infrastructure
 4. Existing Working Agreements

5. Common Interests
6. Ability to provide assistance on a regional basis
7. Redundancy/Service Integrity

Note: A study needs to be performed to decide if the need exists for a Fifth Operating Centre for Central.

3. Management Issues

a. Legal Requirements

- i. Formal State Agreements (Institutional): Will the constitution of AFCAC allow sufficient legal coverage to allow AFCAC to perform the role as co-ordinating authority for AFI CAD? Legal Council needs to be consulted. If not then Formal Agreements between AFCAC and individual states and possibly consortiums of states will then need to be instituted.
- ii. Service Level Agreements: If the AFCAC constitution does provide for AFCAC to act as the co-ordinating authority for AFI CAD, then only a service level agreement will have to be instituted between states and consortiums of states.
- iii. Interstate Consortium Agreements: These will need to be instituted to ensure attainment of target levels of service provision within consortiums of states.
- iv. Service Provider Contract: The study group assumes AFCAC has legal authority to act as co-ordinating authority for AFI CAD, and utilises a Service Provider a contract determining the extent of and target levels performance needs to be instituted. If AFCAC does not have this legal authority, will its constitution need to be amended and new agreements established, a new body created or will the Service Provider conclude this agreement with each participating state?

b. State Responsibilities

- i. Enforceable: The agreements instituted for the participation in AFI CAD need to be enforceable to ensure target levels of source data integrity and service support is provided.
- ii. States which cannot Conform: A mechanism needs to be instituted whereby states that cannot conform to the required standards are encouraged partake in AFI CAD and are assisted to reach and maintain the required standards. This can either be via AFCAC, on a regional basis or via interstate agreements.
- iii. Non-conforming States: Procedures to deal with states which have entered into this agreement to join AFI CAD and then refuse to comply with the standards will need to be established
- iv. Financial: The financial contributions for the establishment, maintenance and advancement of AFI CAD need to be defined in all agreements to join AFI CAD. This commitment will need to be actively policed to ensure compliance by member states to ensure the future sustainability of AFI CAD

- v. Human Resource: Target levels of service provision and its associated Human Resource requirements (Skills, Competencies and Qualifications) must be defined and be enforceable under these agreements.
 - vi. Infrastructure: Target levels of infrastructure service provision and its associated support by states (eg guarantees of security provision) must be defined and be enforceable under these agreements
- c. Service Provider: The manner in which a Service Provider is utilised in the provision of the AFI CAD service will need to be studied and various business models will need to be assessed to determine the safest, most cost-effective, reliable and sustainable model is adopted. These models must be assessed and the most appropriate one recommended for adoption. This must include at least the following models:
- i. AFCAC establishing a subsidiary to perform this service.
 - ii. Establishment of a Consortium owned by African member States possibly in co-operation with an external stakeholder (eg EAD)
 - iii. External Company as Service Provider (eg Group EAD)
- d. Data Provider Requirements
- i. Data Standards: Data standards, which are to be utilised in AFI CAD, need to be defined and accepted by all member states. These standards may be defined (as the Eurocontrol Standards for example) and must be enforceable under these agreement between AFCAC and member states or between AFI CAD Service Provider and states
 - ii. State Data Requirements: The minimum data requirement for AFI CAD (eg IAIP) will need to be defined in agreements. Any additional state requirements (eg Obstacle, Terrain, etc) will also need to be accommodated possibly in phased implementation.
 - iii. Required Data Not Available: If the required data is not available or not available in the required standard in a particular state, procedures will need to be established as to who will be responsible for the acquisition and maintenance of this data, how this will be conducted and who will then own this data.
- e. Data User
- i. Internal (State/Consortium) User Requirements: Access to the data in AFI CAD must be free to contracting states and consortiums of states.
 - ii. External Clients: The requirements of external clients must be addressed to encourage them to utilise and pay for the services provided by AFI CAD. These will include but not be limited to the ATM community:
- f. Financial Model

Despite Financial Model not being part of the scope of this workgroup, the workgroup would like to make following suggestions:

- 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 AFCAC to fund this project as it should be based on the User/ Beneficiary Pays principle.
- g. 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 be assessed to ensure organisation structuring to take advantage of these future benefits
- h. Technical Functionality
- i. Hardware and Facilities: The manner of provision of hardware and facilities either by states or Service Provider must be defined and contained in AFI CAD membership agreements. This will include but may not be limited to the following:
 - 1. Location
 - 2. Technical Support
 - 3. System/Network Interoperability
 - 4. Growth Plans/Capacity Expansion Plans
 - 5. Back-up facilities and hardware
 - ii. Software: The software utilised by AFI CAD must be agreed upon by AFI CAD members and the Service Provider to ensure compatibility and commonality. This will include but not be limited to the following:

1. Software System to be utilised (eg a UNIX system with Oracle or SQL database software along the lines of the EAD system)
 2. Exchange Models to be utilised (eg AIXM)
 3. Standardised State Software Interfaces (will converters be required and who will be responsible for their provision and funding?)
- iii. Human Resources: The Human Resources which each AFI CAD member state and the Service Provider will contribute must be defined in membership agreements to ensure attainability of target levels of data standards. This will include but not be limited to the following:
1. Qualifications & Training
 2. Standards of Qualification and Training
 3. Availability of Skills
 4. Demonstrated Competencies
 5. Required Skills, Competencies and Qualifications for Posts
- iv. Infrastructure: The provision of infrastructure to ensure operational effectiveness of AFI CAD by member states and the Service Provider regarding but not limited to the following:
1. Communications
 2. Uninterrupted Power Supply
 3. Operational Technical Skills
 4. Technical Training Centres
 5. Security Guarantees (physical and financial)
 6. Technical Support
- i. AIS Operational Functionality:
- i. Implementation: Detailed planning as to how operationally the AFI CAD will be implemented including time scales, responsibilities and accountabilities must be defined in agreements between AFI CAD members and the Service Provider. These plans must take the following into account.
 1. Phased Implementation: Will pilot states/Operational Centres be used initially with additional member states/Operational Centres to be added continuously until all AFI states are members?

2. Transition Plans: Plans must be defined on how state data will be incorporated into AFI CAD.
 - ii. State Data Standards/ Quality Assurance: The data standards and methodology to ensure Quality Assurance of state provided data must be defined and accepted and implemented by states before incorporation into the AFI CAD member states.
 - iii. Data Harmonisation/Conflict Resolution: Procedures on how data harmonisation and conflict resolution are to be performed needs to be defined, agreed upon and implemented by states and the Service Provider before states are admitted to AFI CAD.
 - iv. Target Levels of Service Provision: Target levels of service provision by states and the Service Provider must be agreed upon and implemented before admittance to AFI CAD is obtained.
 - v. Business Contingency Management: Business Contingency Management plans need to be designed and state and service provider responsibilities in these plans agreed to.
 - vi. Operational Control, Responsibility & Accountability: Operational Control, Responsibility and Accountability for AFI CAD and the data contained therein must be defined in all agreements between AFCAC, States and the Service Provider
- j. Safety Management System: A SMS must be implemented by all data providing states and the Service Provider to ensure the continuing integrity of data provided by AFI CAD.
- f. AIS Services Provided By State: The AIS services provided by each AFI CAD member state utilising the data used in AFI CAD must be defined and agreed to by both the state and the Service Provider/AFCAC. This can include the following services:
 - i. IAIP
 - ii. Obstacles
 - iii. Terrain
 - iv. Airport Services
 - v. Other
- g. State AIS Human Resources: State AIS Human Resource provision to ensure the attainment of target levels of service by AFI CAD member states must be incorporated into AFI CAD membership agreements. This will include but not be limited to the following:
 - i. AIS staff establishment and staffing levels
 - ii. AIS Staff Skills, Competency & Qualifications
 - iii. AIS Staff Training Development Plans

iv. Target Levels of AIS Service Provision

h. Future Development: Future Development of AFI CAD must be continuously researched and conducted to ensure compatibility with the following stakeholder drivers:

i. Research & Development

1. Comply with future ICAO requirements
2. Database Development
3. Database Interoperability Requirements
4. Future Technologies
5. Future User Requirements

ii. Implementation

1. Future Development Implementation & Transition Plans
2. Future Cost Benefits