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AA Techniques Development Laboratory
Computer Program NWS TDL CP 92-1



SEPARATING INDIVIDUAL SYNOPTICS FROM WITHIN SYNOPTIC COLLECTIVES

Silver Spring, Md.
August 1992

**U.S. DEPARTMENT OF
COMMERCE**

**National Oceanic and
Atmospheric Administration**

**National Weather
Service**

PREFACE

The Techniques Development Laboratory's (TDL's) computer program (CP) series is a subset of TDL's technical memorandum series. The CP series documents computer programs written at TDL primarily for the Automation of Field Operations and Services (AFOS) computers.

The format for the series follows that given in the AFOS Handbook 5, Reference Handbook, Volume 6: Applications Programs, Part 1: Policy and Procedures, published by the Office of Technical Services/AFOS Operations Division.

NOAA Techniques Development Laboratory Computer Program NWS TDL

- CP 83-1 Gross Sectional Analysis of Wind Speed and Richardson Number. Gilhousen, Kemper, and Vercelli, May 1983. (PB83205062)
- CP 83-2 Simulation of Spilled Oil Behavior in Bays and Coastal Waters. Hess, October 1983. (PB84122597)
- CP 83-3 AFOS-Era Forecast Verification. Heffernan, Newton, and Miller, October 1983. (PB84129303)
- CP 83-4 AFOS Monitoring of Terminal Forecasts. Vercelli, December 1983. (PB84145697LL)
- CP 83-5 Generalized Exponential Markov (GEM) Updating Procedure for AFOS. Herrmann, December 1983. (PB84154822LL)
- CP 84-1 AFOS Display of MDR Data on Local Map Background. Newton, July 1984. (PB84220797)
- CP 84-2 AFOS Surface Observation Decoding. Perrotti, September 1984. (PB85137586)
- CP 84-3 AFOS-Era Forecast Verification. Miller, Heffernan, and Ruth, September 1984. (PB86148319LL)
- CP 85-1 AFOS Monitoring of Terminal Forecasts. Vercelli and Norman, May 1985. (PB85236388LL)
- CP 85-2 AFOS Terminal Forecast Decoding. Vercelli, Norman, and Heffernan, October 1985. (PB86147360LL)
- CP 85-3 AFOS-Era Forecast Verification. Ruth, Miller, and Heffernan, October 1985. (PB86148319LL)
- CP 87-1 AFOS Terminal Aerodrome Forecast Formatting. Wantz and Eggers, July 1987. (PB8810449LL)
- CP 87-2 AFOS-Era Forecast Verification. Ruth and Alex, July 1987. (PB88125570LL)
- CP 87-3 Forecast Review. Wolf, July 1987. (PB88125588LL)
- CP 87-4 AFOS Monitoring of MDR Data Using Flash Flood Guidance. Norman and Newton, October 1987. (PB88137450LL)
- CP 87-5 AFOS Terminal Forecast Quality Control. Vercelli and Leaphart, December 1987. (PB88169925LL)
- CP 88-1 AFOS Terminal Forecast Decoding. Vercelli and Leaphart, August 1988. (PB89101240LL)
- CP 89-1 Structure Flow Diagram Generator. Adams, March 1989. (PB89195978AS)
- CP 89-2 String Search. Adams, March 1989. (PB89195986AS)
- CP 89-3 Extended Memory Library for AFOS Applications. Leaphart, June 1989. (PB92-216290)

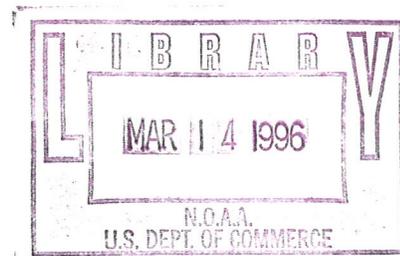
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SEPARATING INDIVIDUAL SYNOPTICS FROM WITHIN SYNOPTIC COLLECTIVES

Robert A. Beasley

1. INTRODUCTION

This program, SSMSEP, decodes the collectives of synoptic observations (SSMs) and stores each individual synoptic (SSM) under a separate AFOS key. The program allows the user to preselect which observations are to be extracted from the collectives and stored individually in the AFOS data base.

In addition, by using command line switches, the user may specify the date and time of the collectives from which he wishes to extract specific synoptics. Thus, one is not bound to only use the most recent version of the collectives which are stored in the AFOS data base. Furthermore, the time output in the header of each individual synoptic can be either the system time or the actual synoptic collective time. Optional diagnostic print is also allowed.

SSMSEP should be made a regular part of the background schedule (e.g., WATCHDOG) as existing applications programs will expect to find synoptics as individual keys. As with any program scheduled through WATCHDOG (or a similar scheduler), SSMSEP can be keyed to run upon receipt of one of the collectives (usually the last one), or at a specific time. The program should be run prior to any attempted use of the synoptics by applications programs.

A secondary program, SORTSSM, allows one to sort the master station list, by AFOS node and local station ID or by WMO number. The master station list is used by SSMSEP. It is strictly for convenience, as a sorted list is not required and does not improve the efficiency of the program.

2. METHODOLOGY AND SOFTWARE STRUCTURE

Data flow and program relationships from initiation to storing each synoptic in the AFOS data base as CCCSSMXXX are shown in Fig. 1. SSMSEP executes in the following manner: (1) reads the optional switches from the command line; (2) reads the two user specified input files, SSMXXXSEP.DT and SSMCLTVSEP.DT, and the master station list (SSMBLOCK.DT); (3) separates the SSMs listed in SSMXXXSEP.DT from the collectives listed in SSMCLTVSEP.DT, if and only if a match is found in SSMBLOCK.DT, and (4) stores each desired SSM in the AFOS data base as a separate key (CCCSMXXX).

The master station list (SSMBLOCK.DT - see Fig. 2) contains the World Meteorological Organization (WMO) block number and station number (five digit number IIIii), and the corresponding AFOS node and International Committee for Aviation Observations (ICAO) 3-letter identifier. SSMCLTVSEP.DT (see Fig. 3) contains a list of synoptic collectives which are to be searched for user specified individual stations. It is recommended that this file contain only those collectives which will actually be needed. Including those collectives which will not be read adds considerably to the run time of the program. Finally, SSMXXXSEP.DT (see Fig. 4) contains a list of ICAO identifiers for those sites which the user wishes to have separated from the collectives as individual SSMs.

A. PROGRAM SSMSEP

The main program for separating synoptics from collectives into individual AFOS keys is SSMSEP. The first task of this program is to read the command line arguments. Switches not included on this command line are assigned default values (see Section 6A, Part B).

After the command line is read, SSMSEP reads, in turn, the user specified collective key list (SSMCLTVSEP.DT), the master station list (SSMBLOCK.DT), and the user specified list of synoptics to be separated into individual AFOS keys (SSMXXXSEP.DT). Note that the master station list is supplied with this package. While the user can also tailor this file for his needs, it is not necessary. It is strongly recommended that a backup of SSMBLOCK.DT be made before any changes to that file are made.

After these files are read and stored in memory, the synoptic collective keys are opened in the order listed in SSMCLTVSEP.DT and searched sequentially for sites desired in SSMXXXSEP.DT. In addition, a corresponding station, node, and WMO block/station number must be found in the master station list (SSMBLOCK.DT) in order for the synoptic to be stored in the data base as CCCSSMXXX. The storing in the data base of the user specified synoptics is the last action of the program. The process continues until all entries in the SSMXXXSEP.DT have been exhausted. Non-fatal, and in some cases fatal errors, will result under certain conditions. These error conditions are detailed in section 6A, Part B.

B. PROGRAM SORTSSM

The purpose of SORTSSM is to sort the master station list (SSMBLOCK.DT) of individual synoptic station sites, their nodes and corresponding WMO block/station numbers, by either AFOS node/station or by WMO block/station number. Although this file is used extensively by SSMSEP, it is not necessary to sort the list in either of these ways. The sorting is strictly for user convenience and readability and does not improve or degrade the efficiency of SSMSEP.

SORTSSM is a very simple program. It simply opens the master station list (SSMBLOCK.DT), reads and stores each line in memory, and does a sort. The default and faster method is to sort by AFOS node and synoptic station. Optional sorting by WMO block/station number can be specified through the global "W" switch.

3. PROCEDURES

The synoptic separator is initiated from the DASHER by entering:

```
SSMSEP/F/X dd/D tt/T
```

This entry will execute all actions from setting the optional switches to storing the desired output SSMs in the AFOS data base as individual keys.

The complete set of programs runs in less than 32K words of memory. The execution time varies with the amount of observations to be separated and the AFOS work load. Even to separate and store in the AFOS data base all of the synoptics listed in the collectives (approximately 210) should take less than

5 minutes. It is the actual storing of the AFOS products in the data base that occupies most of this time.

When SSMSEP is run from an Alphanumeric Display Module (ADM), an alarm light will be activated upon the successful store of each individual specified synoptic key.

4. CAUTIONS

- a. The maximum number of individual synoptics allowed is 250. Initially, only 209 individual synoptic entries were required.
- b. At least 74 RDOS blocks should be available for installation of SSMSEP, SORTSSM and their needed files. This does not all have to be available in one directory or on one disk, as you can move the files to other directories and establish appropriate links. See Section 6A, Part A and Section 6B, Part A below for a complete breakdown of the RDOS block sizes required for SSMSEP, SORTSSM, and their related files.
- d. Two digits are required for specification of a day and/or time through the local "D" and "T" switches. Any other amount of digits will result in a fatal error. When using the local "T" switch, only the regular synoptic issuance times of 00, 06, 12, and 18 UTC are permitted.
- e. You must have a valid AFOS key for each of the synoptics that you wish to separate and store individually. If not, a CFSTO error will result, and the separated synoptic will instead be saved as the RDOS file CCCSSMXXX for each synoptic key output.
- f. Ensure that the required input files SSMBLOCK.DT, SSMCLTVSEP.DT, and SSMXXXSEP.DT reside in the SYSZ partition or are linked to the SYSZ partition. Otherwise, SSMSEP will not run.
- g. Since the SSMs are generated from ASOS SAOs, only data reported by ASOS will be available in the NMC generated synoptic collectives. Elements, such as snow depth, cloud type, etc..., will not be available in the ASOS converted SSM. Missing and unavailable data will be reported using slashes. If the entire 5-digit group of data is unavailable, then that group will be omitted entirely.
- h. The individual synoptics shall not be sent outside the local site. Thus, the address of each individual synoptic produced is always "000".
- i. Always retain a backup of the original master SSMBLOCK.DT file.

5. REFERENCES

- Data General Corporation, 1978: RDOS/DOS User's Handbook, Ordering No. 093-000105, Data General Corporation, Westboro, Mass., 216 pp.
- U. S. Department of Commerce, Defense, and Transportation, 1988: Surface Synoptic Codes. Federal Meteorological Handbook No. 2, 123 pp.
- National Weather Service 1989: AFOS Operators Handbook, No. 2, Vol. 1, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, 471 pp.

_____, 1990: National Weather Service Offices and Stations. National Oceanic and Atmospheric Administration, U.S. Department of Commerce, 53 pp.

Schneider W. R., and C. C Peterson, 1991: WATCHDOG, NOAA Western Region Computer Programs and Problems NWS WRCP 57 (Revised), National Weather Service, NOAA, U.S. Department of Commerce, 24 pp.

6. PROGRAM INFORMATION AND PROCEDURES FOR INSTALLATION AND EXECUTION

I. SYNOPTIC SEPARATION PROGRAM

PART A: PROGRAM INFORMATION and INSTALLATION PROCEDURE

PROGRAM NAME: SSMSEP

AAL ID: DBC080

Revision No.: 01.00

FUNCTION: Extracts user specified synoptic observations from ASOS converted, centrally generated synoptic collectives and stores each specified synoptic as a separate AFOS key.

PROGRAM INFORMATION:

Development Programmer(s):

Robert A. Beasley

Location: Techniques Development
Laboratory

Phone: (FTS) 713-1768
(Commerical) 301-713-1768

Language: FORTRAN IV/Rev 5.57
MAC Assembler/Rev 6.30

Save file creation dates: SSMSEP
Original release/Revision 01.00

Maintenance Programmer(s):

Robert A. Beasley

Location: Techniques Development
Laboratory

Phone: (FTS) 713-1768
(Commerical) 301-713-1768

January 1992

Running time:

Less than 6 minutes to separate all synoptic observations in all of the NMC generated collectives. Approximately 1 minute to separate only 1 synoptic from one collective with all five collectives specified in the SSMCLTVSEP.DT file. Approximately 20 seconds to separate only 1 synoptic from one collective with only one collective specified in the SSMCLTVSEP.DT file.

Disk space: Program files - 39 RDOS blocks
Data files - 8 RDOS blocks

PROGRAM REQUIREMENTS

Program files:

NAME

SSMSEP.SV

Data files:

<u>NAME</u>	<u>Disk location</u>	<u>READ/WRITE</u>	<u>COMMENTS</u>
SSMBLOCK.DT	Master directory	R	Created by RDOS text editor
SSMCLTVSEP.DT	Master directory	R	Created by RDOS text editor
SSMXXXSEP.DT	Master directory	R	Created by RDOS text editor

AFOS Products:

<u>ID</u>	<u>ACTION</u>	<u>COMMENTS</u>
NMCSSM##	Read	## stands for the numbers 70-74 CCC stands for the AFOS node and XXX stands for the local station ICAO ID. The node should be that WSFO which has forecast respon- sibility for site XXX.
CCCSSMXXX	Write	

LOAD LINE

```
RLDR/P/E SSMSEP BMOVE CCAT SEARCH ILEN ^
ICEQAL NAFREAD AFDTIM DCMPR INITAR IPANDEC ^
BCONVRT SSMREV ^
BG UTIL FORT SYS AFOSE>.LB SSMSEP.LM/L
```

PROGRAM INSTALLATION

1. Move the executable module, SSMSEP.SV, to the master directory (usually SYSZ) or to an applications directory with links to the master directory. Under any circumstances, make sure you create proper links if you use an applications directory instead of the master directory.
2. Move the master SSMBLOCK.DT file and the sample SAOCLTVSEP.DT and SAOXXXSEP.DT files to the master directory or to an applications directory with links to the master directory. You may edit any of these files using an appropriate RDOS text editor (QED.SV or EDIT.SV) or edit them at the ADM using the "e:/f" command. However, changing the SSMBLOCK.DT file is not recommended. Make sure you always retain a backup copy of the master SSMBLOCK.DT file.

PART B: PROGRAM EXECUTION and ERROR CONDITIONS

PROGRAM NAME: SSMSEP

AAL ID: DBC080

Revision No.: 01.00

PROGRAM EXECUTION

1. Run SSMSEP.

At the DASHER or ADM enter:

SSMSEP/X/F dd/D tt/T

Definition of switches:

GLOBAL

/X = Print diagnostics on the DASHER concerning separated synoptics.

/F = Use the AFOS system time in the header line of each output synoptic instead of the actual 6 hourly synoptic time. This switch is superseded by the "T" and "D" local switches.

LOCAL

dd/D = Use only those synoptic collectives with the day "dd" indicated in the "AAXX" bulletin line header. Use of this switch overrides the global "F" switch and will always result in the header line of each output individual synoptic containing the 6 hourly synoptic time. When used without the "T" local switch, the most recent version of day "dd" will be used.

tt/T = Use only those synoptic collectives with the UTC hour "tt" indicated in the "AAXX" bulletin line header. Note "tt" must have a value of 00, 06, 12, or 18. Use of this switch overrides the global "F" switch and will always result in the header line of each output individual synoptic containing the 6 hourly synoptic time. When used without the "D" local switch, the most recent version of time "tt" will be used.

Defaults (Switch not used):

Global

/X = Do not print diagnostics on the DASHER.

/F = Use the synoptic 6 hour UTC in each output individual synoptic. The UTC will be that indicated in the "AAXX" bulletin line header of the collective.

Local

/T = Use the most recent synoptic collectives.

/D = Use the most recent synoptic collectives.

2. Before executing the program, you must establish the SSMXXXSEP.DT and SSMCLTVSEP.DT lists. These lists will denote the synoptic stations which are to be separated from within the collective and the key names of the collectives, respectively. The master station list SSMBLOCK.DT must also be accessible. It is recommended that initially you use the unedited master list.

ERROR CONDITIONS

DASHER MESSAGES

MEANING

- | | |
|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. "INVALID STATION XXX IN SSMXXXSEP.DT" - FATAL | Station XXX listed in SSMXXXSEP.DT was not found in the master station list SSMBLOCK.DT. |
| 2. "INVALID DATA FOR XXX" - FATAL | Program was unable to write data sequentially to RDOS file CCCSSMXXX. This most likely suggests that the RDOS file cannot be opened and perhaps may need to be cleared. |
| 3. "REQUESTED VERSION OF NMCSSM(70-74) NOT FOUND - CHECK /T AND /D LOCAL SWITCHES" - FATAL | No synoptic collectives of time "tt" or day "dd" were found in the AFOS data base. |
| 4. "INVALID TIME VALUE SPECIFIED FOR LOCAL /T SWITCH" - FATAL | Time specified in "tt" is not a valid synoptic time of 00, 06, 12, or 18 UTC. |
| 5. "INVALID DATE VALUE SPECIFIED FOR LOCAL /D SWITCH" - FATAL | Day specified in "dd" is not a valid day of a month between 1 and 31. |
| 6. "UNABLE TO OPEN AFOS KEY NMCSSM##" NON-FATAL | Indicated key not in data base or is inaccessible because data base is scrambled. In this case run modify. |
| 7. "PROBLEMS READING AFOS KEY NMCSSM##" NON-FATAL | Specified key contains bad data. This is most likely an indication that MODIFY needs to be run. |
| 8. "PROBLEM FINDING ## VERSION OF AFOS KEY NMCSSM##" - NON-FATAL | Requested version is not present in the AFOS data base. |

II. MASTER SYNOPTIC STATION LIST SORTING PROGRAM

PART A: PROGRAM INFORMATION and INSTALLATION PROCEDURE

PROGRAM NAME: SORTSSM

AAL ID: DBC080

Revision No.: 01.20

FUNCTION: Sorts the master station list (SSMBLOCK.DT) which is required by the synoptic separator program SSMSEP.SV

PROGRAM INFORMATION:

Development Programmer(s):

Robert A. Beasley

Location: Techniques Development
Laboratory

Phone: (FTS) 713-1768
(Commerical) 301-713-1768

Language: FORTRAN IV/Rev 5.57
MAC Assembler/Rev 6.30

Save file creation dates: SORTSSM
Original release/Revision 1.20

Maintenance Programmer(s):

Robert A. Beasley

Location: Techniques Development
Laboratory

Phone: (FTS) 713-1768
(Commerical) 301-713-1768

- January 1992

Running time:

Without /W switch for 210 stations - approximately 21 seconds.

With /W switch for 210 stations - approximately 3 minutes.

Disk space: Program files - 20 RDOS blocks
Data files - 10 RDOS blocks

PROGRAM REQUIREMENTS

Program files:

NAME

SORTSSM.SV

Data files:

NAME

Disk location

READ/WRITE

COMMENTS

SSMBLOCK.DT Master directory R Created by RDOS text editor

SSMBLOCKNW.DT Master directory R Created by SORTSSM

AFOS products:

None

LOAD LINE

SORTSSM:

RLDR/P/E SORTSSM SORTREV ^
BG UTIL FORT SYS>.LB SSMSEP.LM/L

PROGRAM INSTALLATION

1. Move the executable module, SORTSSM.SV, to the master directory (usually SYSZ) or to an applications directory with links to the master directory. Make sure that you create proper links if you use an applications directory instead of the master directory.
2. Move the master SSMBLOCK.DT file to the master directory or to an applications directory with links to the master directory.

PART B: PROGRAM EXECUTION and ERROR CONDITIONS

PROGRAM NAME: SORTSSM

AAL ID: DBC080

Revision No.: 01.00

PROGRAM EXECUTION

1. Run SORTSSM.

At the DASHER or ADM enter:

SORTSSM/W

Definition of switches:

GLOBAL

/W = Sort the master station list (SSMBLOCK.DT) by WMO block and station number instead of by AFOS node and ICAO identifier.

Defaults (Switch not used):

GLOBAL

/W = Sort the master station list (SSMBLOCK.DT) by AFOS node and ICAO identifier.

2. Before executing the program, make sure the master station list is located in the master directory or is linked to the master directory.
3. Upon completion of the program, the sorted output will be stored under the file name SSMBLOCKNW.DT. The original SSMBLOCK.DT file will be unaffected. If you wish to use the new file, simply rename SSMBLOCK.DT something else, and then rename SSMBLOCKNW.DT as SSMBLOCK.DT. You may later delete the old SSMBLOCK.DT if you so desire.

ERROR CONDITIONS

None

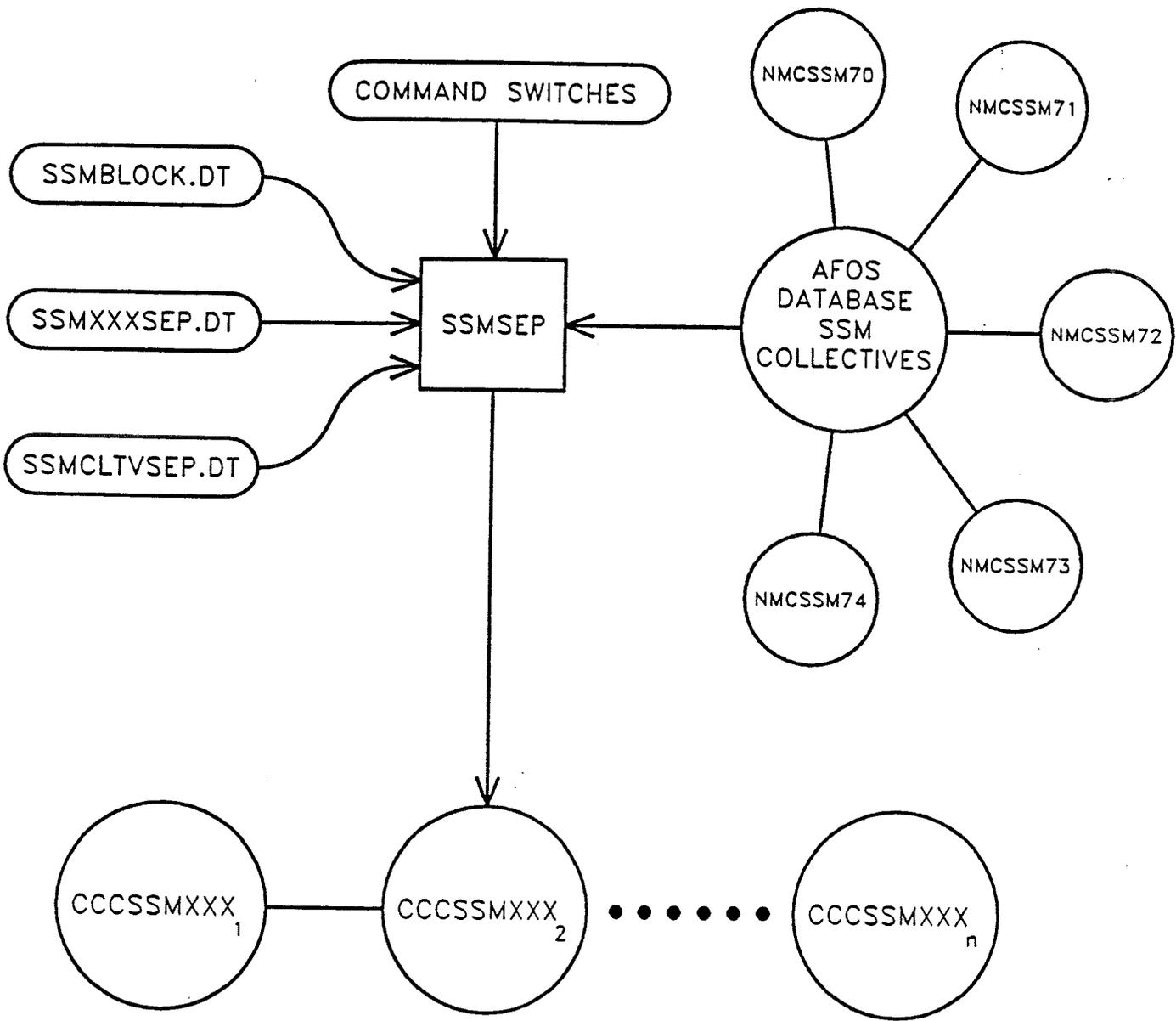


Figure 1. Program flow

```
72365 ABQABQ
72360 ABQCAO
72518 ALBALB
.....
.....
.....
72308 WBCORF
72401 WBCRIC
72402 WBCWAL
```

Figure 2. Partial listing of master station list SSMBLOCK.DT sorted by node.
(This list can also be sorted by WMO block/station number using the global "W"
switch in the program SORTSSM).

```
NMCSSM70
NMCSSM71
NMCSSM72
NMCSSM73
NMCSSM74
```

Figure 3. Sample SSMCLTVSEP.DT file which includes a listing of all NMC
synoptic collectives. Only those listed here will be searched for the
synoptics specified in the SSMXXXSEP.DT file.

```
ABQ
CAO
ALB
ORF
RIC
WAL
```

Figure 4. Sample SSMXXXSEP.DT file. Only synoptics for those stations listed
here (i.e., by ICAO identifier), will be separated from the collectives and
written out as individual synoptics.

