DOCID: 4001428

SECURITY CLASSIFICATION (If any)

DISPOSITION FORM

CONFIDENTIAL

FILE NO.	SUBJECT		
	COMSEC Procurement of a General Purpose Computer		
TO	FROM	DATE	COMMENT NO. 1
DD/COMSEC	COMSEC Keying Materials Committee	20 Jan 56 WMCole/60287/ak	

References: (a) COMSEC Regulation No. 04-0-11, Subj: COMSEC Keying Materials Preparation Methods Committee, 15 Feb 55

(b) COMSEC PAM 04-84-55, Subj: Personnel Assignments to the COMSEC Keying Materials Preparation Methods Committee, 21 Dec 55

1. For approximately one year the COMSEC Keying Materials Committee has been studying the advisability of COMSEC's obtaining a general purpose computer. As a result of this study the Committee has concluded that it would be very desirable for COMSEC to have a general purpose computer under its operational and physical control.

2. This conclusion was based primarily on a review of the requirements for modernization of COMSEC/MAT key production facilities. Some general background information is included in Inclosure I. As indicated in this inclosure, the Univac File Computer was selected as the best commercial equipment for meeting COMSEC/MAT requirements.

3. It should be pointed out that a general purpose computer will not be an immediate or a complete solution to all of our problems. In the opinion of the Committee the following statements are accurate enough to be used as premises in evaluating the desirability of COMSEC s obtaining a computer.

a. Although work done with PROD equipment has demonstrated the feasibility of the production of some keying material by computer method, PROD priorities, unsuitability of most of their equipment, and eventual move of their equipment to Ft Meade preclude these facilities as a permanent adjunct to COMSEC/MAT key material production.

b. During the initial period of use, from one to two years, a computer would be used: to train operators, programers, and maintenance men; to check out programs; and experimentally, to determine most efficient means of utilization. During this period, most production would be handled by present machines and people, necessitating that additional people, power, space, and air conditioning be obtained for operating the computer installation.

c. In order to use the computer it will be necessary to provide a random source of data. Since work is already being done on developing a random generator in conjunction with the high speed one-time tape and one-time pad equipment, the providing of this source for the computer will represent nominal additional expense.

– I don't seem to have a copy of Comment 2
Cole

Declassified and approved for release by NSA on 07-13-2012 pursuant to E.O. 13526

MENT PRINTING OFFICE : 1952 O - 986875

CONFIDENTIAL

SUBJECT: COMSEC Procurement of a General Purpose Computer

TO: DD/COMSEC FROM: COMSEC Keying Materials Committee DATE: 20 Jan 56 COMMENT NO. 1 (Cont'd)

d. Once the required personnel have been trained and routines established, it is expected that one computer will result in substantial savings in personnel and money and an overall increase in production capabilities. It is estimated that a computer could produce as much in one shift with six people as is presently produced in two shifts with over forty people. Inclosure 2 presents a comparative study of present machine costs versus computer costs.

e. There are some imponderables with regard to accuracy, but it is believed that the overall accuracy of operations will be improved through use of a computer since the computer performs automatic checks on itself.

f The computer will represent a ready reserve capacity for use in an emergency. Not only will the machine itself be available for one, two, or three shift operation at anytime, but only three or four additional people will be required for each added shift.

g. Even with a computer in full operation, some special purpose as well as IBM equipment will be needed to do jobs for which the computer is not suitable, or which are small quantity jobs not worth programing.

h. The particular computer under consideration can be either rented or purchased. On a long term basis, especially where multi-shift operation is involved, it is more economical to own rather than rent. However, since this computer has not been proven operationally, since our experience with computers is limited, and since most of our work during the first year will be one shift, it would be wiser, at least for the first year, to obtain the equipment on a rental basis. This eliminates much of the gamble and also under this condition maintenance would be supplied by the manufacturer.

4. If COMSEC/MAT does not utilize the computer on a full time basis, the following additional applications are conceivable:

a. COMSEC/DOC could profitably use the equipment in conjunction with their analytical work although no single computer can meet their varying computer requirements.

b. The COMSEC EDPM program could use such a computer in conjunction with management engineering and logistics problems.

c. PROD would probably be interested in using this computer if time is available. Its very large internal storage and flexible input-output may offer advantages over present PROD computers for some special applications.

CONFIDENTIAL

SUBJECT: COMSEC Procurement of a General Purpose Computer

TO: DD/COMSEC FROM: COMSEC Keying Materials Committee DATE: 20 Jan 56 COMMENT NO. 1 (Cont'd)

5. Conclusions

The findings of the Committee indicate that the long term advantages to be gained through the procurement and utilization of a general purpose computer for COMSEC outweigh the immediate problems of additional personnel and facilities required for this program.

6. Recommendations

The Committee unanimously recommends, therefore:

a. That COMSEC obtain a Univac File Computer at the earliest possible date for the primary use of COMSEC/MAT.

b. That DD/COMSEC signify his approval of recommendation "a" by signing Comment 2 of this D/F and forwarding to COMSEC/MAT for action.

E. T. Rowland

E. T. ROWLAND
Chairman, COMSEC Keying
Material Preparation Methods Committee

2 Incls:
1. Computer Selection Background
2. Preliminary Cost Estimate of Computer Utilization

INCLOSURE I

Computer Selection Background

1. During the past year the COMSEC Keying Materials Committee has made a study on the feasibility and desirability of adapting high speed electronic and electromechanical equipment for the mechanization of the production of keying materials. For purposes of this study the following are considered keying materials:

a. One-time tapes.

b. One-time pads.

c. One-time punched key cards.

d. Machine key lists and checks.

e. Mixed alphabets.

f. Codes.

2. On the basis of study and experience it can definitely be concluded that:

a. Production of keying materials can be considerably improved through the application of newly developed equipments and techniques.

b. To get the best results with a minimum of equipment a combination of special purpose and general purpose equipment is necessary. Special Purpose Equipment is developed for a specific job or a limited number of related jobs. General Purpose Equipment can be used for a large variety of jobs through the use of programing techniques.

3. Because there were already established projects for special equipment to produce one-time tapes, pads, and cards, and there were a number of experimental programs written for PROD computers which showed promise; it was decided to concentrate the efforts of the Committee toward determining if any of the commercial general purpose equipments would meet our needs.

4. The various COMSEC/MAT jobs to be performed were matched against a number of different computers. Most computers fall short because of insufficient storage capacity and Input-Output capabilities. All require an external random data source. The Univac File Computer was selected as the best presently obtainable for the job. Its unitized construction allows ease of expansion and contraction and permits optimum selection of components. A brochure on this equipment is attached.

~~CONFIDENTIAL~~

5. The one known disadvantage of this computer is that it has not been proven operationally; however, most of the individual units, including the magnetic drums, the magnetic tapes, the Unityper, and the high speed printer, have been used very successfully on other equipments.

6. This computer will not only provide us with a general purpose unit but it may be possible to further improve operations by extracting components and building special purpose equipment.

Incl:
Brochure

CONFIDENTIAL

INCLOSURE 2

Preliminary Cost Estimate of Computer Utilization

1. The figures presented here are based on the tentative conclusion reached by the COMSEC Keying Materials Preparation Committee that the Univac File Computer is the most suitable commercially available computer equipment.

2. The production of One Time Pads is excluded from consideration as being a special problem which requires a separate solution. Only that material currently being produced by NSA-43212 is considered and it is possible that upon further examination some items (such as GORGON pads) might be produced more efficiently by means other than an electronic computer.

3. The production figures presented on Table #1, are only for selected items and contain a number of assumptions, some of which are presented in the notes. Back up for the data in the first two columns is offered in Appendix I. Production times (column 3) on ABNER and IBM-701 have also been taken as the production time required for the Univac File Computer, except in the last instance where the production time was estimated from a proposed program synopsis. These figures are probably in the correct order of magnitude but more reliance in their accuracy than this is unwarranted. Probably the best conclusion which can be drawn from these figures is that production will be improved by a factor of approximately ten; or in other words, the Univac File Computer can probably produce in one shift what is presently being produced in two shifts, with perhaps some time left over.

4. Exact production times will not be known until the production programs are actually in operation on the computer. Better estimates than those currently available can be made after the programs have been written. Two people from COMSEC are scheduled to attend a programming training course to be held from 17 Oct to 28 Oct. The major programs should be completed some time early next year and can perhaps (dependent upon security considerations) be debugged on a prototype computer by the middle of the year. Delivery of the Univac File Computer can not be expected before early fall and might get into production before the end of 1956.

5. Table II presents a better comparison of the costs between the present and proposed production methods, with Appendices II and III supplying back-up for these figures. The breakdown of labor costs into direct and overhead in Appendix II was necessary to develop the proper labor cost per hour for determining the production costs in Appendix I. The figures of present equipment rental are those of September 1955. Because of the recent reorganization, past rental costs do not present an accurate figure.

6. Appendix III shows the personnel requirements for the proposed computer installation. No breakdown has been made into direct and overhead categories, but day and night shift requirements have been kept separate so that cost figures for both one and two shift operation could be developed.

~~CONFIDENTIAL~~

7. The data herein presented is tentative and based on a number of assumptions. As such, it does not constitute sufficient evidence upon which to base the decision whether to obtain a computer or not. It does however indicate that the Univac File Computer might afford substantial savings in both time and money as well as reduction in personnel. It appears therefore that additional efforts in writing and testing programs to obtain more accurate information are justified.

/s/ Robert S. Gillett

/s/ H. J. Watson

Incls: 5
a/s

~~CONFIDENTIAL~~

TABLE I

	Present Production Time (in Hours)	Cost (in $)	Computer Production Time (in Hours)	Cost on Present Computer (in $)	Cost on UNIVAC File Computer (3)	UNIVAC File Computer Labor Cost (4)	Total Cost on UNIVAC File Computer
26 Point Rotors (Set of 10)	3.5	8.93	0.11	11.00(1)	5.50	1.65	7.15
M-209 Keys	.038	0.16	.028	0.28(1)	0.14	0.42	0.56
POLLUX/ADONIS	0.46	1.72(5)	.167 .25 (6)	11.69 17.50(2)	8.35 12.50	2.50 3.75	10.85 16.25
BACCHUS/HERCULES	2.84	7.40	.10 .167	7.00 11.69(2)	5.00 8.35	1.50 2.50	6.50 10.85
OPCODES (KAC-9)	1.65	6.87	.059(6)	---	2.95	0.89	3.84

NOTES:

1. Present program on ABNER, costs at $100/hour (rough estimate).
2. Present program on IBM-701, costs at $70/hour (3 shift operation).
3. UNIVAC File Computer costs at $50/hour (1 shift rental operation).
4. Labor Costs at $15/hour on the UNIVAC File Computer (1 shift rental).
5. Letter checks for POLLUX/ADONIS are performed on LEECH. The cost of capitalization of this machine is not included in this cost estimate.
6. These production figures are only estimates since the programs have not actually been written and run on the computer.

~~CONFIDENTIAL~~

APPENDIX I

	Time (in hours)	Costs Labor *	Machine	Total
26 Pt. Rotors (Set of 10)	3.5	8.93		
M-209 Keys				
Sort	2	5.10	.75	5.85
Reproduce	8	20.40	6.25	26.65
Moose	160	408.00	350.00	758.00
(5000 Editions)	188.5	433.50	357.00	790.50
/Edition	.0377	.0867	.0714	.1581
POLLUX/ADONIS				
Sort	.11	.28	.04	.32
Reproduce	.19	.52	.15	.67
Collate	.02	.05	.01	.06
Print	.01	.03	.05	.08
Ltr Check	.13	.33	.26	.59
	.46	1.21	.51	1.72
BACCHUS/HERCULES				
Sort	.01	.03	.01	.04
Reproduce	.12	.31	.09	.40
Print	.01	.03	.05	.08
Ltr Check	2.7	6.88		6.88
	2.84	7.25	0.15	7.40

~~CONFIDENTIAL~~

	Time (in hours)	Costs Labor *	Machine	Total
OPCODES (KAC-9)				
Sort	.55	1.40	.21	1.61
Reproduce	.52	1.33	.41	1.74
Collate	.19	.48	.10	.58
List	.39	.99	1.95	2.94
	1.65	4.20	2.67	6.87

* Labor costs at 2.55/hour (See Appendix II)

~~CONFIDENTIAL~~

TABLE II

COMPARISON OF COSTS
(in dollars per month)

	Equipment		Labor		Other		Total	
	1 shift	2 shifts	1 shift	2 shifts	1 shift	2 shifts	1 shift	2 shifts
PRESENT		8,690		14,581		1,000(1)		24,271
PROPOSED								
Rental -	9,010		2,181		---		11,191	
		13,515		2,558		---		16,073
Purchase --								
Capitalization	15,461		3,091		100(2)		18,652	
Period: 3 yr.		15,461		4,151		100(2)		19,712
Period: 4 yr.	11,596		3,091		100(2)		15,087	
		11,596		4,151		100(2)		16,147
Period: 5 yr.	9,277		3,091		100(2)		12,468	
		9,277		4,151		100(2)		13,528

NOTES:

(1) Approximate cost of average card usage.

(2) Rough estimate of spare parts costs.

~~CONFIDENTIAL~~

APPENDIX II

Present Situation - Personnel

Overhead

GS-11 - 1	6,390	6,390	
9 - 3	5,440	17,320	
7 - 2	4,525	9,050	
5 - 1	3,670	3,670	
			35,430
E-7 - 1	4,400	4,400	
6 - 2	3,810	7,620	
			12,020
Total Overhead			47,450
Total Direct			127,515
Total Labor/Year			174,965
/Month			14,581

Direct

GS-5 - 2	3,670	7,340	
4 - 13	3,415	44,395	
3 - 18	3,175	57,150	
			108,885
E-6 - 2	3,810	7,620	
5 - 2	3,320	6,640	
3 - 1	2,330	2,330	
2 - 1	2,040	2,040	
39			18,630
			127,515

Average Direct $= \frac{127,515}{39} = 3,270/\text{Year} = \frac{3,270}{1756} = 1.86$ / Hour

Ratio of Overhead to Direct $= \frac{47,450}{127,515} = .372$

Total Labor Cost = 1.86 (1 + .372) = 2.55/Hour

Present Situation

Equipment Rental (for September 55)	Day shift	7,151.10
	Night shift	1,538.82
		8,689.92
Card Usage (approx)		1,000.00
		9,690.00

Labor Direct	127,515
Overhead	47,450

12)174,965(14,581

24,271

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

APPENDIX III

Proposed

Personnel - Operating

Day Shift			Night Shift	
GS-11 - 1	6,390	6,390	GS-7 - 1	4,525
9 - 1	5,440	5,440		4,525 /yr. 377 /mo.
7 - 1	4,525	4,525		
5 - 1	3,670	3,670		
3 - 2	3,175	6,350		
		26,375 /yr. 2,181 /mo.		

Maintenance

GS-11 - 1	6,390		GS-7 - 1	4,525
7 - 1	4,525		5 - 1	3,670
	10,915 /yr. 910 /mo.			8,195 /yr. 683 /mo.

Labor Cost /hr (1 shift Rental) = $\frac{26,375}{1756}$ = $15.02 /hr.

Machine Cost/hr (1 shift rental) = $\frac{9,010}{174}$ = 51.78/hr.

CONFIDENTIAL

APPENDIX III
(cont'd)

Proposed

Computer Costs		Monthly Rental (1 shift)	Purchase
Central Computer	1	1900	105,000
High Speed Drum	1	1250	75,000
General Storage Drum	2	1000	119,600
Tape Transport Unit	2	1200	54,000
High Speed Printer	1	3300	185,000
Unityper II	4	360	18,000
		9,010	556,600
Card to Tape Converter	1	2,500	
		11,330	

Purchase Price Capitalized for 3 yr Period = 15,461 /mo.

4 yr Period = 11,596 /mo.

5 yr Period = 9,277 /mo.

Rental Operation on	One Shift	Two Shifts
Rental	9,010	9010 ÷ 910 = 13,515
Labor	2,181	2181 ÷ 377 = 2,558
	11,191	16,073

Purchase Operation		
3 yr. Capitalization	15,461	2181 ÷ 910 15,461
Labor 2181 ÷ 910 =	3,091	÷377 ÷ 683 = 4,151
	18,552	19,612
4 yr. Capitalization	11,596	11,596
Labor	3,091	4,151
	14,687	15,747
5 yr. Capitalization	9,277	9,277
Labor	3,091	4,151
	12,368	13,428