EUROPEAN ORGANISATION FOR THE SAFETY OF AIR NAVIGATION

EUROCONTROL

Model for
Task and Job Descriptions
of Air Traffic Controllers

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**EUROPEAN AIR TRAFFIC CONTROL HARMONISATION
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Abstract
The Job Description Task Force of the Human Resources Team in EATCHIP has developed a model for Task and Job Descriptions of Air Traffic Controllers. The report describes the method used, results and conclusions for current and future work of the Task Force.
Results and conclusions highlight the relevance of cognitive aspects in controller tasks which have important impact for selection, training, licensing and working practices of Air Traffic Controllers and future development of new procedures and technical equipment.

Keywords

Cognitive aspects	Job analysis	Job description	Job design
Task description	Situational awareness		

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EXECUTIVE SUMMARY

The EATCHIP Human Resources Domain recognises that task and job descriptions are significant factors for manpower planning, selection, training, licensing, working practices and developments for the current and future ATM system.

This document reflects the work of the Job Description Task Force (JD TF) of the EATCHIP Human Resources Domain which has developed a model for Task and Job Descriptions of Air Traffic Controllers.

Paragraph 1 introduces the background, scope and purpose of the JD TF and describes the Task Force activities, principles and conceptual model used.

Paragraph 2 describes the identified task structure, knowledge and skills levels of tasks and possible criteria for the definition for jobs and job families which form the basis for a detailed task and job analysis.

Paragraph 3 discusses the relevance of the cognitive aspects in controller tasks which have an important impact on selection, training, licensing and working practices of Air Traffic Controllers and future development of new procedures and technical equipment.

An example of a detailed task breakdown, the list of task clusters & subtasks, references, definitions and abbreviations can be found at the end of the document.

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1.   INTRODUCTION

In 1990 the ECAC Transport Ministers decided to harmonise and integrate the European air traffic system in order to maintain and enhance safety and to increase capacity. Forecasts of traffic increase in Europe indicated that existing procedures and systems could not cope with these demands. EUROCONTROL was asked to manage the project called EATCHIP, the European Air Traffic Control Harmonisation and Integration Programme, a four-part programme utilising various domains with allocated objectives, specific tasks and individual Convergence and Implementation Programmes (CIP) for States.

The work of the Human Resources Domain in EATCHIP is based on the ECAC strategy paper for the 1990's and in particular on Implementation Objective 5 'Guidelines for selection, training and licensing of air traffic staff in ECAC member states'. For that purpose the Human Resources Domain has developed a systemic approach (Figure 1) for manpower planning, selection, training, licensing, working practices and resource management. In this integrated view task and job descriptions of air traffic staff are of central importance for this work and will be extended towards the future ATM system.
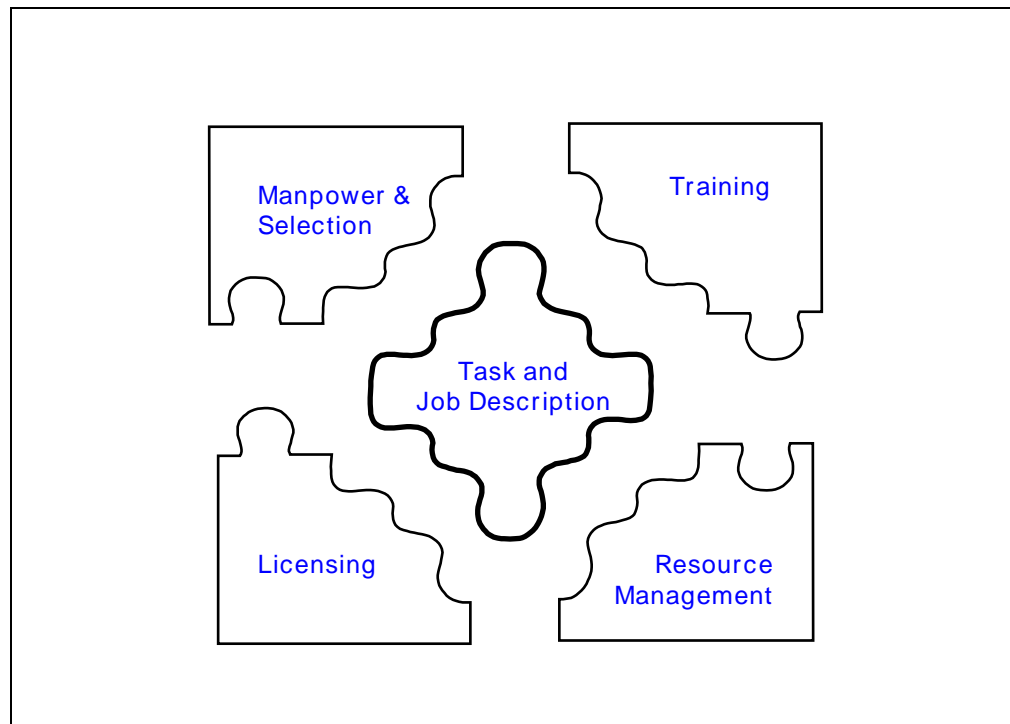
Figure 1: Structure of the EATCHIP Human Resources Domain

1.1 Purpose and Scope

In the EATCHIP Work Programme Specialist Task HUM.ET1.ST01 is titled 'Develop harmonised ATS job descriptions' and was presented to the ECAC representatives at the first Human Resources Team (HRT) meeting in March 1994. The HRT decided to establish a 'Job description Task Force (Air Traffic Controller)' which reports to it directly. The purpose of this group was to produce common agreed descriptions of tasks and jobs for Air Traffic Controllers that can be used for scope and content of guidelines for selection, training, licensing, working practices and future systems.

When the Task Force began to set up a work plan it was obvious that existing tools and methods for job description and job analysis (Gael, 1988) would not meet this specific purpose. As a first step in this cross-cultural and multi-lingual setting it was necessary to reach agreement on a common working terminology (see Definitions). Task and job description content is identified in qualitative descriptions of possible Air Traffic Control Officer (ATCO) tasks, their interrelations and relative importance together with associated levels of abilities, knowledge and skills. The configuration of individual tasks into generic job descriptions will be based on the identification of appropriate environmental conditions (e.g. location of jobs and the technical equipment used etc.). A more detailed breakdown of tasks in terms of quantitative analysis depends on the specific needs of other Human Resources areas. The selection of appropriate methods had also to take into account resource and time constraints, cultural and organisational differences between the States and allow a high level of flexibility towards future environment and system developments.

1.2 Task Force Activities

The Task Force was established in summer 1994 with ECAC States representatives from Austria, Finland, France, Germany, Spain, United Kingdom, Eurocontrol Headquarters and the Institute for Air Navigation and the UAC Maastricht, a mixed team of active controllers, training and human factors experts.

1.2.1 Principles

Harmonisation of ATS task and job descriptions does not follow a linear sequence of formulation-analysis-solution-implementation, one of the reasons why existing methods for job descriptions and analysis do not fit. The work is seen as a cyclic process, and the method looks for techniques and tools which are focused on consensus and commitment to possible options for the solutions of a complex problem and to ensure the involment of subject matter experts (SMEs). For this purpose the Human Resources Domain in EATCHIP has developed a qualitative work and research method which is called 'Project Teamwork'. The method is based on ideas of Nominal Group Technique (Delbecq and Van de Ven, 1971), Cognitive Mapping (Eden, 1989) and Soft

Systems Methodology (Checkland, 1990). Each member of the team is required to present his or her experience and concept of the 'real' situation. The wisdom and experience-gathering provided by members of the team are key elements in developing purposeful concepts and solutions and may be seen as an act of scientific endeavour.

1.2.2   Project Teamwork

Project Teamwork is a facilitative device enabling work on complex problems by using various visual and interactive techniques. It is a structured work technique that attempts to provide an orderly mechanism for obtaining qualitative data and information from groups which are familiar with a particular problem area. The role of the facilitator is to manage the process by which the team arrives at consensus and commitment to decisions and actions. Project Teamwork has six main phases (Figure 2) which can be combined with other work techniques if required.
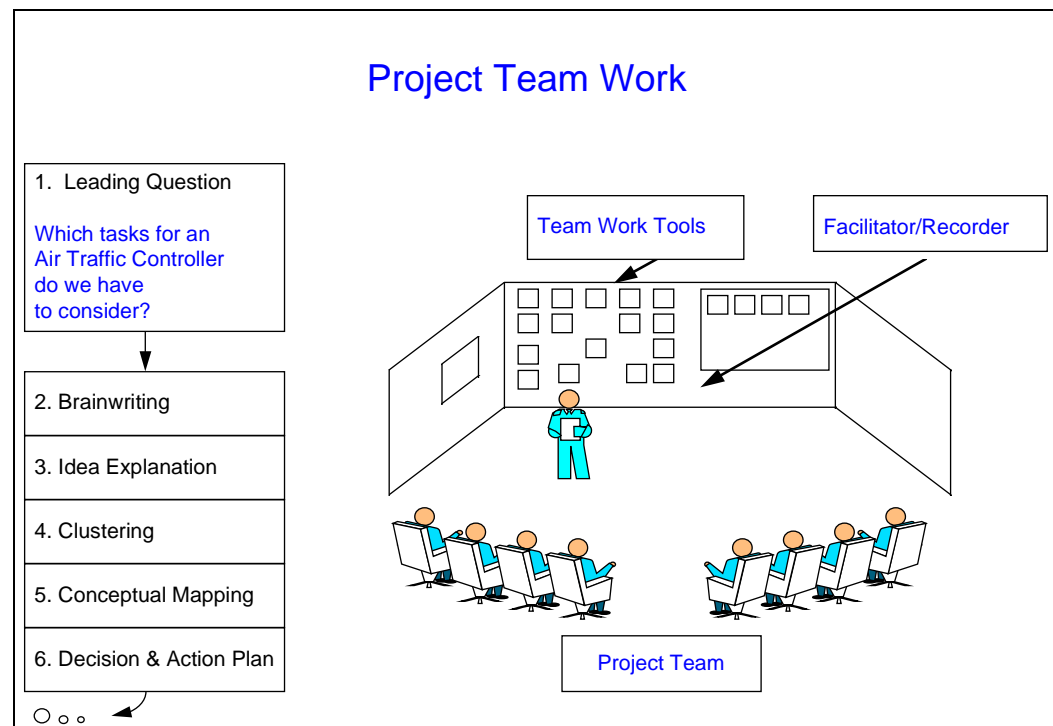
Figure 2: Phases of 'Project Teamwork'

1. Leading question: At the start the facilitator guides the team to find the appropriate question in order to gather ideas on the subject.

2. Brainwriting: Every team member develops as many answers to the question as possible in written form. Every idea is allowed and criticism at this stage is forbidden.

3. Idea explanation: The facilitator asks the team members to explain and discuss the ideas in a structured way, to improve common understanding and to find common agreed definitions.

4. Clustering: The team identifies ideas of similar content to find a structure of the subject.

5. Conceptual mapping: The team identifies the relationships and dependencies of the clustered ideas and by using logical deductions, designs a first model of how the future system looks like.

6. Decision & Action Plan: The decision and action plan concentrates around the three following questions: What? When? Who?

Going through these phases is not seen a one-off exercise, its rather a cyclic and iterative process which allows the required flexibility towards new developments and requirements.

1.2.3   Conceptual Model

After the first Task Force meeting sufficient work material was available to design the first draft of a conceptual model for task and job descriptions (Figure 3). Step A is the description, breakdown and structure of tasks. Step B the definition of task-related ability, knowledge and skill levels. Step C identifies criteria for the configuration of tasks and their related knowledge and skill levels towards jobs and job families.

Further refinement of initial results requires close co-ordination and feedback cycles with associated subdomains. The flexible configuration of training programmes can be based on knowledge and skill related training modules. The production of training modules, however, may require further and more detailed breakdown of task descriptions. The identification of task and job related abilities is the basis for the development of appropriate selection methods and selection programmes. Criteria for configurations of jobs and job families is an important aspect for licensing standards and their associated licensing categories. In order to find best working practices, identified tasks have to be organised in the most efficient way. The pro-active development of new procedures and technology should take account of current task and job descriptions to ensure the match of humans and machines. Conversely new procedures and technology will change and modify current tasks and jobs, and will have impact on selection, training, licensing and working practices.
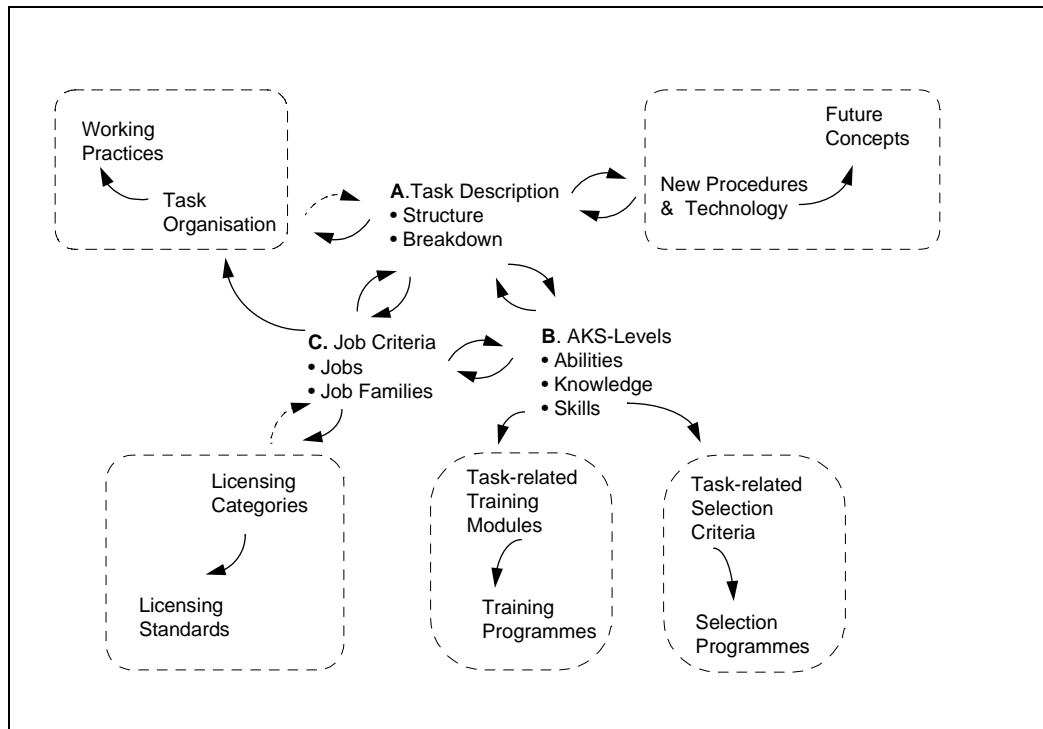
Figure 3: Conceptual model of task and job descriptions

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2.   RESULTS

The application of the 'Project Teamwork' method has proved to be very effective in achieving consensus and commitment by this cross-cultural team bearing in mind that most of the members had to express their ideas and concepts in the English language, not their mother tongue.

The following results are components of the conceptual model which might be refined during further work on the subject.

2.1   Task Description

The 'Project Teamwork' started with the definition of the leading question for the data gathering process:

'Which tasks for an Air Traffic Controller do we have to consider?' This was followed by a training exercise, on how the task statements should be written. In the brainwriting phase the participants produced 140 task statements. In the idea explanation phase the group was mainly faced with semantic problems and therefore decided to produce a list of terms and working definitions. After several cycles of refinement the team identified 23 task clusters with main headings and associated subtasks (see end of the document).

2.2   Task Structure

In order to identify the interrelations and relative importance of the task clusters the team drafted a model where three categories of tasks could be identified.

Core Tasks: involve the design and provision of a product and/or service

Direct Support Tasks: contribute to the design and provision of the product and/or service in the short term

Indirect Support Tasks: contribute to the design and provision of the product and/or service in the longer term

Table 1 shows the provisional list of task cluster headings which include 7 core tasks, 7 direct support tasks and 9 indirect support tasks. In the list of core tasks it could be further differentiated between two 'cognitive tasks' (CT1, CT2) and five 'behavioural or service oriented' tasks (CT3 - CT7). It should be mentioned that Redding and Seamster (1994) came to a comparable set of 13 'key tasks' for air traffic controllers by using the method of 'Cognitive Task Analysis (CTA)'.

Table 1: Initial list of task clusters headings

CORE TASKS
Cognitive Tasks CT1 Maintain situational awareness CT2 Make decisions for control actions Behavioural Tasks CT3 Conduct R/T communication CT4 Provide separation CT5 Provide pilots with all relevant information CT6 Provide assistance to a/c in abnormal situations CT7 Provide tactical air traffic management
DIRECT SUPPORT TASKS
DST1 Check technical equipment at working position DST2 Build up 'mental picture' of traffic situation DST3 Handle and process flight plan information DST4 Ensure correct co-ordination DST5 Manage air traffic within area of responsibility DST6 Update working knowledge DST7 Conform with medical requirements
INDIRECT SUPPORT TASKS
IST1 Prepare operational documentation IST2 Co-ordinate with customers/users IST3 Supervise control room IST4 Report on activities IST5 Provide unit training IST6 Determine operational competence of controllers IST7 Co-operate in incident/accident investigation IST8 Participate in ATC development & implementation IST9 Participate in ATC evaluations

Further work on the breakdown of tasks should concentrate primarily on core tasks and direct support tasks which are seen as the core business of the operational Air Traffic Controller. Indirect support tasks seem to be the basis for additional activities which are mostly performed by more experienced and specially trained controllers.

2.3   Knowledge and Skills Levels of Tasks

After having defined task clusters of ATCOs it seemed necessary to define different levels of knowledge and skills for tasks. If a person performs a certain number of tasks within the scope of his job it may require a high level of knowledge, skills and understanding for one task but only a basic level of knowledge and understanding for another. ICAO has defined a grading scale (Table 2) for five levels of knowledge and skills (in ICAO Doc 7192 AN 857, Part 2, 1st Edition).

Table 2: ICAO grading scale

Level 1	Denotes an understanding of a principle
Level 2	Denotes a basic Knowledge of a subject
Level 3	Denotes Knowledge of the subject and the ability, where applicable, to apply it practically
Level 4	Denotes extensive Knowledge of the subject and the ability to apply it with speed and accuracy
Level 5	Denotes extensive Knowledge of the subject and the ability to apply procedures derived from it with judgement in the light of the circumstances

For practical reasons the Task Force proposes a grading scale (Table 3) with three levels of knowledge and skills based on the ideas of the ICAO grading scale. A grading scale for task-related abilities, necessary for the definition of selection criteria is seen within the scope of the Selection Task Force and could based on the following table.

Table 3: Task Force proposed grading scale

Level A EXPERT:	Requires detailed understanding and knowledge of principles together with skills for complex practical applications
Level B ADVANCED:	Requires advanced understanding and knowledge of principles together with skills for simple practical applications
Level C BASIC:	Requires basic understanding and knowledge of principles without having appropriate practical skills

2.4   Definition of Criteria for Jobs and Job Families

Having defined the tasks it is now required to design jobs. The TF defined these 'as a composition of a certain number of core tasks, direct support tasks and indirect support tasks which require a certain level of abilities, knowledge and skills' which can be used in a given work environment. Jobs can then be grouped into job families in a practical and reasonable way.

The Task Force proposes that AIRSPACE and TECHNICAL EQUIPMENT should be the appropriate criteria for the design of job families (Table 4).

Table 4: Structure of job families

	En-Route Airspace	Terminal Control Area	Airport-Ground
Radar			
Non-Radar			

2.5   Further Breakdown of Task Clusters

A detailed breakdown of task clusters depends on the specific needs of other subdomains (selection, training, licensing etc.). The Task Force has choosen the core task CT4 'Provide seperation' to demonstrate an example of what a detailed breakdown of task clusters could look like (see Example Breakdown of Core Task 4). The breakdown of CT4 comprises 8 subtask levels which range from a detailed description of tasks (levels 1 to 4) to a level where procedural aspects of the task are described (levels 5 to 8). Differentiations in terms of jobs and job families can be found in level 3 and 4. Other task clusters might have a different structure with fewer levels of breakdown. This example might open the question of the appropriate leveling of task breakdowns within the scope of the Job Description Task Force and associated Task Forces of the Human Resources Domain.

3.   CONCLUSIONS

3.1   Project Teamwork

The method of 'Project Teamwork', which was used in the task force, was very useful in developing a common conceptual model for the harmonisation of task and job descriptions. The model was developed within a group of experts, where each participant could contribute his own experience and concepts without being forced to accept one existing 'best' solution. The method also helped to identify and overcome cultural differences which are more often based on different use of terms and language than on different ideas and concepts. For further work of the group it was very important to detect the interrelations, interfaces and dependencies with other domains and subdomains to ensure a flexible and integrated approach towards the harmonisation process.

3.2   Harmonisation of Task and Job Descriptions

Harmonisation of international concepts and systems in aviation opens a new challenge for human factors contribution. Aviation psychology and associated sciences have in the past mainly focused on quantitative approaches in research and application, which can be best used when purpose and aim of the subject is well defined. Harmonisation of human resources and human factors concepts is often not sharply enough defined to choose just the best quantitative means. Purpose and goals are often vaguely described and indicate trends rather than desirable solutions. In this respect we could learn from new developed interactive problem structuring methods of operational research (OR) (Rosenhead, 1989). These non-quantitative graphical and interactive methods help to build up 'system models' of the subject and to display complex networks of influence, causality, similarity or compatibility of tasks.

3.3   Implications for Human Resources Management

Due to the complexity and specific nature of ATC, ATCO manpower has to be planned at least five years in advance. This is the time which is needed for the decision to recruit ATCO trainees until they have completed the necessary training and examination in the institutional and operational environment.

Any major changes in procedures and technologies planned to be used in the future may require modified task-related selection criteria and training content. In order to ensure that future changes are taken into account in selection and training, these changes have to be known well before recruitment. An additional time period of about three years to change and adapt current selection and training systems will be required. This adds up to a planning time of at least eight years to ensure that sufficient staff of the correct

professional profile, in terms of skill, expertise and experience, will be available in time.

3.4   Cognitive Aspects in the Air Traffic Controller Tasks

Within the task description activities the task force felt it was necessary to emphasise the role of the cognitive aspects in Air Traffic Controller's tasks. Many controllers and human factors experts are aware of the importance of situational awareness but still little is known about its specific nature. For the time being the controllers 'situational awareness' can be described as continuous extraction of environmental information, integration of this information with previous knowledge to form a coherent mental picture, and the use of that picture in directing further perception and anticipating future events. On the basis of maintaining situational awareness the controller makes decisions for control actions (Figure 4).

It largely depends on the cognitive capacity of the human to create a clear, stable three- or four-dimensional picture of the airspace and aircraft within it from aural and visual data. Apart from human factors topics (selection, training and working practices), requirements on complex cognitive abilities have important impact on the development of new procedures and technology and future systems. Insights on the way of processing technically mediated data should lead to technical consequences. Isaac (1995) states that 'one of the best approaches would be to assess the tasks which are best suited to humans and then design the equipment which automates the remaining tasks'.
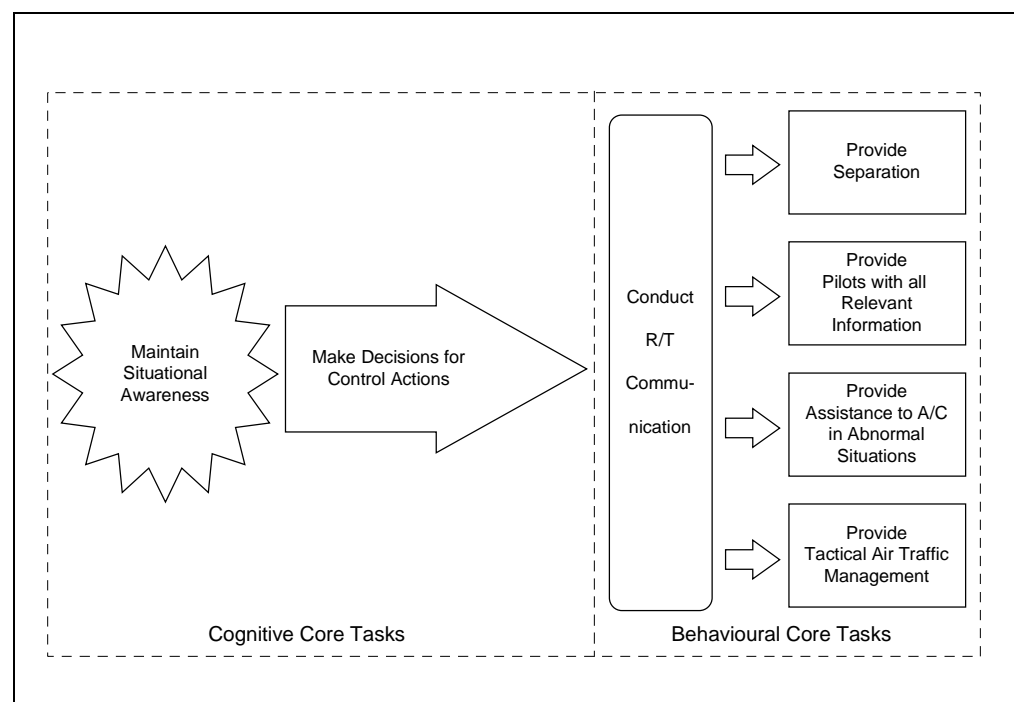
Figure 4: Process model of ATCO Core Tasks

The cognitive Core Tasks (CT1, CT2) should be seen as prerequisites to perform the behavioural or service oriented Core Tasks. High professionalism to fulfil those tasks goes along with high cognitive abilities and skills to develop a mental picture and to maintain situational awareness. While the automation of many tasks will alleviate the workload of the experienced controller, such automation has a negative impact on developing cognitive skills among trainee controller under On-the-Job-Training (OJT). It is most important, therefore, that training during simulation extends to concentrate some effort providing opportunities for the trainee to become aware of the importance of developing and maintaining a mental model of the traffic within the airspace.

As automation increases, the use of additional refresher training must be considered as a means of ensuring that all personnel can revert to active use and development of cognitive abilities and skills.

3.5   Future Concepts

The risk of a purely technology driven approach is to relegate humans to a monitoring role which has been proved not to be his best capability (Bainbridge, 1987). It is hoped that further research on the nature and structure of the controller cognitive tasks will allow development of check routines for the design of procedures and technical equipment. Whenever prototypes for new procedures and HMI are available this will allow to analyse which tasks will be modified, added or deleted. It would also determine how far it affects the controllers ability to regain and maintain the mental picture and to what extent his cognitive strength is increased or reduced. Further decisions on implementation of new procedures and technology should be carefully assessed for human factors implications to ensure that human capabilities are used in the best way and are assisted by modern technology to enhance a high level of safety and to increase capacity of the future air traffic systems.

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EXAMPLE BREAKDOWN OF CORE TASK 4
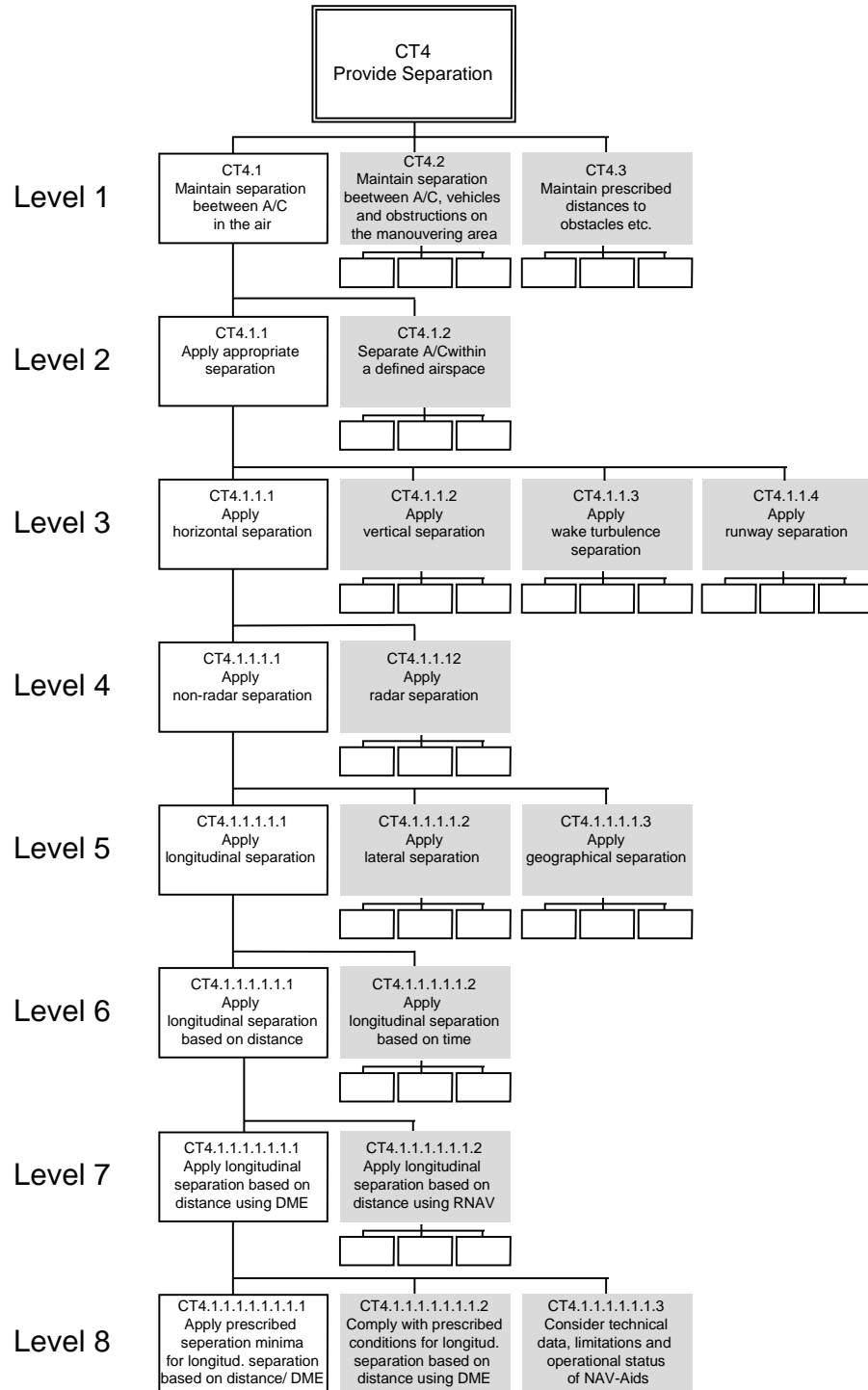
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TASK CLUSTER AND ASSOCIATED SUBTASKS

The following list contains the 23 task cluster and associated subtasks which were identified by the Task Force. The subtasks are not comprehensive and fully consistent and should only be used to understand how the Task Force deduced the definition of the task cluster headings.

CORE TASKS

CT1   MAINTAIN "SITUATIONAL AWARENESS"
CT1.1   Keep scanning traffic displays
CT1.2   Maintain visual contact with aerodrome traffic
CT1.3   Consider current weather situation
CT1.4   Continuously analyse the traffic situation
CT1.5   Continuously scan actual and expected traffic
CT1.6   Assess traffic for control action
CT1.7   Monitor the compliance with the ATC clearance
CT1.8   Be aware of possible abnormal situation
CT1.9   Be aware of possible equipment failure

CT2   MAKE DECISIONS FOR CONTROL ACTIONS
CT2.1   Comply with operational regulations
CT2.2   Select appropriate seperation
CT2.3   Anticipate potential conflict
CT2.4   Allocate priorities to particular aircraft
CT2.5   Expedite traffic in the most competent manner
CT2.6   Respond to requests for climb and descent clearance
CT2.7   Offer aircraft alternative clearances

CT3   CONDUCT R/T COMMUNICATION
CT3.1   Conduct R/T clearly and concisely using standard phraseology
CT3.2   Communicate with ground operators
CT3.3   Communicate with pilots

CT4   PROVIDE SEPARATION
CT4.1   Maintain separation between A/C
CT4.2   Maintain separation between A/C and surface obstacles
CT4.3   Separate surface aircraft from obstacles on the aerodrome

CT5   PROVIDE PILOTS WITH RELEVANT INFORMATION
CT5.1   Respond to pilots request for advice
CT5.2   Provide airport information
CT5.3   Provide weather information
CT5.4   Provide navigational information
CT5.5   Provide traffic information
CT5.6   Acknowledge information given
CT5.7   Provide delay information
CT5.8   Provide information on abnormal situations (migrating birds, weather balloons, etc.)
CT5.9   Relay messages

CT6   **PROVIDE ASSISTANCE TO A/C IN ABNORMAL SITUATIONS**
CT6.1   Recognize abnormal situation
CT6.2   Allocate priorities
CT6.3   Notify pilots of abnormal situations
CT6.4   Notify controllers of abnormal situations
CT6.5   Apply special procedures immediately if required
CT6.6   Assist A/C

CT7   **PROVIDE TACTICAL AIR TRAFFIC MANAGEMENT**
CT7.1   Maximise tactical use of the airspace
CT7.2   Ensure proper sequencing of the traffic

DIRECT SUPPORT TASKS

DST1   **CHECK TECHNICAL EQUIPMENT AT WORKING POSITION**
DST1.1   Maintain the integrity of the working position
DST1.2   Select and adjust technical equipment
DST1.3   Notify any technical failure to maintenance

DST2   **BUILD UP "MENTAL PICTURE" OF AIR TRAFFIC SITUATION**
DST2.1   Ensure that comprehensive handover is performed
DST2.2   Check and analyse traffic situation prior to taking over control
DST2.3   Familiarise with weather conditions
DST2.4   Familiarise with aerodome conditions
DST2.5   Familiarise with airspace conditions

DST3   **HANDLE AND PROCESS FLIGHT PLAN INFORMATION**
DST3.1   Check flight plans
DST3.2   Collate relevant information
DST3.3   Relate radar data to other visual display unit
DST3.4   Evaluate information
DST3.5   Update flight plan information
DST3.6   Check the updated flight plan progress information

DST4   **ENSURE CORRECT CO-ORDINATION**
DST4.1   Co-ordinate within terms of of agreed and prescribed procedures
DST4.2   Notify controllers on abnormal situations
DST4.3   Delegate urgent co-ordination functions
DST4.4   Co-ordinate flight data in the same area of responsibility
DST4.5   Co-ordinate with other areas of responsibility (sectors/units)
DST4.6   Consider team workload
DST4.7   Perform external co-ordination
DST4.8   Co-ordinate with other airspace users and agencies

DST5   **MANAGE AIR TRAFFIC WITHIN AREA OF RESPONSIBILITY**
DST5.1   Evaluate airspace capacity
DST5.2   Balance capacity against demand
DST5.3   Regulate the flow of air traffic

DST6   UPDATE WORKING KNOWLEDGE
DST6.1   Obtain adequate briefing prior to assuming operating position
DST6.2   Be aware of all procedures
DST6.3   Be aware of airspace categories
DST6.4   Know the emergency procedures
DST6.5   Be aware of system limitations

DST7   CONFORM WITH MEDICAL REQUIREMENTS
DST7.1   Maintain required physical condition
DST7.2   Adhere to regulations against substance abuse

INDIRECT SUPPORT TASKS

IST1   PREPARE OPERATIONAL DOCUMENTATION
IST1.1   Prepare local ATC procedures
IST1.2   Prepare national ATC procedures
IST1.3   Prepare letters of agreement

IST2   CO-ORDINATE WITH CUSTOMERS/USERS
IST2.1   Solve operators ATC difficulties
IST2.2   Co-operate with airport operations

IST3   SUPERVISE CONTROL ROOM
IST3.1   Check your team's fitness condition
IST3.2   Work to maintain good team spirit
IST3.3   Ensure integration of team activities
IST3.4   Manage air traffic control team
IST3.5   Monitor sector traffic load
IST3.6   Sectorise as appropriate or necessary
IST3.7   Select ATC technical resources
IST3.8   Liaise with ATS technical unit on technical matters
IST3.9   Check technical equipment at ATC - unit
IST3.10   Notify on any technical failure to maintenance

IST4   REPORT ON ACTIVITIES
IST4.1   Keep the supervisor informed
IST4.2   Notify on any technical failure
IST4.3   Provide relevant information on incidents/accidents
IST4.4   Enter information into logbook

IST5   PROVIDE UNIT-TRAINING
IST5.1   Supervise trainee Air Traffic Controllers
IST5.2   Participate in pre on-the-job training
IST5.3   Participate in on-the-job training
IST5.4   Provide theoretical training for licensed controllers

IST6   DETERMINE THE OPERATIONAL COMPETENCE OF CONTROLLERS
IST6.1   Determine minimum competence standards
IST6.2   Determine retraining requirements
IST6.3   Evaluate competence of Air Traffic Controllers
IST6.4   Examine Air Traffic Controllers for qualification

IST7   CO-OPERATE IN INCIDENT AND ACCIDENT INVESTIGATION
IST7.1   Collect relevant information on incidents and A/C accidents
IST7.2   Analyse information on incidents and A/C accidents
IST7.3   Recommend actions

IST8   PARTICIPATE IN ATC DEVELOPMENT & IMPLEMENTATION PROGRAMMES
IST8.1   Provide operational expertise for the development and implementation of new ATC procedures
IST8.2   Recommend more appropriate ATC procedures
IST8.3   Provide assistance for the ergonomic design of the ATC working environment
IST8.4   Provide advice to the designers of ATC equipment

IST9   PARTICIPATE IN ATC EVALUATIONS
IST9.1   Participate in the evaluation of new ATC procedures
IST9.2   Participate in the evaluation of new ATC equipment

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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, however, is already shaped by general education or experience.

Analysis: A phase of activity which concentrates on trying to understand a situation.

Component: A recognisable part of a system which may be a sub-system or an element.

Core Tasks: Tasks which involve the design and provision of a product and/or service.

Decision Making: The mental process by which operators recognise, analyse, and evaluate information about themselves, the air traffic, and the operational environment, leading to a decision.

Direct Support Tasks: Tasks which contribute to the design and provision of the product and/or service in the short term.

Element: A system component which, at a given level of analysis, one does not intend to divide any further.

Environment: A set of elements that affect the system but which themselves are not controlled by it.

Event: A distinct occurrence that a person perceives and responds to in a specific way.

Goal: A target for medium to long-term strategies. Usually it is used in general rather than specific terms, which describe a direction to move in, rather than a detailed quantitative objective.

Human Activity System: A system in which the main components are people and their actions.

Indirect Support Tasks: Tasks which contribute to the development of a product and/or service in the longer term.

Job: A group of a certain number of core tasks, direct support tasks and indirect support tasks which require a certain level of abilities, knowledge and skills.

Job Family: A group of similar jobs in a job population.

Job Description: A list of tasks and their required level of abilities, knowledge and skills which forms a specific job.

Knowledge: The job-specific content or information which a person has gained through training, education and/or experience.

Model: A description or analogy of a real or hypothetical situation, usually formal and simplified, which is used to develop understanding.

Objective: A short-term, practical and specific target. The tactics for achieving it may be closely prescribed. Much more detailed than a goal.

On the Job Training: The integration of previously acquired knowledge and skills in practice under the supervision of a qualified coach in a live situation.

Process: A series of events, actions, operations, communications, and changing relationships in a situation.

Responsibility: The fact of being in charge of a certain job or task.

Situational Awareness: The continuous extraction of environmental information, integration of this information with previous knowledge to form a coherent mental picture, and the use of that picture in directing further perception and anticipating future events.

Skill: The combination of aptitudes and knowledge after training and practice which is required to perform a job specific task.

Strategy: A medium or long term programme, plan or method employed towards particular goals.

Structure: The aggregate of elements in their relationship to each other in a situation that can be regarded as more or less "fixed" over time.

Subsystem: A system component above the chosen limits of resolution, which contains within it elements.

System: A recognisable whole of components (sub-systems and elements), connected together in an organised way.

Systemic: Using system ideas; treating things as systems or from a systems viewpoint.

Task: A piece of work, performed by an individual or individuals, which has a definite beginning and end, and results in a product or a service.

ABBREVIATIONS AND ACRONYMS

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

A/C	Aircraft
ATC	Air Traffic Control
ATCO	Air Traffic Control Officer
ATM	Air Traffic Management
ATS	Air Traffic Services
CIP	Convergence and Implementation Programme
CT	Core Task
CTA	Cognitive Task Analysis
DED	Directorate EATCHP Development
DST	Direct Support Task
DME	Distance-Measuring Equipment
DOC	Document
EATCHIP	European Air Traffic Control Harmonisation and Integration Programme
ECAC	European Civil Aviation Conference
EUROCONTROL	European Organisation for the Safety of Air Navigation
EWP	EATCHIP Work Programme
HF	Human Factors
HRT	Human Resources Team
HRM	Human Resources Management
HMI	Human Machine Interface
HUM	Human Resources (EATCHIP Domain)
ICAO	International Civil Aviation Organisation

IFATCA	International Federation of ATC Associations
IST	Indirect Support Task
JD TF	Job Description Task Force
NAV	Navigation
OJT	On-the-Job-Training
OR	Operational Research
R/T	Radio Telecommunication
RNAV	Area Navigation
SME	Subject Matter Expert
UAC	Upper Area Centre

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