EUROPEAN ORGANISATION FOR THE SAFETY OF AIR NAVIGATION

EUROCONTROL

Awareness of Human Aspects in Air Traffic Services

Guidance for Managing Current Issues

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Abstract
The purpose of this document is to provide an introduction to current human related issues in order to encourage managers to actively consider these issues. This document aims to help managers and operational staff understand the issues and sets out guidance to promote development of practical solutions in the following areas: communication, teamwork, customers focus, rostering and working practices, human factors techniques, career and personal development.

Keywords

Awareness	Career Development	Communication	Customer Focus
Human Factors	Personal Development	Rostering	Teamwork
Working Practices			

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AUTHORITY	NAME AND SIGNATURE	DATE
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EXECUTIVE SUMMARY

Air traffic systems are essentially made up of equipment, procedures and people.

The EATCHIP Programme recognises that increasing capacity in European airspace whilst maintaining a high level of safety is not simply a technical event. The human is an essential and valuable resource in the European air traffic system. Realising the benefits of EATCHIP hinges crucially on how effectively these human resources are used. Whilst the EATCHIP Human Resources Team (HRT) is concentrating on the longer-term strategic issues - such as common guidelines for the selection, training and licensing of Air Traffic Services (ATS) staff - the HRT's Short-Term Benefits Task Force (STBTF) was established to consider whether controller potential could be enhanced in the short-term through addressing some of the current human related issues.

The STBTF believes that the main short-term benefit to improving air traffic services would flow from heightening awareness of human related issues and by encouraging managers and operational staff in the ECAC States to actively address these issues. In particular, more widespread application of best practice techniques for managing human resources employed by some of Europe's ATS organisations, or techniques practised elsewhere in the aviation industry and in the commercial sector, could bring rapid results.

The purpose of this document is to provide an introduction to the current human related issues in order to encourage managers to actively consider these issues. This document aims to help managers and operational staff understand the issues and sets out guidance to promote development of practical solutions in the following areas:

- Communication

- Teamwork

- Customer Focus

- Rostering and Working Practices

- Human Factors Techniques

- Career and Personal Development.

The key benefit of addressing these issues should be an improvement in the commitment, motivation and job satisfaction of ATS staff at all levels. This, in turn, will help ATS organisations to achieve a sustainable balance of technological and controller productivity improvements necessary to meet customers' expectations from EATCHIP in terms of greater efficiency and improved safety and capacity.

This document is a first step. More work is being undertaken by the HRT to develop detailed solutions in each of these areas to enable the maximum benefit to be realised in the longer-term. Meanwhile, action by Europe's ATS organisations in the short-term to address the issues discussed in this document could potentially produce benefits more immediately.

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1.   INTRODUCTION

The current harmonisation phase of the EATCHIP Programme is designed to increase the capacity of the European Air Traffic Control (ATC) system using present day technology. Although the ultimate limit on capacity under current technology is the amount of traffic an individual controller can handle safely at any one time, the EATCHIP Programme recognises that controller productivity could be enhanced by addressing the various human aspects in Air Traffic Services (ATS).

Whilst the EATCHIP Human Resources Team (HRT) is focusing on the strategic issues, it was concerned that some shorter-term improvements should be developed to help current ATC operations. Accordingly, the Short-Term Benefits Task Force (STBTF) was formed.

1.1   Objectives

The objectives of the STBTF are:

- to elevate the awareness, understanding and importance - throughout ECAC member states - of effective management of human aspects in ATS;

- to encourage managers to actively address human aspects in order to help accelerate capacity improvement.

The STBTF comprised senior ATS managers as well as human factors experts; its membership is listed at the end of the document.

1.2   Scope

This document:

- highlights the importance of heightening the awareness of human aspects in ATS;

- explains the main human issues currently affecting ATS together with the principles behind potential solutions, namely:

  - communication,
  - teamwork,
  - customer focus,
  - rostering and working practices,
  - human factors techniques,
  - career and personal development;

- provides guidance and examples for ATS directors and managers on developing practical solutions to these issues;

- identifies the potential benefits.

Definitions of the terms and abbreviations used in this document are listed at the end of the document.

2.   BACKGROUND

2.1   Human Factors Concepts

Air traffic services are essentially human activity systems because their key components are people and their interactions with equipment, systems and procedures. In aviation, there is an increasing tendency to focus on the limitations of humans rather than on their strengths and capabilities; for example, the increasing use of automation aims to minimise human error by developing technical tools. Under human factors concepts, the aim is to view people as the centre of activities supported and assisted by modern technology in order to enhance the strengths of humans and to minimise their limitations.

The aviation sector, in particular, has carried out much work on human factor concepts. For example, the world's airlines have been deeply engaged in all aspects of pilot productivity, crew resources management (CRM), the role of management and the impact of industrial relations problems on motivation and productivity. There are obvious parallels between cockpit crew and ATC controllers in working environments, technology, team activity, training etc. Therefore, many of the existing human factors concepts are particularly relevant and need to be communicated widely with ATS organisations.

2.2   Human Factors Principles

The way people are managed in organisations can be described in terms of "task orientation" and "human orientation". Most organisations nowadays aim to achieve a sensible balance of task and human orientation in which increases in production and improvements to the social climate are achieved by integrating the individual and the organisation. Under this approach, the functioning of the organisation is improved through a participative management style, increased autonomy and a high level of job satisfaction. This model is usually known as the "human-centred approach".

With management becoming increasingly information based, the human-centred approach relies on a manager's ability to realise the full potential of their people. Participation, delegation and building trust and confidence are the key components of the necessary management style. Under this style of management, performance would not only be measured by results but by a manager's leadership style and their ability to maintain their team at a consistently high level of performance.

2.3   Increasing Awareness of Human Aspects in ATS

The STBTF's task includes elevating the awareness, understanding and importance throughout states participating in EATCHIP of effective

management of human resources in ATS. The diagram below illustrates the process of developing human factors awareness and the application of human factors measures in order to improve the efficiency of ATS. Building awareness is an iterative process; by completing the loop several times, the ATS organisation will become better at addressing human related issues.
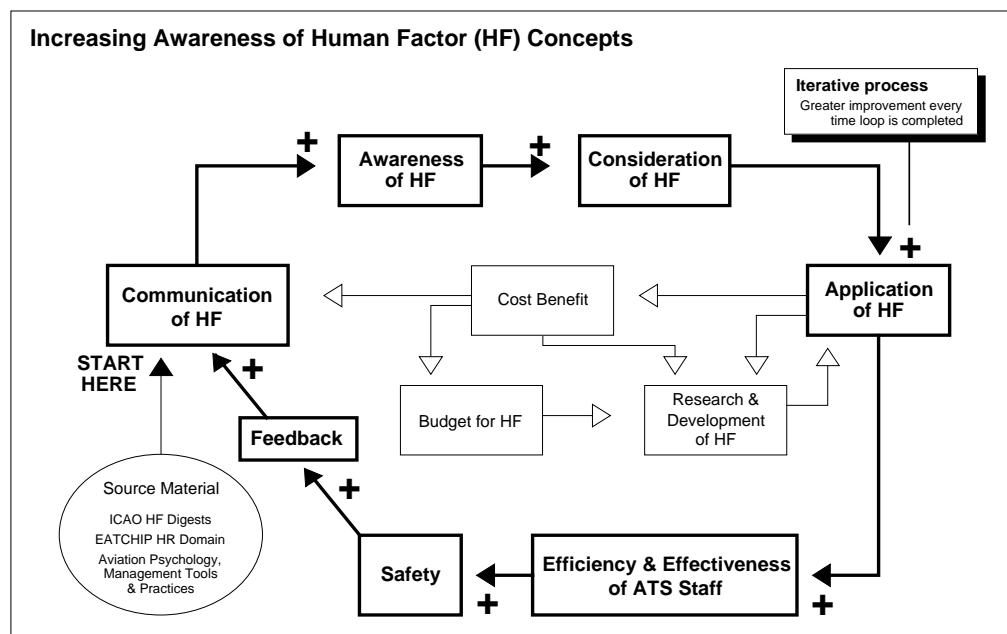
Figure 1: Increasing Awareness of Human Factors (HF) Concepts

The first step is to communicate existing human factors concepts, such as the ICAO Human Factors Digests, EATCHIP Human Resources documents etc. Reference documents are listed at the end of the document.

This heightening of awareness of human aspects is considered to be an essential prerequisite to the application of the medium and longer-term solutions which will flow from the activities of the EATCHIP Human Resources Domain.

3.   CURRENT ISSUES

The STBTF used its combined experience and expertise to identify those issues currently affecting the human aspects of ATS which it considered could be addressed in the short-term to potentially provide significant benefits in terms of improved efficiency of air traffic services.

The issues considered have been grouped into six general headings:

- Communication

- Teamwork

- Customer Focus

- Rostering and Working Practices

- Human Factors Techniques

- Career and Personal Development.

The following sections deal with each of these issues in turn by:

- explaining the current human related issues in ATS;

- outlining the principles behind developing potential solutions, and provide guidance to enable ATS organisations to commence activities;

- identifying potential solutions by looking at examples which illustrate best practice;

- summarising the potential benefits.

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4.   COMMUNICATION

4.1   Introduction

Most European ATS organisations are making significant changes in their business processes and working practices in order to improve performance as they move towards being customer-oriented organisations. Changing the way an organisation does business is likely to affect the whole culture. This presents a communications challenge, especially where new techniques or processes are involved.

Whilst in the throes of major change, communicating to employees and the outside world requires careful thought and planning. Managers and staff need to be equipped with good communication skills and style in order to assist interpersonal contact, encourage dialogue and recognise sensitivities. Moreover, a well-thought out communications strategy will help employees understand what is happening to their organisation, why things need to change, and how changes will affect them. It is equally important to keep influential audiences well informed about the business to make sure they appreciate the organisations' point of view and the benefits of change.

4.2   Objective

To ensure that an effective system of communication is established within ATS organisations which will facilitate change and enhance performance improvement measures, by ensuring that:

- management style and interpersonal skills are properly developed;

- all employees are kept informed on changes affecting their work;

- all employees receive positive management messages which are timely, accurate and well-presented.

That the process of two-way communication enhances participation across the whole organisation in the process of change and improving performance.

4.3   Issues

The following are considered to be the key communication issues for ATS organisations.

- Changing the communication culture in an organisation means leading by example. Staff communications need to have the sponsorship and commitment of the organisation's managers. If there is no leadership, the initiative will shrivel and die.

- Communication should be used to establish interpersonal relationships. The rational level of communication is the exchange of factual information whereas the emotional level is the exchange of feelings, attitudes and sensitivities. The emotional level influences the rational level. Therefore, good interpersonal contact is essential to deal with the emotional level and establish effective dialogue throughout the organisation.

- Communication should be properly planned and structured; it should not be triggered by a crisis. Regular face-to-face briefings should take place - preferably in small manageable groups - supplemented by easily understood media, such as newsletters, videos, electronic mail etc.

- Communication should be relevant to the efficient conduct of the ATS operation and those local matters affecting staff.

- Communication should be open with managers explaining the rationale and facts influencing key decisions so that staff build trust in the information provided.

- Communications is a two-way process. Staff are a vital source of plans and ideas and there is value in creating room in an organisation for ideas from the staff to be seriously considered (and developed and implemented) by management.

- Managers and staff who are committed to a communications process must be prepared to champion and fight for it.

- Feedback should be actively encouraged and not be seen as detrimental if negative.

4.4   Principles

A clearly understood communications strategy should be defined which includes clear principles of openness, consistency and relevance of all types of communication. The communications strategy clearly needs to reflect the resources available, as well as ensuring that all existing communications methods are fully utilised.

The core concepts of the approach to communications are that they should be:

- **Event-Driven**: Appropriate communications should be initiated in preparation for - and generated by - planned developments, changes and activities. Linking communications to these events will help ensure that:

  - communicators are prepared,
  - employees are aware,
  - concerns are expressed,
  - trust is built,
  - commitment is gained.

- **Two-Way**: Communications should be two-way and flexible to the needs of both the organisation and the individual. Encouraging two-way communication across the whole organisation will assist the organisation by:

  - promoting trust at all levels,
  - learning from mistakes and correcting them,
  - providing the opportunity for participation by all,
  - promoting the exchange of ideas,
  - obtaining feedback and reaction to activities.

- **Honest, Clear and Consistent**: Communications which meet the criteria of honesty, clarity and consistency will not only encourage awareness and trust in the ATS organisation's activities, but will provide the foundation to build successfully on this in the new ATS business environment.

- **Via Appropriate and Varied Communications Methods**: The selective use of appropriate communications methods to address each specific target audience and communication requirement will help promote understanding of the message, as well as prevent information saturation.

- **Properly Controlled and Co-ordinated**: Direct involvement in the creation, production, delivery, and distribution of appropriate information will ensure that the communications process properly supports and assists ATS managers and staff in achieving their objectives. Successful co-ordination of the management / staff interface is key to the success of any communications programme.

- **Consider Target Audiences**: The messages communicated will need to take into account the existing perceptions of the people being targeted, what they think of the organisation/the current business process now, and whether there is a need to improve on the image they already have.

4.5   Guidance

ATS managers should be committed to establishing and maintaining effective communication between all levels of staff by:

- developing effective management style, communication skills and interpersonal contact;

- developing communication policy and plans in order to establish an effective communications process, which includes:

  – keeping staff informed on changes affecting their employment and working environment,

  – explaining the benefits of improving the performance and efficiency of ATS,

- establishing a two-way flow of information between staff and management,

- involving staff representatives, although management should communicate directly with staff and not necessarily rely on representatives to do this for them.

4.6   Benefits

Effective communication generates a common awareness of the issues facing ATS organisations, encourages involvement in change and performance improvement initiatives, and enhances commitment.

4.7   Example

The primary and most effective means of communicating information to key internal audiences is through regular face-to-face briefings at all levels through the ATS organisation on a cascade system, for example:

- Head of ATS organisation briefing to Head Office, Operations and Technical Directors;

- Head Office, Operation and Technical Directors' briefing to their unit managers;

- Unit managers' briefings to their face-to-face meetings conducted by well trained, well prepared local managers talking to and receiving feedback from staff;

- Staff representatives' briefings.

Other suggested methods of communication include:

- **Open meetings** - larger meetings open to all staff at a site, conducted by the most senior managers; useful when major initiatives are underway.

- **Presentations** - specific information briefings, seminars or exhibitions that move from site to site, conducted by well-prepared staff.

- **Videos** - an effective means of cascading information throughout an organisation when information needs to reach a wide audience quickly, although they should support and not replace other forms of communication.

- **Conferences, workshops, special events** - in order to establish contact with staff on set agendas.

- **Staff newspaper, newsletters, notice board bulletin, electronic mail** - support (not replace) other forms of communication.

5.   TEAMWORK

5.1   Introduction

A significant number of ATC tasks involve individuals working as part of a team, and there is growing recognition of the need to structure and optimise the functioning of these teams. The "human-centred approach" focuses on the benefits of teamwork. Moreover, the world's airlines have recognised the vital importance of effective teamwork by flight crews on safety and efficiency of flight operations and have invested heavily in Crew Resource Management (CRM) training. The STBTF therefore established a study group to address team functioning in ATC and to investigate the potential benefits of applying a CRM equivalent in ATS - known as "Team Resource Management" (TRM).

5.2   Objective

To enhance teamwork in ATS in order to optimise the safety and efficiency of air traffic services

5.3   Issues

At the organisational level, there is a need to ensure close co-operation and good teamwork between the various ATS elements in order to improve the cohesion of the air traffic system so that the traffic keeps flowing. This involves the ACCs, Airport ATC, Flow Managers and Technicians working together more closely, not only in their day-to-day operations but also in their forward planning.

At the ATC unit level, analysis of ATC incidents clearly indicates that failures in teamwork contribute to incidents. Moreover, a survey of controllers revealed that inconsistencies in working practices of colleagues often have a detrimental effect on the performance of individual controllers within the team and can contribute to safety related incidents and reductions in traffic throughput.

The lessons being learned from airline CRM training should be used to assist ATS organisations overcome problems in team performance.

5.4   Principles

The importance of good teamwork in ATC should be recognised at all levels. The aim is to enable ATC teams - at whatever level - to become self-correcting performing units. To achieve this, some form of teamwork training should be introduced into all aspects of ATC training, including ab-initio training, recurrent qualification training and refresher training. In addition,

human factors techniques (described in <u>Section 8</u>) also contribute to improved teamwork.

The following definitions have been adopted:

- **ATS team:** a group of two or more persons who interact dynamically and interdependently within assigned specific roles, functions and responsibilities, and who have to adapt continuously to each other to ensure the safe, orderly and expeditious flow of air traffic.

- **Team Resource Management (TRM):** strategies for the best use of all available resources - information, systems and people - to optimise the safety and efficiency of ATS.

TRM is now being studied in more depth by the HRT's TRM Task Force in order to produce guidelines for developing and implementing TRM in ATS organisations. This work involves a phased programme of development, consolidation and implementation and is expected to take about three years.

5.5   Guidance

Develop and implement teamwork training:

- Make ATS management and staff aware of the need for teamwork training.
- Integrate teamwork into ATS organisations' global training plans.

5.6   Benefits

Implementation of better teamwork in ATS organisations would:

- reduce team work related incidents,
- enhance task efficiency and improved use of staff resources,
- enhance continuity and stability of team work in ATS,
- enhance sense of working as a part of a larger and more efficient team,
- increase job satisfaction.

5.7   Example

TRM training should focus on the behaviour patterns within an ATC team in order to improve efficiency of the air traffic system and to reduce the impact of human error as a major contributory factor in ATC incidents. TRM training should therefore include topics such as:

- leadership,
- communication,
- situational awareness,
- teamworking skills,
- decision-making,
- stress management.

6.   CUSTOMER FOCUS

6.1   Introduction

The driving force behind the present-day operation and future development of Europe's air traffic system must be "meeting the requirements of users". Therefore, developing a customer-oriented ATS organisation is vital. Establishing and maintaining appropriate links with all customers - aircraft operators and the airlines in particular - is essential in order to understand and respond to their needs, both in the short-term and long-term. In addition, increasing customer awareness amongst managers and staff is of equal importance to ensure that the organisation's efforts are directed towards providing benefits for the customer.

6.2   Objective

To develop a customer-oriented culture in ATS organisations

6.3   Issues

A safe and high quality air traffic service remains the central and most critical item of value sought by users of the European air traffic system. However, the economic situation currently affecting the whole aviation industry has sharpened everyone's sense of reality about their own organisation's performance. Whilst ATC has a high reputation for safety and quality of service, customers continue to press ATS organisations to cut delays and reduce costs. This in turn is forcing ATS organisations to look for new ways of working and achieving efficiencies.

With high levels of traffic growth being sustained across Europe, meeting these customer demands is extremely difficult and presents a major challenge to management. Therefore, it is essential that customers be kept advised of progress. ATS organisations should work closely with customers to ensure that they are fully briefed on progress and current problems so that they can plan accordingly. This should lead to a more "educated" customer who understands the problems and works in partnership with ATS managers to resolve them.

Focusing the ATS organisation on what the customer wants is of vital importance. With the European air traffic system under constant pressure, valuable human resources can no longer be wasted on doing things which do not produce any real benefits for customers, or which fail to deploy resources effectively. This requires raising customer awareness within the ATS organisation, both at the management and operational staff level. There is a clear responsibility on people at the front-line delivering air traffic services to

understand the needs of their customers, and to communicate that understanding.

6.4   Principles

For effective customer dialogue, a formal customer consultation process should take place at various levels, for example:

• with senior airline executives to discuss high-level issues,

• with operations directors to discuss strategic operational issues,

• with operations managers and airline representative organisations to discuss detailed issues.

It is also important to establish informal contacts at unit level to ensure that day-to-day operational issues are addressed by those directly responsible for the service.

Customer service targets should be set by ATS organisations against which improvements in performance can be measured. Surveys should also be conducted periodically across a sample of customers in order to assess their perceptions of performance, including the establishment of a customer satisfaction index in order to measure improvement.

Formal customer awareness training should be established to provide managers, supervisors and staff with the opportunity to develop an understanding of customer requirements and commercial awareness of the airline industry.

6.5   Guidance

• Establish better contact with customers/airlines

• Increase customer awareness amongst ATS staff, particularly on issues such as the impact of ATC delays and ATC charges

• Set customer service standards / customer satisfaction index against which to measure improvements in performance

• Educate customers/airlines on ATS issues and involve the customers/ airlines in ATC problems

6.6   Benefits

The key benefits of embracing the concept of customer service at all levels of the ATS organisation are:

- a constructive relationship which builds a better understanding of each others operating problems, enables informal links between managers to flourish, and encourages progress to be made on a wide range of issues;

- increased awareness of operational ATS units to day-to-day problems which provides impetus for operational managers to find effective and lasting solutions;

- working in a partnership style with customers to solve problems, target capacity improvements and reduce delays.

6.7   Example

The following example illustrates how customer focus could be developed by ATS organisations:

Customer Consultation Process

- Annual conference with senior executives of major airlines and airports, chaired at Chief Executive level, to review performance and discuss strategic issues.

- Twice-yearly meetings with airline and airport operation directors to review operational performance and discuss strategic operational issues.

- Quarterly meetings with operations managers of all airlines operating in national airspace to discuss detailed operational issues.

- Technical working groups (with airline representative organisations) on detailed operational issues.

- Informal contacts with airlines and airports at all levels.

- Consultation with airlines on financial issues, chaired at Finance Director level.

Service Provision Targets

Performance could be measured against high-level targets within the ATS organisation's sphere of influence, for example:

- departure ATC delays within ATS organisation's sphere of influence,
- the average ATC delay for flights departing major national airports,
- average delays in holding stacks.

Customer Satisfaction Index. An annual survey carried out across a broad sample of customers (e.g. national and foreign airlines, airports, general aviation) to assess customer satisfaction on safety, service improvements, responsiveness and value for money.

Customer Awareness Training. Airline customer awareness courses run in conjunction with airlines for ATC supervisors, controllers and other key operational staff.

7.   ROSTERING AND WORKING PRACTICES

7.1   Introduction

In order to achieve a safe and efficient air traffic service, it is essential that resources are effectively deployed to match users' requirements. ATC Watch Rosters are designed to meet the needs of users of the air traffic system in terms of capacity, and to achieve efficient and effective utilisation of ATS staff. Clearly, delivery of a safe and efficient service to users relies heavily on proper consideration of the human aspects, such as the acceptability of rostering arrangements to controllers in terms of rhythm of life and fatigue.

Rostering criteria provide a framework within which statutory regulations (e.g. controllers hours), agreed working practices and local procedures are used to determine staff numbers needed to meet operational requirements and other requirements such as training. Local management and staff representatives jointly undertake an analysis - taking account of all relevant factors such as predicted traffic demand, rostering criteria etc. - to achieve the closest possible match between traffic demand and operating hours of controller positions.

7.2   Objectives

The objectives are:

- to ensure rostering is sufficiently flexible to match staff levels to traffic demand whilst recognising the human aspects;

- to improve working practices to provide ATS managers with flexibility to deploy staff to meet local needs;

- to provide the potential for increased capacity through improved controller productivity.

7.3   Issues

Airline operators expect ATS organisations to operate a safe service, provide the appropriate level of ATC capacity with minimal delays whilst, at the same time, improving the control of costs and charges. Clearly, the ability to adapt the working structure to the needs of customers - such as flexible rostering of ATS staff to match changing requirements - is a key element in consistently providing the required level of ATC capacity. However, where there is evidence that scarce controller resources are poorly utilised, airlines have difficulty accepting the shortage of controllers as a valid excuse for not providing sufficient capacity. Moreover, air traffic charges are a significant element in airlines' cost structures which impact on their profitability, and

airlines are pressuring ATS organisations to utilise controller resources more efficiently to improve services and reduce their cost bases.

It is important that ATS organisations respond positively to these concerns and ensure that all their resources are used efficiently and effectively.

7.4 Principles

Some general principles concerning the way in which human aspects influence rostering and working practices are explained below:

Regulation of Controllers Hours

The aim of regulating controllers hours is to ensure, so far as reasonably possible, that controller fatigue does not endanger aircraft and thereby assists controllers provide a service safely and efficiently. These regulations govern many of the key human aspects, such as periods of duty, the hours worked by controllers and the rest periods during and between periods of duty. The regulations normally including definitions of operational duty, night duty, standby duty, fatigue breaks and rest days.

Rostering Criteria

There is a clear need to balance the needs of the organisation against the needs of the individual. Rostering criteria should address issues such as:

- use of a team system for watch rosters.

- the number of days attendance and the shift length required to achieve the contracted annual working hours;

- the level of additional tasks necessary to sustain staff numbers are identified, quantified and agreed (e.g. training, procedures and systems development, career and personal development, etc.);

- the impact of staff absence on service provision and the options available to resolve both short-term and long-term staff shortages;

- human aspects, such as:

  - limitations on periods of operational duty to avoid fatigue (usually regulated),

  - requirements for breaks, such as meal breaks and relief provision for controllers (fatigue breaks are regulated),

  - rosters having a high degree of long-term predictability so that staff can plan their personal lives;

- procedures to analyse and solve rostering problems and disputes should be clearly defined and commonly agreed.

Working Practices and Flexible Rostering

Whilst framework agreements should be designed to ensure a consistent approach at all operational units throughout the ATS organisation, they should also allow the necessary flexibility to enable local agreements to match specific local requirements. In particular, any potentially restrictive working practices constraining the utilisation of staff by management should be replaced with enabling agreements which give management more flexibility to vary rosters locally to meet traffic needs. Visibility of the important issues driving the changes to working practices - such as performance against customer service targets (see Customer Focus in Section 6) - is essential to help controllers' identify with the need to provide services to customers in a cost efficient way. Teamwork training and human factors techniques (described elsewhere in this document) both contribute to the development of flexible rostering and improved working practices.

The influence of human aspects is a key element in the construction of watch rosters in order to avoid the physical and psychological effects of excessive fatigue on controllers, and to avoid any misunderstanding between staff and management when agreeing working practices. The following human aspects are important:

- to inform staff periodically on the performance of the air traffic system;

- to determine jointly what changes to rostering and working practices are necessary to improve performance to meet customer requirements;

- to make changes to rostering and working practices based on a previously agreed framework of clear rules;

- to ensure the acceptability of rostering arrangements to controllers in terms of rhythm of life and fatigue.

7.5 Guidance

Establish effective work organisation and rostering methods:

- Balance organisation's needs and individual needs when designing duty rosters.

- Determine jointly with staff the practical development of rostering and working practices in order to work more flexibly and introduce more rostering flexibility.

- Ensure consideration of human aspects in the construction of watch rosters.

7.6   Benefits

Where there is scope for improvement, the benefits of improved rostering and working practices would be:

- to accelerate a change of attitude amongst the controller workforce needed to ensure a safer and more efficient and effective service;

- to enable better utilisation of ATCO resources which, in turn, would:

  - eliminate those current shortfalls in capacity caused by staff shortages,

  - reduce future manpower plan targets for controllers,

  - reduce future controller recruitment and training,

  - make controller manpower less of a constraining factor within the EATCHIP Programme.

7.7   Example

The model below illustrates the main elements taken into account in determining watch rosters:
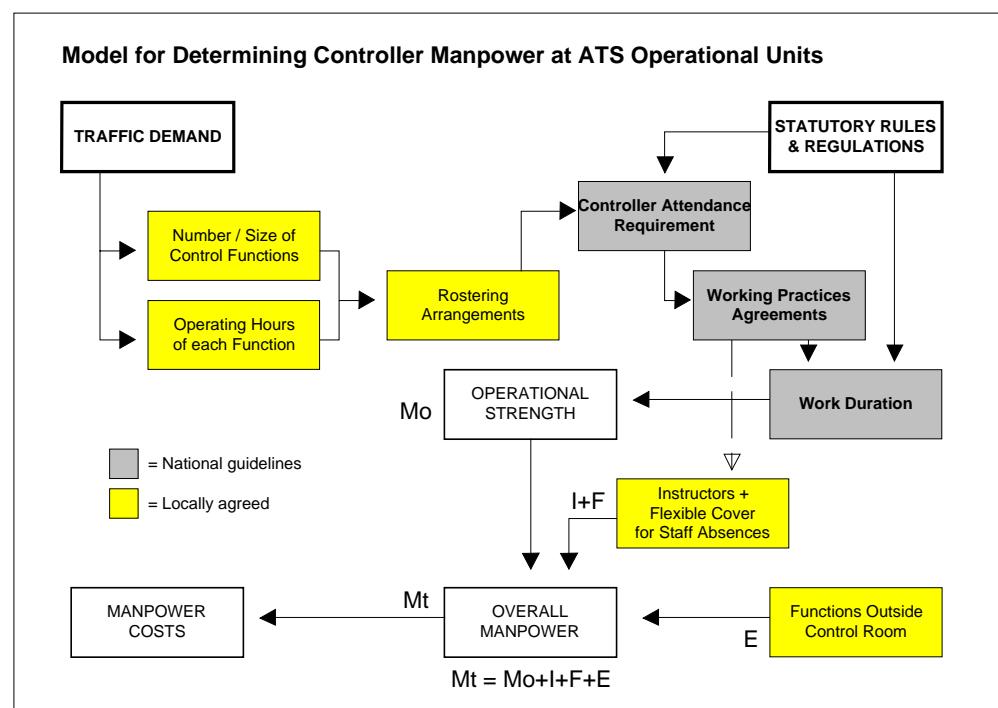

Figure 2: Model for determining controller manpower at ATS operational unit

Typically, limitations imposed by controllers hours regulations include such things as:

- maximum period of duty (e.g. no period of duty shall exceed nine hours),

- intervals between periods of duty (e.g. the interval shall not be less than 12 hours),

- limits on night duties and intervals after night duties.

Generally, these limitations should not inhibit management's flexibility to deploy staff to match air traffic demand. Two key elements are proposed:

- ATS organisations should fix the minimum number of days for the controllers' annual attendance requirement;

- it should be possible for ATS organisations to move away from a rigidly structured watch systems and to adopt more flexible rostering arrangements.
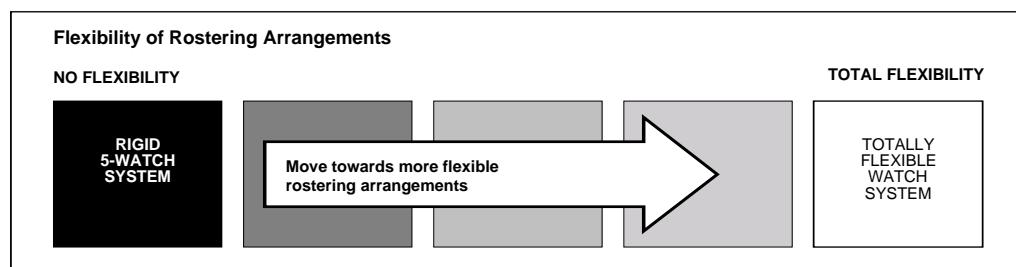

Figure 3: Flexibility of rostering arrangements

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8.   HUMAN FACTORS TECHNIQUES

8.1   Introduction

In the nineties people are managed by participation and delegation of responsibility. Whilst working methods in ATS follow, of necessity, well developed regulations, rules and procedures which contribute positively to the management process, these prescribed working methods tend to be heavily task oriented. In comparison, human factors techniques - which sit alongside traditional task-oriented working methods - focus on the quality of the working environment and motivation in terms of providing the workforce with a sense of achievement, responsibility, and recognition for good performance.

8.2   Objective

To ensure ATS managers consider the application of appropriate human factors techniques

8.3   Issues

ATS managers and staff face an ever increasing complexity of challenges and issues. Add to this the increased assertiveness of staff and the ready accessibility of information to staff with which they can form opinions, then there is a growing need to deal with people in the right way to ensure a continuous improvement in the quality of their work.

8.4   Principles

The key principle is to employ techniques which not only address the needs of the task in hand, but also address the needs of the people doing the task. The aim is to get staff fully involved in developing and owning solutions so that their motivation increases.

The use of structured human factors techniques to tackle complex problems should be considered, such as 'Project Team Work' which is a structured work technique which provides an orderly mechanism for obtaining qualitative data and information from groups who are familiar with a particular problem area. Further human factor techniques are being developed by the EATCHIP Human Resources Domain.

8.5   Guidance

Emphasise the human element in the management of ATS and involve all staff in managing change:

- Develop staff-oriented management style and enhance role and image of managers and supervisors.

- Involve ATS staff in planning activities and technical developments.

- Understand human factors techniques more clearly.

8.6   Benefits

Applying human factors techniques would:

- encourage staff to participate, leading to commitment and motivation;

- ensure staff at all levels have the opportunity to contribute to developing solutions;

- lead to ownership of solutions jointly by managers and staff;

- through active staff participation, enable management to identify underlying problems more readily;

- provide long-term orientation for managers and staff, and enhance their willingness and ability of to cope with change.

8.7   Example

Project teamwork is a recognised methodology for tackling complex problems by getting people with the relevant experience and skills to interact with each other to develop solutions. It employs structured work techniques which provide an orderly mechanism for collecting thoughts and qualitative data from groups which are familiar with a particular problem area. For example, this technique is used in nearly all HRT Task Forces.

The team will have a facilitator whose role is to manage the process by which the team arrives at consensus and commitment to decisions and actions. The main phases of activity are:

- Leading question:

  The appropriate question around which to gather ideas on the problem, e.g. "What can we do to improve the efficiency of ATS staff in the short term?"

- Brain-storming:

  Each team member develops possible solutions.

- Explaining ideas:

  Ideas are explained to improve common understanding of the issues and agree common definitions.

- Clustering:

  Ideas of similar content are grouped to from a structure for analysing ideas and solutions.

- Conceptual mapping:

  The team identifies the relationships and dependencies of clustered ideas and develops model solutions.

- Decision/action plan:

  Decision and action plan defines what, by whom and when.

- Follow-up action:

  Ensuring actions are completed within the agreed timetable, and that any lessons learned are fed back into the process.

This technique also provides an example of ATS teamwork as described in Section 5.

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9. CAREER AND PERSONAL DEVELOPMENT

9.1 Introduction

Each ATS organisation has its own business objectives which drive their human resource strategies. By addressing career and personal development in a business context, the organisation can adopt strategies which aim to match its future manpower requirement to the potential of the current workforce. Therefore, the design and implementation of professional careers is an essential strategy in that:

- it recognises that the organisation's future success is increasingly linked to the quality and commitment of all employees;

- it promotes the development of individual abilities and increases motivation;

- it acknowledges the difficulty in predicting future skill requirements in times of continuous change, particularly in ATC technology and procedures;

- it links achievement of individual goals to the organisation's manpower requirements.

However, whilst implementing effective career and personal development plans within ATS organisations is viewed as a short-term action, the benefits remain longer-term.

9.2 Objective

To ensure effective career and personal development within ATS organisations

9.3 Issues

Career and personal development is a major challenge for ATS organisations which, through improved technology, may reduce opportunities for progression but increasing needs to harness the potential and develop the skills of all employees. ATS organisations have a poor past-record of structuring careers outside of the ATC operations rooms. Therefore, there is a pressing need to properly structure careers in ATS.

Career and personal development is an organised and planned process to achieve a balance between the organisation's human resource requirements and the employee's career needs. A self-development approach to career and personal development is considered to be essential.

Career and personal development should be continuous process, not a one-off event.

- Employees share responsibility for initiating their own career planning and development. They assess their own skills, values, interests and job satisfaction, discuss their expectations with their managers, seek out additional information about career options, and set their own goals.

- The manager's role provides a critical link between the employee and the organisation. They encourage employees to take responsibility for their careers, provide feedback on personal performance and its implications for future development, ensure that the planned development is realistic and achievable and will contribute to the organisation's objectives, and provide links to appropriate resources.

- The organisation is responsible for providing the environment and infrastructure which promotes and assists successful career and personal development.

Career and personal development needs to ensure that employees understand both their opportunities and their limitations. In practice, employees are usually quite realistic in appraising their potential. However, in briefing staff, managers should ensure that - whilst positively encouraging development - expectations are not inadvertently raised.

9.4   Principles

To permit staff to progress, a properly structured career and personal development system should be put in place. The key elements of a career and personal development system are summarised below:

Human resources organisational policy

- Strategic planning of human resources

  - organisational targets,
  - manpower requirements,
  - specific job requirements.

- Individual career planning (over medium-long term time horizon):

  - combines professional opportunities, progress and potential earnings;
  - identifies critical aspects, such as qualification and promotion;
  - includes progressive training.

Identifying individual needs

- Effective process of identifying an individual's needs, e.g.:

  - appraisal interviews and staff reporting,
  - training programmes,

– special events such as promotion, transfer or redeployment,
– role of personnel managers.

- Establish a system of personal development plans

Staged career and personal development

- Identify alternative ways to address development needs:

  – learning tools, e.g. training courses, computer-based training, self-learning packages, tutorship.

- Multifunctional development:

  – broadening career opportunities by lateral development in operational, management or technical fields.

9.5   Guidance

- Establish clear career and personal development structures in ATS

- Define training and development opportunities necessary to manage a professional career in ATS

- Identify different career paths - operational, technical, instructional, supervisory and management

9.6   Benefit

The benefits of improving career and personal development are clearly longer-term. However, a planned approach to career and personal development should help ATS organisations deal more successfully with future changes by encouraging staff flexibility and the adaptability of skills.

9.7   Example

The key elements of professional development in ATS are:

- Multifunctional career

  – Spread over activity areas - operational, technical, managerial

  – Opportunities for lateral and vertical progression

  – Combination of operational and technical activities - 18 months each 4 years

- Diversification of posts in activity areas

  – Operation, instruction, supervision (see diagram below)

- Enhanced job mobility

    - From one facility to another (e.g. TWR to ACC)

- Evaluation system

    - To assess professional potential

Example of Career Diversity in Different Posts

Operational	**Technical**	**Instructional**	**Supervisory**	**Management**
ACC ATCO	ATC Technician	Instructor	ATC Supervisor	Manager
APP/TWR ATCO	Technical Specialist	Technical Instructor	Technical Supervisor	Senior Manager
Planning Specialist		Head of Instruction		

Figure 4: Example of career diversity in different posts

10.   SUMMARY

10.1   Guidance Summary

The following is a summary of the guidance contained in each section of this report.

10.1.1   Communication

ATS senior managers should be committed to establishing and maintaining effective communication between all levels of staff by:

1. developing effective management style, communication skills and interpersonal contact;

2. developing communication policy and plans in order to establish an effective communications process, which includes:

   – keeping all staff informed on all changes affecting their employment and working environment;

   – explaining the benefits of improving the performance and efficiency of ATS;

   – establishing a two-way flow of information between staff and management;

   – involving staff representatives, although management should communicate directly with staff and not necessarily rely on representatives to do this for them.

10.1.2   Teamwork

Develop and implement teamwork training:

1. make ATS management aware of the need for teamwork training,
2. integrate teamwork into ATS organisations' global training plans.

10.1.3   Customer focus

- Establish better contact with customers / airlines

- Increase customer awareness amongst ATS staff, particularly on issues such as the impact of ATC delays and ATC charges

- Set customer service standards / customer satisfaction index against which to measure improvements in performance

- Educate customers/airlines on ATS issues and involve the customers/ airlines in ATC problems

10.1.4   Rostering and working practices

Establish effective work organisation and rostering methods:

1. Balance organisation's needs and individual needs when designing duty rosters.

2. Determine jointly with staff the practical development of rostering and working practices in order to work more flexibly and introduce more rostering flexibility.

3. Ensure consideration of human aspects in the construction of watch rosters.

10.1.5   Human factors techniques

Emphasise the human element in the management of ATS and involve all staff in managing change:

1. Develop staff-oriented management style and enhance role and image of managers and supervisors.

2. Involve ATS staff in planning activities and technical developments.

3. Understand human factors techniques more clearly.

10.1.6   Career and personal development

- Establish clear career and personal development structures in ATS

- Define training and development opportunities necessary to manage a professional career in ATS

- Identify different career paths - operational, technical, management

10.2   Benefits Summary

The key benefit of addressing these issues should be an improvement in the commitment, motivation and job satisfaction of ATS staff at all levels. This, in turn, will help ATS organisations to achieve a sustainable balance of technological and controller productivity improvements necessary to meet customers' expectations from EATCHIP in terms of greater efficiency and improved safety and capacity.

More work is being undertaken by the HRT to develop detailed solutions in each of these areas to enable the maximum benefit to be realised in the longer-term. Meanwhile, action by Europe's ATS organisations in the short-term to address the issues discussed in this document could potentially produce benefits more immediately.

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DEFINITIONS

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

Career and personal development: The process by which an organisation promotes its employees growth within the organisation.

Crew (or cockpit) Resource Management: Using all available resources - information, equipment and people - to achieve safe and efficient flight operations (Lauber, 1984).

Customer: User of the air traffic system, e.g. airlines, general aviation.

Guidance: Statements which are designed to direct the required actions.

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

Human Factors: Those factors which influence the performance of people.

Human Factors Techniques: Techniques which contribute to the management process where quality of the Human Factor is involved.

Rostering: The allocation of human resources in order to ensure service for the scheduled working hours in accordance with legal and local procedures.

Team: An ATS team is a group of two or more persons who interact dynamically and interdependently with assigned specific roles, functions and responsibilities. They have to adapt continuously to each other to ensure the establishment of a safe, orderly and expeditious flow of air traffic.

Teamwork: Group effort applied to work.

Team Resource Management: Strategies for the best use all available resources - information, equipment and people - to optimise the safety and efficiency of Air Traffic Services.

Working Practices: Customs and practices developed to ensure a consistent approach to the structuring of work in the various operational functions at ATS units.

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ABBREVIATIONS AND ACRONYMS

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

ATC	Air Traffic Control
ATS	Air Traffic Services
ATM	Air Traffic Management
CRM	Crew (or Cockpit) Resource Management
EATCHIP	European Air Traffic Control Harmonisation and Integration Programme
ECAC	European Civil Aviation Conference
EUROCONTROL	European Organisation for the Safety of Air Navigation
HRT	Human Resources Team
STB TF	Short Term Benefits Task Force
TRM	Team Resource Management

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