78-4604/1

DD/A Registry
File Personnel

MEMORANDUM FOR: Director of Central Intelligence

FROM : F. W. M. Janney
Director of Personnel

SUBJECT : Personnel Accessions (U)

REFERENCE : Memo for D/Pers fr DCI dtd 4 Dec 78, subj: Personnel

1. Action Requested: None. This memorandum is in response to reference request for information on Directorate planning for new personnel input, particularly in the DDO. (U)

2. Background:

a. Each Directorate reports its personnel plans, including accessions, on a fiscal year basis in the Annual Personnel Plan (APP). The FY 1979 goal setting phase of the APP for each Career Service was submitted to the DDCI on 22 September 1978. The reports reflect by grade the number of expected losses, the number of planned gains, and further breaks down this data into Professional, Technical and Clerical. (U)

b. The Office of Personnel has developed and used statistical modelling techniques in the development of the DDO's personnel requirements. The process that has been developed for the DDO is described in the following paragraphs. (U)

3. Professional Accessions into the DDO:

a. The DDO submission for the FY 1979 Annual Personnel Plan projects professional accessions (internal and external) of 78, of which 40 are from the Career Training Program. The latter figure represents trainees completing last year's program and beginning actual duty with the Directorate. (S)

b. Professional separations from the D Career Service are currently at an annual rate of about 200. This is an abnormally high outflow from an unusually large professional population above age 45. (S)

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c. The Directorate is aware of the desirability of achieving a higher level of professional input and will try for a level in 1980 of 120 career trainees plus specialists and conversions. In contrast to previous years, when more than half the professional input came from internal conversions (from technicians and clericals), the Directorate places primary emphasis upon the Career Trainee Program. (S)

d. The Office of Personnel has studied in 1974, 1975, 1977, and 1978 the question of the desirable level of input into the DDO. It has applied simple models to age and grade flows over five year periods. It applied an early Systems Dynamic model to the problem in 1975. (U)

e. An important conclusion from these studies was the desirability of aiming at a long-term entry level input averaging 120 professionals per year; which would yield a five year input of 600 and, given early year attrition, a net input of 500. This size of class over five years compares favorably with the age distribution of the Career Service which averages 500 in a five-year block, plus or minus 200 according to past periods of increasing or decreasing inputs. Such entry level input would be augmented by conversions and accession of specialists. (S)

f. Another way to cross-check hiring plans is to apply an attrition-type of formula. The key to this approach is to derive an appropriate long-term average rate of attrition based upon career patterns in a particular Directorate. The attrition rates are particularly sensitive to earlier CIARDS retirement in the DDO and the DDA. The long-term average rates may differ from current rates, which are raised by a substantial age hump in the DDO and DDA and lowered by the lengthened retirement age permitted under CSC retirement prevalent in the DDS&T and NFAC. Given the appropriate attrition figure, the "steady flow" rate of accessions would be found by the equation

Input = (Target level) times (Attrition rate)

More sophisticated models make allowance for the impact of differences in age structure upon attrition rates, which are very sensitive to the measure of years of service, which in turn correlates highly with age. (U)

g. Table 1 displays data (on a Directorate basis) for the target 1979 level of professionals, the replacement inputs for alternative specified levels of attrition (long-term), and the annualized estimate of CY 1978 separations (based on 11 months). Table 2 compares the FY 1979 Annual Personnel Plan data on professional inputs with the comparable long-term levels derived from Table 1. As is expected, the DDO inputs are low but the total for all Directorates is quite in line. NFAC and DDS&T are clearly in a strength-building posture. (S)

4. Follow-up:

a. I agree with your comment concerning the possible applicability of models to this area. Attached are two 1976 articles prepared by personnelists detailing early work on such applications. (U)

b. We shall update the Systems Dynamic model for DDO professionals to see what additional insights it reveals. (U)

F. W. M. Janney

Attachments:
As Stated

Distribution:
Orig - Addressee
1 - DDCI
1 - ER
2 - DDA
2 - D/Pers (1 OP DCI File)
1 - OP/PS
OP/P&C/PS/[redacted]:cmc (13 Dec 78)
RETYPED: Page 3 - OD/Pers;rj (15 Dec 78)

STATINTL

TABLES

Approved For Release 2001/07/12 : CIA-RDP81-00142R000400030027-9

ARTICLES

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15 January 1976

MEMORANDUM FOR THE RECORD

SUBJECT : Description of Age Distribution Model

REFERENCE: Memo for the Record dtd 17 Nov 75, subj: Age Distribution, Projection Model

1. The age distribution model is based on the system dynamics approach; that is, a focus on the structure and behavior of systems composed of interacting feed-back loops. System dynamics utilizes the DYNAMO programing language, flow diagraming and causal-loop diagraming to define and simulate the model of the system under consideration. The use of DYNAMO flow diagraming and causal-loop diagraming provides a convenient way to completely describe our model before introducing the system equations.

2. The causal-loop diagram for our age distribution model identifies the principal feedback loops without describing the interconnection process of the variables. In Figure A a causal-loop diagram describes the basic assumptions of the model: the number of persons in an age group is dependent on the plus side by hires, conversions-in, and aging-in. On the negative side the impact is brought about by separations, conversion-out, and aging-out.

3. Definitions of the variables are as follows:

Level in Age Group (L) - Total number of persons in an age group. For the purpose of the model these will be professionals only.

Hires (E) - Direct hires from outside of Agency.

Conversion-In (E) - Persons who through change of status enter age group (e.g., clerical to professional).

Separatees (S) - Separation from the Agency.

Conversion-Out (S) - Opposite process of conversion-in.

Age-In (U) - Persons from a younger age group who through the aging process are increasing the total number of persons in the age group.

Age-Out (U) - Persons who are aging out of the age group. Note that the same variable has been used for both Age-In and Age-Out. This is to imply a movement up and out of the system. If mirror images of the causal-loop diagram are generated, (see Figure B) then the Age-Out for a previous level becomes the Age-In for the current level. In the actual model subscripts are used to distinguish between the U's for level I or level II or level III.

4. The next step in the process is to define the DYNAMO flow diagram. The flow diagram in Figure C consists of two levels and seven rates. Levels may be thought of as holding tanks and rates as the controling valves on pipes (solid lines) between the tanks. Arrows indicate the direction of flow through the pipes. The "clouds" in the diagram represent sources or sinks depending on if something is entering or leaving the system respectively. Dotted lines represent flows of information, and in the case of this model information on how many persons are currently in the level is used in conjunction with a constant to calculate the rate. For example, if the level represents a five-year age group, then the rate (yearly) at which persons age-out of that group would be a constant one-fifth (20%) times the number of persons in that age group. That is to say the valve (rate) on the holding tank (level) would be opened so that at any given time the flow through the valve would represent one-fifth (at a yearly rate) of the level in the tank.

5. The next step in the process is to replicate Figure C so that it will encompass ten levels and thirty rates. These rates and levels correspond to five-year age groups covering 19 under to 60-64. Figure D represents a portion of this replication with the variable names consist with the equation names.

6. Generating equations follows directly from Figure D. In Figure E the equations for two levels are given. The equations for the other levels are the same with the appropriate changes to the "subscripts" of the variables. Supplementary equations are used to calculate level totals, average, age, and the number of EOD's which occur below age 34.

7. Output from the model is specified in the usual way through the use of print and plot cards. Runs were usually limited to 10 periods with period 0 representing the base period and period 5 representing the five-year projection.

8. Input to the model was in the form of constants, thus allowing multiple runs to be made with new vectors for each run. This enabled a single copy of the model to represent any desired directorate without major brain surgery to the model. It also made the model more compact by eliminating multiple copies and made the input data easier to check--it was available in a single vector rather than scattered through the model.

9. The vectors were designed to represent two situations: that of the continued hiring of young professionals, and the case where no young professionals under the age of 34 would be hired. As DYNAMO does not allow the selective carrying of constants from one run to the next, it was necessary to replicate the vectors twice; with one vector representing continued hiring and the other with no hiring. This of course presents a possible modification to the model: the use of a switch to cut off hiring on a second run. This modification was not made in the course of our work, but should the requirement for this kind of model come up again the introduction of a switch will be made.

10. Other possible modifications to the model which are currently being looked at include random noise variations in the rate values and the introduction of switches to represent changes in management policies.

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Plans Staff
Office of Personnel

FIGURE A

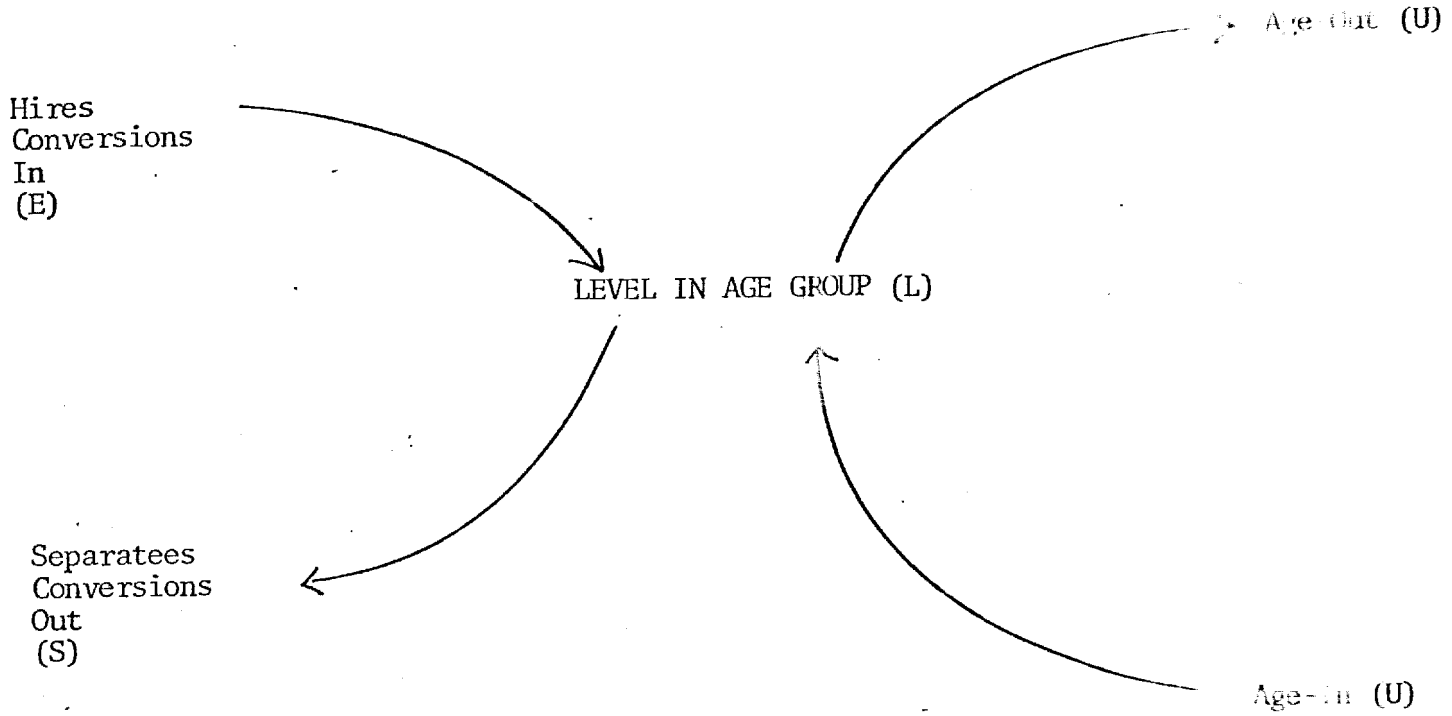

FIGURE B

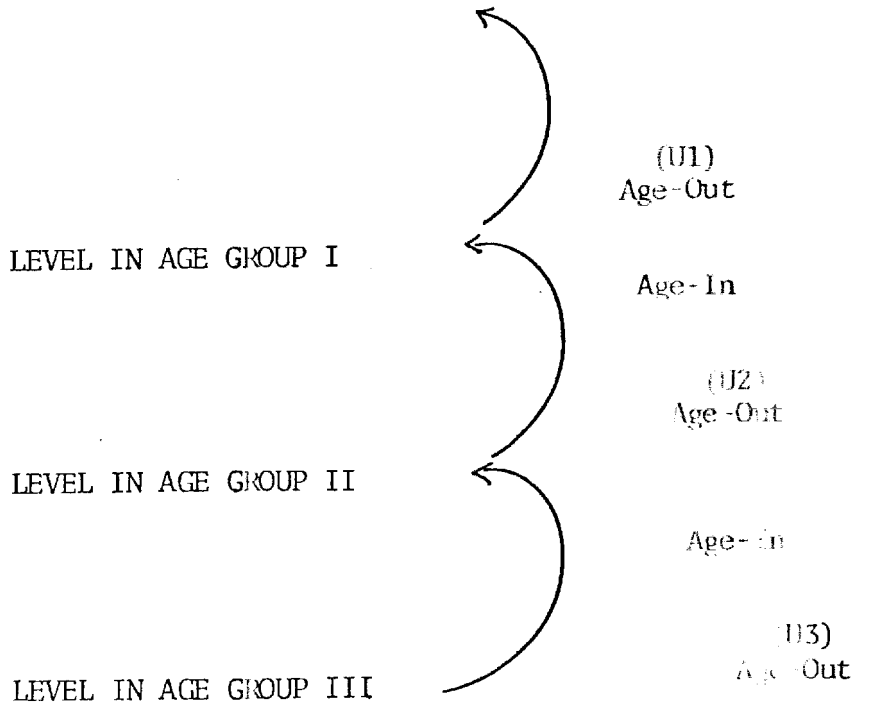

FIGURE C

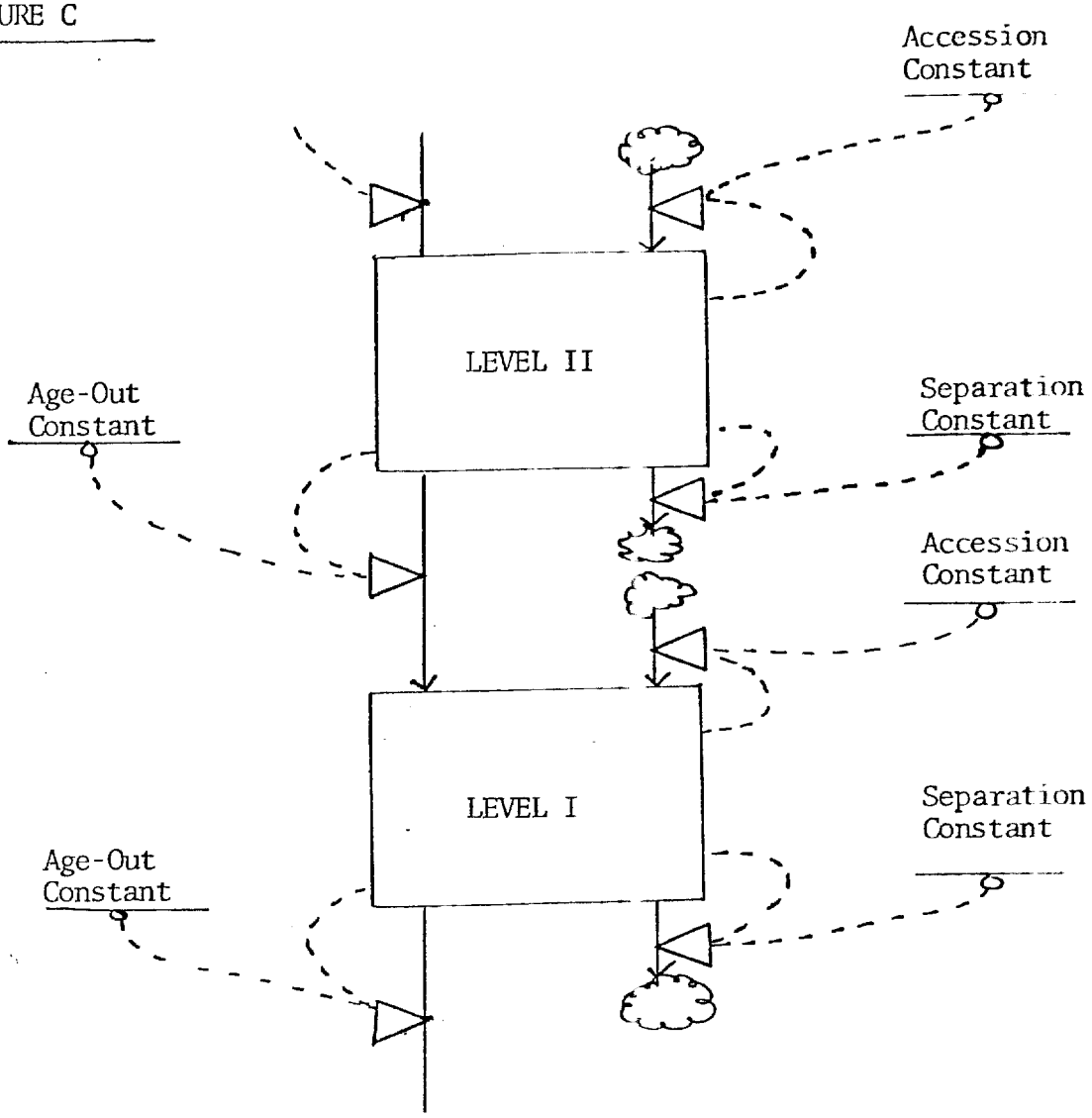

FIGURE D

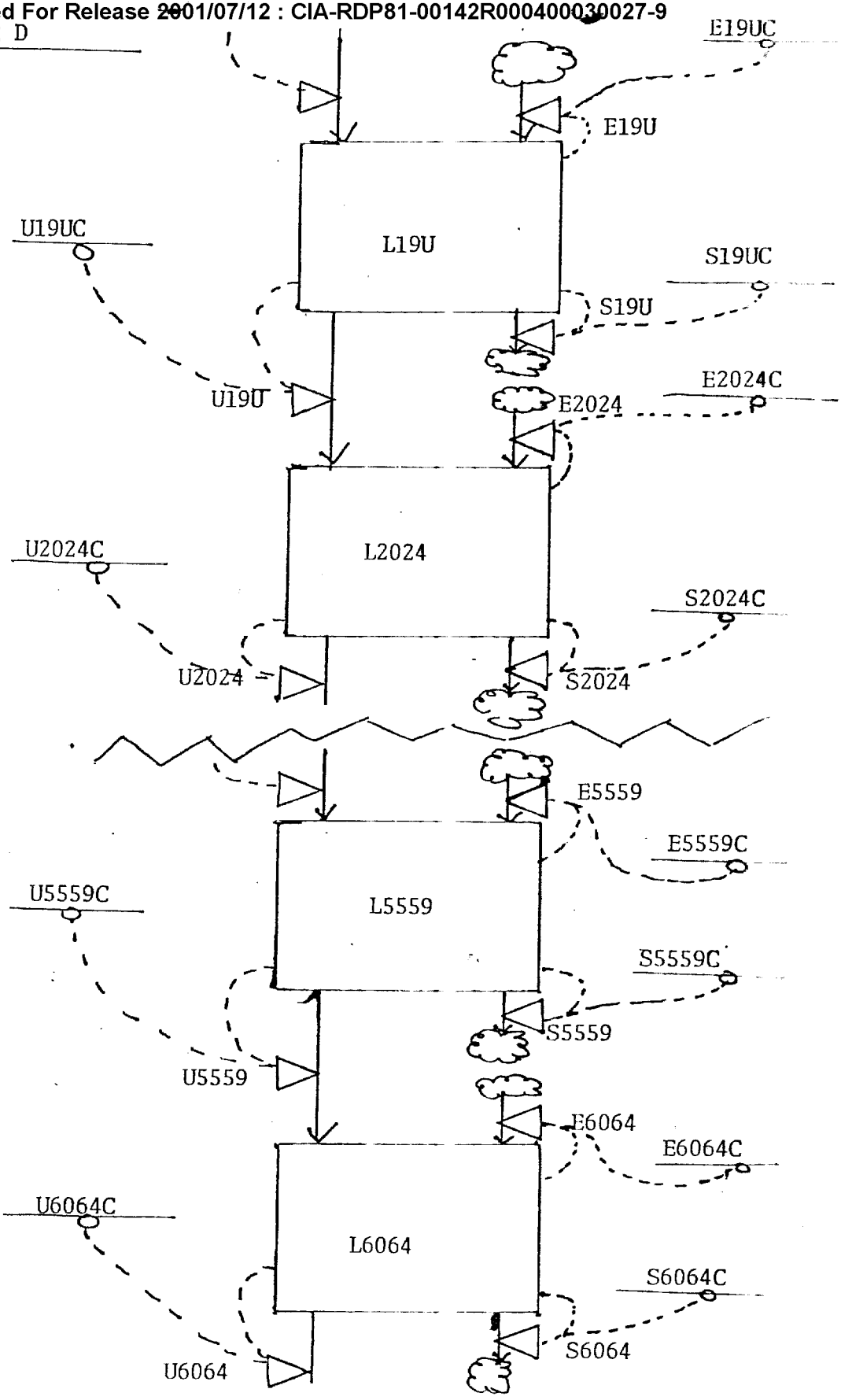

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FIGURE E

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L    L5559.K=L5559.J+DT*(-S5559.JK-U5559.JK+E5559.JK+U5054.JK)
N    L5559=L5559C
C    L5559C=0
R    S5559.KL=S5559C*L5559.K
C    S5559C=0
R    U5559.KL=U5559C*L5559.K
C    U5559C=.20
R    E5559.KL=E5559C*L5559.K
C    E5559C=0.0
NOTE
NOTE
L    L5054.K=L5054.J+DT*(-S5054.JK-U5054.JK+E5054.JK+U4549.JK)
N    L5054=L5054C
C    L5054C=0
R    S5054.KL=S5054C*L5054.K
C    S5054C=0
R    U5054.KL=U5054C*L5054.K
C    U5054C=.20
R    E5054.KL=E5054C*L5054.K
C    E5054C=0.0
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april 1976

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The current terrorist threat appears to pervade all phases of the overseas environment. This thrust and the increased tempo have caused OS to undertake a program to address the problem on a priority basis in all of its facets. The result is that OS is now dispatching two-man teams on a world-wide basis to visit Agency residences, to counsel personnel, to study personnel habit patterns which might play into the hands of terrorists. Eight such teams were in the field as of 1 April. The program has been welcomed with considerable enthusiasm by those stations visited thus far.

STATINTL [redacted] OS

personnel

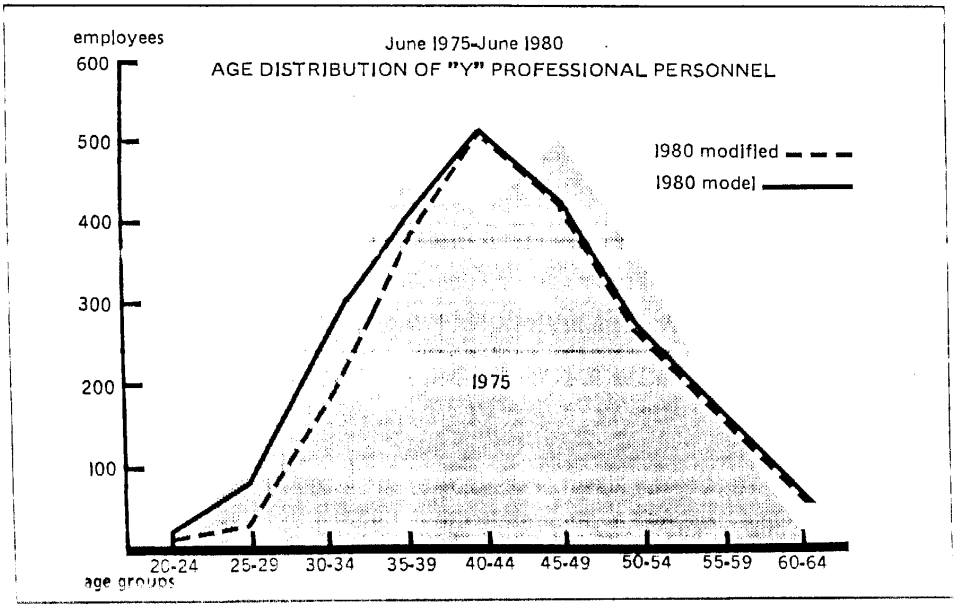
THE PROJECTION OF AGE DISTRIBUTION MODEL

The Office of Personnel periodically analyzes on-duty professional personnel to determine the age distribution of the professional population. Frequently, the analysis has involved some tedious hand counts and computations. During the past year, however, a computer-based model programed in the Dynamo language has been used to facilitate the analysis.

The System Dynamic methodology was used to design the model. It is based on the assumption that there is a relationship between the number of persons in an age group and the number of persons who flow in and out of that age group as a result of aging, accessions and separations.

The model was used first to project the effect of several different management policies on the age distribution of the on-duty professional personnel. For example, OP wanted to find out what the impact would be if a particular directorate hired various numbers of professionals. The managers in that directorate were considering three alternatives they could follow between 1 July 75 and 30 June 80:

hire 50 in FY 76 and 70 each year thereafter;



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hire 50 in FY 76 and 125 each year thereafter; or
hire 125 each year.

OP was able to provide them with the information which helped them to identify a desirable option, given objectives and constraints.

The model was used again to project what the age distribution of professional personnel on-duty at the end of FY 75 would be in FY 80. This model profile was compared with a modified profile which had been projected to show the age distribution under a policy that would not permit the hiring of professionals 34 years old or younger during a five-year period. Again, OP was able to provide management with information which they needed to consider in balancing the immediate or short-range problem of being over strength with the more long-range requirement to have qualified personnel to meet manpower needs at the managerial level. See chart, page 9.

Many personnel policies can affect future age distributions in the Agency. Consequently, it is useful for the manager to have a model that can simulate the effects of various alternate policies and thus facilitate the choice of preferred policies. The System Dynamic methodology provides an excellent vehicle on which models for the testing of policies can be built. The current model is an example of this method and is capable of further development once we have a better understanding of the causal relationships affecting separations and accessions.

This model is an important member of a family of analytic tools that can assist managers to make personnel management decisions.

[redacted] OP

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PERS 78-

Executive Registry
78-7232

78-4043

4 December 1978

MEMORANDUM FOR: Director of Personnel

FROM: Director of Central Intelligence

SUBJECT: Personnel

1. For some time now I have been unable to obtain adequate information on which to base estimates of how many people we need to take in in each Directorate each year in order to ensure a reasonably steady flow, especially in the DDO where lack of adequate input in any given period of time will lead to definite gaps in the future because of the lack of lateral entry. I have just had a glance at the dynamic simulation of personnel systems work that has been done by the Information Science Center. Could we not use these models to our advantage in this area?

2. Again, my most specific interest is what is the right number of people to bring into the professional areas of the DDO every year. If we could solve that one, I think all of the others are probably basically more simple. Please let me know if you've looked at this possibility.

STATINTL

STANSFIELD TURNER

[redacted]

REFERENCE