Assessment of the Aeronautical Meteorological Services Provision in the SAHF Member Countries

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List of Acronyms

AMET	Aeronautical Meteorological
AMETSP	Aeronautical Meteorological Service Provider
ANS	Air Navigation Services (including AMET services)
ANSP	Air Navigation Services Provider (including AMETSP)
ATC	Air Traffic Control
ATFM	Air Traffic Flow Management
CAA	Civil Aviation Authority/Administration
MA	Meteorological Authority (as defined in ICAO Annex 3, para. 2.1.4)
NMS	National Meteorological or Hydrometeorological Service
SAHF	South Asia Hydromet Forum
SWIM	System-Wide Information Management
ICAO	International Civil Aviation Organization
WMO	World Meteorological Organization
ISO	International Organization for Standardization
IATA	International Air Transport Association

Report with Findings and Recommendations

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1. Introduction

The aim of this study is to assess the possibilities for enhancing the aeronautical meteorological (AMET) services provided by the National Meteorological or Hydrometeorological Services (NMSs) in member countries of the South Asia Hydromet Forum (SAHF)¹. Civil aviation safety, efficiency and regularity is highly dependent on weather conditions through all phases of a flight, thus the sustainable provision of requisite meteorological information and services is a critical element of a national aviation enterprise. The improvement of the AMET services is highly desirable since it brings benefits for both the providers and the users of the services through improved safety and efficiency of the aviation operations, on the one hand, and through a stable business area for the AMET providers, on the other. It also brings a significant societal impact as the end user of the aviation business sector is the society as a whole.

The focus of the assessment is on the ability of the national AMET providers to fulfill the international requirements for the delivery of the services regulated by the International Civil Aviation Organization (ICAO) and the World Meteorological Organization (WMO). In all SAHF countries, the AMET provider by default is the NMS, therefore, the assessment has been conducted through gathering of information on the NMSs' institutional and technical capacity for the generation and delivery of aviation-specific information and services, taking into consideration the respective national civil aviation landscape. One of the main aspects of the study is related to the business model of the AMET service, including the implementation of the ICAO policy and guidance on the cost-recovery for the provision of such services through the air navigation service charges. It is well known that, due to various reasons, not all ICAO Contracting States have implemented the cost-recovery for the AMET service, which poses challenges for their sustainable delivery at the required quality level. Through this study, we try to assess the current cost-recovery situation in the SAHF countries and respective impacts on the ability of the NMSs to comply with applicable international requirements and meet the aviation sector's current and future demands.

Core Concept

Cost-recovery is a concept adopted by ICAO from its inception in the first half of the 20th century. It is based on the principle that the end-user should pay for the air navigation services provided by the ICAO Contracting States to ensure the safety and efficiency of the international air navigation. The ICAO Convention specifies the obligation of the States to provide such standardized services while the ICAO Global and Regional Air Navigation Plans contain specific requirements for services and facilities to be made available by each State. The cost-recovery is realized in practice through a system of air navigation service charges applied by each State; these charges should be set in a fair and transparent manner in consultation with the users (airline operators), following the ICAO policies and guidance (e.g., ICAO Doc 9082: *ICAO's Policies on Charges for Airports and Air Navigation Services*, and ICAO Doc 9161: *Manual on Air Navigation Services Economics*). It should be well understood that the cost-recovery is a non-profit mechanism allowing the countries to recover the

¹ SAHF Member countries: Afghanistan, Bangladesh, Bhutan, India, Nepal, Maldives, Myanmar, Pakistan and Sri Lanka

actual cost for the provision of services and facilities to the end-users. The AMET services are a part of the ANS, thus their cost could be recovered through the charging system, however, in many countries the process of establishing, collecting and redistributing the AMET service charges is not fully coherent and transparent. It is in the interest of the NMSs as the main national AMET service providers, to improve their cost-recovery practices; the WMO Doc No.904, *Guide to Aeronautical Meteorological Services Cost Recovery: Principles and Guidance*, provides essential guidance in this regard.

2. Scope and structure of the study

The study elements include the following elements of AMET services for each SAHF country:

- a) Institutional arrangements designation of AMET Authority and AMET provider(s);
- b) Scope and volume of the aeronautical meteorological services regulated (as per the ICAO Regional Air Navigation Plan for Asia and Pacific), and additional (e.g., general aviation, domestic flights, etc.);
- c) Capacity for service delivery technological and human resources aspects;
- d) Compliance with ICAO and WMO requirements for quality management (QMS) and competency of AMET staff;
- e) Financing utilization of government budget, cost-recovery, commercial activities.

In assessing national capacities for AMET services, we try to distinguish between two demand areas: the ICAO requirements, specified in the Annex 3 to the ICAO Convention, covering the international air navigation, i.e., regulated services for international flights to/from the country; and, additional national requirements for domestic civil aviation operations, if any.

3. Methodology

The assessment has been conducted through three main complementing methods: desk-top review of existing previous assessments/studies, an on-line questionnaire (see Annex I and Annex II), and on-line interviews with AMET experts selected as national focal points.

4. Findings and recommendations

The demand for AMET services in each SAHF country is based on the state of the aviation sector in terms of current and projected volumes of international and national operations for passenger and freight flights. There are substantial differences in this regard between the nine countries participating in the study, which can be demonstrated by figures and statistics describing the status of the national aviation sector (e.g., number of international and domestic airports, number of operating airlines, number of passengers (international/domestic) per calendar year, volume of cargo operations, etc.). The knowledge of such basic statistics is important to assess the potential for cost-recovery, which is based on the volume of the overall collection of air navigation service charges by the country. However, the collection of exact financial statistics for each country is outside the scope of this study, thus, the goal here is to understand and assess both enabling and impeding factors for effective AMET service provision, and to highlight elements which are typical for the region and could be addressed through regional capacity development actions.

4.1 Institutional frameworks

A fundamental ICAO requirement in its Annex 3 to the Chicago Convention is that each country shall designate an entity as a Meteorological Authority "to provide or to arrange for the provision of meteorological service for international air navigation on its behalf"². The Meteorological Authority (MA) is the organization which carries the responsibility for the provision of the required AMET services, but not necessarily to be the actual provider of the service. Thus, for each country we consider two functions and their assignment by the government to concrete organizations – the MA, which carries regulatory function, and AMET service provider (AMETSP); the case may be that the two functions are assigned to one organization, or two separate organizations.

Finding 1.1: In six of the SAHF countries (India, Maldives, Myanmar, Nepal, Pakistan, Sri Lanka) the NMS is the designated MA, while in the remaining three countries it is the CAA (Bangladesh, Bhutan) or other organization (Afghanistan). In almost all SAHF countries the NMS is an exclusive AMETSP, with possible other providers only in one country (India, where some services are provided by the military).

Recommendation 1.1: While ICAO Annex 3 allows for the combination of MA and AMETSP functions in one organization, such situation is not considered a best practice from the perspective of quality management and safety oversight, due to potential conflict of interest. If the NMS is the designated MA, the DG (also PR with the WMO) is loaded with regulatory function and respective accountability. It is therefore recommended to consider in the future to separate the function of MA from the NMS and assign it to the CAA (or similar) with respective amendments to national legal framework. Such an arrangement will allow the NMS to focus on the AMET service delivery, which is its adequate function in the national aviation enterprise.

Finding 1.2: Most of the SAHF countries have relatively satisfactory basic legal framework defining roles and responsibilities for the provision of AMET services. In four of the countries (Afghanistan, Bhutan, Maldives, Nepal) these are defined at the top level in either the Civil Aviation Act or the Hydromet Law (or both). In the rest of the countries the services are provided on the basis of agreements between the NMS and relevant civil aviation authorities. Governing laws for meteorology, to include also AMET services, are under development in at least two countries (Pakistan, Sri Lanka).

Recommendation 1.2: The availability of a clear definition of roles and responsibility for the provision of AMET services at national level is a key factor for sustainable service delivery. The best practice in this regard is to use national laws such as a Civil Aviation Act, a Meteorological Act, or similar as the main reference point for those roles and responsibilities. If this is not the case, an appropriate agreement should exist between the CAA and the NMS defining in detail the scope of services and the means for their provision. Since the existence of such basic arrangements is subject to ICAO safety audits, the AMET providers, i.e., the NMS, should maintain a record of those agreements and ensure their periodic updates (it is desirable to conduct annual reviews and consider any changes based on the dynamics of the aviation sector in the country).

4.2 Funding and Cost-recovery

Finding 2.1: All but one of the SAHF countries informed that the financing of the AMT services provided by the NMS comes from the regular budget provided by the government. India is the only country where the financing is a mixture of government budget and cost-recovery, but there was no clarity regarding how the cost-recovery has been applied. There was a general agreement that the current form of financing through government funding was a limiting factor for the quantity and

² ICAO Annex 3, para. 2.1.4.

quality of the services being delivered, and that cost-recovery should be considered in order to enable the needed improvements to meet the growing aviation sector demands for AMET services. A general problem was the lack of sufficient knowledge of the ICAO policies and guidance on the application of air navigation services charges, including those for AMET services.

Recommendation 2.1: Implementation of cost-recovery for AMET services is a lengthy process engaging all relevant aviation stakeholders at national levels: ANS providers (including ATC), airport authorities and operators, airline organizations (such as IATA), relevant ministries (e.g., the ministry responsible for the aviation transport, the ministry to which the NMS reports, ministry of finance). The best practice is to establish a working group at national level to prepare a proposal clearing all the details and disputes between the stakeholders. The multidisciplinary nature of such work usually requires support from competent international consultants with knowledge of the relevant ICAO policies, guidance and good applicable national practices.

Finding 2.2: There is currently no exact knowledge of the actual cost of the AMET services provided by the NMS. Also, there is a general lack of knowledge of what costs are eligible for cost-recovery through air navigation service charges (e.g., the cost for services exclusively for aviation users, and the percentage of the core costs for general weather monitoring and forecasting). The current staffing levels of the AMET units in the NMS, which are hardly sufficient to cover the operational duties, do not allow to dedicate time to study all applicable ICAO and WMO policies and guidance in order to conduct the needed cost estimates.

Recommendation 2.2: A fair and transparent estimate of the actual costs incurred by the AMETSPs (i.e., NMSs) should be assisted by appropriate consultancy by expert(s) familiar with ICAO and WMO air navigation service charges policies and guidance. Such consultancy could be provided on country-by-country basis and by developing regional guidelines for use by SAHF countries taking the path towards cost-recovery. Regional training for SAHF countries on the methodology of cost-recovery should also be considered (eventually assisted by ICAO and WMO).

Finding 2.3: Lack of adequate cost-recovery is not unique for the AMET services, but a more general problem for the air navigation services provided by the SAHF countries. The IATA Annual Review 2024 states that a common problem for the whole Asia/Pacific region is that charges are often increased by ANS providers and implemented unilaterally, without consultation. "Also, ANSPs typically do not adhere to ICAO Document 9082 and its recommendations concerning charges. IATA advocates for greater transparency, consultations, and the creation of economic regulations where absent. In India and Pakistan, navigating ANSP billing poses unique challenges"³.

Recommendation 2.3: It will be appropriate for the SAHF countries DGs to take the lead in addressing the ANS charging issues by making the AMET cost-recovery an example of good practice. They can hold consultations with all relevant users, in particular with the main airlines operating to/from their international airports. Additionally, it should be clarified, in coordination with relevant government actors, whether the charges collected by the CAAs from the airlines already include a certain percentage for the AMET services. This percentage might be "hidden" within the overall air navigation services and not allocated back to the AMET Service Providers (AMETSPs), which are typically the National Meteorological Services (NMSs).

Finding 2.4: There is a general understanding that the introduction of cost-recovery could bring improvements in the AMET service delivery, as well as opportunities for continuous improvement. Some capital investments in AMET-related equipment, specialized training activities, etc., could be

³ <u>https://www.iata.org/contentassets/c81222d96c9a4e0bb4ff6ced0126f0bb/iata-annual-review-2024.pdf</u>

included in the cost-recovery. It should be clearly understood that the cost-recovery is a non-profit mechanism, and the funds received through cost-recovery for ICAO-regulated services are to be used entirely for covering actual eligible expenditure. However, some AMET providers may enter into contractual agreements with aviation users for additional services outside of the scope of the ICAO Annex 3. Such arrangements are not part of the cost-recovery and such services may be provided on a commercial or other basis, in accordance with relevant national regulations.

Recommendation 2.4: SAHF AMET providers should be assisted to prepare a five-year plan for their AMET services based on current and forecast aviation operations, in coordination with relevant national aviation stakeholders (airlines, airport operators, ATC), to assess the possibility for expanding their services and generate revenue through all possible means (increased government budget, cost-recovery, commercial).

4.3 Organizational matters

Finding 3.1: Quality management. Implementation of QMS for the provision of AMET services is a standard requirement by ICAO and WMO. On a global scale, more than 80% of the national AMET providers have achieved compliance with this requirement and obtained ISO 9001:2015 certification. In the SAHF countries the level of compliance is worse than the global average: only four countries reported full implementation of QMS, while the other countries are in a different stage of preparation for implementation.

Recommendation 3.1: Implementation (and maintenance) of QMS for AMET services should become a high priority for the NMSs; lack of QMS (non-compliance with international standards of ICAO and WMO) carries reputational risk and is an organizational weakness in a possible competitive environment. DGs should seek international assistance to enable QMS implementation, e.g., twinning and coaching by AMET providers with advanced knowledge of QMS. The matter should also be raised at national level with the CAAs to advocate for targeted funding to resolve ICAO-related air navigation deficiency.

Finding 3.2: Most of the SAHF countries experience difficulties with human resources engaged in the provision of AMET services. In some countries the lack of sufficient qualified and competent personnel is the most severe barrier to the quality and sustainability of the current and future operations of the AMET providers.

Recommendation 3.2: DGs should analyze the current and future needs for specialized AMET personnel in relation to Recommendation 2.4 above. In case of severe shortages, preventing the provision of basic requisite services (e.g., the current situation in Bhutan), interim measures, such as hiring temporary staff from other countries, on the basis of bilateral agreements between NMSs, might be considered.

Finding 3.3: Almost all SAHF countries expressed an urgent need for training of AMET personnel, in particular AMET forecasters, both for foundational and refresher trainings. There is a lack of opportunities for participation in international training activities mostly for financial reasons, but there is a general lack of international training events on aviation meteorology in the region. The general feeling is that, due to that reason, the qualification and competence of AMET staff in SAHF countries is lagging behind the contemporary levels.

Recommendation 3.3a: The training needs of SAHF countries could best be addressed through regional efforts by creating opportunities for short- and long-term training modalities. Such

opportunities should be discussed with WMO and ICAO regional offices; the WMO regional training centres (RTC) should also be consulted. The funding of training activities should be discussed in the relevant regional frameworks, including SAHF and RIMES. Opportunities for distant learning should be considered as a cost-effective approach.

Recommendation 3.3b: In relation to cost-recovery discussions, it should be understood that the cost of specialized AMET training is an eligible cost that could be part of the cost-recovery bill. Where cost-recovery is discussed with other aviation stakeholders, this argument could be used by AMET negotiators to stress on the benefits of training to ensure qualified and competent personnel.

Finding 3.4: AMET experts from almost all SAHF countries cannot attend relevant ICAO meetings due to lack of budget for travel (e.g., the regular meetings of the MET group(s) of the ICAO Asia/Pacific Planning and Implementation Regional Group (APANPIRG), held annually in Bangkok). Such disconnection from the ICAO developments prevents participation in regional initiatives, knowledge-sharing and planning for future AMET services (e.g., the migration to System-Wide Information Management (SWIM), or new services for Air Traffic Flow Management (ATFM)).

Recommendation 3.4: SAHF Member countries to undertake coordinated action to secure funding for international travel of AMET experts to attend relevant ICAO and WMO meetings; this should include engagement with the national CAAs and with regional bodies, such as the ICAO Asia/Pacific Regional Office and the Asia/Pacific Conference of civil aviation DGs.

4.4 Technical matters

Note: Findings in this section are only based on online survey and interviews, thus not exhaustive due to the lack of direct observations of the status through onsite inspections.

Finding 4.1: In general, the technology used for the requisite aerodrome observations (those needed for METAR, SPECI and other local reports) is a mixture of automated sensors and human observers. It seems that, for the main international airports, the basic needs for those reports are met; there is no sufficient information about the existing domestic airports or airfields, where the weather conditions may pose significant safety risk, due to the complex terrain or other factors. In some countries, the airport AMET observing systems and sensors are owned by entities other than the NMS. A general concern exists regarding the level of maintenance and calibration of the sensors which is crucial for the accuracy of the reported data (and part of the QMS in this regard).

Recommendation 4.1: AMET providers (i.e., NMSs) should maintain a clear record of the status of all observing systems at the aerodromes/airfields served (regardless the actual ownership). Any discrepancies and malfunctions should be documented and addressed in due course. The capacity for calibration of equipment to meet WMO requirements should be considered at SAHF level to find economic solution for regular inspections and testing.

Finding 4.2: Almost all SAHF countries (with a notable exception of India) reported a lack of weather radar data which impedes the provision of important AMET services, such as SIGMET and aerodrome warnings.

Recommendation 4.2: It cannot be expected that the situation with the weather radar information in the SAHF countries would improve quickly due to the significant cost factor, thus, such data gap could be (at least partially) filled with better use of the available satellite and NWP information.

Development of operational guidance and training on such methods should be encouraged with international assistance; RIMES could be instrumental in this regard.

4.5 Service delivery

Note: Findings in this section are only based on online survey and interviews, thus not exhaustive due to the lack of direct observations of the status through onsite inspections.

Finding 5.1: There are several SAHF countries lacking the capacity to provide basic AMET services such as terminal aerodrome forecasts (TAF), aerodrome warnings, and SIGMET information (for the country's flight information region(s)). Notably, such deficiencies are reported for Afghanistan and Bhutan. Lack of such products is considered a serious aviation safety issue.

Recommendation 5.1: Resolving the safety-related deficiencies mentioned above should be considered a top priority, which requires proper national planning with international financial and expert help. Focused projects and implementation plans should be in place with clear target dates for achieving compliance with international requirements.

QUESTIONNAIRE

for conducting a rapid assessment of the current status of the provision of Aeronautical Meteorological (AMET) Services by the SAHF States

Objective:

The objective of the Questionnaire is to collect updated information from the providers of the AMET Services (by default the NMHSs) concerning the existing institutional arrangements, funding, scope of services, technical capacity, and level of compliance with relevant international requirements. Through the collected information, to establish a baseline and to identify critical needs to be addressed as a priority, in order to enable advancements in the service provision as well as a potential for implementing a better business model, including cost-recovery.

Methodology:

The collection of information is to be conducted in two steps: 1) through written replies to the Questionnaire; and 2) through online interviews.

Targeted Responders:

It is expected that the Questionnaire will reach experts at NMHS responsible for the provision of AMET services. In addition, in case of engagement of the CAA of the State as a MET Authority, it would be useful to reach those at the CAA dealing with the AMT services. It will also be instrumental if the PRs are informed and eventually engaged in the process.

References:

- ICAO Annex 3 to the Convention on International Civil Aviation, Meteorological Service for International Air Navigation
- Guide to Aeronautical Meteorological Service Cost-recovery, (WMO-No.904)
- WMO Technical Regulations, Volume I (WMO-No.409)
- Compendium of WMO Competency Frameworks (WMO-Mo. 1209)
- Guide to the Quality Management System for the Provision of Meteorological Service for International Air Navigation (WMO-No. 1001)

Section 1: Information of the respondent

- Q1.1: Please provide your name and surname
- Q1.2: Agency you are representing
- Q1.3: Role
- Q1.4: Email address

Section 2: National regulatory and institutional framework on aeronautical meteorological (AMET) service provision

It is expected that each country (ICAO Contracting State or WMO Member State) has developed and promulgated a national legal and regulatory framework based on the international framework established by ICAO and WMO. This section of the survey is intended to collect information about the various national legal and regulatory frameworks, including existing deficiencies thereof (e.g. lack of or inadequate national legislation/regulation).

Q2.1: In your country, is the provision of the aeronautical meteorological (AMET) services covered by any legal act(s)?

- Yes
- No
- Unknown
- Q2.1a: If your answer to the question above is "yes", please provide detail (e.g., the Civil Aviation Act, Meteorology Act, etc.); if possible provide the exact name of the respective legal act.
- Q 2.2: Which entity/organization has been designated as the Meteorological Authority in your State in accordance with the ICAO Annex 3, p. 2.1.4?
 - The Civil Aviation Authority (CAA)
 - The NMHS
 - Other (e.g., Ministry of Transport, etc.)
 - There is no formal designation of Meteorological Authority
 - Unknown

Q2.3: Is the NMHS the main provider of AMET services in your country?

- Yes, for all services international and domestic
- Yes, for part of the services
- No, there are other providers of aeronautical meteorological services

Q2.3a: In case there are other providers of AMET services in your country, please provide details:

Q2.4: If the NMHS is the main provider of, are there any formal arrangements with the aviation users – airports, air traffic services providers, airlines, etc.?

- Yes
- No

Q2.4a: If your answer to the question above is "yes", please provide details:

- Q2.5: Please provide any other remark relevant to the institutional arrangements for AMET services provision in your country.
- Q2.6: What is the main funding mechanism for AMET service provision in your country?
 - Fully covered by the government budget
 - Fully covered by cost-recovery
 - Combination of government budget and cost-recovery
 - Combination of government budget, cost-recovery and commercial arrangements
 - Unknown

Section 3: Cost-recovery (optional section)

If cost-recovery for the provision of AMET services has been implemented in your country, please provide details by answering the questions in this section.

- Q3.2: What type of charges are included in the mechanism used to recover costs for the provision of AMET service?
 - Terminal charges
 - En-route charges
 - Ticket tax charges or levies
 - Specific national/regional charges
 - Unknown
- Q3.2b: If available and allowed to be disclosed, what is the percentage of the MET charges as part of the overall air navigation service charges in your country?
- Q3.3: Does your State include a portion of the cost of "core meteorological facilities" or services (core cost) in the cost-recovery arrangements for AMET service provision?

"Core cost" refers to a fair share of the costs for infrastructure like e.g. Numerical Weather Prediction, weather radar, satellite. Detailed information about "core cost" is available in the Guide to Aeronautical Meteorological Service Cost-recovery (WMO-No.904)

- Yes
- No
- Q3.3b: If your answer to the question above is "yes", please specify details, including the portion (as percentage) of the "core cost"
- Q3.4: Please provide any other remark that may be of use for this survey concerning cost-recovery

Section 4: Details on organization and technical capacity in the provision of AMET service

This section is intended to collect information on the technical capacity of the AMET service providers. The information, while not exhaustive, would serve as a "baseline" in determining the need for technical assistance activities in the future.

Q4.1: Number of Meteorological Watch Offices (MWO) responsible for issuance of SIGMET in your country

- Q4.2: Number of international aerodromes for which regular METAR reports are issued
- Q4.3: Number of international aerodromes for which TAF forecasts are issued
- Q4.4: Are there additional AMET services provided specifically for domestic aerodromes?
 - Yes
 - No
- Q4.4a: If your answer to the question above is "yes", please specify details about the additional AMET services
- Q4.5: Are international aerodromes equipped with automatic weather observing stations (AWOS)?
 - Yes, all
 - Yes, some (e.g. mixture of automatic sensors and manual input)
 - No
- Q4.6: Are the products of the World Area Forecast Centres (WAFS) available and used by the AMOs (please include also an estimate of the reliability of the telecommunication means used to receive these products)?
 - Fully utilized, no problems with telecom means
 - Utilized, some telecom outages
 - Utilized, frequent telecom outages
 - Not utilized
- Q4.6a: What are the main telecom means to receive the WAFS products (e.g., SADIS, ftp, internet, etc.)?

Q4.7: Are aeronautical forecasts (e.g., TAF, "trend" or any other forecasts for aeronautical users) regularly verified?

- Yes, all TAFs are verified on a routine regular basis
- Yes, periodically (quarterly, annually, etc.)
- Occasionally (e.g., case studies, or on demand)
- There is no regular verification of TAFs or other forecasts

Q4.8: Is SIGMET information issued for the flight information region(s) your country is responsible?

- Yes
- No

Q4.8a: Is there a cross-border coordination for SIGMET production with neighboring countries?

- Yes
- No

Q4.8b: If yes, with which countries?

- Q4.9: Is there a special requirement for issuing information for low-level flights (e.g., AIRMET)?
- Q4.10: Please provide information about products and services provided to pilots and airlines (i.e., briefing, flight documentation, etc.)

Section 5: QMS, competency and qualification

During the recent years, Members have been putting a lot of effort in ensuring compliance with the ICAO and WMO requirements related to quality management, competency and qualification of the aeronautical meteorological personnel. This section will provide information on the attained compliance of SAHF States and of any significant deficiencies.

- Q5.1: Has the AMET services provider(s) in your country established a properly organized Quality Management System (QMS), including an ISO 9001:2015 certification? Note: It is assumed that the NMHSs are the main AMET service providers in the SAHF countries, thus, the question is mostly directed to the NMHS of the country
 - Yes
 - No
- Q5.1a: If the answer on the above question is "No", is there a plan to implement QMS in the near future? By when? Please provide more details
- Q5.2: What is the current status of the competency assessment of AMET personnel (observers and forecasters) in your country in accordance with the competency standards of WMO (applicable since 1 December 2013)?
 - Fully implemented
 - Partially implemented
 - Not implemented
- Q5.2a: In case that competency assessment has not been implemented, what are the main reasons.

- Q5.3: What is the current status of compliance with the WMO qualification standard for AMET forecasters (applicable since 1 December 2016)?
 - Fully implemented
 - Partly implemented
 - Not implemented
- Q5.3a: In case that the qualification standard has not been implemented, what are the main reasons?

Section 6: Additional feedback on challenges and needs for improvement of AMET services

- Q6.1: Please mark the major challenges/needs faced by the AMSP(s) in your country by assigning ranks from "5 most important/urgent" to "1 least important at present" to the following service elements:
 - Quality of forecasts (TAF)
 - Issuance of SIGMET
 - QMS implementation
 - Competency of staff
 - Lack of qualified forecasters
 - Cost-recovery
 - Automation of aerodrome observations
 - Improved communication with airlines and other users
- Q6.2: Any additional comments on the challenges and needs for improved AMET services in your country

Responses by SAHF Members to the Survey on the current status of the provision of Aeronautical Meteorological (AMET) Services

The survey of the SAHF countries was conducted through an online Questionnaire containing six Sections. With the help of the RIMES, responses have been received from all targeted countries. Altogether, ten responses have been received since Afghanistan provided two different responses.

The respondents have been selected among the operational units for the provision of AMET services in each country, thus the overall quality and relevance of the information collected is satisfactory and will serve for deriving specific recommendations at regional and national level for the enhancement of the AMET services.

Some general findings could be mentioned, as follows:

- No country has implemented cost-recovery for the provision of AMET services. The service provision has been fully budgeted by the government.
- Several countries express the lack of cost-recovery as an obstacle for the development of better services. There is a general willingness to pursue the implementation, but the understanding is that the task is not in the hands of the NMHSs.
- The provision of the basic required services seems to be at an acceptable level. However, several countries express the need for more advanced services to be offered, providing that the appropriate equipment id made available (radar, wind shear, lightning detection, etc.).
- Half of the surveyed countries have implemented the QMS. The implementation of the related competency and qualification requirements is mostly "partly implemented". The need for further training has been mentioned in a couple of responses.
- Three responders report on the existence of coordination of SIGMET between neighboring countries. It is a proven good practice that should be expanded among the rest of the countries in the region.
- SIGMET is an issue in several countries. Also, specific MET services for low-level aviation need to be developed and harmonized.
- The respondents were asked to rank eight major challenges for their respective AMET services. The average results for the region are shown in the graph below.

