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Guidelines for Selection Procedures and Tests for *Ab Initio* Trainee Controllers (Revised)

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Abstract		
<p>The Selection Task Force (STF) of the European Air Traffic Control Harmonisation and Integration Programme (EATCHIP) Human Resources Team (HRT) has produced guidelines for the establishment and application of procedures and tests for the selection of air traffic controller candidates (<i>ab initio</i> trainee controllers) in European Civil Aviation Conference (ECAC) States. The guidelines describe the methods used and the results obtained by the STF. The guidance material includes recommendations regarding the strategic and tactical aspects of implementing selection activities (procedures and tests) and the use of 'Best practices' in selection activities. The total selection process was examined. As far as possible recommendations are related to common practice as identified in a survey of ECAC States undertaken by the STF. This document replaces HUM.ET1.ST04.10000-GUI-01. The old 1996b issue will be superseded once this document is available.</p>		
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EXECUTIVE SUMMARY

This document reflects the work of the First Selection Task Force (STF) and other selection experts of the Human Resources Team (HRT) of the European Air Traffic Harmonisation and Integration Programme (EATCHIP).

The document is intended to assist managers in national Air Traffic Service (ATS) administrations in the development and implementation of procedures and tests for the selection of *ab initio* trainee controllers.

The selection of *ab initio* trainees is examined from a systemic perspective. All pertinent selection activities, from policy related issues to tactical implementation aspects, were considered. With these issues in mind the document gives clear descriptions of the methodology in line with defined purposes or rationales.

A Group of Selection Experts (Selection User Group) has reviewed this document to identify areas in the original document in need of update / revision and amendments. The group based its considerations on findings in a Guidelines Implementation Survey and with a view towards new developments in the Selection Core Drafting Group (CDG). The CDG was established by the Manpower Sub-Group (MSG) as the expert working group in the Human Resources Programme (HRS), Manpower Sub-Programme (MSP), for the Work Package "First European ATCO Selection Test-package (FEAST)" (HRS/MSP-002).

This document reflects the changes adopted by the group. Chapter 1, "Introduction", describes the background, purpose and scope of the document. It also details the activities of the Task Force and the work method used.

Chapter 2, "Planning and Resourcing", relates manpower planning issues to the activities in the planning and administration of selection procedures.

Chapter 3, "Basic Requirements", deals with basic medical standards and requirements regarding age and education.

Chapter 4, "The Selection Process", deals with the methods used in the various selection stages. It describes ability, knowledge and personality criteria that should be tested or assessed in the selection process.

Chapter 5, "Quality Assurance and Control", suggests methods whereby quality in standardisation, documentation and training can be assured, with an emphasis on quality issues in providing a selection service.

Chapter 6, "Future Perspectives, Developments and Concepts", addresses future research and development issues with regard to selection.

Chapter 7, "Summary of Guidelines", summarises the guidelines for the development and implementation of selection procedures and tests.

Additional information regarding the then existing situation on the selection of Air Traffic Controller (ATCO) candidates in European Civil Aviation Conference (ECAC) States and a

description of major issues in quality systems are given in the Annexes. The Annexes also contain References, a Bibliography of relevant books and articles on selection, Definitions and a list of Abbreviations and Acronyms.

This document replaces HUM.ET1.ST04.10000-GUI-01. The old 1996b issue will be superseded once this document is available.

1. INTRODUCTION

This document should be read in conjunction with the Human Resources Business Plan of the EATCHIP Work Programme (EWP) Document (EATCHIP, 1993).

The first Human Resources Team (HRT) meeting in March 1994 approved Specialist Task HUM.ET1.ST04 entitled "Establish guidance material for selection procedures and tests".

Subsequently, a Task Force under the direction of the HRT was established by the then Manpower Sub-Group to deal specifically with the job of air traffic controller. The STF (Air Traffic Controller) began its work in November 1994 and reported directly to the HRT.

The STF's mission was to produce guidelines and recommendations for ECAC States establishing and applying procedures and tests for selecting air traffic controller candidates (*ab initio* trainee controllers). The STF was dis-established in November 1995 when its work was completed.

A Group of Selection Experts have reviewed this document in May 2000 to identify areas in the original document in need of update / revision and amendments. The group based its considerations on findings in a Guidelines Implementation Survey and with a view towards new developments in the Selection Core Drafting Group (CDG). The CDG was established by the Manpower Sub-Group (MSG) as the expert working group in the Human Resources Programme (HRS), Manpower Sub-Programme (MSP), for the Work Package "First European ATCO Selection Test-package (FEAST)" (HRS/MSP-002).

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1.1 Purpose

The primary purpose of these guidelines and recommendations is to help national administrations in ECAC States identify, develop and implement selection systems suitable to their needs and in accordance with Convergence and Implementation Programme (CIP).

A second purpose is to assist managers responsible for choosing and using effective selection methods to make judgements regarding which elements best suit their circumstances. The application of 'Best Practices' in selection procedures will assist managers to increase and assure the quality of selection procedures and tests in use.

1.2 Scope

Within its general scope the Task Force followed the recommendations of the HRT to:

- define a common yardstick for assessing the success of selection;
- gather information on selection procedures and tests in Europe;
- produce appropriate guidance material.

The scope of these guidelines covers the guidance material, related information gathered during Brainstorming Sessions (see next sub-chapter) and information gathered in an ECAC - wide survey.

An analysis of this data was undertaken to identify common areas of interest as well as problem areas to be considered in more detail in the guidelines.

The guidance material includes recommendations for the strategic and tactical aspects of implementing selection activities and the use of 'Best Practices' (procedures and tests). As far as possible the recommendations are related to common practice as identified in the above-mentioned survey.

1.3 Relevant Selection Issues

The STF identified during facilitated Brainstorming Sessions relevant selection issues in regard to the question: "Which activities in the selection of ATCO candidates do we have to consider?" - in order to begin gathering ideas on the subject.

Table 1 summarises the issues brought forward by the group in regard to 2 levels of main activities and corresponding task areas.

Table 1: The selection process: main activities and corresponding task areas

LEVEL 1: MAIN ACTIVITIES	LEVEL 2: TASK AREAS
POLICY AND PLANNING	<ul style="list-style-type: none"> - Manpower Policy and Planning - Selection Policy and Planning
MARKETING	<ul style="list-style-type: none"> - Information - Advertising
BASIC REQUIREMENTS	<ul style="list-style-type: none"> - Medical Requirements - Age - Minimum Educational Requirements - National Obligations
APPLICATION FORM	<ul style="list-style-type: none"> - Content of Application Form - Design/Layout of Application Form
ABILITY AND PERSONALITY TESTS / ASSESSMENTS	<ul style="list-style-type: none"> - Basic Requirements - Areas to be tested - Available Ability and Personality Tests Questionnaires and their Effectiveness - Test Procedures - Assurance of Test Quality
INTERVIEW	<ul style="list-style-type: none"> - Purpose of the Interview - Areas to be covered - Methods available - Interview Procedures - Assurance of Interview Quality
COST - BENEFIT	<ul style="list-style-type: none"> - Cost - Benefit Analysis

A complete list of task statements is given in [Annex A](#), "Task Cluster and Associated Sub-tasks in Selection".

Information obtained during the Brainstorming Sessions was used to define the baseline and the scope and content of the work, to design a survey questionnaire, and to identify problem areas that should be considered in more depth.

1.4 Data Gathering on Selection Procedures and Tests

Using a questionnaire the Task Force contacted representatives in ECAC States in order to gather information on selection procedures and tests in use. A total of 25 out of 30 States contacted answered the questionnaire.

This data was collated and analysed and a description of the main results prepared. These descriptions were later used to describe common practice in the present guidelines.

A description of the main results obtained is supplied in the [Annex B](#), "Situation of ATCO Candidate Selection in ECAC States".

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2. PLANNING AND RESOURCING

The two main areas to be addressed by Human Resources Management in Air Traffic Services (ATS) are:

- a manpower plan which defines the number of controllers required;
- a selection process which determines how they will be provided.

A manpower plan of necessity precedes the selection process either in detailed long-term form to cater for large numbers of staff or simply ad hoc where there is a clear staffing requirement.

2.1 Manpower Planning

A manpower plan must provide for a sufficient number of qualified controllers, within the required time frame, to meet ATS demands.

Providing ATS with suitable candidates requires a complex structure and heavy investment in the training of *ab-initio* trainees. It follows that a manpower plan should effectively plan at least 5-10 years in advance. The plan must be conceived in such a way that it can set the selection process on the right track. It must establish, within national or corporate constraints, the very basic criteria for selection, e.g., age, minimum educational standards.

A manpower plan needs to run more than 5 years as this is close to the average time between the moment a decision to recruit is taken until a candidate can be considered as truly productive, having completed all necessary training, both institutional and operational.

2.1.1 Manpower Planning Methodology

A manpower plan must determine the actual requirements. It must allow for:

- present staff allocations;
- retirements, due to age, foreseen within the duration of the plan;
- loss of staff due to other factors such as external recruitment, medical etc.;
- forecast traffic growth;
- improved technology;
- efficiency gains through changes in working practices

to be taken into account, as well as, must take account of national or corporate ethos and policies.

This will have an effect on the type of candidate being sought. Manpower planners must consult with the training authorities so that any potential intake of students can be accommodated in the classroom and simulator facilities available. It may be necessary to compile a list of training courses available outside the ECAC State concerned. A plan must ensure that once institutional training is completed there will be sufficient On-Site Training capacity available and that a saturation of such facilities will not occur¹.

Because of the high cost of training the plan should seriously examine the level of remuneration offered to candidates during training. The level should be economic but should not result in obtaining candidates of a lesser ability.

A plan must allow for all appropriate legislation and must ensure that the selection process complies with such legislation. This will include items such as equal opportunity employment and may include a male/female staffing balance. Language may also be an item in this category.

A manpower plan must also allow for future changes in work practices. Candidates must have an educational ability, which will allow them to adapt easily to changing traffic patterns and the technologies used to control them.

Detailed guidelines and reports are available in EATCHIP and EATMP on the manpower planning process (EATCHIP, 1996a; 1998a, 1998b, 1998c; EATMP 1999b; 2000a) and advanced manpower planning methods and tools have been released (EATMP, 2001a).

Guideline 1: Manpower Plan

In order to provide a sufficient number of qualified ATCOs within the required time frame a manpower plan covering at least 5 years should be in place. The plan must take account of the actual requirements for staff allocation, planned retirements due to age and staff reductions due to other factors.

2.2 Selection Process and Policies

2.2.1 Selection Process Policy

A selection process derived from a manpower plan must allow for the intake of sufficient numbers of *ab initio* trainee controllers.

The actual selection process may be achieved in a variety of ways but the main items must be clearly defined and well documented.

Those involved in the selection process must have clearly defined goals. It is most important that the selectors, particularly if they come from an external source, understand what is required of candidates. This must be established at a very early stage. The success of the selection process must be measured against this stated final goal.

¹ For further details see EATMP (1999a).

Selection must be fair to applicants. Its processes must be transparent to all participants (applicants and staff). It must meet national and/or corporate objectives and must ensure the selection of candidates of the appropriate calibre.

The policies may also determine whether potential candidates must be nationals of the State concerned and have fulfilled all necessary obligations such as military or other public service.

The selection policy must try to ensure cultural fairness. The design of tests as well as their application and marking should allow for cultural differences so that no applicant is disadvantaged. Much research remains to be done on cultural fairness in international recruiting but the problem rarely exists within individual States.

Selection policy must state whether applicants can undergo the process more than once.

Selection and manpower personnel must ensure that adequate co-ordination takes place between operational management and staff on the criteria used in the selection process. These criteria must be transparent to both management and staff if credibility is to be maintained.

Before embarking on a 'Paper Sift' (PS) and throughout the selection process it is important to clearly define exceptions, if there are to be any, to published requirements. These may include allowing a lower educational standard or higher age limits for those with previous aviation related experience, higher age limits for those involved in national defence or security forces etc.

An early decision must be taken on which criteria should be used for eliminating unlikely candidates before further testing through a PS. This mechanism is used where there are large numbers of applicants, and resources to assess all of them are not readily available. It may be seen as a pre - selection tool.

Before embarking on the selection process it would be appropriate to define a policy on the reimbursement of costs incurred by applicants. It should be borne in mind that any policy defined should be equitable and not deter suitable applicants who may be inhibited from presenting themselves because of travel and accommodation costs. The terms of this policy should be clearly indicated to applicants.

The selection process will benefit from a feedback mechanism post selection. It is imperative that such a feedback mechanism is established so that the success, or failure, of the selection process can be determined. The policies on selection can also be updated in light of developments at each selection stage.

The selection criteria must allow for a 'drop out rate' following recruitment. This loss of personnel will be attributable to a number of factors amongst which will

be failure to progress through the courses, dissatisfaction with the job itself, a realisation that the candidate is over or under-qualified etc.

Policy in regard to appeals mechanism, or requests for information once the selection process has been completed, should be established at an early stage. The selection board, and others involved in the administration of selection tests, should be aware of all details of the policy, so that proper documentation of results and assessments will enable appeals and requests for information to be adequately dealt with.

Applicants should be advised of the broad details of an appeal/request for information procedure.

Guideline 2: Selection Policy

A well documented selection policy must be defined and must be in accordance with manpower planning requirements. It must allow for the intake of sufficient numbers of *ab initio* trainee controllers of appropriate calibre by applying fair and effective selection methods.

2.2.2

Selection Plan

The selection plan must outline

- the selection time scale;
- the location of the selection facilities;
- the duration of the tests;
- a well defined procedure for handling appeals and complaints.

Details of available accommodation and public transport to the selection facilities should allow applicants to make all necessary arrangements to present themselves at the appointed time.

The plan must establish criteria to ensure the confidentiality of the selection process. It must not allow for any external interference in the process and must be seen to be fair to all applicants. The results of the selection process must not be available beyond those who actually need to know.

The plan must specify whether an interview or a complex testing system is to be used in the selection process. If the testing is complex it must be clearly understood what is being tested - e.g. abilities, knowledge, skills, personality.

Guideline 3: Selection Plan

A selection plan must give relevant details to applicants concerning the selection administration and the selection procedures used.

2.2.3 Publicity and Marketing

A publicity programme associated with a recruitment drive can be a major factor in attracting an acceptable number of candidates of the right calibre in regard to both education and personality. This "marketing" of the positions on offer must be designed to reach the appropriate audience, at the right time, in order to ensure fully cost-effective use of the publicity.

The use of television only is not cost-effective. Advertising only in aviation related magazines might similarly not be the most effective way to communicate the message. Placing advertisements in daily newspapers is in fact one of the most effective methods as job-seekers are well used to scanning their pages for potential posts. "Niche" magazines can also be used and should be considered.

Advertising media should be selected on the basis of proven principles.

- National daily newspapers obviously reach large numbers of potential applicants.
- Radio is also very effective but care must be taken with the timing of the advertisement. The nature of radio stations must also be taken into consideration. It is probably not worthwhile to place a contract with a station geared to the over 30s etc.
- Magazine advertising is also very effective. Select magazines aimed at the target age group.
- Advertising in aviation related magazines would yield applicants with an obvious interest in the specific environment.
- The Internet offers a viable platform for educating and informing potential applicants about the ATCO job.
- Cinema advertising can also be a cost-effective method for informing potential applicants about the ATCO job.

Whatever media is selected the design of the advertisement is important. It must:

- be attractive,
- be informative,
- try to convey the concept behind the job.

In setting up a web page, it is important to keep the site simple but informative, make it appealing to the younger population, provide accurate and update information and provide links to other relevant sites as appropriate. (More detailed information on the Internet as a marketing media is given in EATMP, 2001b,c).

Information should be designed in such a way that potential candidates feel it is unambiguous. It must contain all relevant details on educational and age requirements, and if an information pack is not available for separate dissemination, it must also contain details of the selection process, detailing:

- any costs to be borne by the applicant;
- costs covered by the administration;
- probable date of the selection;
- expected date of employment of successful candidates.

The timing of the campaign is critical and must be geared to the academic year, regardless of whether the entry qualification is degree level or university entry level. If the advertising campaign begins too early there is the automatic elimination of a whole year's potential. If it is too late, the best applicants may already have found other employment or may be on waiting lists and are "playing the field" in the meantime. In these latter cases it will be quite difficult to have a cost-effective campaign.

EATMP (2000c) gives the results of an initial study of the marketing and communication of the ATCO job in Europe based on survey results. The document identifies the perceived positive and negative images related to the job and the tangible and intangible job elements. The document also provides a generic job marketing and communication strategy and concept together with marketing and communication action sheets.

Guideline 4: Publicity and Marketing

Advertising and presentation material must be designed to address and attract an appropriate audience at the right time and in a cost-efficient way.

2.2.4 Information for Applicants

Where possible an "Information Pack" should be prepared which will give details of:

- the selection methods to be used;
- the time of the testing procedures, if used;
- the location of the testing;
- possible costs to be incurred by the applicant;
- details of remuneration during training;
- an outline of the salary progression which can normally be expected;

- the location of the training centre;
- a list of possible working places;
- job information.

The pack may also contain some information on the hours of work and the distribution of those hours.

Where possible, applicants should be afforded an opportunity to visit an operational unit. This gives applicants an opportunity to decide for themselves whether they wish to proceed with their application and if they do, the interview board will be able to assess their powers of observation. Those really interested in the job are quite likely to have gained some background information from controllers to whom they speak and will have formed some opinion of the job. Enthusiasm for the job will be clearly demonstrated when an applicant can give an accurate picture of what was seen in a short period of time.

Guideline 5: Information of Applicants

Applicants should be informed about the selection process, training after recruitment and the Air Traffic Controller job itself in order to attract highly job-motivated people.

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3. BASIC REQUIREMENTS

3.1 Medical Requirements

By applying prescribed medical standards and methods it can be ensured that controller candidates have the level of health required to carry out the duties of an ATCO (e.g. eyesight requirements, irregular working hours).

In general, prescribed International Civil Aviation Organisation (ICAO) standards and valid national standards and prescriptions have to be applied. Information available from States indicates that more than 83% apply ICAO Standards Classes 1 - 3 with 50% applying ICAO Class 3. The present ICAO medical requirements (see Annex 1, ICAO, 1988) meet those of most ECAC States. New Medical Requirements for ATCOs will be issued which intend to satisfy the Medical Requirements of the EUROCONTROL Safety Regulatory Requirement for ATM Services' Personnel (ESARR5) in the ECAC area (EUROCONTROL Safety Regulation Commission (SRC), 2000)².

The cost of ensuring that applicants meet the stipulated medical standards is normally borne by the recruiting authority. Medical testing of applicants before they undertake selection tests or other kinds of assessment is obviously a waste of resources since all applicants will not be recruited. For this reason most recruiting administrations only perform a medical examination of those applicants who have successfully completed the selection process and whom they intend to recruit.

Inevitably, medical failures still occur at this stage and is a waste of valuable places in the selection procedure. Most failures to meet ATCO medical standards are due to eyesight deficiencies, either visual acuity or colour vision or hearing deficiencies. A reduction in the number of applicants reaching this point in the selection process and failing would be considerable if applicants were required to provide proof, at their own expense, of the fact that they meet certain medical standards. When applicants are sent an application form or invitation to selection testing they could also be provided with a document (e.g. "Eye Test Certificate ") which clearly states standard vision requirements for the job and instructs them to have the document certified by a competent medical practitioner. The cost and effort required to do this should not be a deterrent for a properly motivated applicant.

It will also be worthwhile adopting this procedure in other medically important areas as hearing.

² Reference is made to Chapter 12, Air Traffic Control Safety Regulation Procedures-Medical, in the document EATMP Human Resources Team (2000). European Manual of Personnel Licensing – Air Traffic Controllers (HUM.ET1.ST08.10000-STD-01). (Edition 1.0). Brussels: EUROCONTROL.

Guideline 6: Medical Requirements

In general, prescribed ICAO standards and valid national standards and prescriptions have to be applied in the medical tests of applicants who have successfully completed the selection process. Applicants should however be required to provide proof, at their own expense, that they meet eyesight and hearing standards before they undergo selection tests or other kinds of assessment.

3.2 Age

An important part of the selection policy to be agreed upon within the organisation is to clearly define the lower and upper age limits for direct entry.

When defining a lower age limit, legal and other national obligations have to be fulfilled (e.g. concerning acquisition of a controller licence). The maturity and sense of responsibility of candidates entering the service should be taken into account when setting age limits.

When defining an upper age limit, a number of factors should be taken into account e.g. the risk of training failures related to learning abilities, working lifetime, duration of the training, mixed age group, flexibility, alertness, decision speed.

Experience has shown that the ability to acquire the skills necessary for executing Air Traffic Control (ATC) duties begin to decline at a relatively early age.

Age and experience tend to act in opposite directions. Older controller candidates have developed skills based on experience that to some extent can offset the negative effects of age. After a controller has been trained his/her increased experience may counteract the effect of age but the extent to which it does depends upon the individual.

It becomes more difficult to train controllers as they get older especially if they cannot use their experience and expertise. Older controllers may have more difficulty adapting to evolutionary changes in the design and operation of the ATC system. Further, new skills cannot be learned as easily by older controller candidates because some well established habits and cognitive strategies have to be broken or changed.

Around half of ECAC States canvassed by questionnaire have an upper age limit of 25 years or less.

Guideline 7: Age

Upper and lower age limits for candidates must be clearly defined. Consideration should be given to legal and other national obligations as well as to economic, educational and psychological factors when defining age limits.

3.3 Educational Requirements

Candidates must have attained a level of education sufficient to enable them to acquire the skills necessary for the job and the knowledge and understanding of the concepts encountered during ATCO training.

Although a good level of education is required, academic over-qualification might lead to problems due to boredom or job dissatisfaction.

There are two ways of ensuring that applicants have attained the stipulated education level:

1. by requiring them to produce established, recognised and accepted certificates (e.g. Abitur, Matura),
2. by subjecting them to tailor-made examinations.

Common practice in ECAC States is to require University Entrance Level (Matura, Abitur etc.) qualifications as the minimum educational level for *ab initio* trainee controllers.

ATCOs are also required to have a knowledge of the English language. Applicants may be required to prove that they have reached a certain standard (e.g. comparable to Cambridge First Certificate) or may be trained to the required level after recruitment³.

Nearly 75% of the non-English speaking countries surveyed require ATC applicants to have pre-knowledge of the English language while 55% of these States provide English training after recruitment.

In exceptional circumstances exemptions from normal educational requirements and upper age limits may be granted to applicants who have undergone a technically orientated secondary school education or who have a certain basic pre-knowledge of aviation (e.g. holders of radio-telephony, military or civil ATC, or pilot's qualifications).

³ Note that in EATCHIP an English language proficiency test for ATCOs, intended to be administered at the end of institutional training, is available (EATCHIP, 1995). The test 'Proficiency in English Language for Air Traffic Controllers' (PELA) is updated as required.

Previous experience in aviation can be an advantage but may also be a drawback, for example in those cases where incorrect or outdated knowledge has been absorbed or unsound skills or practices acquired.

Guideline 8: Educational Requirements

The level of general education required of candidates must be sufficient to enable them to acquire the skills necessary for the job and the knowledge and understanding of the concepts encountered during air traffic controller training. Applicants may be required to prove that they have reached a certain standard in the English language.

3.3.1 National Obligations

The obligation to perform military or civil service is a factor in approximately two-thirds of the States surveyed. Absence for the long period normally associated with such national service after ATC training is likely to lead to a rating decline and / or loss of validation. It is therefore desirable that basic military or other public substitute service is completed before beginning ATC training.

Applicants will also have to meet national security requirements defined for ATS personnel.

Guideline 9: National Obligations

Applicants will have to meet national security requirements defined for air traffic control services personnel.

4. THE SELECTION PROCESS

This chapter describes the implementation of the selection plan.

Selection can be seen as a filtering process. The information needed is different for each step of the filtering process. Unnecessary data collection should be avoided for reasons of efficiency and also to respect an applicant's privacy as long as possible. A systematic and well planned procedure allows the efficient collection and processing of information.

When executing the plan, three distinct phases in the selection process can be identified:

- registration and acceptance of applicants;
- pre-selection on conditional aspect;
- final selection.

These three phases are further explained below.

4.1 Registration and Acceptance of Applicants

The traditional response to a vacancy notice is an application letter. When large numbers of applicants are involved however this is not the most effective way to obtain selection data. A well-designed application form can help to collect the appropriate information in a systematic way and ensure the validity of an application by means of a legal declaration or affirmation by an applicant.

Nearly all European States already use application forms, ranging in size from single-page to multi-page, according to national practices and needs. Examples show that application forms mostly serve the purpose of collecting all relevant information for the personnel department to employ a member of staff once he or she is selected. This form is not always the best choice in order to contribute to the selection of ATC applicants.

When designing an application form it should be borne in mind that information gathering should not be an end in itself and that all information requested should be strictly relevant to the selection decision.

All unconditional requirements for a valid applicant should be identified in the first phase and be used to decide whether or not an application can proceed. Depending on national law and/or selection policy the following items will normally fall into this category:

- military obligations,
- nationality,
- languages (spoken and/or written),
- security clearance,
- basic requirements (education level),
- basic medical conditions (e.g. eyesight requirements),
- age.

Care should be taken that only basic requirements are examined in this first phase. Additional information should only be requested of applicants if they are invited for the final selection.

Guideline 10: Registration and Acceptance of Applicants

An application form should be designed to collect only relevant information in a systematic way. It should allow suitable potential candidates to be identified and should ensure the validity of the application by means of a legal declaration or affirmation on the part of the applicant.

4.2 Pre-selection

The object of pre-selection is to increase the percentage of valid applications reaching the final selection process in a structured and standardised way. Cost-effectiveness is considered an acceptable argument for applying some kind of pre-selection. Pre-selection in its simplest form can be a 'paper sift' or in a more complex form could comprise questionnaires, preliminary interview or even some form of testing.

When dealing with large numbers pre-selection using PS is common practice. Care should be taken when defining appropriate criteria and score keys for PS. To ensure that pre-selection is done in an efficient, fair and transparent manner the quality requirements and standards discussed in more detail in Chapter 5 should be applied as far as possible.

It should also be kept in mind that decisions are based on a restricted amount of information provided by applicants at this level.

Preliminary interviewing can be used if clearly defined criteria that can only be obtained from an interview can establish whether to reject/accept applicants.

EATMP (2001b) gives detailed descriptions of methods and tools in pre-selection of applicants.

Guideline 11: Pre-selection

Where possible procedures should be in place to pre-select suitable potential candidates in a structured, cost-effective and standardised manner, to increase the percentage of valid applications and to present an appropriate number of applicants to the final selection process.

4.3 Final Selection

The final selection is normally directed at identifying those candidates that meet the required abilities, knowledge, skills and personality to be successful as ATCOs.

The following sub-paragraphs discuss the basic tests that provide information on the applicants: ability testing, knowledge testing, personality assessment and interview.

4.3.1 Ability Testing

In the ECAC States surveyed the great majority (88%) conduct ability tests covering a broad range of cognitive abilities in the selection process.

Most tests applied in the States surveyed in 1995 were of the so-called “paper and pencil” variety where test items are either printed on paper and answers have to be given in writing or marking, or where test items are presented via tape or slide and answers have to be marked on an answer sheet. Computer-based tests were at that time used by some ECAC States only and were often limited to those tests requiring more highly evolved techniques (e.g. when testing multiple task abilities). A recent survey on selection methods for *ab initio* trainee controllers showed that the picture has completely changed and that computer-based testing is more common now as the sole or main means than paper and pencil testing (see EATMP, 2000b).

Typical and relevant ability areas that are tested are described in the following. The areas for testing given reflect current best practice. But this will change in the future (see CAST, 1999 a,b,c).

1. Memory Functions

The ability to memorise and retrieve from memory visually and/or verbally coded information. Memory can be short-term or long-term.

Short-term memory is the ability to recall precisely a piece of information after a short period of time.

Long-term memory is the ability to learn something and recall it after a long period of time.

79% of the States surveyed apply tests to measure short-term memory and 54% apply long-term memory tests.

2. Attention

Important aspects of attention are concentration, vigilance, divided attention and selective attention.

Concentration: The ability to direct attention to a task for a long period of time. The tasks may be monotonous, tasks of varying difficulty and/or tasks of a distracting nature.

Vigilance: The ability to respond to specified infrequently and seldom occurring events in a stream of irrelevant events over a long period of time.

Divided attention: The ability to direct attention to different tasks simultaneously in an efficient and effective way (see also multiple task abilities under point 7. of this sub-chapter).

Selective attention: The ability to direct attention to one of several sources of information by switching the focus of attention i.e. without being distracted by other or irrelevant information.

Concentration tests are applied in 75% of ECAC States while 58% conduct vigilance tests.

3. Logical Reasoning

Logical Reasoning is the cognitive ability to find and apply rules in various task situations using verbal, mathematical or other abstract material. The assessment of logical reasoning is traditionally done by applying a kind of intelligence test.

Intelligence tests are applied in 42% of the States surveyed.

4. Mental Arithmetic

The ability to perform numeric computations quickly and correctly in the mind.

About two-thirds (67%) of the States surveyed conduct tests to assess mental arithmetic ability.

5. Perception

The ability to perceive relevant visual or auditory information quickly and accurately.

Perception tests focus either on the speed of presentation or on the presentation of incomplete material.

Tests of perceptual speed and/or accuracy of perception are applied by 71% of States surveyed.

6. Spatial Comprehension

Spatial comprehension has the following two aspects:

Spatial Orientation: The ability to maintain orientation with respect to objects as the direction and location of a body (the frame of reference) changes.

Visualisation: The ability to construct an appropriate three-dimensional mental image from given information.

Most visualisation tests require a prediction of what an object or pattern would look like after certain changes (e.g. rotation) are made.

Spatial orientation tests are applied in 71% of ECAC States.

7. Multiple Task Abilities

The ability to perform and prioritise multiple activities at the same time.

In nearly two-third (63%) of the States surveyed tests are conducted to assess the ability to perform multiple activities (multi-tasking).

Guideline 12: Ability Testing

The following cognitive abilities should be assessed by means of ability tests: memory functions, attention, logical reasoning, mental arithmetic, perception, spatial comprehension and multiple task abilities.

4.3.2 Knowledge Testing

Knowledge is the job-specific content or information that a person has gained through training, education and/or experience. The knowledge is used to perform job tasks. For ATC duties, English language is a typical example of knowledge area that should be tested in the selection process.

About 50% of the States surveyed apply English language tests in their selection procedures.

Guideline 13: Knowledge Testing

A knowledge of the English language should be tested during selection.

4.3.3 Personality Assessment

Personality factors are considered next in importance to ability factors when selecting ATCO candidates. In fact, about two-thirds of States surveyed conduct some sort of personality test or assessment during the selection process.

It should be noted that as far as personality is concerned there are no absolutes and it is not recommended that personality tests alone be used as the selection method. Personality tests can however help to provide a more complete picture of a person. Care must be taken in order to correctly interpret and use these data during selection and decision-making.

Personality factors that can be considered relevant are as follows:

1. Motivation and Achievement

The maintenance of energy and persistence in order to reach an objective despite obstacles and difficulties, boredom and distraction while maintaining a positive attitude towards the task.

Indicators of this factor are: need to achieve, persistence, resilience, vitality, readiness to acquire new knowledge and skills, responsibility.

67% of ECAC States conduct tests to assess the motivation and achievement need of applicants.

2. Decision-Making Behaviour

The ability to make the correct responses in complex situations where several reactions are possible, taking time pressure into account.

Related personality traits are: flexibility, creativity and dominance.

Decision-making behaviour is assessed by 59% of States in the selection process.

3. Social Behaviour

The need to develop contacts and working relationships with other persons and to act accordingly.

Related personality traits are: Extroversion vs. Introversion, Dominance or Assertiveness, Empathy, Aggression etc.

In interpersonal and group activities social behaviour is indicated by verbal and non-verbal expression and social sensitivity and tolerance with respect to individual needs and cultural differences. With regard to team behaviour a situation dependent and group-oriented leadership style, the acceptance of team objectives, tasks and roles and striving towards consensus are possible indicators.

Social behaviour, especially team and communication skills, are considered and assessed by 59% of the States surveyed.

4. Stress Coping

The behavioural tendency to cope with external and/or internal stresses in such a way that efforts can be effectively directed in order to maintain control and to reach objectives.

Related personality traits are: emotional stability, flexibility and aggression.

Stress coping is indicated by the capability of individuals to detect and evaluate stressful situations appropriately and to develop and implement effective cognitive and behavioural strategies in order to master them.

Not all the personality factors discussed may be assessed adequately using tests or questionnaires. The use of more direct behaviour-related assessment methods should be considered as an option. About one-third of the States (38%) surveyed use assessment centre methods to obtain more behaviour-oriented personality data from applicants.

Observations of an applicant's behaviour during a test (e.g. when undergoing apparatus tests such as multi-tasking) can also provide useful information (e.g. concerning stress resistance).

Guideline 14: Personality Testing

Where possible, the following personality factors should be assessed using personality assessments or tests: motivation and achievement, decision-making behaviour, social behaviour and stress coping.

4.3.4 Interview

An interview is considered as a conversation with a clear purpose and goal. Interviewers should have decided what they want to elicit from applicants before they start the conversation.

Interviews vary in type, composition and number. They can be one to one or one to several in a panel interview. The recruitment process can often involve more than one interview, either at different stages e.g. initial sifting interview, or covering different aspects e.g. personnel interview and technical interview.

The value of an interview is that it allows information to be obtained and exchanged face to face. It also allows assessments to be made, albeit subjectively, on the applicants ability to fit in the organisation and team, their motivation regarding the job/organisation and their general ability to do the job.

The survey of recruitment practices confirms that interviews are very widely used in the selection of *ab initio* trainee controllers: In 83% of the ECAC States this method is applied.

In the majority of States surveyed interviews cover the following areas:

- general motivation (88%),
- job-oriented motivation (83%),
- personality factors (75%),
- communication skills (71%),
- team skills (63%),
- biography of applicants (63%).

Another area considered in interviews is the applicants stress resistance (46%). In some ECAC States surveyed the English conversation skill of applicants is also assessed.

With regard to the interview board available data show that 41% of the States request board members to undergo specific training. Techniques such as, for example, the use of standard questions, a standard marking system or standard assessment form are used by around a quarter of the States. On average, an interview board consists of three members. The average length of an interview is about one hour.

4.3.5 Unstructured Interview

The unstructured interview is still used to evaluate candidates. Although this type of interview is not normally recommended due to its lack of standardisation (see [Sub-chapter 5.1](#)) it may have the benefit of uncovering information that would not be forthcoming using a completely structured approach.

The commonest types of interviews used are structured, biographical and situational.

4.3.6 Structured Interview

In a structured interview a series of questions is given to each applicant in order to obtain information on specific job-related criteria. The criteria are often developed by means of a job analysis which allows the behaviour patterns of excellent job performers to be identified.

For example the analysis may show 'team orientation' to be an important criterion. Applicants would therefore be asked a series of questions aimed at demonstrating their strengths and weaknesses in team skills.

The strength of this type of interview is that since the questions are based on an analysis of the job, they are relevant to the requirements of the job. The information collected by the interview can be evaluated on a scale against the relevant criteria. However weaknesses in this kind of interview are that it:

- relies on a reliable job analysis having been undertaken;

- can often be quite time consuming to allow for all the established criteria to be covered;
- and that aspects of the applicants work/education history may not be covered.

4.3.7 Biographical Interview

A biographical interview looks in a chronological way at an applicant's past experience, in work and education and personal life. The assumption is that the past will give a good prediction of future behaviour.

This is perhaps the most commonly used interview, often being used for first stage screening. Its strength is that it provides a complete picture of the applicant both in work and personal life. Its weakness is that, not being related to the job, irrelevant questions can be asked which could lead to discrimination under equal opportunities legislation.

4.3.8 Situational Interview

In a situational interview applicants are asked a series of highly structured, pre-determined and normally hypothetical job-related questions. The Applicants answers are scored against a set of example answers. The strengths of this type of interview are that all applicants receive identical questions and the information obtained from the applicant is evaluated in a very structured way. As the interview is based on job situations, it is viewed as having a high face validity. It has also been found that the situational interview has a good level of predictive validity.

The weakness of this type of interview is that, as with the structured interview, work history may not be fully explored, applicants can find the formality of the interview unfriendly and off-putting, and some applicants may be able to determine the type of answer the interviewer will score favourably. This type of interview is also time consuming and expensive to develop.

Guideline 15: Interview

The following aspects should be covered and assessed by means of an interview: general motivation, job-oriented motivation, communication skills, team skills and biographical aspects. Members of the interview board should be required to undergo specific interview training.

4.3.9 Conduct of the Interview

Many studies have been made into the reliability and validity of the interview as a selection tool. Reliability can be either the consistency of decisions made by an interviewer if s/he were to re-interview an applicant or, in a panel situation, the extent to which different interviewers give a particular applicant the same rating.

Research has shown that, in general, there are low levels of consistency between the ratings, indicating that interviewers are not assessing on the same information. However, interviews have been shown to have low but positive validity in future work success. The structured interview with job criteria has the greatest predictive validity.

Despite the doubts raised above, the interview is a common and expected part of a selection process. A poorly conducted interview can significantly damage an applicant's view of the organisation as well as lead to a poor selection decision. To minimise the danger of this, interviewers should be fully trained in interviewing techniques, have a clear view of the objectives of the interview and have a structured method of recording interview notes and final decisions.

An interview board could comprise at least two team members and not more than five. It is recommended that at least one ATCO from an operational unit be involved in interviewing.

Guideline 16: Conduct of the Interview

Interviewers should be fully trained in interviewing techniques and should have a clear view of the objectives of the interview. A structured method of recording interview notes and final decisions should be available.

4.4 Design and Application of Tests

Tests to select candidates capable of meeting the specific requirements of the ATCO job can either be specifically designed and developed for the selection of *ab initio* trainee controllers or be off-the-shelf tests.

4.4.1 Specifically Designed Tests

Most tests applied in the selection of *ab initio* trainee controllers seem to be 'off-the-shelf' products specifically designed and developed for their purpose. Besides this, most tests include items of an 'abstract' nature, i.e. their content is not ATCO job-related.

The design of specific tests requires in the first instance valid information regarding ATCO tasks and the abilities a candidate should possess before entering the training. The accurate identification of ability requirements depends on the job tasks to be performed. Additionally, a thorough analysis of controller equipment and facilities may give worthwhile inputs for test design. Based on this information, tests for the selection of *ab initio* trainee controllers can be developed with characteristic ATCO task and job-related features.

Future developments should also be taken into account. If important changes occur in ability requirements, it will be necessary to develop or modify selection procedures for future ATCOs (see [Sub-chapter 6.1.3](#) for further details). Available data on common practice in ECAC States show that this objective is only partly met.

Nearly three quarters of States reported that they have undertaken some kind of research or study into the attributes or skills of ATCOs in the present system. This information could be used for designing selection tests or for identifying other procedures which could be applied to selection.

4.4.2 Tests Not Specifically Designed for ATC

The use of tests not specifically designed for ATC is perfectly acceptable provided that they have been correctly validated using criteria for ATC before used (see next paragraph).

The advantage of off-the-shelf tests is that there are no costs for research, development and production for the tests prior to validation. The validation cost of off-the-shelf tests will be the same as that of specifically designed tests. The disadvantage of some of the off-the-shelf tests is that they lack 'face validity', but it should be noted that selection tests which possess a high 'face validity' (appear as having direct job-related features) might lack true validity.

However, the usage of specially designed tests is under better control guaranteeing to a large extent that they are not known to the applicants.

Available data on ATCO skills and attributes should be used when considering the possibility of specially designed tests and other selection procedures.

If common tests have to be brought into the selection process, the decision as to what kind of tests should be used should be based on available data on ATCO skills and attributes.

It is strongly recommended that both off-the-shelf tests and specially designed tests be validated before used.

4.4.3 Validation of Tests

Whenever possible, standardised psychological tests and questionnaires fulfilling the general requirements of objectivity, reliability and validity should be applied (see Sub-chapter 5.1.2 for more details).

The evidence on validity must depend on much more than common sense (face validity) of tests. Before tests are used for selection purposes, evidence on their validity (and other test quality aspects) should be sought and ensured.

Detailed information and guidelines on validation of are given in EATMP (2001c,d).

Guideline 17: Design and Validation of Tests

Available data on ATCO skills and attributes should be used when considering the possibility of specially designed tests and other selection procedures. Off-the-shelf tests and specially designed tests should be correctly validated before they are used in selecting candidates.

4.4.4 Re-testing

In those cases where the same tests are used in the selection of candidates for different jobs in aviation (e.g. pilots, ATCOs) the problem of test repetition arises. Applicants interested in the job of a pilot but fail in pilot selection may decide to apply for an ATCO job. It is then more than likely that these applicants will gain higher scores in the same tests in the second and subsequent testing (test-training effect).

4.4.5 Test Pre-information

Information should be sent to applicants before the test about the selection process they will undergo. An explanation of the administrative aspects of testing together with an easy to understand and fair description of test conditions and test content should be given.

By providing pre-information on tests and exercise items it is possible to level out - at least to some degree - differences in pre-knowledge and pre-experience about psychological testing among applicants.

An information booklet containing all relevant information on test stages and procedures should be considered. The booklet may contain the following information:

- stages of psychological selection (e.g. duration of testing, type of tests applied);
- general information (e.g. general conditions of test application, health conditions required);
- explanations of test performance (e.g. speed and accuracy, knowledge required);
- test description and practice items (e.g. test and task description, example items, exercise items, correct solutions).

Guideline 18: Test Application and Information

The development or availability of parallel tests should be considered in order to reduce the effect of test repetition. A booklet should be sent to applicants giving pre-information on the selection stages and general test conditions as well as test descriptions and practice items.

4.5 Decision-making in Selection

Selection procedures and tests provide guidelines for accepting candidates for training and the job as an ATCO.

A decision whether a candidate fulfils the various requirements of the job must be based on pre-defined clear-cut and exhaustive decision rules. The decision

rules should be based on rules for the evaluation and interpretation of test results and other assessments.

The evaluation and interpretation of test results should be performed by suitably trained personnel in order to ensure that ethical standards and public policy recommendations regarding the use of psychological testing are applied and that no overvaluation and inappropriate reliance on test results occurs.

The evaluation of test results is normally done by comparing the raw score of an applicant with a “norm”, that is, the average result achieved by a representative group of comparable applicants (for more details see Subchapter 5.1.3). For every test or assessment, the cut-off scores for rejecting / accepting applicants should therefore be defined.

If the selection process consists of several steps (e.g. pre-selection by PS, selection by ability tests, final selection by interview) these rules must state what information about applicants should be available for consideration and decision-making at each step. Decisions should be taken as to what information not to show and what not to take into consideration at each step in the process.

It should be ensured that all available and relevant information about applicants is appropriately used in making the decision, not leaving out important information or applying different cut-off scores. This is of special importance when the selection decision is not made by the same board.

Information to be used in decision-making may not be equally weighted. The procedures to be applied and the weighting calculations to be made should be laid down in particular rules.

If there is redundant information available (for example from different ability tests measuring the same ability) rules should be in place on how to handle cases where the information is contradictory.

With regard to common practice in ECAC States, the available data shows that more selection boards make a final decision (rejection or acceptance of applicants) (46%) than a recommendation (38%). The decision or recommendation made is slightly more often based on majority vote (38%) than unanimity (33%).

Concerning the evaluation of the final result an applicant receives in the selection process, 50% of the States surveyed use pass/fail criteria whereas 41% use some form of grading system.

Guideline 19: Decision-making in Selection

Pre-defined, clear-cut and exhaustive decision rules should be based on rules for evaluating and interpreting test results and other assessments performed by suitably trained personnel. In making decisions all available and relevant information about applicants should be appropriately and consistently used.

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5. QUALITY ASSURANCE AND CONTROL

A primary concern of any organisation must be the quality of its products and services. To ensure that the selection process is efficient, fair and transparent and meets the needs of customers, those responsible for the administration of the selection procedure must develop and maintain a high quality of service. To be successful in this respect a clear understanding and specification of “quality requirements” has to be achieved.

The selection process should be transparent and well documented, and all tests used as an active selection tool should be validated. A feedback system from Training Establishments and units for the On-the-Job-Training (OJT) should be developed in order to have a continuous validation process for the recruitment and selection of ATCOs.

The following paragraphs describe in detail the quality requirements and standards that should be considered with regard to the application and administration of selection procedures and tests.

5.1 Standardisation Issues

Standardisation of procedures, tests and facilities used in selection is necessary to ensure that the selection process is efficient, fair and transparent.

In order to achieve a sufficient level of standardisation in the use of selection procedures and tests it is necessary to:

- make use of standardised tests;
- have standard norms available for tests or questionnaires;
- use facilities of equal standard;
- document test procedures;
- make use of staff trained to the same standard.

The use of standardised tests and standard norms are described in more detail in the following sub-paragraphs.

5.1.1 Standardised Tests

Standardised tests are tests designed with regard to rules, principles and measures established by scientific research in the field of diagnostic psychology.

It is widely recognised as acceptable to apply only those tests that fulfil, to an appropriate extent, the following quality criteria:

- objectivity;
- reliability;
- validity.

These psychometric quality criteria will be tackled in more detail in the following sub-chapter.

5.1.2 Psychometric Quality Criteria

In order to keep drop-out rates in training to a minimum and have a high probability of identifying suitable candidates during selection, only such tests and procedures that fulfil the psychometric quality criteria of validity, reliability and objectivity should be used for selection purposes.

The survey done in 1995 showed that less than 50% of the States answering the questionnaire could provide data on the psychometric quality of tests used. A more recent survey (EATMP, 2000b) indicates a positive trend in this regard showing that more often psychometric information is available on tests in use for selection.

Reliability

Reliability is the degree of self-consistency (stability) of a test as a measuring instrument. It is the extent to which a test (or another measuring procedure) yields the same results on e.g. repeated trials and is measured by an index ranging from 0 to 1. A high index indicates good reliability. Reliability can be calculated between scores on two halves or between parallel forms of the test, or by re-testing individuals with the same test.

Validity

The most important validity aspect is the forecasting capability of a test. An appropriate psychological test should prove valid in the selection of ATCOs. Validity is measured by an index ranging from 0 to 1. A high index indicates good validity. The predictive validity index is calculated between scores on the respective test and scores of a criterion the test seeks to predict, for example scores from final examinations and assessments in ATC training.

Objectivity

Objectivity is the degree of independence of test results from the persons:

- administering the test;
- scoring and evaluating test results;

- interpreting the test results.

The more standardised test application, scoring and evaluation are, the higher is the objectivity of the test. For example, the automatic reading, processing and evaluation can enhance the objectivity concerning scoring and evaluating test results.

In general a high degree of objectivity as well as reliability and validity of selection procedures and tests can be ensured by proper standardisation and documentation of all relevant details of the selection system and by training of staff involved. These aspects will be described in detail in the following sub-chapters.

Guideline 20: Standardisation Issues

Tests used in selection should fulfil the general psychometric quality criteria of validity, reliability and objectivity. This can be ensured by using standardised tests, by analysing the reliability of the tests and by test validation. A high objectivity can be ensured by standardised test application, scoring and evaluation and by the appropriate training of staff.

5.1.3

Standard Norms

In order to evaluate test or questionnaire results of individual applicants, standard norms have to be available for every test / questionnaire. These norms can be derived from a distribution of relevant test scores in samples similar in important characteristics (e.g. age, education) to those of applicants. After a sufficient and representative number of applicants for the ATCO job have been tested this reference group can be used in order to derive standard norms.

For reasons of standardisation it is recommended to use one commonly used standard scoring system (e.g. the STANINE system) for all tests or questionnaires in order to compare test results.

As far as common practice is concerned, the questionnaire gives some indication that standardisation is an area for improvement, despite the fact that some nations have already reached a high standard.

Standardisation issues are of crucial importance for quality assurance and control. Without appropriate standards, a sufficient level of quality in the selection process cannot be guaranteed.

The items "documentation", "training of staff involved" and "psychometric quality criteria" are therefore considered in the following sub-chapters.

Guideline 21: Standard Norms

Standard norms derived from a reference group of applicants should be available for each test or questionnaire used for selection purposes. A standard scoring system should be used to compare test results.

5.2 Documentation and Regulation Issues

5.2.1 Documentation Policy

Procedures should be established and maintained in order to control all processes, documents and data that are part of the selection system. These procedures should be documented to ensure that every single part of the selection system is handled in the same way for every single applicant.

The documentation should be done in a systematic and orderly manner in the form of written policies and manuals ensuring a common understanding.

Detailed documentation has to be set up for:

- each individual test;
- the test facilities used;
- the sequencing and duration of administered tests;
- the timing of breaks between tests;
- allowed information or help given to applicants during tests.

In general the documentation will be executed in the form of manuals stating the following issues:

- date of issue;
- document version;
- related documents.

Methods and controls should be established for making changes, modifications, revisions or additions to the contents of these manuals. This control shall also ensure that the appropriate documents are available at all locations where selection is performed and that obsolete documents are promptly removed from points of issue or use.

It has to be ensured that all staff involved in selection have been trained in using test documents, equipment and facilities and are committed to following the prescribed procedures.

At present, detailed documentation is available from a few States only. However, detailed documentation is necessary in order to fulfil quality requirements.

It is recommended to document the areas of:

- information to be gathered before testing;
- test administration;
- test environment;
- sequencing;
- timing;
- conduct of the interview.

Guideline 22: Documentation Policy

Procedures should be established and maintained in order to control all processes, documents and data that are part of the selection system. The procedures should be documented to ensure that every single part of the selection system is handled in the same way for every single applicant. The documentation should be done in a systematic and orderly manner in the form of written policies and manuals ensuring a common understanding.

5.2.2 Documentation of Gathered Information

All information gathered ought to be documented. The most efficient and transparent way is to use standard sheets and forms for all data collected. This already starts when sending out application forms.

5.2.3 Coding of Information

Where data (e.g. from application forms) has to be coded for further use (e.g. PS, pre-selection) documented procedures should be available for staff involved to ensure that coding is done with:

- high reliability (high probability that different coders / raters assign information to the same category);
- high validity (high probability that the information is assigned to the appropriate category);
- high objectivity (high degree of independence from the person doing the coding).

Guideline 23: Documentation of Gathered Information and Coding Procedures

Standard sheets and forms should be used for all data collected from applicants. Documented procedures for coding information should be available and should be used by staff involved.

5.2.4 Test Administration Manual

A manual of administration information should be available for every single test. It must be ensured that this manual is used by test administrators in every test application. The manual should include a description of every step in test administration:

- It should describe in detail which test instruction shall be given by test administrator(s).
- A precise description of examples of the test, including the proper solution, should be included.
- Start and stop times have to be marked clearly.
- The test manual should be available even in cases when test instructions are given via tape, slides or on computer screen.
- It should contain clear guidance on which way questions raised by participants are to be answered and what help the instructor is allowed to provide.

The manual should give straightforward regulations on the sequence in which the tests are to be administered as well as on time and length of breaks between tests. This can be done by giving a time schedule together with the sequence of events (sequence of tests, breaks etc.).

Guideline 24: Test Administration Manual

A manual of administration information should be available for every single test. It must be ensured that this manual is used by test administrators in every test application. The manual should include a description of every step in test administration.

5.2.5 Test Facilities Manual

Besides the manual issued for every individual test, there should be a general manual giving detailed guidance for items like room layout, handling of "rare events" such as illness of applicants, disturbances or attempts at cheating.

In general, it is advisable always to use the same facilities for all applicants. If the same room is not always used for testing - especially when working with larger groups of applicants - details of the layout of the other rooms should be

as close as possible to that of the first room. In the documentation, the minimum requirements ought to be stated in order to guarantee the fair conduct of tests. It must be ensured that equal chances exist for all applicants applying for the same profession, no matter when or where the selection procedure takes place.

In order to meet this requirement the manual should document:

- permitted range of viewing distance when using slides, videos;
- permitted range of hearing distance from loudspeaker or administrator;
- required lighting conditions;
- minimum distance between participants to prevent cheating unless this is already taken into account by test-construction.

Furthermore, guidance should be given on how to handle applicants arriving late for testing, reporting sick or wishing to leave the room during testing etc. in order to minimise disturbance for other participants and to make sure that no advantage or disadvantage is caused by such action.

Last but not least, the manual shall give instruction on how to handle disturbances from the environment like someone entering the room or noise caused, for example, by construction work going on outside. For such cases clear instructions should be given on whether to continue, terminate or stop and restart a test. Ideally, prior co-ordination should be carried out to preclude such disturbances from outside.

Another item to be addressed in the manual is how to treat applicants observed to be cheating or using non-permitted material for assistance.

Guideline 25: Test Facilities Manual

A manual giving detailed guidance for items like room layout, handling of "rare events" such as illness of applicants, disturbances or attempts at cheating should be available. It must be ensured that this manual is used by test administrators in test application.

5.2.6 Test Evaluation Manual

Besides the administration and conduct of tests as such, documentation should be issued describing in detail the evaluation of test scores, data handling and pass-fail criteria. A test evaluation manual should be provided describing the procedures for doing the evaluation of tests manually (for example by using templates).

Guideline 26: Test Evaluation Manual

A manual should be available describing in detail the evaluation of test scores, data handling and pass-fail criteria. It must be ensured that this manual is used by staff involved in test evaluation.

5.2.7 Test Documentation

In order to ensure the appropriate control of test quality and the further development of tests, a test documentation file should be made available. This manual should contain the following information:

- description of test constructs and test principles;
- relevant literature concerning the test;
- description of the rationale and reason for using the test for the selection of candidates for the ATC profession;
- documentation of test versions (e.g. test material, test instructions in use);
- information about the period of time the version was applied;
- relevant psychometric information concerning the test version (e.g. item difficulty and selectivity coefficients, raw score distribution, reliability information, validity information);
- relevant differential test information (e.g. male/female differences in relevant test scores, differences between age groups, results of factor analyses of items/test battery);
- test norms available with detailed description of the population and norm sample; a description of standardised variables.

This documentation ensures that, at any time, a record of past experience with applied tests can be given. The document is especially important for making decisions on required further actions (e.g. whether a test should be further used for selection or not or whether further development of the test is necessary).

Guideline 27: Test Documentation

A manual should be available giving detailed descriptions of the tests used in selection plus psychometric information and information on test development.

5.2.8 Documentation in Interview and Assessment Centre

Detailed documentation should be available for the conduct of structured or biographical interviews, situational interviews or assessment centre.

Clear-cut written rules on how to prepare for interviews, conduct them and score the information gained should be established and provided to each individual board member.

With regard to assessment centre techniques and situational interviews more detailed documentation is required.

Where applicable and approved, standard rating scales should be used in assessments or observations for making relative estimates or evaluations in interviews or assessment centre.

Care must be taken to ensure that the rating categories used are:

- self-explanatory or easy to understand;
- directly related to observable behaviour or clearly described criteria.

Guideline 28: Documentation in Interview

A manual should be available for every board member giving detailed information for the preparation and conduct of interviews or assessment centre.

5.2.9

Documentation of Decision Rules and Results

Decision rules to be applied at the end and/or at intervening steps during the selection process must be defined and documented. This document should contain the following information:

- a list of the information about applicants that should be available and should be used in making a decision at a certain decision step;
- the decision rules together with cut-off points or other applicable pass-fail criteria to be applied at a certain step;
- information about the number and the functions of board members who must be present in making the decision;
- rules concerning the weighting of information (where necessary);
- rules concerning the decision-making process.

The document should be available to every board member in case of need.

Guideline 29: Documentation of Decision Rules and Results

Decision rules and results to be applied at the end and / or at intervening steps during the selection process must be defined and documented and should be available to every board member.

5.3 Training of Selection Personnel

One of the most difficult issues concerning standardisation is the training of staff involved.

However, qualified training is necessary to meet the required standards concerning psychometric criteria especially with regard to objectivity and reliability.

Staff involved in selection should be trained appropriately to the level required for their work in order to ensure that selection procedures, tests and facilities are applied and used with regard to documented rules and conditions.

It should be stressed that a high level of success in selecting *ab initio* trainees for controller training can only be achieved by applying sound professional standards and bringing together and sharing the expertise, knowledge and skills of the different professions involved in a multi-disciplinary team.

5.3.1 Training of Staff in Test Administration and Evaluation

Test administrators and staff tasked with evaluating and scoring test data have to be trained to make use of the documentation and to strictly adhere to all items and rules prescribed.

Test administrators should also be trained to deal with special situations (e.g. illness of applicants, disruptions and disturbances, difficult applicants). They should also be taught how they can contribute to a positive, relaxed atmosphere during tests etc.

Guideline 30: Training of Staff in Test Administration and Evaluation
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Test administrators and staff tasked with evaluating and scoring test data have to be trained to make use of the documentation and to strictly adhere to all items and rules prescribed.
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5.3.2 Training of Board Members

Training of interview and decision board members is time consuming and costly. However, it is one of the most important items because their decision determines the success or failure of the entire selection system.

The training needs of the board will vary depending on the role they take. If they are only making a recommendation about suitability following interview, then they do not need to have a detailed knowledge of the tests, the scoring of tests etc. However, if they are making a final decision, then they must have a full understanding of the areas listed.

Through training of board members - irrespective of their role - it can be assured that interviews are conducted and decisions and assessments are made:

- with the necessary reliability and objectivity;
- following appropriate professional standards (e.g. concerning psychological standards and recommendations);
- following appropriate ethical standards (e.g. concerning treatment of applicants, questions allowed).

The final decision or recommendation made by the board - no matter whether dealing with interviews or assessment centres - must be reliable, valid and objective. To ensure this the decision must be:

- based on all relevant data available;
- based on the observation and judgement of all board members;
- uninfluenced by irrelevant personal matters.

To achieve a uniform level of qualification each board member should undergo a training module. Where board members make final selection decisions they should:

- know the selection process in detail including all application procedures;
- know all tests used from own experience;
- know the statistical background of the scoring methods used;
- know and apply the decision rules properly;
- have undergone practical interview training in relevant interview techniques as well as in decision-making;
- know about possible implications of interpersonal perception and possible bias in their observations, judgement and decision-making.

The pool of board members should be limited to a number that guarantees their frequent and regular participation in the process.

All board members should be informed of changes prior to implementation. Major changes may need some extra training for the staff concerned.

It is advisable to introduce regular refresher training, including practical training for activities like interview training, observer training, evaluation and scoring training or decision-making.

Guideline 31: Training of Board Members

Members of the interview and decision board should receive regular practical interview or observer training, evaluation and scoring training or training in decision-making.

5.4 Quality Assurance in ATCO Candidate Selection System

The selection system provides in the first instance a service that is intended to meet requirements from different customers. Customers of the selection service are, for example, the manpower department, the training establishment, the operational units and the applicants themselves.

It could be expected that these different customers might have different and sometimes even conflicting requirements with regard to the selection system.

5.4.1 Specification of User Requirements

The requirements of customers should be specified in as much detail as possible. Solutions for conflicting requirements have to be found by agreement between customers.

Two quality aspects are of importance in this respect:

- the quality of the product of the selection system (e.g. the qualities of selected candidates);
- the quality of the selection process.

The quality of the product of the selection system is the ability of selected candidates to meet stated user requirements. The aim of selection can be defined as “to select those capable of learning to become controllers, able to do air traffic control tasks after training, and likely to remain motivated and able to make air traffic control their career” (Hopkin, 1982, page 94; see also ICAO, 1993, page 27).

The quality of the selection process concerns all those planned and systematic measures required to create the necessary confidence that the candidates will satisfy the given customer requirements of quality. [Chapter 4](#) and the preceding paragraphs deal mostly with this second aspect of quality assurance.

The following list gives some examples of measures for quality assurance and control in the selection of *ab initio* trainee controllers:

- application of efficient publicising methods;
- application of efficient and effective pre-selection and selection methods;
- continuous control and improvement of selection methods;

- regular follow-up meetings of selection staff, psychologists and representatives from management to analyse the selection work;
- appointment and training of qualified selection staff;
- long-term follow-up of the trainees;
- availability of efficient training resources (qualitative as well as quantitative).

Quality assurance in selection deals with all planned and systematic measures required to create the necessary confidence in the ability of selected candidates and the selection service to meet agreed quality standards. Quality system guidelines developed by national or international standards organisations aim to provide detailed help for quality management (see for further details [Annex C](#) “Quality Systems”).

The operational elements in quality assurance and control described in the following sub-paragraphs are applicable to the selection system especially in cases where part of the selection service is ‘outsourced’ to contractors.

5.4.2 Working Relations with Contractors

A working relationship with contractors, which includes a feedback mechanism, should be established. The procurement requirements should include as a minimum:

- selection of qualified contractors after on-site assessment and evaluation of contractor’s capability and quality system elements;
- evaluation of contractor’s samples and past history and experience of other users of contractor’s service;
- agreement on quality requirements and quality assurance requirements;
- agreement on quality assurance and verification methods;
- service quality records;
- periodic review meetings in order to revalidate and improve the service;
- validation studies to be performed;
- development of specially designed selection tests and procedures.

Guideline 32: Working Relations with Contractors

A working relationship with qualified contractors, which includes a feedback mechanism, should be established on the basis of procurement requirements. These requirements should include quality assurance and control methods and records, validation studies and the development of selection procedures and tests.

5.4.3 Validation of the Selection Service

In order to ensure that the selection service is fully developed and meets the needs of customers, validation should be defined and completed prior to service implementation. It should be confirmed that:

- the service is consistent with customer requirements;
- the service delivery process is complete;
- resources are available to meet the service obligations (e.g. material and personnel);
- personnel are trained and informed;
- codes of practice with regard to standards, drawings and specifications are satisfied (where necessary and applicable);
- information to customers in the use of the service is available;
- revalidation activities are planned and documented including actual field experience and past history on selection, impact of modifications in selection and training, impact of personnel changes, adequacy of procedures and tests, test-instructions, training of selection personnel etc.

Guideline 33: Validation of Selection Service

Validation should be defined and completed prior to the implementation of a selection service ensuring the completeness of the service delivery process and the availability of resources and appropriately trained personnel.

5.4.4 Selection Performance Analysis and Improvement

A continuous evaluation of the operation and the quality of the selection service should be practised to identify and actively pursue opportunities for quality improvement.

To implement such evaluations, an information and feedback system should be established and maintained. The following two actions are of importance:

1. Data collection and analysis

The regular collection and analysis of data from customers (training institutions, operational units and as well applicants) should be part of the work to be done in order to keep records on past experience, to identify significant changes and problems, to check important quality aspects etc.

2. Quality audits

All procedures and processes should be internally audited and evaluated on a regular basis. This concerns also personnel, equipment and material, documentation and reports, administrative and operational processes.

Guideline 34: Selection Performance Analysis and Improvement

Procedures for the evaluation of the operation and the quality of the selection service should be implemented. As part of the information and feedback system the regular collection and analysis of data from customers and internal quality audits should be established and maintained.

5.5 Security and Confidentiality of Data

5.5.1 Policy on Security and Confidentiality of Data

A policy and prescribed procedures on data security and confidentiality must ensure that personal data acquired during selection and recruitment are collected, stored and processed in a safe and efficient way.

Prescribed procedures should be applied in order to ensure data integrity and to avoid misuse of data.

During the selection process a considerable amount of data on applicants is acquired in different formats and by different methods:

- application forms and application letters;
- biographical data sheets;
- psychological tests and other assessments;
- interview data;
- observation data;
- medical data.

Special procedures have to be followed in order to ensure that this data is collected, stored and processed in a secure and confident way and is used

only for the purpose of selection. National and European obligations on data security have to be considered and fulfilled as well as ethical standards of professionals involved in the selection of controller candidates (e.g. psychologists, medical doctors).

Guideline 35: Policy on Security and Confidentiality of Data

Policies and procedures must be defined and must be followed in order to ensure that applicant data is collected, stored and processed in a secure and confident way and is used only for the purpose of selection. National and European obligations on data security have to be considered and fulfilled as well as ethical standards of professionals involved in selection.

5.5.2 Data Affirmation

Applicants are not always aware of their rights and of national and European obligations with regard to data security. Normally, national and European obligations have to be considered in order to fulfil legal requirements on data security.

Legal regulations in most countries allow the use of personal and test data only for clearly circumscribed purposes and reasons. Two possible purposes for using (processing) selection data could be:

- selection of candidates;
- (quality) control of applied selection procedures and tests.

The first point above concerns the purpose of using personal and test data with regard to a single application.

The second point concerns all those actions that are necessary and sufficient from a researchers point of view for assuring and controlling the quality (effectiveness and efficiency) of applied selection procedures and tests. The calculation of descriptive statistics, psychometric coefficients (e.g. reliability coefficients) should be done with anonymous (depersonalised) data.

Applicants should be made aware of common practice with regard to the storage and processing of personal data. They may be required to give signed consent for the storage and use of their data depending on national and European obligations.

Guideline 36: Data Affirmation

Applicants should be informed about common practice with regard to the storage and processing of personal data. Depending on national and European obligations they may be required to give signed permission for the storage and use of their data for the purpose of selection and/or for the purpose of quality assurance and control.

5.5.3 Data Storage

The most unsophisticated but widely used method is storage in files (hard copy storage). Further processing of filed forms is done normally on a case-by-case basis (e.g. in pre-selection by PS). The application of automated data processing tools requires that the data is coded and stored in electronic format.

Today, most applicant data is stored in electronic databases (computers) which allow the application of statistical packages, decision-making algorithms and other tools to analyse test results.

Using computers, access to stored information about applicants is made easier and increases the possibility of data misuse. The increase in risk should therefore be countered by data security methods and by applying strict rules concerning the use of data. Training in data security for staff involved in data collection, storage and processing should be considered a pre-requisite.

Of special importance is the application and control of data security if the selection work is done by external consultants or service providers.

The length of time the data is stored will depend on individual requirements. The storage time is normally related to the success or failure of the applicants but should at least be long enough to allow for appeals and information requests to be dealt with and for conducting validation studies.

Suitable procedures should be in place with regard to access, handling and control, as well as data transfer and deletion and suitable training on this should be given to staff concerned. This requirement must also be fulfilled if the selection procedure is contracted out or if external staff is used. It should also be ensured that collected data will be deleted or returned after a contract expires.

Guideline 37: Data Storage

Data security methods and strict rules concerning the use of applicant data should be defined and applied. Staff involved in data collection, storage and processing should be trained in data security issues.

5.6 Security and Confidentiality of Tests

Test security must ensure that selection tests and procedures are developed and applied by authorised and trained staff in a safe and efficient way by applying prescribed procedures in order to ensure test integrity, validity and specificity and to avoid misuse of tests.

With the increasing application of documented procedures and tests in personnel selection, more and more information about test content is available to applicants. The validity of tests is lowered by (external) test coaching and test repetition.

Applicants should be informed that they are not allowed to write notes or take away copies of the answer sheet etc., before the test starts.

6. FUTURE PERSPECTIVES, DEVELOPMENTS AND CONCEPTS

6.1 Research

Before a suitable selection system for ATCOs can be realised the task and job requirements must be investigated in detail. Only by looking in depth at the job can one ascertain the characteristics needed to do it and find ways to determine the presence of those characteristics in prospective applicants.

6.1.1 Attributes and Skills of the Air Traffic Controller

ATCO selection testing methods in use today have been developed on the basis of considerable research into the job and tasks of ATCOs.

Job analysis techniques have been used to try to identify the skills, abilities and personality characteristics needed to do the job successfully. From the opposite point of view, investigation has also been carried out into the causal factors of ATC accidents and incidents so that problems can be anticipated and mistakes eliminated through proper selection techniques. A bibliography is provided in the Annex.

The amount of written material available gives some indication of the volume of work done on the subject over the past thirty to forty years. In addition, three quarters of those ECAC States addressed in the data collection exercise have done at least some kind of research or study on the “attributes or skills of ATCOs”, most of this not appearing in the list of published material attached.

To suggest re-analysing or analysing further, the job of ATCO may seem like wanting to re-invent the wheel. However, there is evidence to suggest that it may be of benefit. According to the data collection results 88% of States conduct selection testing to discover certain “Knowledge, Skills and Abilities and Other characteristics” (KSAO), yet the average failure rate in the training of those selected is 24%, with the highest indicated as 70%. It is not necessarily the 12% of States not using selection tests that have the highest failure rates.

To put these figures in perspective, it is useful to compare them to the failure rate in *ab initio* airline pilot training. This example is taken because of the similarities that exist in the two selection systems. With the exception of job-specific skills (e.g. psychomotoric ability in the case of candidate pilots) the range of ‘desirable’ abilities is very similar (e.g. short and long-term memory, concentration, vigilance) and in some cases the same tests are used in both test batteries. Failure rate in pilot training is considerably less than for ATCO - typically being less than 10% and frequently less than 5%.

Failure during training may, of course, be caused by deficiencies in the training system (institutional and on-the-job) and may have no bearing on

selection. It is necessary to minimise this factor when undertaking an assessment of selection.

However there is always room for improvement in any selection system. It may be useful to re-analyse the job of ATCO with the benefit now of improved research techniques and more extensive empirical data. Possible approaches in this respect are:

- Cognitive Task Analysis (CTA) with special regard to mental models, knowledge organisation, and skills for job performance (e.g. Redding and Seamster, 1994);
- Task related KSAOs analysis following the approach of Fleishman and Reilly (1992); Fleishman (1992);
- Deductive job and task analysis.

6.1.2 Test Validation

Validation of selection tests, referred to earlier in [Chapter 4](#), is also a type of research but with positive rather than neutral expectations.

Such validation procedures continue routinely in certain States. However, less than 50% of those ECAC States questioned are in a position to give any information on the objectivity or general validity of tests used. Efforts should be made to improve the availability of empirical data and to use it for common benefit.

6.1.3 The Future Job of the ATCO

New technology and other changing factors will certainly provoke changes in the profile of the ATCO's job, although it is now generally accepted that the controller will remain as decision-maker in a system that will never be totally automated.

Some studies have taken place in an effort to define the ATCO's job of the future but with little success. Thus research so far done deals with the job as it was or is. As mentioned earlier nearly three-quarters of States contacted in the data collection exercise have done some kind of research into the attributes required for the job of ATCO as known today, but only one quarter has given consideration to the future profile of the job.

Controllers are nowadays routinely involved in the development and evaluation of equipment, procedures and facilities to be used in the future. The needs of the controller selection process should also be taken into account at the same time. This would allow selection methods to evolve in parallel with the job itself.

The following example areas illustrate where change might be expected and where new or different abilities may be required. Little research is being done

in these areas despite the fact that evolutionary changes are already underway:

- Basic knowledge requirements are constantly changing particularly in the area of technology of air and ground-based equipment. There is a trend away from physics-based knowledge towards computer science. Learning ability and attitudes towards “life-long learning” will increase in importance.
- Auditory information will decrease and visual information will increase as radio-telephony gives way to data-link. Screen-type displays will be capable of accommodating more information, both static and dynamic.
- As a greater part of the controller’s functions become automated there is a danger of boredom becoming a problem. Vigilance and concentration will become even more important.
- On the other hand, more sophisticated programs to check human inputs may reduce the importance of tests to check a propensity to make errors.
- The teamwork element of ATC may change, thereby changing the emphasis currently placed on direct interpersonal relationships.
- Greater mobility of manpower in accordance with European Union (EU) law, and standardisation of licences, will mean more attention having to be placed on cross-cultural matters.
- More flexibility and adaptability towards evolutionary changes in working environment and conditions will probably be required.

An analysis of the job of ATC should be carried out at intervals sufficiently regular to:

- confirm the effectiveness of existing selection methods,
- detect change in the job which will require change in selection methods.

At the same time as development and evaluation of equipment, procedures and facilities in ATC take place, the requirements of the ATCO selection system should also be considered.

Detailed studies have been done in the frame of the project "Consequences of future ATM systems for ATC Selection and Training" (CAST). CAST (1999a) provides the findings regarding the current and future ATM system; a description of the future ATCO is given in CAST (1999b) and on future ATCO selection in CAST (1999c)⁴.

⁴ CAST was funded by the European Commission under the Transport RTD Programme of the 4th Framework Programme.

6.2 Joint Ventures in Selection

For some States the problems associated with controller selection are:

- high cost of buying or developing effective scientifically-based tests;
- lack of expertise and resources;
- lack of objectivity and validity;
- economy of scale (few recruits needed infrequently).

There are several possible solutions, one of which in an ideal world would probably be a centralised test unit, which could carry out selection for individual States as required, and at reasonable cost. The establishment of such a unit might not receive sufficient consensus or demand in which case it may be feasible to have a central information unit, which could collect and dispense a range of information on various aspects of selection, for example:

- currently available validated and emerging tests;
- information on research and validation studies;
- availability of selection testing capacity;
- relevant test and assessment documentation.

Even in the absence of any centralised service, it may be of interest to an individual State to contact and co-operate with one or more other States with similar needs or problems, with a view to jointly undertaking some integral parts of the selection process. Some examples of functions which could be carried out on a joint basis are:

- marketing and promotion of the profession of ATC and advertising of vacancies,
- distribution of application forms and other material,
- PS of applications,
- interviewing,
- administration of tests and analysis of results,
- research, development and validation of tests and test exchange.

A possible drawback to a joint venture may be that problems could be compounded rather than solved. Open discussion between potential partners should address this situation.

7. SUMMARY OF GUIDELINES

The following is a summary of the guidelines contained in chapters 2 to 5 of this document.

7.1 Planning and Resourcing

Guideline 1: Manpower Plan

In order to provide a sufficient number of qualified ATCOs within the required time frame a manpower plan covering at least 5 years should be in place. The plan must take account of the actual requirements for staff allocation, planned retirements due to age and staff reductions due to other factors.

Guideline 2: Selection Policy

A well documented policy on selection must be defined and must be in accordance with manpower planning requirements. It must allow for the intake of sufficient numbers of *ab initio* trainee controllers of appropriate calibre by applying fair and effective selection methods.

Guideline 3: Selection Plan

A selection plan must give relevant details to applicants concerning the selection administration and the selection procedures used.

Guideline 4: Publicity and Marketing

Advertising and presentation material must be designed to address and attract an appropriate audience, at the right time and in a cost-efficient way.

Guideline 5: Information of Applicants

Applicants should be informed about the selection process, training after recruitment and the Air Traffic Controller job itself in order to attract highly job-motivated people.

7.2 Basic Requirements

Guideline 6: Medical Requirements

In general, prescribed ICAO standards and valid national standards and prescriptions have to be applied in the medical tests of applicants who have successfully completed the selection process. Applicants should however be required to provide proof, at their own expense, that they meet eyesight and hearing standards before they undergo selection tests or other kinds of assessment.

Guideline 7: Age

Upper and lower age limits for candidates must be clearly defined. Consideration should be given to legal and other national obligations as well as to economic, educational and psychological factors when defining age limits.

Guideline 8: Educational Requirements

The level of general education required from candidates must be sufficient to enable them to acquire the skills necessary for the job and the knowledge and understanding of the concepts encountered during air traffic controller training. Applicants may be required to prove that they have reached a certain standard in the English language.

Guideline 9: National Obligations

Applicants will have to meet national security requirements defined for air traffic services personnel.

7.3 Selection Process

Guideline 10: Registration and Acceptance of Applicants

An application form should be designed to collect only relevant information in a systematic way. It should allow potential candidates to be identified and should ensure the validity of the application by means of a legal declaration or affirmation on the part of the applicant.

Guideline 11: Pre-selection

Where possible procedures should be in place to pre-select suitable potential candidates in a structured, cost-effective and standardised manner, to increase the percentage of valid applications and to present an appropriate number of applicants to the final selection process.

Guideline 12: Ability Testing

The following cognitive abilities should be assessed by means of ability tests: memory functions, attention, logical reasoning, mental arithmetic, perception, spatial comprehension and multiple task abilities.

Guideline 13: Knowledge Testing

A knowledge of the English language should be tested during selection.

Guideline 14: Personality Testing

Where possible, the following personality factors should be assessed using personality assessments or tests: motivation and achievement, decision-making behaviour, social behaviour and stress coping.

Guideline 15: Interview

The following aspects should be covered and assessed by means of an interview: general motivation, job-oriented motivation, communication skills, team skills and biographical aspects. Members of the interview board should be required to undergo specific interview training.

Guideline 16: Conduct of the Interview

Interviewers should be fully trained in interviewing techniques and should have a clear view of the objectives of the interview. A structured method of recording interview notes and final decisions should be available.

Guideline 17: Design and Validation of Tests

Available data on ATCO skills and attributes should be used when considering the possibility of specially designed tests and other selection procedures. Off-the-shelf tests and specially designed tests should be correctly evaluated before they are used in selecting candidates.

Guideline 18: Test Application and Information

The development or availability of parallel tests should be considered in order to reduce the effect of test repetition. A booklet should be sent to applicants giving pre-information on the selection stages and general test conditions as well as test descriptions and practice items.

Guideline 19: Decision Making in Selection

Pre-defined, clear-cut and exhaustive decision rules should be based on rules for evaluating and interpreting test results and other assessments performed by suitably trained personnel. In making decisions all available and relevant information about applicants should be appropriately and consistently used.

7.4 Quality Assurance and Control

Guideline 20: Standardisation Issues

Test used in selection should fulfil the general psychometric quality criteria of validity, reliability and objectivity. This can be ensured by using standardised tests, by analysing the reliability of the tests and by test validation. A high objectivity can be ensured by standardised test application, scoring and evaluation and by the appropriate training of staff.

Guideline 21: Standard Norms

Standard norms derived from a reference group of applicants should be available for each test or questionnaire used for selection purposes. A standard scoring system should be used to compare test results.

Guideline 22: Documentation Policy

Procedures should be established and maintained in order to control all processes, documents and data that are part of the selection system. The procedures should be documented to ensure that every single part of the selection system is handled in the same way for every single applicant. The documentation should be done in a systematic and orderly manner in the form of written policies and manuals ensuring a common understanding.

Guideline 23: Documentation of Gathered Information and Coding Procedures

Standard sheets and forms should be used for all data collected from applicants. Documented procedures for coding information should be available and should be used by staff involved.

Guideline 24: Test Administration Manual

A manual of administration information should be available for every single test. It must be ensured that this manual is used by test administrators in every test application. The manual should include a description of every step in test administration.

Guideline 25: Test Facilities Manual

A manual giving detailed guidance for items like room layout, handling of "rare events" such as illness of applicants, disturbances or attempts at cheating should be available. It must be ensured that this manual is used by test administrators in test application.

Guideline 26: Test Evaluation Manual

A manual should be available describing in detail the evaluation of test scores, data handling and pass-fail criteria. It must be ensured that this manual is used by staff involved in test evaluation.

Guideline 27: Test Documentation

A manual should be available giving detailed descriptions of the tests used in selection plus psychometric information and information on test development.

Guideline 28: Documentation in Interview

A manual should be available for every board member giving detailed information for the preparation and conduct of interviews or assessment centre.

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Decision rules and results to be applied at the end and/or at intervening steps during the selection process must be defined and documented and should be available to every board member.

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Test administrators and staff tasked with evaluating and scoring test data have to be trained to make use of the documentation and to strictly adhere to all items and rules prescribed.

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Members of the interview and decision board should receive regular practical interview or observer training, evaluation and scoring training or training in decision-making.

Guideline 32: Working Relations with Contractors

A working relationship with qualified contractors, which includes a feedback mechanism, should be established on the basis of procurement requirements. These requirements should include quality assurance and control methods and records, validation studies and the development of selection procedures and tests.

Guideline 33: Validation of Selection Service

Validation should be defined and completed prior to the implementation of a selection service ensuring the completeness of the service delivery process and the availability of resources and appropriately trained personnel.

Guideline 34: Selection Performance Analysis and Improvement

Procedures for the evaluation of the operation and the quality of the selection service should be implemented. As part of the information and feedback system the regular collection and analysis of data from customers and internal quality audits should be established and maintained.

Guideline 35: Policy on Security and Confidentiality of Data

Policies and procedures must be defined and must be followed in order to ensure that applicant data is collected, stored and processed in a secure and confident way and is used only for the purpose of selection. National and

European obligations on data security have to be considered and fulfilled as well as ethical standards of professionals involved in selection.

Guideline 36: Data Affirmation

Applicants should be informed about common practice with regard to the storage and processing of personal data. Depending on national and European obligations they may be required to give signed permission for the storage and use of their data for the purpose of selection and/or for the purpose of quality assurance and control.

Guideline 37: Data Storage

Data security methods and strict rules concerning the use of applicant data should be defined and applied. Staff involved in data collection, storage and processing should be trained in data security issues.

ANNEX A: TASK CLUSTER AND ASSOCIATED SUBTASKS IN SELECTION

The following list contains the 7 main activities (clusters at level 1) and the 21 task areas (clusters at level 2) together with their associated sub-tasks which were identified by the Task Force during the Project Team Work Sessions.

POLICY AND PLANNING

Manpower Planning

- Determine manpower requirements
- Take account in planning of success rate in selection and training
- Consider selection against manpower planning programme
- Consider influence of organisation/company policy
- Take into account classrooms/training facilities and capacity available
- Determine remuneration level during training
- Consider appropriate level of remuneration
- Consider legal restrictions
- Consider what “type” of ATCO is needed in the future

Selection Policy and Planning

- Take account of cultural differences
- Define the criterion of selection
- Measure “success” against defined criterion
- Define policy on re-testing
- Define policy on treatment and welfare of applicants during selection
- Establish a post-training feedback mechanism
- Define criteria for success/failure in selection process
- Ensure confidentiality of results
- Define what is to be tested: skills vs. personality or both
- Keep in mind average drop-out rate
- Keep close contact with consultants for selection
- Establish criteria for “paper sift”
- Get acceptance of selection system by management and staff
- Determine acceptable exceptions to basic requirements (e.g. aviation experience)

MARKETING

- Market the ATCO job to the target group

Information

- Ensure that applicants are aware of basic prerequisites
- Ensure that applicants are aware that the job entails shift work
- Explain future responsibilities of student as a controller
- Show ATC facilities
- Explain the aim of the selection run to applicants
- Debrief failures after selection tests
- Explain criteria for success in training

Advertising

- Announcement of tests
- Find best advertising methods

- Select suitable advertising media
- Design advertising to attract and to inform
- Consider presentation of application form
- Identify and address the “right” population

BASIC REQUIREMENTS

Medical Requirements

- Set medical standards
- Consider smoking, drugs, and alcohol consumption habits

Age

- Define lower and upper age limits
- Determine minimum & maximum age groups for training

Minimum Educational Requirements

- Define specific educational requirements
- Define English language pre-qualifications
- Define educational qualifications

National Obligations

- Military service
- Substitute for military service (e.g. fire brigade, technical service)
- Security clearance

APPLICATION FORM

Content of Application Form

- Personal data
 - Name, first name, maiden or previous name
 - Title, date of birth, social security number
 - Permanent address, temporary/mailling address, phone number(s)
 - Marital status
 - Religion (e.g. for working restrictions)
 - Photograph
- Military service and substitute
 - Kind of service
 - Date of release
 - Rank achieved
 - Future obligations
- Nationality
 - Citizenship(s) (since when)
 - Previous citizenship (since - until)
- Language(s)
 - Mother tongue
 - Command of other language(s)
- Security statement
 - Civil and/or criminal proceedings
- Educational background
 - School career
 - Apprenticeship
 - Further or higher education
 - Qualifications/diplomas/certificates obtained

- Type of schooling/study/further education
- Work experience
 - Previous employment
 - Employment to date
 - Voluntary service
 - Part-time or holiday work
- Information on basic health
 - General state of health
 - Degree of disability
 - Vision and hearing
- Previous knowledge in aviation
 - Formal licences or experience in aviation
 - Previous ATC courses
 - Previous application in ATC
- Hobbies and interests
 - Sports
 - Membership in clubs
 - Cultural activities
- Miscellaneous
 - Application source
 - Reasons for application
 - Enclosure
 - Sign declaration
 - References

Design / Layout of Application Form

- Emphasis on critical data
- Sequence of data
- Size of application form
- Official use
- Front page data

ABILITY AND PERSONALITY TESTS

Basic Requirements

- Find out ATCO abilities and skills
- Match tests - job requirements - training requirements - recruits available
- Consider technical situation in 25 years
- Consider future employment roles of student: ATC non & radar control/management
- Consider how to test changing role of control to monitoring situations
- Impact of training structure
- Decide which "qualifications" should be tested
- Avoid contradicting requirements
- Define the best personality traits for ATCO
- Define personality requirements
- Abilities tower = abilities radar?
- Specify English language ability

Areas to be Tested

- Flexibility
- Decision-making
- Short/long term memory
- Perception speed and accuracy

- Ability to learn
- Multi-tasking
- Ability to observe and remember professionally related things
- Personality
- Stress resistance
- Mental modelling
- Motivation
- Concentration
- Tendency to make errors
- Cognitive components visual and auditive
- Spatial orientation
- Ability in mental arithmetic
- Mechanical and technical understanding
- Range of attention
- Frustration tolerance
- Vigilance
- English language
- Communication skills
- Ability to integrate with a “team”
- General knowledge

Available Ability and Personality Tests and Their Effectiveness

- Examine computer based ability tests
- Investigate tests available
- Consider psycho tests methods
- Use only proven tests
- Decide on in-house development and testing or outsourcing
- Use tests specially developed
- Get acceptance of tests by management and ATC-staff
- Consider the use of assessment centres
- Consider the use of task related tests
- Decide whether computer-based ability assessment will be used
- Consider the security of tests
- Define type of tests test battery
- Address the question of bias in tests
- Try to find a way to detect motivation

Test Procedures

- Determine sequence of test events
- Define procedures for interrupted tests
- Ensure the security of tests
- Decide on pass / fail or grading system
- Maintain test order and conditions

Assurance of Tests Quality

- Check tests for objectivity, validity, and reliability

INTERVIEW

Purpose of the Interview

- Define content and purpose of interviews

Areas to be Covered

- General motivation

- Job oriented motivation
- Behaviour and voice of the applicants during interview
- Ability to observe and remember professionally related things in interview
- Biography
- Impression of appearance
- Lack of timing and motivation
- Verbal communication
- Attitudes and personality
- Ability to integrate with a “team”

Methods Available

- Consider interviewing techniques

Interview Procedures

- Determine composition of the board
- Determine size of the board
- Consider attendance of active ATCOs
- Decide who should do the interview

Assurance of Interview Quality

- Ensure that selection boards produce consistent and objective outcome
- Consider selection and training of the board

COST - BENEFIT

Cost Benefit Analysis

- Calculate/analyse total test costs
- Consider total cost-effectiveness of recruitment and selection
- Calculate the cost of failures and relate them to the costs of selection
- Consider the use of consultants
- Consider pre-selection tests
- Consider the role of application forms in pre-selection (= paper-sift)
- Keep in mind average dropout rate during selection and training

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ANNEX B: SITUATION OF ATCO CANDIDATE SELECTION IN ECAC STATES

The analysis below is based on survey data collected by the STF in 1995 and focuses on the common practice for selecting *ab initio* controller students in ECAC States.

Questionnaire data from the following 23 States was used in the analysis⁵:

Austria, Belgium, Bulgaria, Czech Republic, Denmark, EUROCONTROL (Maastricht UAC), Finland, France, Germany, Hungary, Ireland, Italy, Lithuania, Malta, Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland, U.K.

Basic Entry Requirements

Medical Requirements

Medical requirements are defined in accordance with ICAO guidelines:

- ICAO class 3 (highest class) is required in 50% of the States surveyed;
- 33% apply class 1 and class 2;
- One third (33%) of States have, in addition, set higher medical standards mainly with regard to vision and hearing;
- Between 20 and 30% of organisations questioned have plans regarding policies on smoking, drug testing, alcohol consumption or on HIV testing.

Age

The minimum age on entry of controller candidates was surveyed as 17 years, the maximum is 40 years. About half the States questioned have an upper age limit of 25 years or less.

Higher age limits are generally more applicable when candidates already have Radio / Telephony (R/T) or other ATS licences (e.g. as military ATCOs) or have other aviation experience (e.g. as pilots).

Educational Requirements

Most States (80%) expect university entrance level as the minimum educational requirement while the remainder (20%) expect that candidates should have post-secondary or university qualifications.

⁵ Two of the 25 States were excluded from the analysis due to incomplete data.

About 20% of States define exceptions on educational requirements; for example, applicants with flight data experience or proven ATC qualifications.

English Language

3 States were English native speakers.

20 States were non-English native speakers.

- 15 (75%) of these required English as a pre-requisite.
- More than half (55%) of these States provide trainees with further English language training after recruitment.
- 5 (25%) did not require English as a pre-requisite but provided English language training after recruitment.

Compulsory Military or Public Service

In 67% of States some form of compulsory National military or other public service is a requirement while 50% consider this in the ATCO selection process.

Number of Applications Allowed

25% of States have no limitations on the number of unsuccessful applications a candidate may make provided they are submitted within the age limits; in practice the average is two applications.

Method of Application

An application form is used in nearly all States (96%).

Content of Application Form

Personal data

In at least 50% of the States the application form asks the following personal information (the rank order is given in brackets on the left):

(1)	Name, first name, date of birth	(96%)
(2)	Permanent address	(92%)
(3)	Temporary address	(71%)
(4)	Maiden or previous name	(68%)
(5)	Marital status	(54%)
(6)	Title, security number	(50%)

From this data only age (date of birth) is important for a PS and is used in 75% of the States.

National military or obligatory public service

In 50% of the States the duration of service is asked in the application form. For PS, 25% of the States consider the duration of service to be of greatest importance; the type of service, rank achieved and future obligations were important to 17%.

Nationality

A statement of citizenship is asked for in most application forms (88%) and is used in PS by 58%.

Language

Ability in another language(s) is asked in 54% of the States and is used for PS in 46%.

Security statement

Statements concerning civil and/or criminal proceedings are requested in 54% of the States surveyed. This data is used for PS in 46% of the States.

Educational background

A full educational history, in addition to minimum requirements, is required from applicants by 54% of the States. Both aspects are used in PS (42% and 50%).

Work experience

Data on employment prior to the application is asked by 67% of the States but only 21% use it for PS.

Information on health

50% of the States ask questions on the general state of health of applicants although only 33% use the information in PS. Information concerning visual performance is asked by 46% of States but only 29% consider this to be of interest in PS.

Experience in aviation

Information on formal licences held, or experience in aviation, is required by 67% of States surveyed; this information is considered for PS in only 38% of the States.

50% of the States ask about previous applications for ATC training; 42% consider them important in PS.

Hobbies and interests

Questions concerning hobbies and interests are not very common (asked in less than 50% of the States) nor do they play a role in PS.

Miscellaneous

Less than 50% require a signed declaration and references. 36% consider the declaration and 27% consider references in PS.

Interview Content and Procedures

Nearly all States (83%) use interviews in selection. Purposes of the interview, stated in the questionnaire, are to test job oriented motivation or the fitness for the ATCO job, to assess personality aspects, the sociability, the adaptability and the stress tolerance of applicants.

Interview Methods

52% of those States that conduct interviews make use of the biographical interview which, in most cases, is conducted as a structured interview.

Situational interviews, sometimes combined with a biographical interview, are used by another 16% of the States.

The remaining 32% use combinations of structured and unstructured interviews (not clearly identified as biographical or situational) or other interview methods.

More than 50% of States that conduct interviews do so in a structured form. However, the use of standardised techniques for interviews and assessments is not very common. 30% of States make use of techniques such as standardised questions, a standard marking system or a standard assessment form.

Interview Board

Only 41% of States request board members to undergo specific training.

On average the selection board consist of 3 members (min. 1, max. 5). The average length of an interview is about 1 hour (min. = 10 Minutes, max. = 150 Minutes).

More interview boards make final decisions (46%) rather than recommendations (38%) after the interview. Decisions or recommendations are made by majority vote slightly more often (38%) than by unanimity (33%).

Interview Content

In at least 50% of the States conducting interviews the interview covers the following areas (the ranking order is given in brackets on the left):

(1)	General motivation	(88%)
(2)	Job oriented motivation	(83%)
(3)	Personality	(75%)
(4)	Communication skills	(71%)
(5)	Team skills, impression of appearance, biography	(63%)
(6)	Punctuality of the applicant	(50%)

Stress resistance of applicants - although an important aspect of the ATCO job - is assessed in 46% of the States conducting interviews.

Assessment of Ability and Personality Aspects (Selection Tests)

The majority (88%) of States conduct selection tests.

Ability, Knowledge and Skills Tests

In at least 50% of the States the tests cover the following ability, knowledge or skill areas (the ranking order is given in brackets on the left):

(1)	Short term memory	(79%)
(2)	Concentration	(75%)
(3)	Perceptual speed, accuracy of perception, spatial orientation	(71%)
(4)	Ability in mental arithmetic	(67%)
(5)	Multi tasking ability	(63%)
(6)	Vigilance	(58%)
(7)	Long term memory, mental modelling	(54%)
(8)	Attention Span, English knowledge	(50%)

Other ability or skills areas listed in the questionnaire are less often tested. Very often only part of the relevant ability areas is assessed and 42% of the organisations questioned use 'unspecified intelligence tests' in selection.

Most of the tests are conducted as paper and pencil exercises using an abstract item format. Exceptions in this respect are multi-tasking, vigilance and mental modelling, where computer based tests are more often applied. Only a few tests (e.g. mental modelling, multi-tasking) are job related.

Personality Tests and Assessments

Personality tests are applied by 67% of the States.

In at least 50% of the States, the tests cover the following personality aspects (the rank order is given in brackets on the left):

- | | | |
|-----|--|-------|
| (1) | Motivation, stress resistance | (67%) |
| (2) | Flexibility, team skills, communication skills, decision-making, flexibility | (59%) |
| (3) | Learning ability | (50%) |

In 27% of the States other personality aspects are also tested: (e.g.) emotional stability, rigidity, extroversion/introversion, aggressiveness, vitality, dominance, empathy, mobility, leadership, social relations, self-confidence.

About one-third (38%) use 'assessment centre' methods in order to obtain behavioural oriented data from applicants.

Test Development, Evaluation and Quality

In 67% of States some tests are specifically designed for ATCO selection.

Research and Development

About 70% of States have done research on the attributes or skills of ATCOs in the current system, but only 29% have considered the impact of future technical developments on the job of ATCOs.

No State has, or applies, different selection criteria for radar and non-radar (e.g. Tower (TWR)) controllers.

33% of the States have survey data available concerning differences in test results between male and female applicants.

Information on the psychometric quality of tests

Information on the psychometric quality of tests, that is their objectivity, reliability and validity is not widely available. Only 50% of States report that, as a minimum, information on the reliability of tests used is available. 46% of the States questioned can provide data on the validity of their test system and 42% can provide information about the objectivity of the tests applied in selection.

Evaluation of Results

50% of the States use a pass/fail criterion to evaluate the final results of applicants and 41% use some form of grading system (for example Standard scales).

Failure Rate During Training

States report that on average one-fourth (24%) of their student controllers fail the training due to malperformance.

The lowest failure rate reported is 2% the highest failure rate is 70%.

The figures given are based on data from 23 States and an average sample size of 126 student controllers (min. = 3; max. = 800).

Note: This data has to be considered with extreme care because of different evaluation criteria applied in training, different training schemes (e.g. length of training), different procedures concerning the number of re-sits allowed after examination failures and expectations concerning the level of proficiency to be achieved in training etc.

Marketing

Most States (88%) use newspapers for marketing vacancies or make information visits to schools (58%). Instead of this, or in addition to it, 42% advertise in aviation magazines and 38% in other magazines. One third (33%) make use of career offices in order to inform and attract *ab initio* trainee controller applicants.

An information package (e.g. company brochure, job information, test information) is sent to applicants by only 58% of the States.

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ANNEX C: QUALITY SYSTEMS

STANDARD QUALITY SYSTEMS

In order to assure the quality of the product or service of a system, users of the system have to define the quality of the required service provided.

The following considerations may help in adopting a more systematic approach to employing a quality system in the selection of ATCO candidates.

The ISO 9000 - 9004 Standards

There are a number of definitions of international and national quality systems available. In the following only a short review of the International Organization for Standardization (ISO) Standards is given.

The ISO Standards are a set of internationally agreed standards which aim to:

- clarify the principal quality concepts;
- describe the basic set of elements from which quality systems can be developed;
- define the quality system requirements for a number of quality assurance models.

It is the broad principles of control which are defined in the standards and not the working methods by which control can be achieved. Specific working methods must be developed independently.

The ISO series set out a definitive list of those features and characteristics it is considered should be present in an organisation's management control system through:

- documented policies,
- manuals and
- procedures,

- which help to ensure that quality is built into the process (for example the selection process) and is achieved. These aspects are described in more detail in Sub-chapters 5.1 and 5.2. They are reconsidered from the quality system perspective in the following paragraph.

Quality Systems Principles in Service Organisations

Four key aspects of a quality system in service are important:

1. Management Responsibility

A policy for service quality should be established concerning the grade of service provided, objectives for service quality, quality responsibility and authority, periodical review and improvement.

2. Personnel and Material Resources

Sufficient and appropriate personnel resources (concerning their motivation and commitment, training and development, communications and team work skills and knowledge) as well as material resources (concerning test facilities and equipment, accommodation, information systems, computers and software, operational and technical documentation) should be provided.

3. Quality System Structure

A structured quality system should be established for the control and assurance of all operational processes affecting service quality: internal and external feedback mechanisms, quality documentation and records (documentation system = quality manual, quality plan, procedures, quality records), documentation control, internal quality audits.

4. Interface with Customers

An effective interaction between customers and service personnel and facilities should be established concerning content, scope and availability of service, service costs, customer contributions to service quality, facilities for effective communication.

OTHER SYSTEMS IN QUALITY ASSURANCE AND CONTROL

In recent years the concept of 'quality' has changed. Quality assurance not only concerns a 'product' or a service but the 'totality' of the work process. In classical terms quality assurance was mainly understood as a failure searching system. Once a failure in the quality of a product or service was detected, actions were taken to 'repair' the product or to improve the quality of the service. In modern terms, the aim of quality assurance actions is the prevention of failures or quality problems.

Total Quality Management

With regards to Total Management systems the reader is referred to publications and documentation of the European Foundation for Quality Management (EFQM), e.g. EFQM (1996).

'Total Quality Management' (TQM) is a strategic management approach to quality. It involves a significant change in an organisation's culture, including its goals, mission, philosophy, and procedures.

Guiding Principles of TQM

This approach requires the following prerequisites compared with a more 'classical approach' to quality assurance and control:

1. Common understanding of quality goals

All participants (customers, suppliers and service providers) at all levels must agree on quality goals.

2. Correspondence between duty and responsibility

Professional personnel (e.g. psychological consultants, instructors, interviewers) should be responsible for the results of their work.

3. Process-oriented planning and action

Not only results are important but also the way of achieving them in order to avoid quality shortcomings and to eliminate the causes of failures.

4. Awareness of the customer - supplier relationship in the organisation

Everyone inside or outside an organisation who is the recipient of a product or service is regarded as a customer.

5. Feedback to the persons providing a piece of work/service

Suppliers need to know to what extent they have met quality requirements.

The TQM approach ensures but also requires the deep involvement of all parties in the process of quality assurance and control. A broader agreement has therefore to be found within an organisation between management and staff with regard to a general quality policy or 'philosophy'.

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DEFINITIONS

For the purposes of this document the following definitions shall apply:

Ability: What a person brings to the job situation without specialised, job specific training, education or experience. Ability, at that point has already been shaped by general education and experience. There are many kinds of abilities. With regard to ATCO selection the focus is on relatively broad mental abilities.

Ability Tests: These tests are developed in order to predict future performance in areas in which individuals are not currently trained. Ability tests used in selection of ATCO candidates cover a more or less broad range of abilities pertinent to the job of an air traffic controller.

Ab Initio Trainee Controllers: Selected individuals, with no previous relevant qualifications, who are given basic instruction and training to enable them to obtain theoretical qualifications.

Assessment Centre: A behaviour-oriented method of selection to assess the social and action competence of applicants in job-related situations. Applicants are observed and assessed by trained observers in various standard situations (e.g. role-play, teamwork) with regard to certain competences.

Customer: Any person or any unit receiving a service or product.

Interview: A structured, or unstructured, one to one or one to several on a panel conversation with a job-applicant for the purpose of identifying knowledge, skills, abilities and behaviours that may be predictive of success in subsequent training and in the job. To this effect biographical, or situational, performance and motivation related information from the applicant is taken into consideration in order to make a decision on employment.

Joint Venture: The united activity of two or more organisations in order to share financial risks and gains with regard to an enterprise.

Knowledge: The job-specific content or information which a person has gained through training, education and/or experience. Knowledge is built upon the foundation of mental abilities that a person brings to the situation.

Mental Abilities: Mental abilities are the operations of the mind. They are the fundamental, basic, and to some degree abstract, capacities and processes of perceiving, thinking, and deciding.

Norm: A norm is a standard of achievement in tests or questionnaires usually derived from the average achievement of a large group of individuals. The interpretation of results in tests or questionnaires is normally based on a

comparison of the individuals response with those previously obtained to establish the appropriate standard for the test scores.

On-the-Job Training (OJT): The integration in practice of previously acquired job related routines and skills under the supervision of a qualified coach in a live traffic situation.

Paper Sift: The sift of application forms and attached application material in order to pre-select candidates according to previously defined criteria.

Personality Tests: These tests measure social and emotional attitudes of applicants.

Psychological Testing: The measurement of some aspects of human abilities by standardised procedures consisting of carefully prescribed content, methods of administration, and interpretation. Tests are usually administered by qualified psychologists or specially trained staff according to professional and ethical principles.

Quality Assurance: All planned and systematic measures required to create the necessary confidence in the ability of a product/service to meet agreed quality requirements or standards.

Selection Procedures: Selection procedures provide guidelines for accepting, or rejecting, applicants for a job on the basis of data from application forms, psychological tests (abilities, personality tests) or interviews.

Skill: The combination of ability and knowledge after training and practice which is required to perform a job specific task. Skill is built upon the foundation of mental abilities that a person brings to the situation.

Student Air Traffic Controller: Selected individuals who have successfully completed approved initial ATC instruction and training to enable them to obtain theoretical qualifications prior to commencement of pre on-the-job training.

Supplier: Any person or any unit providing a service or a product.

Test: A standardised and controlled method for measuring abilities, knowledge or personality of applicants.

ABBREVIATIONS AND ACRONYMS

For the purposes of this document the following abbreviations and acronyms shall apply:

ATC	Air Traffic Control
ATCO	Air Traffic Controller
ATM	Air Traffic Management
ATS	Air Traffic Services
CAST	Consequences of future ATM systems for air traffic controller Selection and Training
CDG	Core Drafting Group (Selection)
CIP	Convergence and Implementation Programme
CTA	Cognitive Task Analysis
DED	Directorate EATCHIP Development
EATCHIP	European Air Traffic Control Harmonisation and Integration Programme (<i>now EATMP</i>)
EATMP	European Air Traffic Management Programme (<i>formerly EATCHIP</i>)
ECAC	European Civil Aviation Conference
EFQM	European Foundation for Quality Management
ESARR	EUROCONTROL Safety Regulatory Requirement
ET	Executive Task (<i>EATCHIP</i>)
EU	European Union
EUROCONTROL	European Organisation for the Safety of Air Navigation
EWP	EATCHIP Work Programme
FEAST	First European ATCO Selection Test package
GUI	Guidelines (<i>EATCHIP/EATMP</i>)
HRS	Human Resources Programme (<i>EATMP, HUM</i>)

HRT	Human Resources Team (<i>EATCHIP/EATMP, HUM</i>)
HUM	Human Resources (Domain) (<i>EATCHIP/EATMP</i>)
IANS	Institute of Air Navigation Services (<i>EUROCONTROL, LUXEMBOURG</i>)
ICAO	International Civil Aviation Organisation
ISO	International Organization for Standardization
KSA	Knowledge, Skills, and Abilities
KSAO	Knowledge, Skills and Abilities and Other characteristics
MSG	Manpower Sub Group
MSP	Manpower Sub-Programme
OJT	On-the-Job Training
PELA	Proficiency in English Language for Air Traffic Control
PS	Paper Sift
R/T	Radio Telephony
SRC	Safety Regulation Commission (<i>EUROCONTROL</i>)
ST	Specialist Task (<i>EATCHIP</i>)
STANINE	Standard Nine Score
STF	Selection Task Force
TQM	Total Quality Management
TWR	Tower

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