

**International Civil Aviation Organization
UNDP/ICAO REGIONAL PROJECT RLA/98/003
Transition to the CNS/ATM Systems in the CAR and SAM Regions**

**HUMAN RESOURCE PLANNING AND TRAINING FOR THE TRANSITION TO
CNS/ATM SYSTEMS**

1. Introduction

1.1 The human resource planning and training activities for the transition to CNS/ATM systems in the CAR/SAM regions were developed in two phases: the first one during the months of May and June and the second, during September and October 2001.

2. First phase activities

2.1 During this phase, the surveys to collect information related to human resource, ACC infrastructure and flight calibration/inspection in the CAR/SAM States were prepared. Reference and discussion material was also prepared regarding the different aspects to be considered by civil aviation administrations during the human resource planning for the transition to the new systems.

2.2 Review of CNS/ATM personnel profiles

2.2.1 The different elements that might contribute to define the desired profile for the personnel that will be working in an intensive automation environment, use of data link in aeronautical communications, application of the air traffic management concept regarding air traffic services integration, airspace management and air traffic flow management were reviewed. Automation aspects and their impact in human element (ATC personnel) were analyzed, as well as the considerations on the required profiles for the actual ATC and CNS personnel and in the CNS/ATM environment and the transition planning and definition of CNS/ATM personnel profiles.

2.3 Level and amount of human resources for the operation of CNS/ATM systems in the CAR/SAM regions

2.3.1 The study presented considerations on the aspects that should be considered during the human resource planning process, not only in the aspects related to the amount, but also in aspects related to personnel level of preparation.

2.3.2 It will be highly important to have qualified and sufficient personnel available for the operation and maintenance of the actual systems, while personnel for the operation and maintenance of the new systems is prepared. Personnel requirements will be different for each administration, according to the level of the actual ATS units' infrastructure in operation, emphasizing the automation level already available.

2.3.3 Finally, it will be necessary to make a careful evaluation in the planning process to define, taking into consideration operational requirements and according to the regional planning, the functions to be implemented, the number of personnel requirements, the profile desired, define if the personnel available is enough or not in order to determine the modifications to be introduced and the required training (basic, elementary, for the transition, refresher).

2.3.4 Furthermore, the adequate human resource planning for the transition to the new systems was considered, as well as CNS and ATM human resource planning, CNS and ATM personnel rationalization with the implementation of the new systems and preliminary measures related to human resource planning and training required for the transition.

2.4 Procedures for the transition to CNS/ATM systems

2.4.1 The transition from the actual to the new CNS/ATM systems should be gradually, as defined in the CAR/SAM Regional Plan. In this regard, ATM evolution will be progressive, using actual CNS resources while new CNS functions are installed. It should be pointed out that the evolution of CNS elements will always be directly related to the operational requirements, which will be the base for the introduction of new functions or improvements in ATM procedures.

2.4.2 It will be necessary to determine the evolution degree of the system and the modifications to be introduced. Based on the above, it will be possible to define technical and operational personnel requirements, training requirements and the need or not of complementary personnel, in order to develop a secure and organized transition.

2.4.3 Human resource planning for the transition should also consider the need to have trained personnel available for the reception and installation phases of the new equipment, monitoring tests, etc. These personnel should be separated from the normal staff of operation and maintenance of the actual systems to receive adequate training and additional personnel could be required to satisfy these requirements.

2.4.4 On this matter, automation requirements and their long term planning were considered, as well as the evolution process of the CNS/ATM systems and transition plan; administrative matters; previous training requirements; and personnel participation in the transition process and transition phases.

3. Second phase activities

3.1 The information received from the administrations was analyzed and processed with the purpose of obtaining a wide vision on the actual CNS and ATM personnel status in the CAR/SAM regions and evaluating personnel availability and training level in order to estimate the requirements for the transition phase and continuation of the operations with the new systems.

3.2 Results of the human resource planning and training surveys

Note: The analysis refer to the 17 CAR/SAM administrations that answered the surveys

3.2.1 The objective of the surveys was to obtain updated information related to the different aspects involved in human resource planning and training for an efficient operation and maintenance of the different systems and subsystems that characterize the CNS/ATM environment.

3.2.2 Surveys on human resources and their training were carried out to obtain information on:

- The actual status of CNS and ATM human resources;
- Area control centers infrastructure (ACC);
- Studies or criteria related to the determination of the required profiles for the personnel to be working in the new environment;

- Capacity and availability of aeronautical training centres to provide training on the new systems and procedures and, likewise, the possibility to support the administrations upon request;
- Status of flight inspection/calibration.

3.3 Preparation of surveys

3.3.1 When preparing the surveys, it was determined that the information collected from CAR/SAM administrations would not only assist project requirements, but also serve for other works or activities in the human resource area, as the GREPECAS HH. RR. Subgroup and informal meetings on the subject.

3.3.2 To reach the objectives, the following surveys were prepared:

- a) Survey on the status of ATM human resource planning and training in the CAR/SAM regions;
- b) Survey on the status of ACC infrastructure in the CAR/SAM regions; and
- c) Survey on the status of CNS human resources in the CAR/SAM regions.

3.3.3 Considerations on the responses received from the CAR/SAM administrations

3.4.1 The material provided by the States enable to obtain a reasonable vision of the human resources and ACC infrastructure and the status of the actual CNS/ATM human resource availability in the CAR/SAM regions.

3.4.2 This analysis allowed the formulation of some recommendations so that the administrations could properly advance in their human resource planning and training. Such planning will be basic to confront the challenges that the transition from the actual CNS/ATM functions, procedures and systems to the new systems and operational concept will represent.

3.4.3 Conclusions on the results of the analysis of the information provided in the surveys related to personnel training at ATM management and planning levels

3.5.1 A great number of personnel in the ATM **planning and management** areas of the CAR/SAM States have not yet reach the basic knowledge levels required for CNS/ATM transition.

3.5.2 The results are surprising taking into account the number of seminars, workshops, meetings, etc., that on these matters have been carried out in the last years. The explanation could be:

- That participants in CNS/ATM events are the **same** and no opportunity is given to other personnel from the administrations;
- That the participants in the events **do not transfer** the knowledge received to other members of the administrations;
- A **combination** of both situations.

3.5.3 Experience demonstrates, with some assertion, that the last case could be the most common situation in many CAR/SAM administrations.

Recommendation:

The project should keep supporting the holding of seminars and workshops for personnel of the administrations that present deficiencies in their knowledge of CNS/ATM matters. The seminars should be selective regarding the participants, giving priority to the administrations with major shortcomings and, through some mechanism, give the opportunity to personnel that have not participated before.

3.6 Results of the analysis of the information provided in the surveys regarding air traffic controllers (ATCO) training in CNS/ATM matters

3.6.1 A great number of ATCO personnel from the CAR/SAM States have not reach the basic knowledge required for CNS/ATM transition, planning and management. The reasons could be the same as before.

3.6.2 The following is recommended:

That

- a) ICAO regional offices ensure that administrations include in the ATC course, CNS/ATM material in the proper levels.
- b) ICAO regional offices, within the framework of RLA/98/003 project and in consultation with the administrations, coordinate the holding of CNS/ATM seminars for the ACC ATCO personnel.
- c) ICAO regional offices, within the framework of RLA/98/003 project and in consultation with the administrations, coordinate the holding of **workshops or courses** on ATM specific matters, functions or procedures for pre-operational or operational application to the selected ACC ATCO personnel (Example: longitudinal separation application based on RNAV distance and MNT in RNAV routes).
- d) the Coordination Committee considers the possibility of contemplating in the work program, activities related with items **b)** and **c)** above.

Notes:

- Each seminar should count, whenever possible, with ICAO participation;
- The administration personnel should, **by all means**, participate in the topics presentation.

3.7 Actual availability of ATM human resources (planning and operational levels)

3.7.1 The figures shown hereunder represent the human resource status to confront actual ATM requirements. The percentages refer to the administrations that answered the surveys (17).

- **Adequate: 25,00%**
- **Not adequate: 68,75**
- **No information: 6,25%**

3.7.2 Conclusions

- a) As per the above figures, only **25%** of CAR/SAM administrations that answered the surveys consider their ATM staff adequate for their actual needs.
- b) This significant deficiency (mainly ATCO personnel), associated to the cases of inadequate personnel training, may result in a negative impact in ATS quality and may affect air navigation safety and efficiency (See reports on ATS incidents).
- c) In addition to the above, as informed in the surveys, several administrations plan to modernize their units and re-sectorize their airspace, measures that, with no doubt, will require additional personnel.
- d) Finally, it has to be considered that during the transition phase, additional personnel will be required due to the need to separate personnel from their duty stations to receive specific training, staff increment for parallel operation of the units, etc.
- e) Although the information provided represents less than half of CAR/SAM administrations, they are indicative of personnel shortage, which may affect, in mayor proportion, the remaining of States of both regions.

Recommendation:

That ICAO regional offices consider the need of taking actions jointly with the States, through appropriate mechanisms (Grepecas informal meetings, etc.), adopting the corresponding (and urgent) measures on the shortcomings identified.

3.8 Capacity and availability of civil aviation training centres

3.8.1 Conclusions

3.8.1.1 From the information received, the following can be concluded:

- a) A significant number of training centers does not provide yet basic CNS/ATM training in the air traffic controller course;
- b) Only a reduced number of training centers would be in conditions of providing advanced training to ATM planning, management and operation personnel;
- c) Only a limited number of training centers consider to have the required conditions to support other States in CNS/ATM training matters;
- d) The survey has not identified specific training that could be provided by the training centers to personnel of other administrations. The study of this matter should be intensified in order to better evaluate the real conditions of the training centers in these matters.

Recommendations:

- a) ICAO regional offices should consider, through the appropriate mechanisms, the need to urge States to include CNS/ATM basic training in the air traffic controller course;
- b) Intensify and define the real conditions of the training centers considered capable to support other States;
- c) Determine the CNS and ATM type of training or topics that could be provided by the centers selected, according to their conditions.

3.9 ATM personnel profile

3.9.1 In this part of the survey, the administrations criterion for the recruitment of candidates for the air traffic controller course was investigated, as well as the desired profile for the ATCO that will be working in the new systems environment.

3.9.2 In connection to the above mentioned matters, no significant percentages can be noted in order to identify the firm tendency of the States on these matters. On the other hand, the small amount of responses received has shown it is not prudent to make estimations on topics of known sensibility. Anyway, in the project documentation extensive information is provided.

3.9.3 The survey has also showed that some States have as pre-requisite two years of a university course for the air traffic controller course. Furthermore, it should be pointed out that one State already grants the upper level degree to the personnel graduated from the air traffic controller course.

3.9.4 The transition to CNS/ATM systems will require from the air traffic controller more refined basis in intellectual aspects, as in abilities for specific and complex tasks, which are not common in most of the actual CNS/ATM systems. The demands for the controller wrking in a more advanced CNS/ATM environment will, naturally, be greater. The performance of more complex functions, the high technology and automation environment, the new characteristics of the air traffic controller will have to be added to the required qualifications.

3.9.5 The candidates' selection process for ATCO courses will be more severe each time, looking for personnel with the highest preparation level and natural conditions adjustable to the new environment. A career that turns more demanding should be more attractive in every aspect. Additionally, it is fair to recall ATCO's responsibility that has to deal daily with situations requiring soon and lonely decisions involving thousands of people safety.

3.9.6 In depth studies should be made at GREPECAS level with the ATM Committee participation.

Recommendation:

That the Coordination Committee consider the convenience of including specific tasks in the work program of the GREPECAS ATM Committee regarding the required ATM personnel profile, taking into consideration the material developed by the project.

3.10 Results of the ACC infrastructure survey

3.10.1 The purpose of the survey was to search information on the actual ACC status of the CAR/SAM regions. Basically, information has been requested on the following: operational systems, ATCO personnel, FIR organization, ACC internal organization, etc. From the responses received from 21 ACC, the following can be summarized:

Operational conditions:

- 11 ACC have automated functions
- 2 ACC have semi-automated functions
- 8 ACC have conventional functions (manual)

Availability of air traffic controller personnel (ATCO):

From the 21 ACC, 16 units informed deficit in their actual ATCO staff. The deficiencies are between **10%** and **71 %**. Additionally, several administrations informed on their plans to re-organize their FIR airspace, increasing the number of sectors. Such airspace re-organization will result in an increment on the deficit indicated.

3.11 Results of the flight inspection/calibration survey in the CAR/SAM regions

3.11.1 The survey sent to the CAR/SAM administrations searched information on the actual status of the flight inspection/calibration service in the regions, specifically on the resources used or if the same or another administration performs it, under some type of contract or bilateral arrangement.

3.11.2 From the information received, it can be summarized that **60%** of the administrations **perform** the flight inspection of the actual CNS systems with their **own air means and personnel**. The **remaining 40%** performs such service **under contract** with other administrations.