

**EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH
ORGANISATION EUROPEENNE POUR LA RECHERCHE NUCLEAIRE**

CERN - PS DIVISION

PS/DR/Note 2000-031 (Info.)

**REVIEW OF PS TRAINING ACTIVITIES
for the period
1999/2000**

P. Pearce

Geneva, Switzerland
2 August 2000

1. Introduction.

1.1 General data.

This note reviews the training activities for the PS division made during 1999 and includes all internal training courses as well as participation in the many external specialised courses and schools during this period. It also looks at some training data from the other accelerator divisions for comparison.

The CERN training group, now situated within the HR division and called TD (Training & Development) offered a large number of courses in the Language, Management and Technical categories. Within the division a total of 283 different training courses were attended by 159 staff, resulting in 1.8 training courses per participant. The number of training days per person, course enrolments and the number of participants within the division has reduced together with the total expenditure on training (Table 1) compared to 1998. These lower figures are in line with the 20% reduction in training hours over the year without any obvious reason, and concluding that 1998 was an exceptional year and that all training offered was matched to the divisions needs at that time. This trend was also present in data for the SL division, where in 1998 the number of training days per person was about 3.2, and has reduced (as in the PS) to about 2.9 training days per person for 1999.

Period	Number of participants	Course enrolments	Courses/person	Course hours	Training days/person	Total costs KCHF	PS staff	PS visitors
1996	168	258	1.54	7876	2.8	166.3	295	57
1997	127	243	1.91	7953	2.8	205.5	286	67
1998	177	314	1.8	9584	3.5	234.3	273	67
1999	159	283	1.8	7657	2.9	168.6	265	69

Table 1. General training data for the PS division

The Table 2 below shows a comparison for the 1999 period between the LHC, PS and SL divisions with respect to relevant training data. The age profile for the PS division is shown in Figure 1 (from July 2000).

1999	LHC	SL	PS
Total course enrolments	479	486	283
Total training hours	11970	8898	7657
Total training costs KCHF	262.8	292	168.6
Training days/person	3.5	2.9	2.9
Average age (all categories) years	40.9	46.6	44.4
Number of staff + visitors	428	388	334
Training costs/person KCHF	0.614	0.753	0.485

Table 2. Comparison of training data for 1999

1.2 EDH and training.

The widespread use of EDH for course enrolment has speeded up the administration work enabling requests to be followed through the system quickly. A small but repeated problem of the person requesting a training course **not** actually signing electronically the form after completion causes it to remain pending with no action, and the DTO automatically receives reminders from EDH every 10 days until signed or deleted by the requestor.

1.3 The JTB.

From the beginning of this year (2000) the JTB has a new chairman and a different mandate and structure. This is designed to give it a better access to CERN management and a wider influence on training matters within the organisation, and which should eventually reflect on the courses available for all staff members.

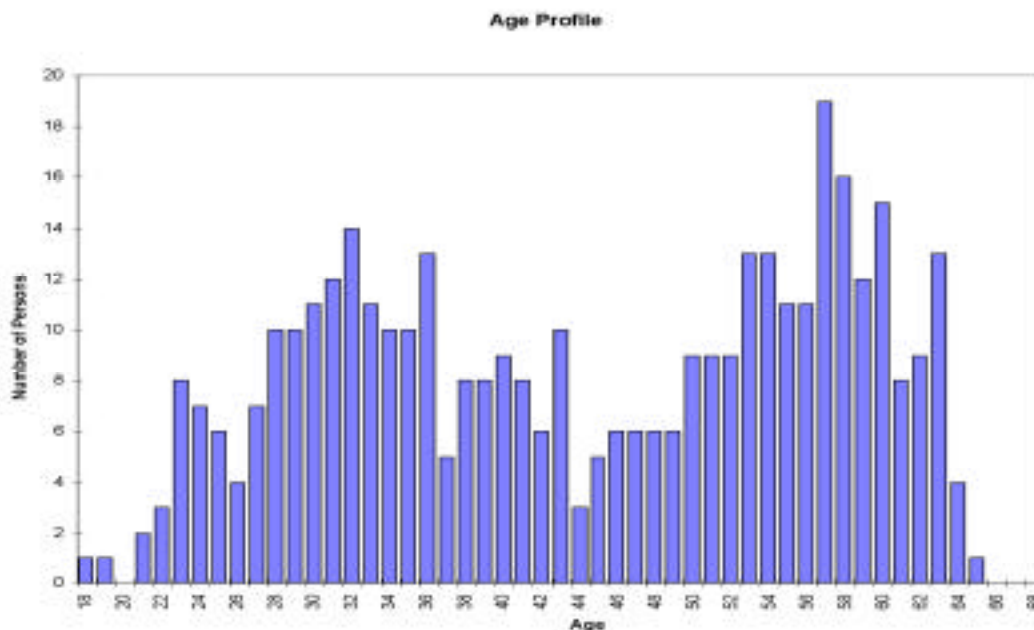


Figure 1. PS division age profile (July 2000)

2. Review of training made in 1999.

An overview of training in 1999 within the PS division was presented in a preliminary way at the last Training Executive Committee meeting (TEC) on the 31 May 2000.

In order to be consistent with previous years training plans and their analysis, this data has been re-arranged in the same ten classification areas for this year's review. Table 3 gives a summary of these classification areas for the different staff categories and number of courses¹ that have been followed in 1999 including the internal PS divisions operator training courses.

Type of training	Cat 2	Cat 3	Cat 4	Cat 5	Total	(%)
Office Software	2	9	2	5	18	5.5
Programming	22	21	0	0	43	13.1
Electronics	11	17	1	0	29	8.9
Mechanics	3	16	1	0	20	6.1
Security	2	8	2	0	12	3.7
Accelerators	7	3	0	0	10	3.0
Others ²	10	21	1	0	32	9.8
Languages	41	26	1	3	71	21.7
Management ³	35	11	0	2	48	14.7
Teaching ⁴	16	28	0	0	44	13.5
Total	149	160	8	10	327	100

Table 3. Number of courses taken (or given) for each staff category in 1999

¹ Courses organised by the CERN education services and by the PS division.

² Training and related courses not falling into the other classifications.

³ Management training including project management, communication and MOAS refresher courses.

⁴ Teaching activities within PS division (operators courses) and for external courses.

A comparison of the ten course areas over the period 1997, 1998 and 1999 is shown in Figure 2. A remarkably strong decrease in all electronics type courses and accelerator courses is seen, whilst courses in security have continued to increase over this period. The number of management type courses has been very cyclic in the past and interest in this area has once again increased during 1999. The requests for programming courses have remained very constant over the three-year period, as has the number of language courses. Office software course requests have diminished over this same period but are a function of the rate that new software tools and operating systems are introduced on the computing network.

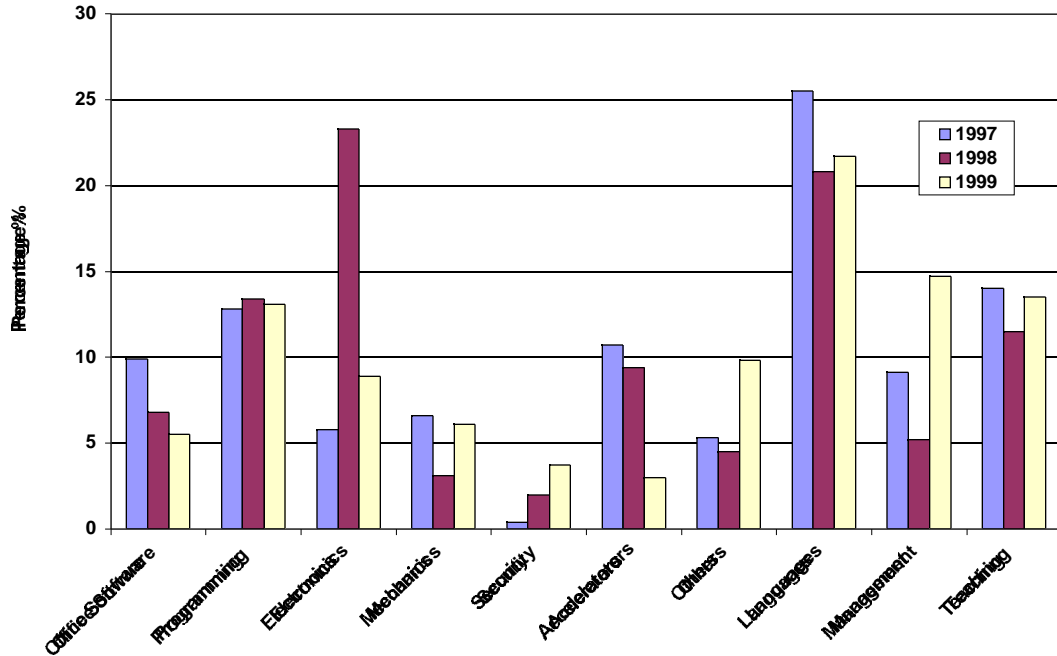


Figure 2. Comparison of the number of courses taken or given from 1997 to 1999.

The Table 4 below shows the distribution of training hours that were spent on internal and external courses, workshops and CERN schools, and also the giving of courses such as those at Archamps, the CERN accelerator schools and internal shutdown courses given in the PS Operations group.

Type of training	Cat 2	Cat 3	Cat 4	Cat 5	Total	(%)
Office Software	8	112	16	64	200	2.6
Programming	375	571	0	0	946	12.2
Electronics	132	381	0	0	513	6.6
Mechanics	69	357	5	0	431	5.6
Security	16	48	16	0	80	1.0
Accelerators	264	147	0	0	411	5.3
Others	368	162	0	0	530	6.9
Languages	1941	1313	20	118	3392	43.8
Management	696	219	0	48	963	12.5
Teaching ⁵	205	64	0	0	269	3.5
Total	4074	3374	57	230	7735	100

Table 4. Distribution of training and teaching hours for 1999.

⁵ Contains teaching hours for external workshops and courses, and all internal PS/OP shutdown teaching .

The comparison between training hours made in 1997, 1998 with 1999 are put into the graph of Figure 3 below. Basically we can see that the number of hours devoted to language and management training has increased, whilst training hours in most other categories have decreased, particularly in attendance at accelerator courses or schools. Of course, it is not sure whether the schools on offer during 1999 were of less interest to PS staff, or that they had already attended schools of the same type and at a similar level in recent years.

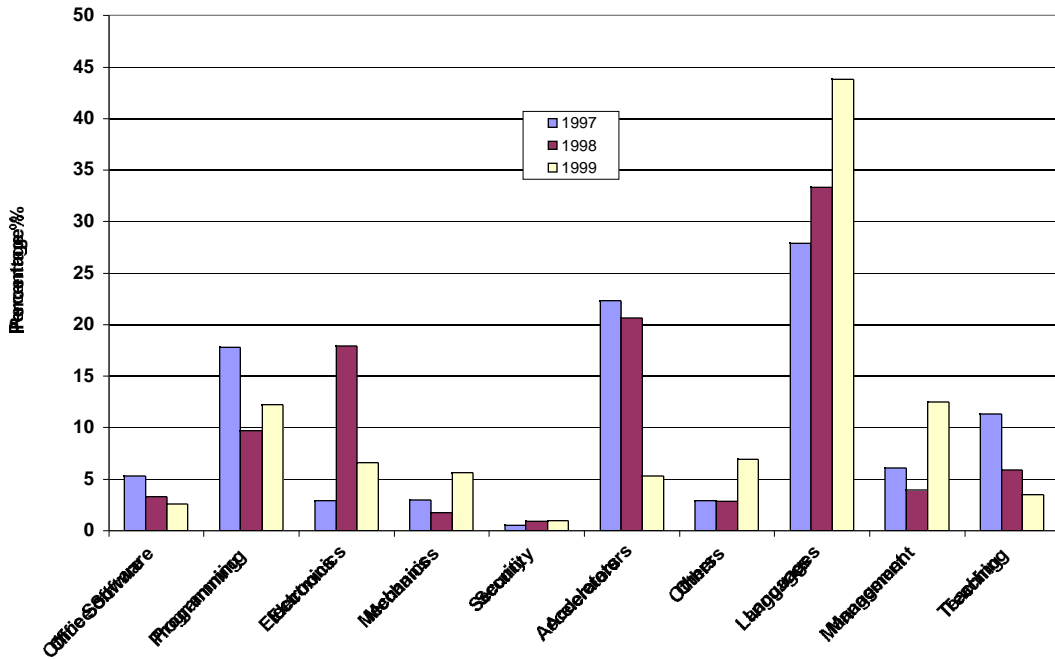


Figure 3. Comparison of training hours from 1997 to 1999

The training enrolments made during the first 5 months of 1999 were used to try and predict what range of courses may be needed throughout the remaining period. This proved to be a difficult result to predict and seems to have been more influenced by a strong decrease in courses for Office Software and Electronics as well as increases in demands for language and specialised external courses. This is probably due to new fellows, associates, students etc. arriving in the division in the latter half of the year and needing this type of training. It also shows the overall effect of a general reduction in training made over the year. The results are shown in Table 5 below and the differences are given in graph form in Figure 4.

Type of training	Predicted (1999)	Actual (1999)
Office Software	38	18
Programming	51	43
Electronics	74	29
Mechanics	24	20
Security	16	12
Accelerators	15	10
Others	18	32
Languages	57	71
Management	47	48
Teaching	49	44
Total	389	327

Table 5. Comparison of predicted to actual course numbers in 1999

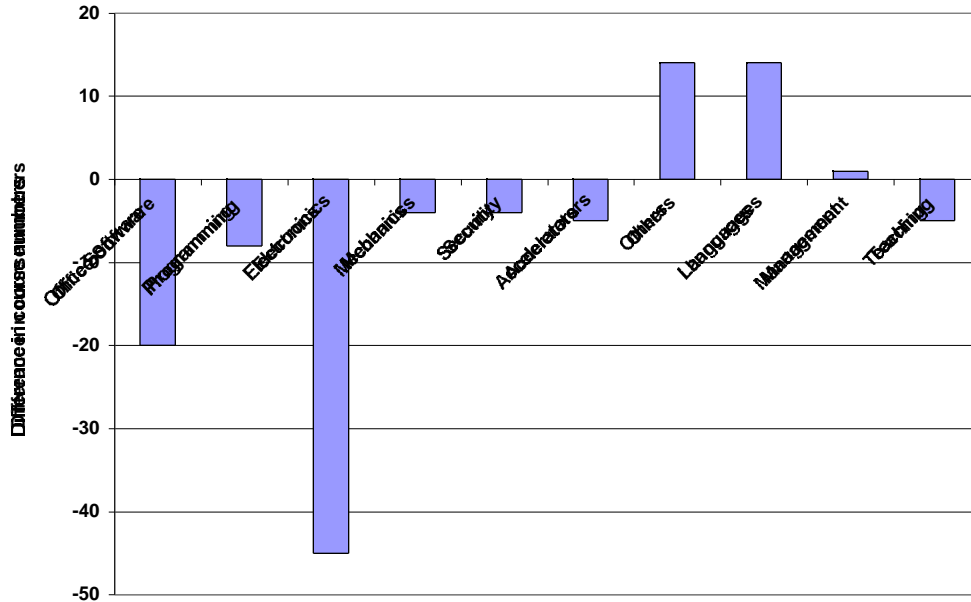


Figure 4. Difference between predicted and actual course numbers in 1999

3. Training forecast for the 2000/2001 period.

The training requests already received up until the end of April 2000 have been included in the forecast Table 6 below. The training requests from the MOAS interviews have been added to these, making sure that they were not already counted in the April data, to form a predicted total for all the types of training listed this year. Any in-house, on the job training for those people taking over specific tasks due to the reorganisation or replacing retiring staff members are not included.

Type of training	1 st 4 months of 2000	MOAS results for 2000	Predicted total for 2000	(%)
Office Software	24	24	48	11.2
Programming	37	38	77	18.2
Electronics	5	38	43	10.2
Mechanics	1	13	14	3.2
Security	0	7	7	1.6
Accelerators	0	39	39	9.2
Others	11	42	53	12.5
Languages	29	21	50	11.8
Management	12	33	45	10.6
Teaching ⁶	40	9	49	11.6
Total	159	264	423	100

Table 6. Predicted total number of courses in the ten categories for 2000

The predicted total number of training courses for 2000 is about 10% higher (374 compared to 340, not taking into account teaching courses) for 1999 when the number of teaching assignments (49) are deducted. However, only about 73% of the places that were foreseen to be taken were actually converted into courses in 1999. The reasons for this are diverse, although mostly were due to work taking a priority position. The prediction comparisons with 1999 information are given in Figure 5.

⁶ Contains PS/OP shutdown courses and known external courses to be given.

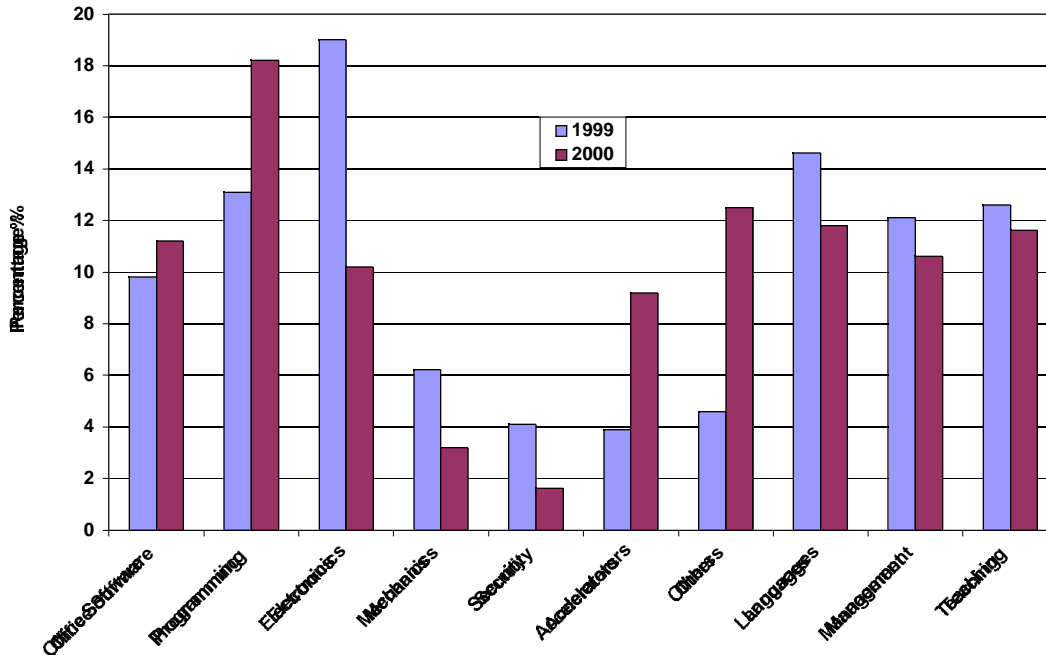


Figure 5. Comparison of predicted course numbers for 2000 with those made for 1999

4. Summary.

Compiling the division's annual training data clearly takes some time and effort, and will almost certainly have some small errors within it. This report uses information obtained from many sources, including HRT, BHT, the divisional training database and from the appropriate part of the MOAS form. The CERN Core Training Application (CTA) software that could automate this task and reduce the time and errors is currently being developed by AS division and hopefully should provide in the future a better way of managing divisional training information in a coherent form CERN wide. However, for the present the information from these different sources mentioned show areas where (Figure 5) there is a need for continuing or additional training in the PS division.

Seen from last years predictions, although there may be a specific training need identified at the MOAS interview, the timing of the required courses does not always coincide with peoples availability to attend them, and impacts attendance numbers. It should be remembered that training time is available for all courses that are appropriate and in the interest of the division. The following is a condensed review of what is seen to be the current training needs in the PS division.

Programming languages and systems courses are a continuing requirement in the division, particularly for Java and VHDL software methods. The needs for office software training are mainly introduction and advanced courses in Excel.

Electronics courses being requested are the following:

- a) LabView software training at basic and advanced levels.
- b) Power electronics courses for those people working on power supply systems.
- c) Pspice analogue and digital simulation courses.
- d) Pcad courses for electronic circuit design.
- e) Simatics courses for using industrial control hardware and software systems.
- f) Basic RF design course.

More emphasis is now being placed by technical staff on electronics courses that teach methods and techniques rather than acquiring software programming skills. A well structured electronics training programme should be planned as part of the CERN training review of present courses, and perhaps with

links to nationally accredited schemes (CNAM, OU, C&G etc.) for those wishing to obtain higher professional qualifications that are externally recognised.

Mechanical design courses are needed by a few people for AutoCad 14 training at basic and upgrade levels, whilst again a small number of requests have been made for training in electrical safety issues. General safety training for those newly appointed TSOs has also to be satisfied since there has been a continuing requirement for training in safety related matters. Both of these areas could benefit from a more structured training programme approach.

Training requests for CERN accelerator and connected technology schools have increased in 2000, and the demand for specialised workshops, schools and courses (mostly external), has also increased. Almost all of these requests are directly dealt with at the divisional level after discussions with the group leaders concerned. These schools and courses have a very positive impact on the work of the division and are encouraged by the management. They enable students to quickly build their skill levels and contributions within the larger area of accelerator work. Equally encouraged are students taking external courses for the CNAM and Open University qualifications and at the present time this concerns nine students in the PS. The level of financial and study time support for students varied widely between CERN divisions in the past, although some convergence is appearing. In the PS division this support is reviewed yearly and for the moment has been maintained at the 1999 level. A proposal was made at a recent meeting of the JTB to consider a common CERN-wide approach for supporting students of this category.

Distance learning is becoming a CERN training method due to its flexibility in terms of when and where it can be undertaken. A few PS staff have sampled some of the technical and language courses but there are no divisional statistics at present to assess its impact on training in general.

Requests for language and management courses are seen to be stable or slightly decreasing for 2000 as are the demands for divisional effort in teaching duties internally and externally. Any training courses that are required but not in the present CERN training programme will be proposed to the appropriate TEC working groups for consideration. In 1999 the training areas that attracted most PS division students were; Languages, Management and Electronics, in that order. This year the MOAS predictions indicate that training courses in Programming, Languages and Management will be mostly required.

The PS/OP shutdown lectures on accelerator techniques attracted a dedicated group of people working in this area from the PS, SL and ST divisions. These lectures are organised within the PS division and are given by PS/OP operations staff with course information that has a direct application for the accelerators being operated by the division.

The number of training hours for category 4 and 5 staff in 1999 has fallen compared to 1998, whilst the staff complement has remained stable at 11 persons in each category. Seen as a percentage of the total number of training hours in the division however, category 5 has increased slightly. The overall situation is given in Table 7 with the 1998 data in brackets.

Category	Percentage of training hours (%) 1999 (1998)
Cat 2	52.7 (34.0)
Cat 3	43.5 (62.0)
Cat 4	0.8 (1.5)
Cat 5	3.0 (2.7)

Table 7. Percentage of training hours by category

The data above most notably reflects an increase in category 2 training, and the underlying training required for visitors of all types who have needed language and computer software training to adapt efficiently to the working environment. With a currently reducing CERN staff complement and constantly changing numbers of short-term visitors working within the division, the training requirements and

availability of appropriate courses become more important. Using training programmes effectively ensures that all staff stay competitive, and a visible result of this training is the divisions acknowledged ability and technical competence in all areas of its work. Lower operating budgets should not be considered major obstacles in maintaining or improving divisional skill levels in all areas where training will enable it to remain competitive now, and for future projects and work programmes.

5. Acknowledgments.

I would like to thank both J.P Delahaye and D.J Simon as well as the divisional management for their continued support in all training matters during the last year, and also J. Schinzel the deputy DTO for her useful comments, help and suggestions. Thanks also to the PS training linkmen and divisional representatives of the TEC working groups who have proposed new courses and made staff aware of the many training possibilities.

C. Galmant and T. Kehrer have provided a professional and timely preparation of all divisional training information, statistics and enrolments for courses, schools, workshops and conferences, as well as maintaining the divisional training database system.

5.1 PS division training committee.

Members:

Divisional Training Officer (DTO)	:	P. Pearce
Deputy DTO	:	J. Schinzel
PS Seminars	:	B. Autin
Library representative	:	R. Cappi
Secretariat	:	T. Kehrer, C. Galmant
Training Linkmen	AE :	C. Carli
	BD :	J. Bosser
	CO :	F. di Maio
	DR :	T. Kehrer
	LP :	L. Rinolfi
	OP :	M. Benedikt
	PP :	C.E Hill
	PO :	F. Voelker
	RF :	S. Hancock

5.2 Representatives in the TEC working groups.

Working Groups		Members from the PS
Office Software and administration methods	:	-
Electronic design	:	P. Pearce
Mechanical design	:	-
General scientific culture	:	M. Martini
Language training	:	J. Schinzel
Management and Communication	:	J. Schinzel
Software technology and systems	:	F. di Maio
Security	:	-
Distance learning	:	-
Academic Training	:	P. Pearce