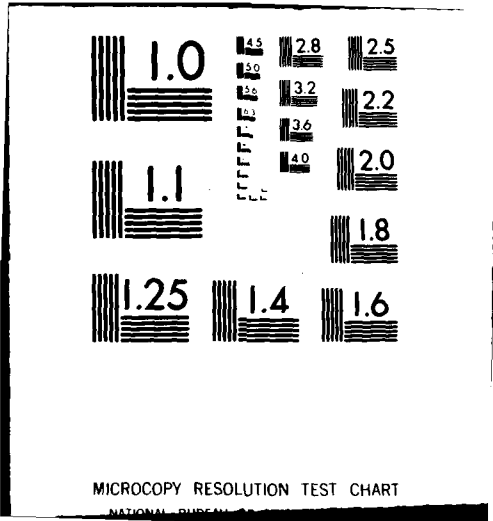END
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1. REPORT NUMBER NRL Memorandum Report 4421	2. GOVT ACCESSION NO. AD-A093 755	3. RECIPIENT'S CATALOG NUMBER
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Project management

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

A time-share computer program is described, useful at the Branch level, for projecting surplus/deficit at the end of a current fiscal year and for monitoring the time assignments of Branch personnel.

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CONTENTS

iii

A Branch-Level Management Program for
Assessing Branch Status on Projected Surplus/Deficit
and Personnel Utilization

1. Introduction

Reference 1 describes a time-share computer program used by the Search
Radar Branch, Radar Division, to monitor individual projects. That program,
written in Fortran for the DEC-10 computer at NRL, is called MANAGE.FOR and
it provides an extrapolation of project spending based on specified person-
nel, major procurements and other routine expenditures. Its principal out-
put is an estimate of final surplus/deficit at the end of the fiscal year.

The purpose of the time-share computer program described in this report,
called BRANCH.FOR, is to collect the results of the individual runs of
MANAGE.FOR from each project and provide an overall Branch summary of:

    (1)   whether the available funds will cover the Branch manpower funding
          requirements for the remainder of the fiscal year

    (2)   whether the personnel are fully assigned

    (3)   whether there is a projected net surplus or deficit for the end of
          the fiscal year, including labor and overhead, planned major pro-
          curements and expected other routine charges.

2. Review of Output Format of the Program MANAGE.FOR

Although discussed in Reference 1, the output format of MANAGE.FOR is
briefly reviewed here for completeness. An example is shown in Fig. 1 for a
specific project numbered 0646. Program milestones are first printed and
then the operator enters the month and day (3,30) when the computer run was
made. After that, the operator enters expenditures, obligations and encum-
berances to date* and an amount called "EXTRA" which covers the average ex-
pected monthly expenditure in the future for routine items such as travel and
minor procurements.

After the above sequence, the program asks the operator if the run is
only to update Branch summary data (in the program BRANCH.FOR) or if further
output data is to be printed in the current run. In this run, the operator
answered the question UPDATE ONLY? with a 0 (for NO). The subsequent graph
shows a plot of actual expenditures, obligations and encumberances up to the

---

*   Obtained from Job Order Status Reports (JOSR's distributed by the NRL
   Budget Office.

```
.EX MANAGE.FOR.R0646.FOR
LINK:    LOADING
[LNKXCT MANAGE EXECUTION]

LIST OF MILESTONES? YES=1.NO=0
1

1. INSTALL KA-BAND HORN ON HARM FOR WIDE ANGLE SINGLE-BEAM MEASUREMENTS (4/30/80)
2. PERFORM KA-BAND MEASUREMENTS AS REQUIRED (MAY-SEPT.1980)
3. RECEIVE A 94 GHZ RADAR & PLACE IN OPERATION (5/30/80)
4. PERFORM 94 GHZ MEASUREMENTS AS REQUESTED (JUNE-SEPT.1980)

INPUT:PRESENT DATE--M.D
3.30

INPUT:EXPEND.OBLIG..ENCUMB..EXTRM
8717.0.0.100

UPDATE ONLY? YES=1.NO=0
0

GRAPH? YES=1.NO=0
1


*=BUDGET FUNDING: .=PLANNED SPENDING
+=AVAILABLE FUNDS: 0=EXPEND. X COMMIT.
    44405.+   *   *   *   *   *   *   *   *   *   *   *   *   *
         I                                                  .
         I
         I                                             0   0
         I                                         0
    37004.+
         I
         I
         I
         I
    29603.+
         I
         I
         I                                      .
         I
    22203.+                                 .
         I                              .
         I                          0
         I                      .
         I                  .   0
    14802.+              .   0
         I          .   0
         I      .   0
         I  .   0
         I  0   0
    7401.+      .
         I  .
         I
         I
         I
     0.+   0   0   0   0   0
         -   -   -   -   -   -   -   -   -   -   -   -   -   -
         9  10  11  12   1   2   3   4   5   6   7   8   9
```
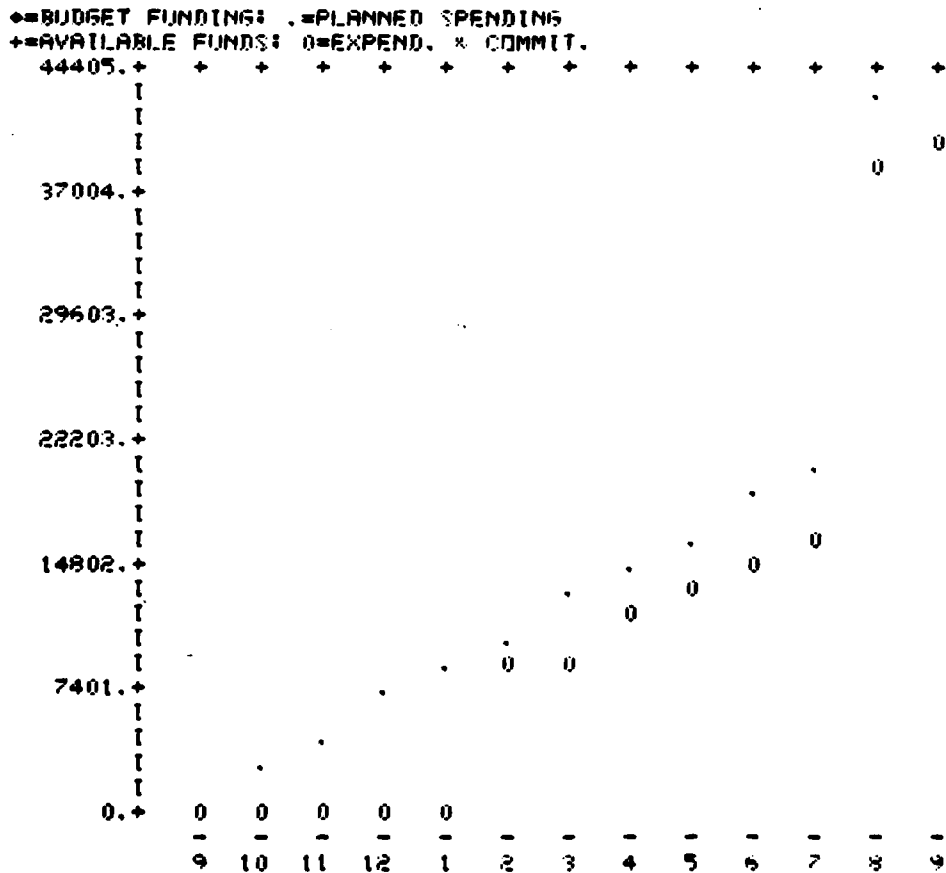
Fig. 1 — Sample output format of the program MANAGE.FOR as run for project 0646

LIST OF MAJOR PROCUREMENTS? YES=1,NO=0
1

1. 94-GHZ MAGNETRON (8,30,80)--$20K

PROJECT STAFF? YES=1,NO=0
1

LICITRA(.12),J.WARD(.15),P.WARD(.05)

LIST OF NUMERICAL VALUES ON GRAPH? YES=1,NO=0
1

MO.	●	.	+	0	BAL (+-0)
9	44405.	0.	44405.	0.	44405.
10	44405.	2034.	44405.	0.	44405.
11	44405.	4068.	44405.	0.	44405.
12	44405.	6101.	44405.	0.	44405.
1	44405.	8135.	44405.	0.	44405.
2	44405.	10169.	44405.	8599.	35806.
3	44405.	12203.	44405.	8717.	35688.
4	44405.	14236.	44405.	10448.	33957.
5	44405.	16270.	44405.	12178.	32227.
6	44405.	18304.	44405.	13909.	30496.
7	44405.	20338.	44405.	15639.	28766.
8	44405.	42371.	44405.	37370.	7035.
9	44405.	44405.	44405.	39100.	5305.

END OF EXECUTION
CPU TIME: 13.73 ELAPSED TIME: 4:40.38
EXIT

Fig. 1(Continued) — Sample output format of the program MANAGE.FOR as run for project 0646

run date, and predicted expenditures thereafter (curve made up of the symbol "O"). The prediction includes true labor rates actually charged for the GS levels of personnel assigned to the project.

Next on the output format is a list of major procurements, with name of expected expenditure, date and amount. This is followed by a listing of assigned personnel with fraction of time on the job. The final table is a listing of the plotted values on the graph, with the right-hand BAL (balance) column being the difference between expected available funds (+ curve) and predicted expenditures (O-curve). The final number in the lower right-hand corner of this table is the projected surplus (if positive) or deficit (if negative) for this particular project. This number is stored in a file called SUR.DAT as a vector $S(I)$, where I is a job number assigned to this project 0646. In addition to this storage in the SUR.DAT file, the assigned manpower (fraction of time) is stored in a file TIME.DAT in the form of a matrix $T(I,J)$, where I is an identification number assigned to each person and J is a project number.

3. Sample Output of Program BRANCH.FOR

A sample output from a run of BRANCH.FOR is shown in Fig. 2. The program first asks for the BALANCE remaining for the Branch as a whole (taken from Job Order Status Reports supplied by the NRL budget office). The program then asks for the number of months remaining in the fiscal year (in this case, 6). The program then computes the absolute minimum amount needed to cover staff manpower alone. This is done by using salary data stored in a file called PSAL.DAT via a vector $PS(I)$, where I is a personnel identification number. This salary data is weighted by a vector $W(I)$, where I is again a personnel identification number. $W(I)$ is a weight between 0 and 1 representing availability of a particular person for the remainder of the fiscal year. For example, if a man is temporarily assigned outside of the Branch (e.g., as an NSAP representative), his weight would be 0. The next item printed, called SURPLUS, is the excess of the current balance over the amount needed for the staff. Note that procurements, travel, etc. have not yet been taken into account although overhead charges have been included.

The next listing in the output, labeled "MAN FRACT," gives the identification number of an individual and the total fraction of time he has been assigned to all jobs. In some cases, a man may work part-time and a fraction less than 1 is normal for him; in other cases, a low fraction indicates that he has not been fully assigned. Following the table, the SUM of all fractions is given (23.37 in this run). The indicated discrepancy implies that all of the manpower in the Branch has not been fully accounted for in the individual project runs by MANAGE.FOR. Specifically, the funding must actually cover 24.95 man years plus any personnel being funded outside the Branch who have not been accounted for by an identification number. Any projected surplus (estimated later in the run) should be decreased by the cost of such personnel unaccounted for.

The subsequent table in Fig. 2 is a breakdown of the staff's assigned time, by both personnel identification numbers and job numbers (note that a man may be assigned to several projects).

4

```
E: BRANCH.FOR
LINK:   LOADING
[DIRECT BRANCH EXECUTION]

INPUT: BALANCE
1148900

INPUT: NO. OF MONTHS REMAINING
6

CURRENT BALANCE= 1148900.

AMT. NEEDED FOR STAFF=   859185.


SURPLUS=   289715.


  MAN      FRACT.


   1      2      3      4      5      6      7      8      9     10
  .66    .00    .78   1.00    .00    .35   1.00    .67    .38    .99


  11     12     13     14     15     16     17     18     19     20
 1.00   1.00    .89    .00    .00   1.00   1.00    .31   1.00   1.00


  21     22     23     24     25     26     27     28     29     30
 1.12   1.02    .99   1.00    .00    .00    .66   1.00    .75    .49


  31     32     33     34     35     36     37     38     39     40
  .93    .56   1.05    .77    .00    .00    .00    .00    .00    .00


SUM= 23.37     SUM SHOULD BE= 24.95   PLUS PERSONNEL OUTSIDE BRANCH

PRINT BREAKDOWN? YES=1,NO=0
1


  MAN     JOB    FRACT.

   1       9      .44
   1      11      .22
   3      13      .78
   4       4     1.00
   6       1      .13
   6      11      .22
   7       2      .49
   7       9      .38
   7      11      .13
```

Fig. 2 — Sample output format of program BRANCH.FOR

8	5	.11
8	9	.11
8	11	.27
8	13	.18
9	13	.38
10	4	.84
10	7	.04
10	10	.11
11	2	.51
11	9	.42
11	11	.07
12	1	.11
12	9	.89
13	3	.20
13	5	.11
13	9	.18
13	13	.40
16	4	.56
16	7	.11
16	10	.33
17	1	.44
17	11	.56
18	6	.27
18	9	.04
19	11	.49
19	13	.51
20	1	.07
20	4	.09
20	6	.13
20	9	.33
20	11	.38
21	4	.44
21	6	.07
21	10	.33
21	11	.16
21	12	.12
22	3	.20
22	8	.13
22	11	.69
23	4	.84
23	7	.04
23	10	.11
24	9	.69
24	11	.18
24	13	.13
27	8	.04
27	11	.62
28	2	.51
28	11	.49
29	4	.09
29	9	.44
29	11	.22
30	11	.27
30	13	.22
31	2	.49
31	11	.44

Fig. 2(Continued) — Sample output format of program BRANCH.FOR

6

```
32      11      .51
32      12      .05
33       3      .44
33      11      .33
33      12      .15
33      13      .13
34       4      .11
34       7      .22
34       9      .11
34      10      .33
```

SURPLUS LIST? YES=1,NO=0
1

JOB   SURPLUS

1   2   3   4   5
-26662.   10417.   5013.   -20268.   5213.

6   7   8   9   10
79322.   5752.   2206.   -18996.   23103.

11   12   13   14   15
-51088.   5305.   -6612.   0.   0.

16   17   18   19   20
0.   0.   0.   0.   0.

SUM=   12705.

STAFF ID LIST? YES=1,NO=0
1

1. ADAMS, 2. TITUS, 3. BARRY, 4. BORCHARDT 5. BRINSON
6. J.L.WARD, 7. CRISLER, 8. CROSS, 9. HSIAO 10. GOTT
11. HAILEY, 12. HARPER, 13. HOWARD 14. XXXXXX, 15. XXXXXXX
16. LINDE, 17. LIPKA 18. MARINOS, 19. MAYS, 20. MEADS
21. MEIXNER 22. ORNSTEIN, 23. PIERNIK, 24. RAO, 25. KALUZIENSKI
26. LEITCH, 27. THIEBAUD, 28. THOMPSON, 29. THRIFT, 30. PINION
31. WALTERS, 32. P. WARD, 33. J.H.WARD, 34. WATERS, 35. TEMES

JOB ID LIST? YES=1,NO=0
1

1. R0680, 2. R0637, 3. R0638, 4. R0614, 5. R0677
6. R0615, 7. R0644, 8. R0643, 9. R0640, 10. R0681
11. R0641, 12. R0000, 13. R0645

END OF EXECUTION
CPU TIME: 5.40 ELAPSED TIME: 3:29.58
EXIT

Fig. 2(Continued) — Sample output format of program BRANCH.FOR
```

Next there is a table preceded by the heading "JOB SURPLUS". This is a listing of projected surplus or deficit by job number, as stored in the file SUR.DAT by the individual project runs of MANAGE.FOR. This table is followed by the algebraic sum, indicating whether there is a projected net surplus or deficit for the Branch as a whole. This has to be weighed against any time deficit in assigned personnel, as mentioned above.

The next table in the readout associates each personnel identification number with a person in the Branch, by name.

Finally, a table is given showing the computer-program job numbers in terms of NRL project numbers.

A listing of the program is given in the Appendix.

Reference

1.  C. L. Temes, "A User-Oriented Management Program for Project Monitoring
    on a Time-Share Computer Terminal", NRL Memorandum Report 3706,
    January 1978.

APPENDIX


Listing of BRANCH.FOR

```
TYPE BRANCH.FOR
00100          DIMENSION W(35),PS(35)
00200          DIMENSION T(40,20)
00210          DIMENSION S(20)
00300          DIMENSION IND(10)
00400          DO 100 I=1,35
00500      100 W(I)=1.
00600          W(1)=0.; W(18)=0.; W(25)=.75
00700          W(26)=0.; W(35)=.2; W(2)=0.
00710          W(9)=0.;W(5)=0.;W(15)=0.;W(30)=0.
00720          W(14)=0.
00800          OPEN(UNIT=21,DEVICE='DSK',FILE='PSAL.DAT',ACCESS='SEQIN')
00900          READ(21,1) (PS(I),I=1,35)
01000      1   FORMAT(35F5.0)
01100          CLOSE(UNIT=21,DEVICE='DSK',FILE='PSAL.DAT')
01200          SUMR=0.
01210          SUMW=0.
01300          DO 110 I=1,35
01310          SUMW=SUMW+W(I)
01400      110 SUMR=SUMR+W(I)*PS(I)
01500          R=SUMR*45/12
01600          WRITE (5,3)
01700      3   FORMAT(1X,'INPUT: BALANCE')
01800          ACCEPT*,BAL
01900          WRITE(5,4)
02000      4   FORMAT(/1X,'INPUT: NO. OF MONTHS REMAINING')
02100          ACCEPT*,FM
02200          USE=R*FM
02300          SUR=BAL-USE
02400          WRITE(5,5) BAL,USE
02500      5   FORMAT(/1X,'CURRENT BALANCE=',F10.0,//1X,'AMT.
02600         1 NEEDED FOR STAFF=',F10.0)
02700          WRITE (5,7) SUR
02800      7   FORMAT(//1X,'SURPLUS=',F10.0)
02900          OPEN(UNIT=21,DEVICE='DSK',FILE='TIME.DAT',ACCESS='SEQIN')
03000          READ(21,8) ((T(I,J),J=1,20),I=1,40)
03100      8   FORMAT(800F4.2)
03200          CLOSE(UNIT=21,DEVICE='DSK',FILE='TIME.DAT')
03300          FSUM=0.
03400          DO 120 I=1,39
03500          SUMT=0.
03600          DO 120 J=1,19
03700          SUMT=SUMT+T(I,J)
03800      120 T(I,20)=SUMT
03900          WRITE(5,9)
04000      9   FORMAT(//2X,'MAN',5X,'FRACT.')
04100          DO 210 K=1,4
04200          DO 410 L=1,10
04300      410 IND(L)=L+(K-1)*10
04400          WRITE(5,31) (IND(I),I=1,10)
04500      31  FORMAT(//1X,10(I2,4X))
04600          WRITE(5,32) (T(IND(I),20),I=1,10)
04700      32  FORMAT(1X,10(F4.2,2X))
04800      210 CONTINUE
```

13

```
04900            DO 130 I=1,40
05000            FSUM=FSUM+T(I,20)
05100        130 CONTINUE
05200            WRITE(5,21) FSUM,SUMM
05300         21 FORMAT(//1X,'SUM=',F6.2,5X,'SUM SHOULD BE=',F6.2,'   PLUS
05310          1 PERSONNEL OUTSIDE BRANCH')
05400            WRITE(5,13)
05500         13 FORMAT(/1X,'PRINT BREAKDOWN? YES=1,NO=0')
05600            ACCEPT*,IANS
05700            IF(IANS.EQ.1) CALL PRINT(T)
05800            WRITE(5,15)
05900         15 FORMAT(/1X,'SURPLUS LIST? YES=1,NO=0')
06000            ACCEPT*,IANS
06100            IF(IANS.EQ.0) GO TO 140
06110            WRITE(5,61)
06120         61 FORMAT(///1X,'JOB',4X,'SURPLUS')
06130            OPEN(UNIT=21,DEVICE='DSK',FILE='SUR.DAT',ACCESS='SEQIN')
06140            READ(21,71) (S(I),I=1,20)
06150         71 FORMAT(20F9.0)
06200            DO 150 K=1,4
06300            DO 151 L=1,5
06400        151 IND(L)=L+(K-1)*5
06500            WRITE(5,41) (IND(I),I=1,5)
06600         41 FORMAT(//1X,5(I2,9X))
06700            WRITE(5,42) (S(IND(I)),I=1,5)
06800         42 FORMAT(1X,5(F8.0,3X))
06900        150 CONTINUE
07000        140 CONTINUE
07001            SUM=0.
07002            DO 300 I=1,20
07003        300 SUM=SUM+S(I)
07004            WRITE(5,52) SUM
07005         52 FORMAT(//1X,'SUM=',F10.0/)
07010            CLOSE(UNIT=21,DEVICE='DSK',FILE='SUR.DAT')
07100            WRITE(5,11)
07200         11 FORMAT(/1X,'STAFF ID LIST? YES=1,NO=0')
07300            ACCEPT*,IANS
07400            IF(IANS.EQ.1) CALL STAFF
07500            WRITE(5,12)
07600         12 FORMAT(/1X,'JOB ID LIST? YES=1,NO=0')
07700            ACCEPT*,IANS
07800            IF(IANS.EQ.1) CALL JOBS
07900            END
08000            SUBROUTINE PRINT(T)
08100            DIMENSION T(40,20)
08200            WRITE(5,2)
08300          2 FORMAT(//2X,'MAN',3X,'JOB',3X,'FRACT.'/)
08400            DO 100 I=1,40
08500            DO 100 J=1,19
08600            IF(T(I,J).GT.0.) WRITE(5,1) I,J,T(I,J)
08700          1 FORMAT(1X,I4,3X,I4,3X,F4.2)
08800        100 CONTINUE
```

```
08900          RETURN
09000          END
09100          SUBROUTINE STAFF
09200          WRITE(5,1)
09300      1   FORMAT(/1X,'1. ADAMS, 2. TITUS, 3. BARRY, 4. BORCHARDT
09400      1 5. BRINSON'/1X,'6. J.L.WARD, 7. CRISLER, 8. CROSS, 9. HSIAO
09500      2 10. GOTT'/1X,'11. HAILEY, 12. HARPER, 13. HOWARD
09600      3 14. XXXXXX, 15. XXXXXXX'/1X,'16. LINDE, 17. LIPKA
09700      4 18. MARINOS, 19. MAYS, 20. MEADS'/1X,'21. MEIXNER
09800      5 22. ORNSTEIN, 23. PIERNIK, 24. RAO, 25. KALUZIENSKI'/1X,'26.
09900      6 LEITCH, 27. THIEBAUD, 28. THOMPSON, 29. THRIFT,
10000      7 30. PINION'/1X,'31. WALTERS, 32. P. WARD, 33. J.H.WARD,
10100      8 34. WATERS, 35. TEMES')
10200          RETURN
10300          END
10400          SUBROUTINE JOBS
10500          WRITE(5,1)
10600      1   FORMAT(/1X,'1. R0680, 2. R0637, 3. R0638, 4. R0614,
10700      1 5. R0677'/1X,'6. R0615, 7. R0644, 8. R0643, 9. R0640,
10800      2 10. R0681'/1X,'11. R0641, 12. R0000, 13. R0645')
11000          RETURN
11100          END
```