, **Revised: 6/25/2003 11:19 AM**

CHAPTER FIVE

TRAINING PLANNING

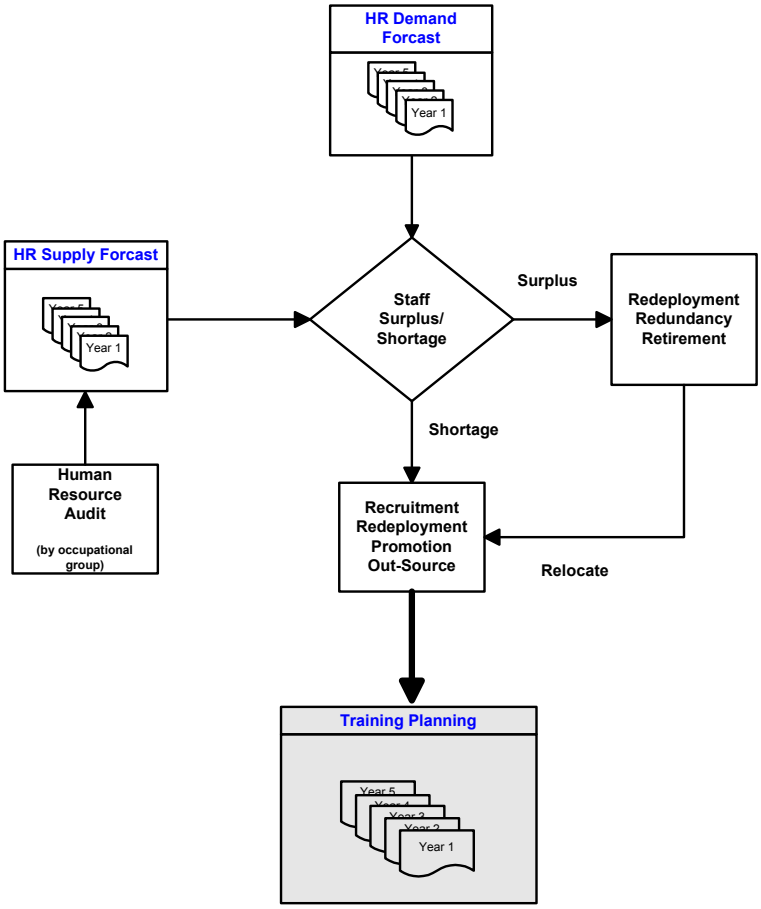


Figure 1 Human Resource Planning Process

1. LONG-RANGE FORECASTING OF TRAINING DEMAND

1.1 Training Planning Process

1.1.1 Training planning is an integral part of the human resource planning process. This chapter focuses on medium to long-range (12 months to sixty months) training forecasts. At this point global figures only are analyzed. The detailed tactical training plan is based on the long-range forecast and takes

into consideration many other factors that are outlined in the following chapter. The training planning process consists of a series of tasks from long-range human training planning, forecast of annual training requirements to the tactical (12 month) training plan. The steps in the process are identified in Figure 2.

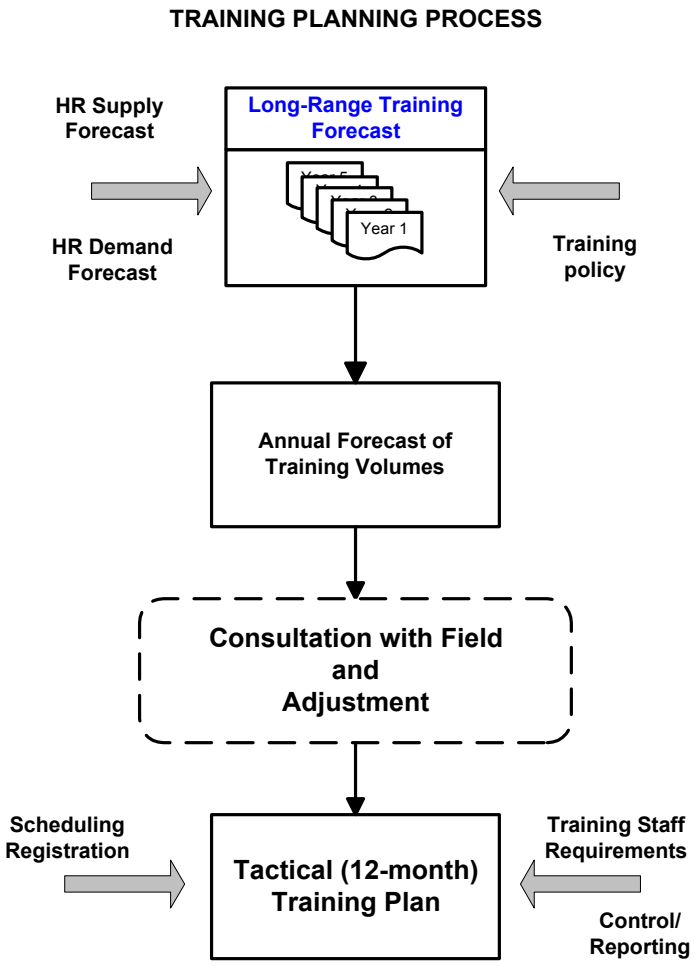


Figure 2 Training Planning Process

2. FORECASTING TRAINING REQUIREMENTS

2.1 Training Policy

2.1.1 The training forecast is mainly dependent on organizations' training policies. For example, a possible policy for an organization could be that all staff recruited, promoted or redeployed should receive a basic training course for their new positions. Also a decision may be made that each middle manager and supervisor should receive from one to four weeks of advanced training per year. Some operational personnel may only receive on-the-job training by the supervisory staff. If an organization does not have a training policy, it should be developed prior to preparing a training forecast.

2.2 Sample Training Policy

2.2.1 An example of part of a training policy statement is provided below. This is given only as a sample to illustrate the potential contents of a policy statement. Training policies should be developed which meet the specific needs of an organization.

a) "x" per cent of senior managers will follow a management course each year.

b) An initial training course will be given to all middle managers and supervisors on their appointment, promotion or redeployment.

c) Newly appointees to the organization will require foundation and initial training whose duration and content will depend on their previous experience and education.

d) Middle managers and supervisors will generally attend periodic advanced training and/or refresher training.

e) All senior administrative personnel should undertake periodic training where possible on a yearly basis.

f) Skilled workers and semi-skilled workers will receive formal on-the-job training during a probationary period and, where necessary, throughout their technical career.

2.2.2 A training policy should be prepared in consultation with operational management to ensure that the policies are appropriate to the needs. The training requirements specified in the policy should be consistent with safety, regulatory requirements, and efficiency and career development objectives of an organization. At the same time, the policies should not adversely affect operations by requiring excessive amounts of training. In reality certain departments may require more training than others. However, training policy statements typically address an average figure for an organization to enable them to calculate a global estimate of training needs.

2.3 Training Volume

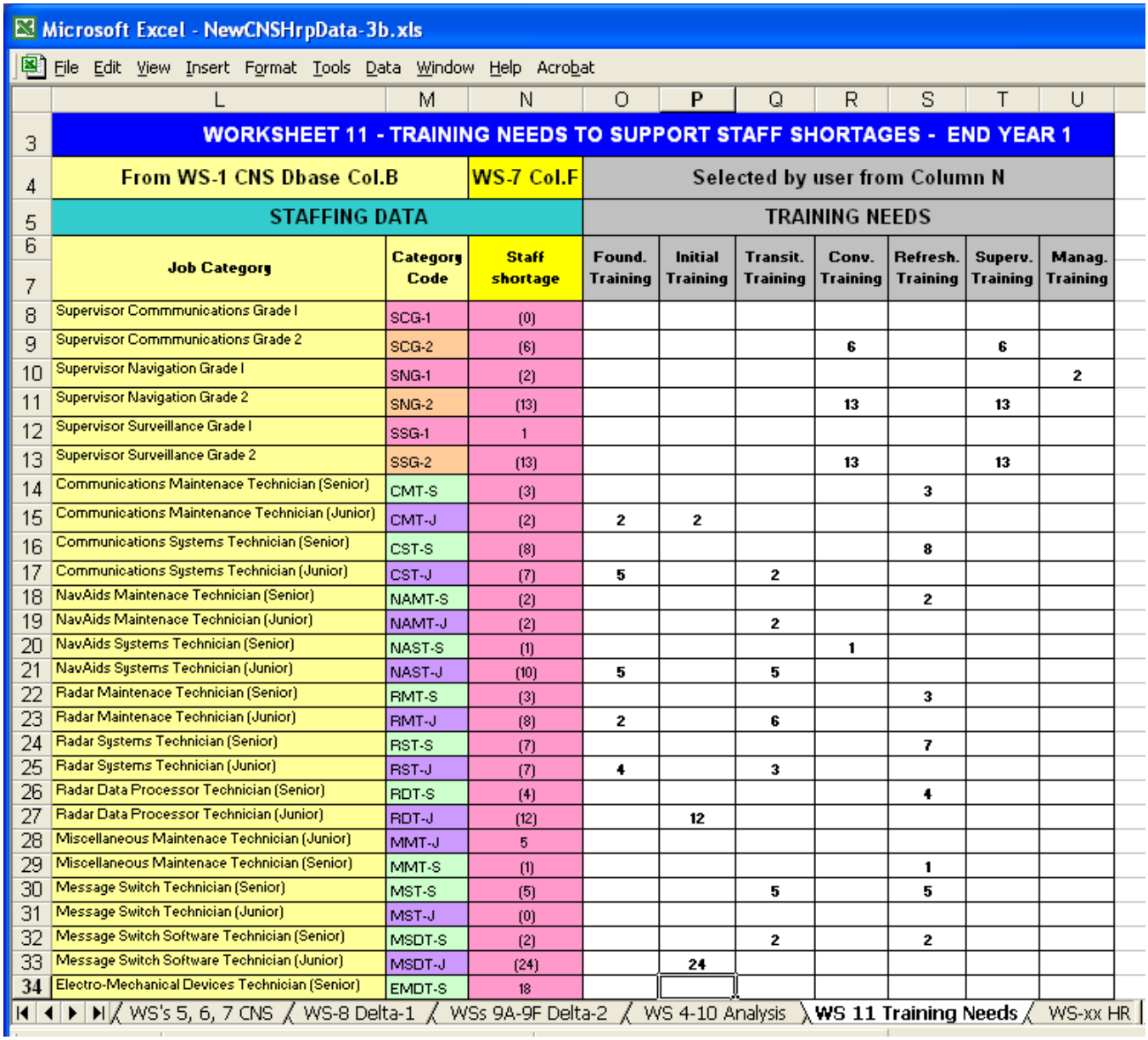
2.3.1 The number of staff taking new positions each year for each job category and each department can be calculated using the human resource planning process outlined in Chapter 4 and the case study in Chapter 8. The long-range training forecast is based on the assumption that all staffing requirements are to be met. It is then necessary to calculate the amount of training required or training volume with these estimates and established training policies.

2.3.2 The number of staff that may require training, is the difference between the forecast staffing requirement and the forecast number of staff available. In the event that new job categories are needed, typically most staff will require conversion training. The planning worksheets shown in Chapter 4 can be used to assist in this type of calculation. Figure 3 (Worksheet 11) shows a sample of CNS job categories status at the end of planning year 1.

2.3.3 Figure 3 (*Worksheet 11*) identifies the staff shortage (linked from worksheet 7, see Chapter 4, figure 20) in each job category. The identified shortages, will be filled by promotions, recruitment or transfer-in from other departments. If the position is a "senior", "supervisor-2" or "supervisor-1" then normally the action will be a promotion into the posts. In normal circumstances all "junior" posts will be

filled by recruitment and/or transfer-in. The user should adjust the actions and training numbers as deemed necessary.

2.3.4 The worksheet also lists the types of training that may be required by each category of staff following promotion, recruitment and/or transfer-in. It is possible that if a shortage exists in a job category, that some posts will be filled by recruitment of new staff who may require foundation training, and others that may be transferred-in from other departments and already have the required foundation training. These personnel will require some form of transition training or even refresher training, dependent on their previous work experience.



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	L	M	N	O	P	Q	R	S	T	U
3	WORKSHEET 11 - TRAINING NEEDS TO SUPPORT STAFF SHORTAGES - END YEAR 1									
4	From WS-1 CNS Dbase Col.B		WS-7 Col.F	Selected by user from Column N						
5	STAFFING DATA			TRAINING NEEDS						
6										
7	Job Category	Category Code	Staff shortage	Found. Training	Initial Training	Transit. Training	Conv. Training	Refresh. Training	Superv. Training	Manag. Training
8	Supervisor Commmunications Grade I	SCG-1	(0)							
9	Supervisor Commmunications Grade 2	SCG-2	(6)				6		6	
10	Supervisor Navigation Grade I	SNG-1	(2)							2
11	Supervisor Navigation Grade 2	SNG-2	(13)				13		13	
12	Supervisor Surveillance Grade I	SSG-1	1							
13	Supervisor Surveillance Grade 2	SSG-2	(13)				13		13	
14	Communications Maintenace Technician (Senior)	CMT-S	(3)					3		
15	Communications Maintenance Technician (Junior)	CMT-J	(2)	2	2					
16	Communications Systems Technician (Senior)	CST-S	(8)					8		
17	Communications Systems Technician (Junior)	CST-J	(7)	5		2				
18	NavAids Maintenace Technician (Senior)	NAMT-S	(2)					2		
19	NavAids Maintenace Technician (Junior)	NAMT-J	(2)			2				
20	NavAids Systems Technician (Senior)	NAST-S	(1)				1			
21	NavAids Systems Technician (Junior)	NAST-J	(10)	5		5				
22	Radar Maintenace Technician (Senior)	RMT-S	(3)					3		
23	Radar Maintenace Technician (Junior)	RMT-J	(8)	2		6				
24	Radar Systems Technician (Senior)	RST-S	(7)					7		
25	Radar Systems Technician (Junior)	RST-J	(7)	4		3				
26	Radar Data Processor Technician (Senior)	RDT-S	(4)					4		
27	Radar Data Processor Technician (Junior)	RDT-J	(12)		12					
28	Miscellaneous Maintenace Technician (Junior)	MMT-J	5							
29	Miscellaneous Maintenace Technician (Senior)	MMT-S	(1)					1		
30	Message Switch Technician (Senior)	MST-S	(5)			5		5		
31	Message Switch Technician (Junior)	MST-J	(0)							
32	Message Switch Software Technician (Senior)	MSDT-S	(2)			2		2		
33	Message Switch Software Technician (Junior)	MSDT-J	(24)		24					
34	Electro-Mechanical Devices Technician (Senior)	EMDT-S	18							

WS's 5, 6, 7 CNS / WS-8 Delta-1 / WSs 9A-9F Delta-2 / WS 4-10 Analysis \ **WS 11 Training Needs** / WS-xx HR

Figure 3 (*Worksheet 11*) Sample of training needs to support staff shortage – one planning year

2.3.5 Worksheet 11 makes no assumptions as to outcome of training and only provides figures regarding training requirements to replace vacancies. To cover the full planning period, year 1 to year 5, it is necessary to carry forward worksheets for each planning year similar to Figure 3 (*Worksheet 11*). This process is covered in the case study of Chapter 8. An important factor identified in this worksheet is that new entry staff will require training prior to the planning year covered by the worksheet if they are to fill positions during the current planning year.

3. THE TRAINING PROGRAMME

3.1 Training Forecast for the Planning Period

3.1.1 Information from the Human Resource Demand Forecast and the Human Resource Supply Plan worksheets are utilized to determine the number of trainees to be trained and the training requirements in training weeks of courses.

3.2 A Training Programme for CNS Department

3.2.1 The CNS department has been chosen for demonstration of preparing a training plan. Figures used to represent quantities of trainees and course duration in weeks are fictitious and do not represent any specific organizations.

3.2 Types of Training

3.3.1 Figure 4, CNS Department Sample Training Progression Flow Chart, illustrates a possible training road map that various categories of staff need to undergo to enable staff to perform required tasks and support of their career progression.

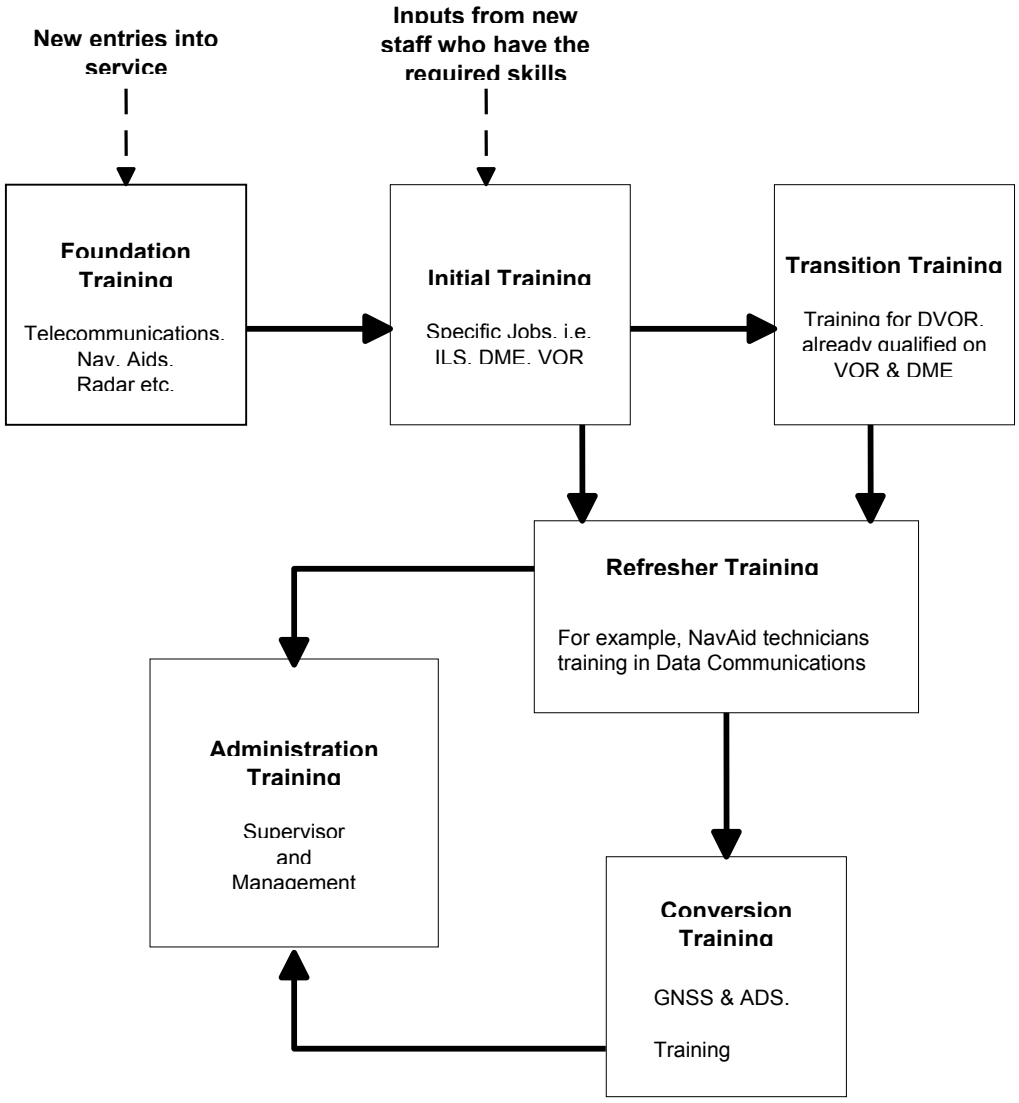

Figure 4 – CNS Division, Sample Training Progress

3.3.2 The types of training identified are broken down in classifications that are described below.

a) ***Foundation Training***. This type of training is required when the target population does not possess the underlying knowledge and/or skills needed to enter job-oriented training. For example, it may be necessary to provide foundation training in basic electricity to staff who will maintain airport lighting, if they do not already have basic electrical maintenance skills. Foundation training is frequently required in aviation as entry level personnel may not have previous exposure or knowledge of the aviation field.

b) ***Initial Training***. Initial training is the first job specific training that personnel receive to qualify for a specific aviation job within a category of jobs as defined by the ICAO job

category numbers (see column two of Appendix A). For example, once a newly hired AIS staff member has completed foundation training, the subsequent training required to qualify him/her as an Aerodrome Officer would be considered initial training.

c) ***Transition Training***. This type of training is required to prepare an existing staff member to perform another job within a given category of jobs (i.e. ICAO job categories). For example, training a procedural approach controller to become a radar approach controller would be considered transition training.

d) ***Conversion Training.*** This type of training is required for a qualified staff member in a specific job to obtain the skills required to use new procedures and/or technologies such as ICAO CNS/ATM systems.

e) ***Refresher Training***. Regular refresher training is provided to ensure that personnel maintain a skill and knowledge level needed to perform their jobs safely and in compliance with all established performance standards. Refresher and conversion training are sometimes combined to introduce new procedures and/or technologies.

3.4 Training Capacity

3.4.1 When conducting medium/long term planning, attention should be given to training capacity or the number of places at the training institute. The capacity of the operational environment to perform on-the-job training (OJT) should also be evaluated, particularly for air traffic controller training. OJT is widely known, as being the bottleneck in training. Appendix A “Training Capacity", provides, an example of how to determine OJT capacity for new trainees and in-service air traffic controllers

4. INSTRUCTIONAL STAFF REQUIREMENTS

4.1 Staffing factors for training staff

4.1.1 The first step in forecasting the number of instructors required for any specific training programme, is to determine the staffing factors for the instructors at the training centre. This is a similar operation that would have been carried out for other personnel such as air traffic control and CNS maintenance staff. This operation was demonstrated in Chapter 2.

4.1.2 In this case, Worksheet 15A, “Training Centre Staff Data” will be used along with the Worksheet 3, “Staffing Factors”. Figure 5 (Worksheet 2) shows a typical completed worksheet 2 with user inputs. Worksheet 3 is not shown, as there are no user inputs to this worksheet. The resulting data of worksheet 2 are automatically linked to worksheet 3 with the “*available working days per year*” automatically linked to worksheet 15C.

	B	C
2	**WORKSHEET 15A - TRAINING CENTRE STAFFING DATA**	
3		
4	**Description of Data**	User Data Input
5	**PERSONNEL DATA**	
6	**Days per year:**	365
7	**Hours per day:**	24
8	**Hours per working day:**	7.5
9	**Work schedule, Days On:**	5
10	**Work schedule, Days Off:**	2
11	**Annual leave, Days per year:**	30
12	**Average sick days per year:**	6
13	**Statutory holidays per year:**	12
14	**Average training days per year:**	10
15	**Other (days off per year):**	5
16	**Breaks per working day in Hours:**	1

Figure 5 (Worksheet 15A) Training Centre – Staff Data

4.2 Determine the number of Instructors

4.2.1 The Training Forecast worksheets for each department can be used to calculate the total number of training weeks required by an organization for each of the years over the forecast period. These annual figures can then be used to determine the number of instructors required as well as training equipment and facility requirements.

4.2.2 Figure 7 (Worksheet 15C) is utilized to determine the minimum number of courses that can be conducted in any given year. The calculations use the "available operational working days per year" figure from a Staffing Factor Worksheet as the basis for each instructor. The input data for the "staffing factor worksheet" can be adjusted to reflect conditions for instructors at the training centre by using a "staffing data input worksheet". For example, instructors may have to periodically attend seminars/workshops to upgrade their technical skills/knowledge, and also attend a number of administrative tasks out side of the classroom/laboratory.

4.2.3 Figure 7 (Worksheet 15C) also provides figures relating to the number of training days per year for instructors associated with a specific course. In addition, worksheet 15C is used to determine the number of courses that can be conducted in a year based on availability of instructional staff and facilities and, the number of instructors required for a specific number of courses to be conducted in a year.

4.2.4 Worksheet 15C (figure 7) is intended to be used as an "interactive" tool, that is, the user enters appropriate data into the blank cells (white). The following should be noted:

- Cell "Q4" is linked from "Worksheet 3 – Staffing Factors"
- Cell "T4" is linked from "Worksheet 15A, Training Centre Staffing Data"

4.2.5 User data is entered into columns B, C, D, F and G (all white cells). All other data in columns E, H, I, J and K are automatically calculated. Important outputs of this worksheet are found in the cells of columns "J" and "K". Column "J" provides an indication of the maximum number of courses that can be conducted in one year by the number of instructors indicated in the cells of column "F". Column "K" indicates how many instructors are required to conduct a specified number of courses (Column "C"). The combination of columns "C" and "K" become a useful tool for a "what-if" analysis.

4.2.6 Reference to column "C - number of courses to be conducted". The number of courses required to be conducted, Column C, is a function of the number of staff to be trained in the specific job category and the maximum number of trainees that can be handled by the training establishment at one time for a specific course. For example, if there are 48 staff to be trained (obtained from previous planning worksheets) and the training centre can handle 12 trainees at a time, the number of courses required are:

$$\frac{\text{maximum, number of trainees}}{\text{maximum number of trainees per course}} = \frac{48}{12} = 4 \text{ courses}$$

The numbers used in Figure 6 are fictitious and do not relate to any organization.

4.2.7 Use of qualified field personnel as part-time instructor's in combination with "full-time" instructors is recommended. For example, if a part-time instructor is used for approximately 25 percent of a full-time instructor, then "0.25" can be used in the number of instructors column (column "F").

Microsoft Excel - Instructors.xls

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	J	K	L	M	N	O	P	Q	R	S	T
2	WORKSHEET 15C - Number of Course / Instructors / Year										
3	This worksheet is interactive. User to enter data into "white cells"										
4	*Available Instructor trainee - contact days per year (WS-3 SF CNS H61)* =							198	Training days per week =		5
5	A	B user	C	D user	E (M7*T4)	F user	G user	H (P7*Q4)	I (07*Q7)	J (R7/N7)	K C*E*F/H
6	Sample Training Courses	No. Trainees/ Course	No. of Courses	Duration of Course in Weeks	Duration of Course in days	No. Instructors/ Course	Instructor % of trainee contact	One Instructor for training /days /year	No. of training days for all Instructors	Max No. of courses/year ref. Col.C	Number of Instructors to teach "x" courses
7	Initial Training Intro NavAids	6	4	12	60	2.5	0.65	129	321	5.4	4.7
8	Initial Training Radar Systems	8	4	20	100	3	0.65	129	386	3.9	9.3
9	Conversion Training Intro. To CNS	12	12	3	15	2	0.80	158	316	21.1	2.3
10	Conversion Training Data Comm.	8	10	4	20	2	0.70	138	277	13.8	2.9
11	Conversion Training The ATN	8	2	8	40	2.5	0.70	138	346	8.7	2.5
12	Management	12	3	3	15	2	0.80	138	277	18.5	2.0
13											

Figure 6 (*Worksheet 15C*) Number of course / instructors per year

5. TRAINAIR SUPPORTING DOCUMENTATION

5.1 General

5.1.1 The *TRAINAIR Training Management Guideline (TMG)*, developed by the ICAO TRAINAIR Programme, provides detailed information on training support functions, training delivery, administrative support functions, planning and design of training facilities, etc. Another manual, the *TRAINAIR Training Development Guideline (TDG)*, details a course development methodology for aviation personnel and provides guidelines on training techniques, validation, revision and implementation of courseware, design of tests, post-training evaluation, etc. The aim of both the TMG and TDG is to provide civil aviation training managers with tools they need to effectively manage their training organizations, and can effectively benefit from utilizing these tools.

APPENDIX A

CHAPTER 5

CALCULATING TRAINING CAPACITY

1. Introduction

1.1 Understanding the organizations capacity to undertake training both on-the-job (OJT) and formal institute training is of extreme importance to the human resource planners. The ability to provide the correct training at the appropriate time is essential to maintaining the operational standards and thus achieving the operational requirements of the air navigation service.

2. Training capacity

2.1 In reference to OJT. If the maximum OJT capacity is 32 per annum (12 new controllers and 20 for operational controllers (endorsements of for existing controllers), then this is the figure that the human resource planners must consider in their long-range planning. Foundation (*ab initio*) training of new controllers must be planned ahead so as not to exceed the maximum OJT training capacity and also to take into consideration the success rate of the foundation training.

3. Determine Training Numbers

3.1 When making any calculations regarding training numbers, it is important that the relevant success rate at the different stages of training is considered. For example, if the overall success rate in training before OJT is 67% then this should be taken into account.

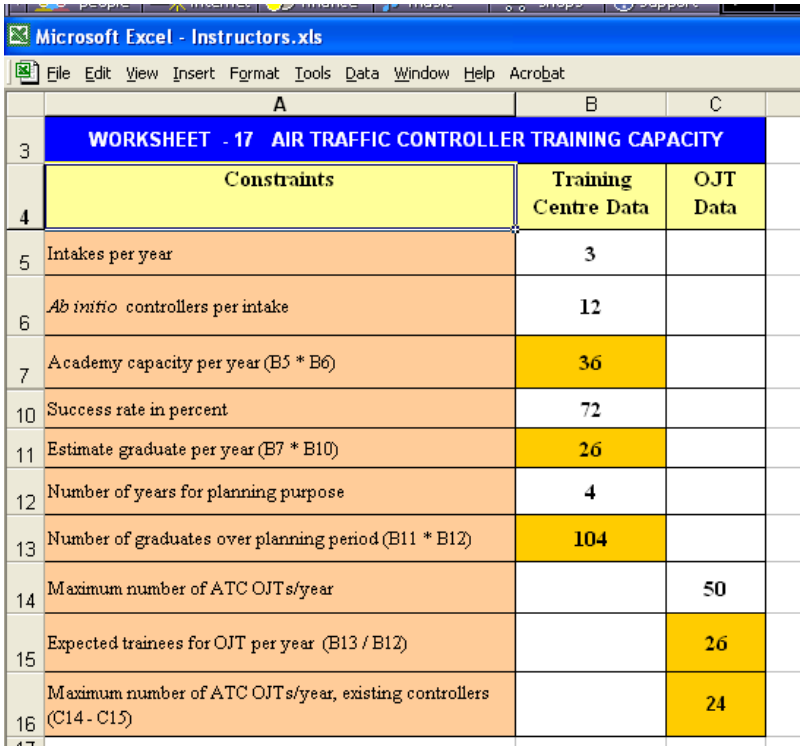
3.2 An example follows:

a) The national civil aviation training centre capacity, with the given instructor availability and facilities, is three intakes per year with 12 *ab initio* trainee controllers in each intake.

b) This relates to 144 *ab initio* controllers over a period of four years.

c) If the average success rate is 72 percent, then the number of trainees entering into an OJT programme is 104 over the four-year planning period.

3.3 Figure 1 illustrates a sample “interactive worksheet” that can be used to determine training capacities. The user can enter the pertinent data in the “white” cells and the forecast number of graduate trainees over the planning period is provided. The trainee OJT and in-service controller OJT yearly maximums is also provided. These are important factors, particular for air traffic control.



Microsoft Excel - Instructors.xls

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	A	B	C
3	WORKSHEET - 17 AIR TRAFFIC CONTROLLER TRAINING CAPACITY		
4	Constraints	Training Centre Data	OJT Data
5	Intakes per year	3	
6	*Ab initio* controllers per intake	12	
7	Academy capacity per year (B5 * B6)	36	
10	Success rate in percent	72	
11	Estimate graduate per year (B7 * B10)	26	
12	Number of years for planning purpose	4	
13	Number of graduates over planning period (B11 * B12)	104	
14	Maximum number of ATC OJTs/year		50
15	Expected trainees for OJT per year (B13 / B12)		26
16	Maximum number of ATC OJTs/year, existing controllers (C14 - C15)		24

Figure 1 Worksheet, Training Centre and OJT Capacity

3.4 Figure 1 was produced with a Microsoft Excel workbook; it is dynamic, permitting the user to introduce any numbers.