NOAA Eastern Region Computer Programs
and Problems NWS ERCP - No. 4

SPECIAL SEARCH COMPUTER PROGRAM

Scientific Services Division
Eastern Region Headquarters
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U.S. DEPARTMENT OF COMMERCE / National Oceanic and Atmospheric Administration / National Weather Service

NOAA TECHNICAL MEMORANDUM

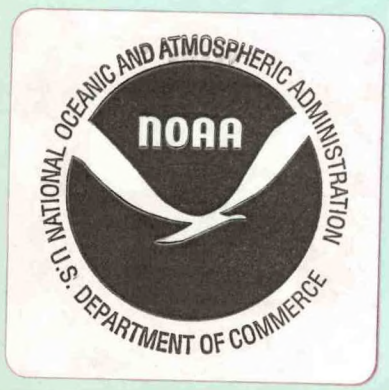
National Weather Service, Eastern Region Computer Programs and Problems

The Eastern Region Computer Programs and Problems (ERCP) series is a subset of the Eastern Region Technical Memorandum series. It will serve as the vehicle for the transfer of information about fully documented AFOS application programs. The format of ERCP - No. 1 will serve as the model for future issuances in this series.

1 An AFOS Version of the Flash Flood Checklist. Cynthia M. Scott, March 1981. (PB81 211252).

2 An AFOS Applications Program to Compute Three-Hourly Stream Stages. Alan P. Blackburn, September 1981. (PB82 156886).

3 PUPPY (AFOS Hydrologic Data Reporting Program). Daniel P. Provost, December 1981. (PB82 199720).



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I. General Information

A. Summary:

This program searches user-specified surface observations in the AFOS database and flashes the alert light on an ADM if it finds a special or record special. The program thus alerts the forecaster to critically changing conditions without unnecessarily alerting him/her with routine observations.

B. Environment:

The program runs in the background on the Data General Eclipse S/23Ø computer while the AFOS program is running in the foreground. The program is written in Data General FORTRAN IV.

II. Application

A. Complete Program Description:

The forecaster needs to be alerted to changing weather conditions. Before this program was written, the only way this could be done was to set an alert for all surface observations. This was not a useful method since the majority of all observations are routine. This program searches for special and record special observations, which are issued during changing conditions, and alerts the forecaster.

First the program finds the reads the AFOS keynames for the desired SAOs from a formatted product. It finds and counts the keynames by looking for two spaces where an SAO keyname should begin.

The program uses AFREAD.LB subroutines (WRCP #23) to read the SAOs from the AFOS database and then looks in the first ten characters for the letters "SP" or "RS" with a space before and after.

If the program finds an "SP" or "RS", it looks in a file called SAOMEM (which is in the same directory as the program) and checks to see if the time of the observation is the same as one received earlier. If the time is different, the program files the new time in SAOMEM, alerts an ADM that a special has been received, and writes the special to an AFOS product for display.

B. Machine Requirements:

The program will run in 9K of background memory.

The save file itself requires 31 blocks of disk storage, and the SAOMEM file takes up 1 block. Two blocks are used for a temporary file during the program run. The formatted product containing the search list of SAO keynames is less than one ADM page long.

With twenty SAOs in the search list the program takes 2Ø to 3Ø seconds to run at a WSFO.

C. Database:

The SAO search list is stored in a formatted AFOS product (called BUFTAPBUF at Buffalo). The 9-letter keynames begin in columns 5, 15, 3Ø and 45 of each line.

The four-digit times of the specials are stored in a packed format in the sequential file SAOMEM (resides in the same directory as the program). The specials are stored in a product in the database (BUFACCBUF at Buffalo).

III. Procedures

A. Program Preparation and Initiation:

1. Fill in the preformat (file TAP, stored in any available CCCMCPXXX) with the keynames of the SAOs you want to be checked and store it as an AFOS product. (The program as written uses BUFTAPBUF, but this can be changed by editing the source file and recompiling.) Figure 1 shows the preformat.

   The program will search up to 5Ø SAOs. To add more, add to the preformat, increase the program's array dimensions (see source listing), recompile and reload.

   To recompile: FORT SPECIAL
   To reload: RLDR SPECIAL AG.LB OUT AFREAD.LB BG.LB UTIL.LB FORT.LB

2. Create a file called SAOMEM in the directory where SPECIAL will run. The following procedure will ensure that it contains 1 empty block at the start (necessary for proper execution of read command):

```
CCONT DUMMYFILENAME 1
XFER DUMMYFILENAME SAOMEM
DELETE/C/V DUMMYFILENAME
```

   (You only need to do this once, when first installing the program.)

3. The program can be run at any time from an ADM with the command RUN:SPECIAL, or a procedure can be set up to run the program at time intervals. Buffalo's procedure SPLSA, shown in Figure 2, runs every 1Ø minutes and displays the specials found after each run.

B. Input Required:

Input is the search list of SAOs (the formatted product BUFTAPBUF).

C. Output:

When the program finds a special, it writes it into the product BUFACCBUF using AG.LB routines (WRCP #18) and then displays a message at the ADM where the program was initiated:

```
JOB SPECIAL COMPLETED:  OUTPUT IN FILE BUFSAOBUF
JOB SPECIAL COMPLETED:  OUTPUT IN FILE YYZSAOYSN
```

Error messages also may appear on the ADM:

Error message	Cause
SAO CALL	Can't find the SAO search list (BUFTAPBUF)
CCCSAOXXX	Can't find the SAO listed in the search file in the database
FORM READ	Can't read the SAO search list or no blanks found at end of search list
SAO READ	Can't read the SAO from database
PREFORMAT	Empty search list

D. Cautions and Restrictions:

If the program is interrupted from the Dasher with Cntrl A, the background queue may be hung up. Restart the queue by typing GDIR on the Dasher.

A temporary file (SPECIALS) is created, used in subroutine UTF, and then deleted after a five-second wait. This delay has been sufficient for UTF to execute properly on a busy WSO system. However, if the AFOS error "File Nonexistent" prints out on the Dasher and the product BUFAACBUF is never created, you may have to increase the delay. Change the first argument in CALL WAIT to the number of seconds you think sufficient, then recompile and reload (see Section III).

The program has proved to be quite stable in normal use. The procedure used to run it at timed intervals occasionally hangs up and needs to be restarted.

IV. Complete Program Listing

Figure 1. Preformat for SAO identifiers.

```
1 [          ] 2 [          ] 3 [          ] 4 [          ]
5 [          ] 6 [          ] 7 [          ] 8 [          ]
9 [          ] 10 [         ] 11 [         ] 12 [         ]
13 [         ] 14 [         ] 15 [         ] 16 [         ]
17 [         ] 18 [         ] 19 [         ] 20 [         ]
21 [         ] 22 [         ] 23 [         ] 24 [         ]
25 [         ] 26 [         ] 27 [         ] 28 [         ]
29 [         ] 30 [         ] 31 [         ] 32 [         ]
33 [         ] 34 [         ] 35 [         ] 36 [         ]
37 [         ] 38 [         ] 39 [         ] 40 [         ]
41 [         ] 42 [         ] 43 [         ] 44 [         ]
45 [         ] 46 [         ] 47 [         ] 48 [         ]
49 [         ] 50 [         ]
[ ]END
```

Figure 2. Procedure SPLSA for running SPECIAL every ten minutes.

	DISPLAY (1-4)	MODE (D/M)	ACC/OV (R/A/O)	COMMAND (ANY COMMAND; LAST LINE MUST BE END OR "NAME")
01				RUN:SPECIAL
02				PAUSE 38
03	2	D	R	BUFAACBUF
04				DELAY 09
05				RUN:SPECIAL
06				PAUSE 38
07	3	D	R	BUFAACBUF
08				DELAY 09
09				RUN:SPECIAL
10				PAUSE 38
11	4	D	R	BUFAACBUF
12				DELAY 09
13				"SPLSA"

```
C        *****  SPECIAL SEARCH PROGRAM  ****
C        ****  WRITTEN OCTOBER 27, 1981  ****
C        ****  ALAN BLACKBURN, WSFO BUFFALO, NY ****
C
C
C       THIS PROGRAM SEARCHES SPECIFIED FILES FOR SPECIAL OR RECORD SPECIAL
C       SURFACE OBSERVATIONS.  THE IDENTIFIERS ARE READ FROM A PRODUCT WHICH
C       HAS BEEN FILLED FROM A PREFORMAT. THE PROGRAM READS THE SAO'S
C       CHECKS FOR SP OR RS AND IF IT HAS SEEN THE OBSERVATION BEFORE,
C       THEN NOTIFIES THE USER IF IT IS A NEW SPECIAL.  THE PROGRAM WAS
C       DESIGNED TO BE RUN AT INTERVALS BY A PROCEDURE.
C
C       THE PREFORMAT HAS THE SAO IDENTIFIERS ON COLUMNS 5,20,35
C       AND 50 OF EACH LINE.  UP TO 50 SAO'S ARE CHECKED.
C
C       A SEQUENTIAL FILE NAMED SAOMEM MUST BE PRESENT ON DP0
C       (OR THE DIRECTORY FROM WHICH THE PROGRAM IS RUN).
C
C       THE COMMANDS WHICH MUST BE CHANGED TO ADAPT THE PROGRAM FOR
C       LOCAL USE ARE PRECEDED BY A CCC LINE.
C
C       TO COMPILE:  FORT SPECIAL.FR
C         RLDR/M SPECIAL.RB AG.LB OUT.RB AFREAD.LB BG.LB UTIL.LB FORT.LB AFOSE.LB
C
C
C       N IS THE NUMBER OF SAO'S TO BE CHECKED
CCC     TO INCREASE THE NUMBER OF SAO'S BEYOND 50, INCREASE THE DIMENSIONS
C       OF THE FOLLOWING:  IUHDRS = 9 X N  IPHDRS = 4.5 X N
C                          IMEM = 4 X N    IMUP = 8 X N
      DIMENSION IPHDR(40),IUHDR(80),IUHDRS(450),IPHDRS(225),IDENT(5)
      DIMENSION IUP(80),IOUT(40),IMEM(200),IMUP(400)
      INTEGER SCRIPT(40)
      COMMON /D/ SCRIPT
C       II IS THE NUMBER OF SPECIALS FOUND
      II=0
C       SET GRAPHIC PARAMETERS
      IP=0
      ISIZ=0
      IZT=1
      IXOF=0
      IYOF=0
CCC     CHANGE THE NAME IN THE FOLLOWING COMMAND WHERE YOU WILL STORE
C       YOUR SAO IDENTIFIERS
      CALL AFREAD(1,"BUFTAPBUF",$500)
      N=0
651   CALL AFREAD(2,IPHDR,$530,$530)
      NN=0
      CALL UNPACK(IPHDR,80,IUHDR)
C       LOOK FOR THE END OF THE SAO'S TO FIND N
652   IF(IUHDR(NN+5).EQ.40K .AND. IUHDR(NN+6).EQ.40K)GO TO 3
```

```
      N=N+1
      DO 660 I=1,9
C      PUT SAO IDENTIFIERS INTO IUHDRS
      IUHDRS(N*9-9+I)=IUHDR(NN+4+I)
660   CONTINUE
      IF(NN.EQ.45)GO TO 651
      NN=NN+15
      GO TO 652
3     IF(N.EQ.0)GO TO 520
      L=0
5     IF (L.EQ.N)GO TO 670
      L=L+1
      DO 661 I=1,9
C       FIND AND READ THE SAO
661   IUHDR(I)=IUHDRS(L*9-9+I)
      CALL PACK(IUHDR,9,IDENT)
      CALL AFREAD(1,IDENT,$505)
      GO TO 600
500   CALL FORKE("SPECIAL","SAO CALL",IER)
      GO TO 620
505   CALL FORKE("SPECIAL",IDENT,IER)
      GO TO 5
520   CALL FORKE("SPECIAL","PREFORMAT",IER)
      GO TO 620
510   CALL FORKE("SPECIAL","SAO READ",IER)
      GO TO 5
530   CALL FORKE("SPECIAL","FORM READ",IER)
      GO TO 620
600   CALL AFREAD(2,IOUT,$5,$510)
      CALL UNPACK(IOUT,80,IUP)
      LL=0
610   LL=LL+1
C       LOOK FOR SP AND RS
      IF(IUP(LL).EQ.40K .AND. IUP(LL+1).EQ.123K .AND.
     2IUP(LL+2).EQ.120K .AND. IUP(LL+3).EQ.40K)GO TO 630
      IF(IUP(LL).EQ.40K .AND. IUP(LL+1).EQ.122K .AND.
     2IUP(LL+2).EQ.123K .AND. IUP(LL+3).EQ.40K)GO TO 630
      IF(LL.LT.10)GO TO 610
      IF(L.LT.N)GO TO 5
      IF(II.GT.0)GO TO 670
      GO TO 620
C       COMPARE TIME:  HAS THE SPECIAL BEEN SEEN BEFORE?
630   CONTINUE
      K4=4*L
      K3=K4-1
      K2=K4-2
      K1=K4-3
      CALL GCHN(ICHN,IER)
      CALL OPENE(ICHN,"SAOMEM",0,IER)
      CALL ERROR(IER,"CAN'T FIND FILE SAOMEM--SPECIAL")
```

```
      CALL RDS(ICHN,IMEM,(4*N),IER)
      CALL ERROR(IER,"CAN'T READ FILE SAOMEM--SPECIAL")
      CALL KLOSE(ICHN,IER)
      CALL UNPACK(IMEM,(4*N),IMUP)
      IF(IUP(LL+4).EQ.IMUP(K1) .AND. IUP(LL+5).EQ.IMUP(K2) .AND.
     2IUP(LL+6).EQ.IMUP(K3) .AND. IUP(LL+7).EQ.IMUP(K4))GO TO 5
C       CHANGE THE TIME IN SAOMEM
      IMUP(K1)=IUP(LL+4)
      IMUP(K2)=IUP(LL+5)
      IMUP(K3)=IUP(LL+6)
      IMUP(K4)=IUP(LL+7)
C       STORE IN SAOMEM
      CALL PACK(IMUP,(8*N),IMEM)
      CALL GCHN(ICHN,IER)
      CALL OPENE(ICHN,"SAOMEM",0,IER)
      CALL WRS(ICHN,IMEM,(4*N),IER)
      CALL KLOSE(ICHN,IER)
      II=II+1
      LL=72
C       WRITE TO THE GRAPHIC FILE
      CALL PACK(IUP,LL,SCRIPT)
      JP=2905-(75*(II-1))
      IF(JP.LE.0)GO TO 650
C        ALERT THE CONSOLE WHICH SAO IS SPECIAL
      CALL TEXT(SCRIPT,IP,JP,ISIZ,IZT,IXOF,IYOF)
650   CALL FORKO("SPECIAL",IDENT,IER)
      GO TO 5
670   CONTINUE
      IF(II.EQ.0)GO TO 620
CCC     CHANGE BUFAACBUF TO A PRODUCT IN YOUR DATABASE
        CALL CFILW("SPECIALS", 2, IER)
      CALL UTF("BUFAACBUF","SPECIALS")
        CALL WAIT(5,2,IER)
        CALL DFILW("SPECIALS", IER)
620   STOP
      END
```

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