"STRUCTURE, COMPOSITION AND THERMAL STATE OF THE CRUST IN BRAZIL"

Investigation M-51

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INTRODUCTION

This investigation aims at understanding the deep structure of the continental crust in Brazil and its variation in different structural environments. It is expected that a preliminary crustal model for the main structural provinces will be obtained. A secondary objective of this investigation is to check the normal geomagnetic field for the Brazilian area.

During the period covered by this report our activities were concentrated on the following topics:

i) Aeromagnetic data analysis and comparison with Magsat anomalies

ii) Implementation and testing of software required by the analysis of Magsat data.

In the following sections these topics will be discussed in greater detail.

AEROMAGNETIC DATA ANALYSIS AND COMPARISON WITH MAGSAT ANOMALIES

The aeromagnetic survey of the state of Minas Gerais areas was analyzed. (This survey is described in the previous progress report). Because the surveyed region is a cratonic area (the São Francisco craton), the results derived from the analysis may serve as a guide-line to the interpretation of geophysical data (Magsat data included) relative to other cratonic areas of the Brazilian territory.

Initially the data set was used to determine the thickness of the magnetized crust (Mantovani & Shukowsky, in press). The value obtained is in agreement with crustal models derived from deep seismic sounding and gravity data (Blitzkow, et al., 1980),

indicating that the bottom of the magnetized layer occurs close to the Moho transition.

Then an analysis was made of the long wavelenght pattern observable in the anomaly maps derived from the survey data (Shukowsky and Mantovani, 1981). The long wavelenght anomalies form a series of lineations, elongated in a direction close to the magnetic E-W, as illustrate by Figure 1.

It was shown by the interpretation of the behaviour of the anomalies, when reduced to the pole, that these E-W lineations have no tectonic significance. They seem to be formed by the attenuation, which occurs at low inclination of the reference field, of the anomalies with variation predominantly in the magnetic E-W direction.

At present it is being verified if a similar situation may occur with the anomalies computed from Magsat data.

A striking characteristic of the total intensity anomaly map plotted by GSFC, which is particularly evident in the colored version of the map, is that the localized anomalies such as the Bangui anomaly, the anomalies related to the Himalayas and others, are superimposed onto an anomaly background formed by an alternation of positive and negative patches which are strongly elongated along the dip parallels. This situation is sketched for the South American continent in Figure 2, but it is readily observable in all area covered by the colored global anomaly map, being more pronounced in the vicinity of the dip equator.

Two alternative explanations were suggested for the peculiar anomaly pattern, at the group discussion sessions which took place at the Magsat investigator's meetings at GSFC and in Edinburgh. One of them proposes that the lineations are somehow caused by the process used by GSFC to eliminate the effect of the ring current

and other external fields. The other explanation relies on the existence of an equatorial current system, not modeled at present.

IMPLEMENTATION AND TESTING OF SOFTWARE

The analysis of the Magsat data is now proceeding along the following lines:

i) Assessment of the resolution of the Magsat data by the examination of the anomaly profile along passes intersecting known crustal anomalies.

ii) Evaluation of the noise level in the data by the comparison of geographically close passes, grouped according to the value of the K_p index.

iii) Inversion of the Magsat data by the equivalent source technique.

To carry out the operations listed above it is essencial to be able to manipulate the Magsat data in order to select passes which are close to some geographic location or to one another, as well as to restrict the data set to certain sub-regions for the purposes of inversion, regional studies and correlation with terrestrial data.

The geographic restriction of the Magsat data set is done by the program SELECTB. This programa reads an Investigator B tape and selects data falling within an area confined by any two parallels and any two meridians. It finds out if a pass cuts across the selected area by examining the longitude of the ascending and descending nodes contained in the header record.

If the pass intersects the area of interest, then the header record is written to the output tape along with all data records

which have at least one data point inside the selected area. Otherwise the pass is rejected.

The listing of the program is given in the Appendix.

The re-processing of the latest Investigator B data tape (OF8023) by the program SELECTB has revealed that the data selection software used by NASA has some bugs. Our selection program has identified and rejected 52 passes from a total of 610 passes selected by NASA. All these passes, listed in Table 1, consist of t e header record and of one single data record which stradles the 180° longitude, well outside of our area.

TABLE 1. PASSES ERRONEOUSLY SELECTED BY NASA

Pass n°	Pass n°	Pass n°	Pass n°
41	395	642	1027
57	410	657	1028
133	411	718	1043
134	426	719	1058
210	487	734	1074
211	488	749	1105
241	503	765	1135
257	580	795	1136
272	595	796	1151
287	610	811	1166
303	611	827	1167
333	626	950	1197
364	641	1012	1198

The selection of individual passes for mutual closeness or

for closeness to a given point on the surface of the Earth is made by the examination of the longitude of the ascending and descending modes of the passes.

The longitudes of the nodes, along with the pass ID and other additional information are conveniently organized into a disk file, titled MS/NODES, by the program NODEGEN, listed in the Appendix.

To identify mutually close passes, the file is searched in the ascending order of the node longitudes. Two passes are considered to be "close" when the corresponding nodes differ in longitude by less than a predetermined value.

To identify passes which are close to a given point on the surface of the Earth the file MS/NODES is searched for passes which are close to a pass which is directly overhead of the given surface point.

The node longitude of such an overhead pass is computed by

$$\alpha = \arcsin (\pm \sin \phi / \sin I) \qquad (1)$$

$$\beta = \arcsin (\pm \tan \phi \cot I) \qquad (2)$$

$$\Omega = \lambda - \beta + \frac{\omega T}{2\pi} \alpha \qquad (3)$$

Where (ϕ, λ) are the geocentric latitude and longitude of the surface point, I is the inclination of the Magsat orbit, T is the orbital period and ω is the angular velocity of the rotation of the Earth. The sign in (1) and (2) is positive for the ascending node and negative for the descending node.

The expressions (1) - (3), derived with the simplifying assumption of a circular orbit, are nevertheless sufficiently precise to be used for the pass selection, and are so simple as to be easily programmed even into a hand held calculator.

We intend to use the software distributed by NASA to compute the equivalent source parameters. For this purpose the program AESMAP is now being adapted and tested.

PROBLEMS

We continue to experience difficulties with the customs clearance of the Magsat data types sent by post.

A lot of 35 data tapes was given provisional clearance, subject to the condition that we exhibit a statement by NASA declaring the tapes to be scientific material without monetary value.

We were informed at the time that all future data packages will be cleared only if accompanied by such a statement.

The matter has been referred to the Magsat Technical Officer.

PUBLICATIONS

During the reporting period a paper was presented to the Fourth Scientific Assembly of IAGA, in Edinburgh (Shukowsky and Mantovani, 1981), dealing with the analysis of long wavelenght anomalies in a large aeromagnetic survey.

CONCLUSIONS

The results anticipated from the analysis of the Magsat data are stirring a lively interest among Brazilian geoscience researches, so as to envisage the possibility of co-operative research between our institution and other scientific institutions.

On the other hand, the mineral exploration industry has

manifested a great interest in the crustal models which are expected to be derived in the course of the present investigation, particularly for the region of the Paraná basin, now being intensively studied by the industry for the evaluation of petroleum potentiality.

REFERENCES

1. Blitzkow, D.; Gasparini, P.; Mantovani, M.S.M.; Sá, N.C. de - "Crustal structure of southeastern Minas Gerais, Brazil, deduced from gravity measurements". Rev. Bras. Geoc. 9:33-38, 1980.

2. Mantovani, M.S.M.; Shukowsky, W. - "Analysis of a large extent aeromagnetic survey near the geomagnetic equator (Minas Gerais, Brazil)". Pure and Applied Geophysics - in press.

3. Shukowsky, W.; Mantovani, M.S.M. - "Discussion of a large extent aeromagnetic survey analysis near the geomagnetic equator". IAGA Scientific Assembly, Edinburgh, 1981.

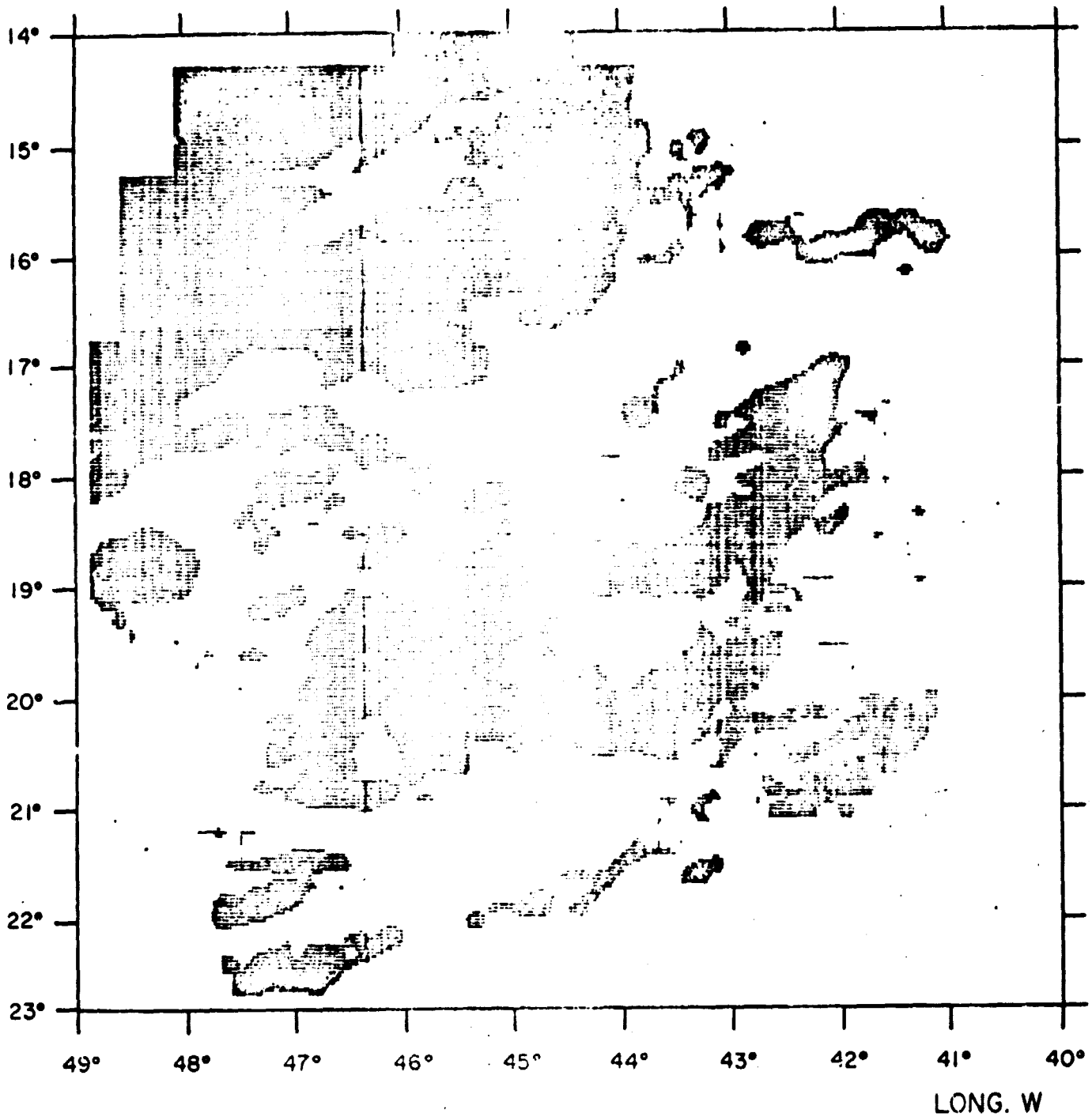

FIGURE 1. The long wavelenght total intensity magnetic anomaly pattern over the state of Minas Gerais, Brazil. The shaded areas are negative, the clear areas are positive.

ORIGINAL PAGE
BLACK AND WHITE PHOTOGRAPH

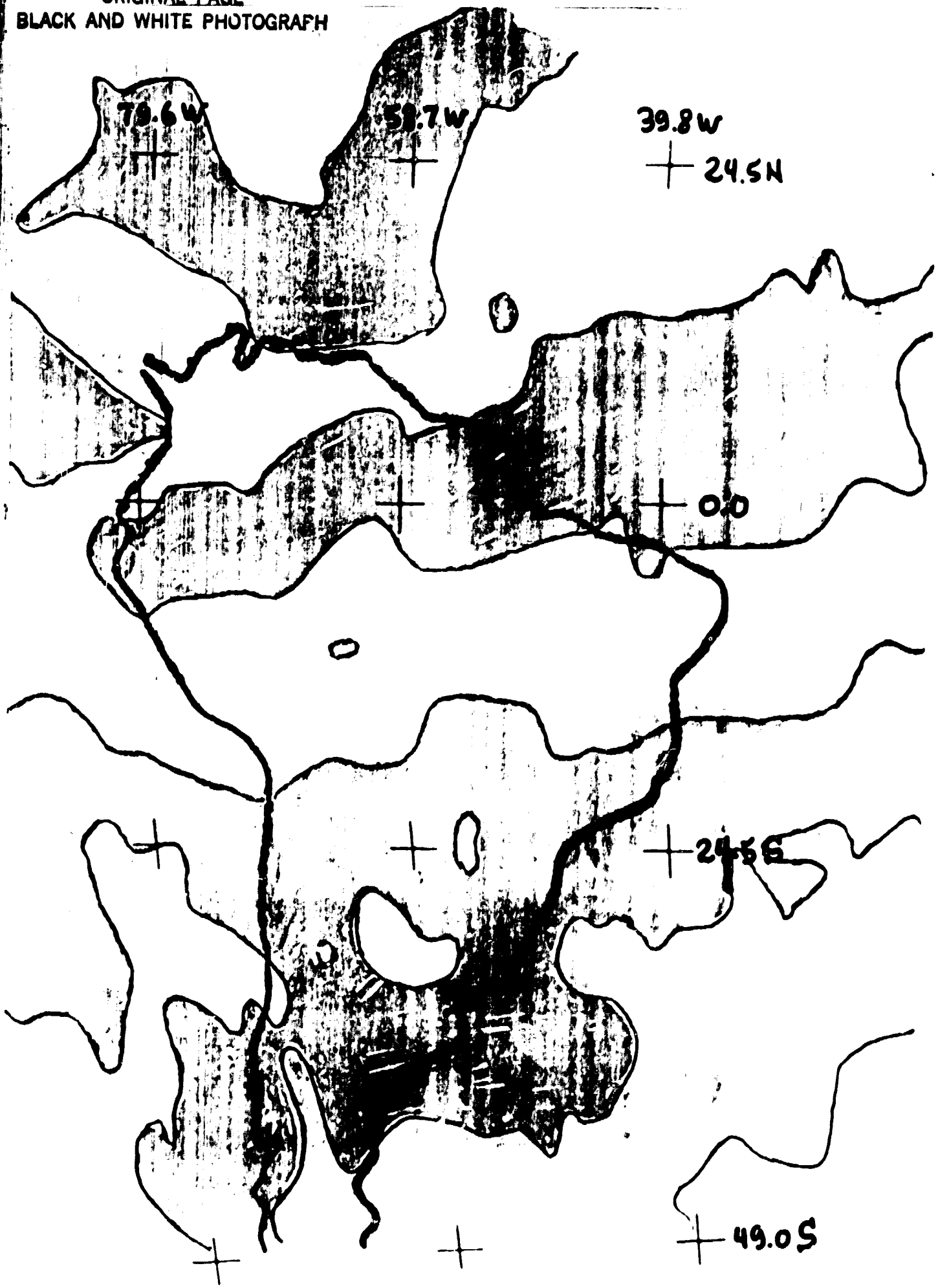

FIGURE 2. The total intensity anomaly pattern over the South American continent, from the Magsat anomaly map, prepared by GSFC. Dark gray areas are positive. Light gray areas are negative.

APPENDIX - PROGRAM LISTINGS

SELECTE
* * * * * * *

```
$SET AUTOBIND
$BIND = FROM MSLIB/=
$INCLUDE "MS/INCLFILE/INVB" *

      REAL LAT,LONG,MLT,INVLAT
      INTEGER EFLAG,QUAL
      DIMENSION ASCX(2),DSCX(2),MSECX(2),ALTMX(2),ALONX(2),IKP(2)
      DIMENSION GSM(2,3),DST(2,6),COMM(18),E(3),GH(14,14),GHT(14,14)
      DIMENSION B(757)
      COMMON/INBUF/NSEQB,ITYPEB,NTYPEB,MJDB,MSECB,IPASSB,
     1    TINTB,LAT(30),LONG(30),RAD(30),MLT(30),INVLAT(30),
     2               DIPLAT(30),BS(30),BV(30),X(30),Y(30),Z(30),
     3               BVA(30),XA(30),YA(30),ZA(30),BVSD(30),
     4             XSD(30),YSD(30),ZSD(30),BMD(30),XMD(30),YMD(30),
     5            ZMD(30),QUAL(30),SPARE(30)
      EQUIVALENCE(NSEQB,B)
      EQUIVALENCE(NSEQX,B(1)),(ITYPEX,B(2)),(NTYPEX,B(3)),(MJDX,B(4))
      EQUIVALENCE(IPASSX,B(5)),(ASCX,B(6)),(DSCX,B(8)),(MSECX,B(10))
      EQUIVALENCE(ALTMX,B(12)),(ALONX,B(14)),(IKP,B(16)),(GSM,B(18))
      EQUIVALENCE(DST,B(24)),(JFLAG,B(36)),(KFLAG,B(37)),(EFLAG,B(38))
      EQUIVALENCE(TZERO,B(39)),(COMM,B(40)),(E,B(58))
      EQUIVALENCE (GH,B(61)),(GHT,B(257))
      LOGICAL FORMSG/.FALSE./,EOF/.FALSE./
C
C     DECLARATIONS RELATIVE TO THIS PROGRAM
C
      LOGICAL HOOK/.FALSE./
      REAL LATN,LATS,LONGE,LONGW,LONGL1,LONGL2,LONGU1,LONGU2
      DIMENSION BUF(14),SVHDR(757)
      DATA PAD/99999./
      READ(5,500,END=555)BUF

500   FORMAT(14A6)
      READ(5,*,END=555)LATN,LATS,LONGE,LONGW
      WRITE(6,600)CONCAT(0,TIME(15),47,15,48),BUF,

     *           LATN,LATS,LONGE,LONGW
600   FORMAT(26X,82(1H*),/,26X,1H*,80X,1H*,/,26X,"*",12X,
     1"MAGSAT INVESTIGATOR-B GEOGRAPHIC SELECTION - DATE ",A6,/,26X,
     2"*",80X,"*",/,  26X,"*",13A6,A2,"*",/,26X,"*",80X,"*",/,26X,
     3"*",12X,
     4"LATN=",F7.3," LATS=",F7.3," LONGE=",F8.3," LONGW=",F8.3,
     510(/,26X,"*",80X,"*"),/,26X,82(1H*))
C    THE FOLLOWING TWO CARDS DEPEND ON THE LATITUDE LIMITS CHOOSEN
C       THRU THE GEOMETRY OF THE ORBIT
      LONGL1=LONGW-7.5;LONGU1=LONGE+2.5
      LONGL2=LONGW-2.3;LONGU2=LONGE+7.7
C
C    GET HEADER RECORD
202   HOOK=.FALSE.
      CALL RDINVB(ERRMSG,EOF)
      IF(ECF)GO TO 201
      GO TO (200,202),ITYPEX
C    TEST HEADER
C       CHECK FOR DUPLICATED PASSES
```

```
C  000*0000*5
C  000*0000*5
C  000*0000*5
 START OF SEGMENT, 002
1  002*00C0*0
1  002*0000*0
1  002*0000*0
1  002*0000*0
1  002*0000*0
1  002*0000*0
1  002*0000*0
1  002*0000*0
1  002*0000*0
1  002*0000*0
1  002*0000*0
1  002*0000*0
1  002*0000*0
1  002*0000*0
1  002*0000*0
1  002*0000*0
C  002*0000*0
C  002*0000*0
C  002*0000*0
C  002*0000*0
C  002*0000*0
C  002*0000*0
C  002*0000*0
C  002*0000*0
C  002*0000*0
     FIB IS 0006 LONG
C  002*0008*0
C  002*0008*0
C  002*0016*0
     FIB IS 0006 LONG
C  002*001D*3
C  002*0026*2
C  002*0026*2
C  002*0026*2
C  002*0026*2
C  002*0026*2
C  002*0026*2
C  002*0026*2
C  002*0026*2
C  002*0026*2
C  002*002E*4
C  002*0031*4
C  002*0031*4
C  002*0031*4
C  002*0032*2
C  002*0034*0
C  002*0034*5
C  002*003A*3
C  002*003A*3
```

```
200     IF(IPASSX.GT.LPASSX)GO TO 203                                          C  002:C03A:3
        KREPT=KREPT+1;GO TO 202                                                C  002:C03C:1
203     LPASSX=IPASSX                                                          C  002:C03E:0
        IF(ALONX(1).LT.LONGL1.OR.ALONX(1).GT.LONGU1)GO TO 204                  C  002:C03F:1
        KL=1;KU=30;GO TO 205                                                   C  002:C042:1
204     IF(ALONX(2).LT.LONGL2.OR.ALONX(2).GT.LONGU2)GO TO 202                  C  002:C044:1
        KL=30;KU=1                                                             C  002:C047:1
C     SAVE HEADER RECORD                                                       C  002:C048:4
205     DO 100 J=1,757                                                         C  002:C04B:4
100     SVHDR(J)=B(J)                                                          C  002:C04A:0
C     GET DATA                                                                 C  002:C04E:4
200     CALL RDINVB(ERRMSG,EOF)                                                C  002:C04E:4
        IF(EOF)GO TO 201                                                       C  002:C050:2
        GO TO (200,206)ITYPEX                                                  C  002:C051:1
C     TEST FOR PADDED LATITUDES                                                C  002:C057:0
206     IF(LAT(KL).NE.PAD)GO TO 207                                            C  002:C057:0
        KPAD=KPAD+1;INC=-1;IF(KL.LT.KU)INC=+1                                  C  002:C059:1
209     KL=KL+INC                                                              C  002:C05D:2
        IF(LAT(KL).NE.PAD)GO TO 207                                            C  002:C05E:5
        IF(KL.NE.KU)GO TO 209                                                  C  002:C060:4
        GO TO 208                                                              C  002:C062:0
207     IF(LAT(KU).NE.PAD)GO TO 210                                            C  002:C062:3
        KPAD=KPAD+1;INC=+1;IF(KL.LT.KU)INC=-1                                  C  002:C064:4
211     KU=KL+INC                                                              C  002:C065:5
        IF(LAT(KU).NE.PAD)GO TO 210                                            C  002:C06A:2
        IF(KU.NE.KL)GO TO 211                                                  C  002:C06C:1
        GO TO 208                                                              C  002:C06D:3
C     TEST LATITUDE BOUNDS                                                     C  002:C06E:0
210     IF(LAT(KU).LT.LATS.OR.LAT(KL).GT.LATN)GO TO 212                        C  002:C06E:0
        JU=MINO(KL,KU);JL=MAXO(KL,KU)                                          C  002:C072:0
        IF(LONG(JU).LT.LONGW.OR.LONG(JL).GT.LONGE)GO TO 212                    C  002:C078:0
        IF(HDRCK)GO TO 213                                                     C  002:C07C:0
C     WRITE SAVED HEADER                                                       C  002:C07C:5
        KOUT=KOUT+1                                                            C  002:C07C:5
        SVHDR(1)=KOUT                                                          C  002:C07E:1
        WRITE(9)SVHDR                                                          C  002:C07F:2
                                                                                  FIB IS 0006 LONG
        HDRCK=.TRUE.                                                           C  002:C085:0
C     WRITE DATA OUT                                                           C  002:C085:4
213     KOUT=KOUT+1;IAUX=NSEGB;NSEGB=KOUT                                      C  002:C085:4
        WRITE(9)B;NSEGB=IAUX;GO TO 208                                         C  002:C089:1
212     IF(HDRCK)GO TO 202                                                     C  002:C094:4
        GO TO 208                                                              C  002:C091:3
201     LOCK 9                                                                 C  002:C092:0
        IF(ERRMSG)WRITE(6,601)                                                 C  002:C093:3
601     FORMAT("0*****SEE DIAGNOSTIC MESSGS PRINTED BY INVB READER ROUTINE ")  C  002:C098:2
       .")                                                                     C  002:C098:2
        WRITE(6,602)KREPT,KPAD,KOUT                                            C  002:C098:2
602     FORMAT("0",I6," DUPLICATED OR OUT OF SEQUENCE PASSES DETECTED"//       C  002:C0A2:2
       .          ,I6," DATA RECORDS WITH PADDED LAT VALUES DETECTED"//,       C  002:C0A2:2
       .           I6," RECORDS SELECTED"///,"EOT.")                           C  002:C0A2:2
        STOP                                                                   C  002:C0A2:2
555     WRITE(6,666);STOP                                                      C  002:C0A3:1
666     FORMAT("0*****UNDEFINED GEOGRAPHIC LIMITS ")                           C  002:C0A8:1
        END                                                                    C  002:C0A8:1
        C02:C0A9:4  IS THE LOCATION FOR EXCEPTIONAL ACTION ON THE I/O STATEMENT AT C02:0089
        C02:C0AB:0  IS THE LOCATION FOR EXCEPTIONAL ACTION ON THE I/O STATEMENT AT C02:007F
        C02:C0AE:1  IS THE LOCATION FOR EXCEPTIONAL ACTION ON THE I/O STATEMENT AT C02:0008
        C02:C0B1:2  IS THE LOCATION FOR EXCEPTIONAL ACTION ON THE I/O STATEMENT AT 002:0000
                                                                    SEGMENT 002 IS C0C1 LONG
```

```
                                                        FORMAT SEGMENT IS 00BE LONG
                                                            START OF SEGMENT 006
                                                                  (15C)

WARNING:THE SUBROUTINE "ROINVB" WAS NOT FOUND

                                                            START OF SEGMENT 00B
                                                        SEGMENT 00B IS 00CE LONG
                                                        SEGMENT 006 IS 0019 LONG

     NO ERRORS DETECTED.  NUMBER OF CARDS = 106.
     COMPILATION TIME = 23 SECONDS ELAPSED,  2.24 SECONDS PROCESSING.
     C2 STACK SIZE = 16 WORDS.  FILESIZE = 218 WORDS.  ESTIMATED CORE STORAGE REQUIREMENT = 2061 WORDS.
     TOTAL PROGRAM CODE = 270 WORDS.  ARRAY STORAGE = 1528 WORDS.
     NUMBER OF PROGRAM SEGMENTS = 7.  NUMBER OF DISK SEGMENTS = 31.
     PROGRAM CODE FILE = (112AGG)SELECTB ON PACK.
     COMPILER COMPILED ON 09/07/79 (FORTRAN ON PACK).
```

MSLIB/SUBS

```
 $SET SEPARATE                                                          C  000:0000:5
                                                                         START OF SEGMENT 002
      SUBROUTINE RDINV8(ERRMSG,EOF)                                     C  002:0000:0
      LOGICAL ERRMSG,EOF                                                C  002:0000:0
       COMMON/INBUF/BUF(757)                                            C  002:0000:0
      EQUIVALENCE (BUF(1),NSEG),(BUF(2),TYPE)                           C  002:0000:0
C                                                                       C  002:0000:0
C         INVESTIGATOR B READER ROUTINE                                 C  002:0000:0
C                                                                       C  002:0000:0
205   LSEG=NSEG+1                                                       C  002:0000:0
202   READ(8,END=200,ERR=201)BUF                                        C  002:0001:3
                                                                          FIB IS 0006 LONG
      IF(NSEG-LSEG)202,203,204                                          C  002:0007:0
C***READ ERROR - BLOCK(S) MISSING                                       C  002:0008:0
C                                                                       C  002:0008:0
204   ERRMSG=.TRUE.                                                     C  002:0008:0
      DO 100 LSEG=LSEG,NSEG      -1                                     C  002:0008:4
      WRITE(6,600)LSEG                                                  C  002:000F:4
                                                                          FIB IS 0006 LONG
600   FORMAT(1HO,"      RDINV8***** READ ERR - BLOCK#",I5," IS MISSING")  C  002:0016:2
100   CONTINUE                                                          C  002:0016:2
C*** CHECK TYPE CODE                                                    C  002:0016:5
203   IF(TYPE.LE.2)RETURN                                               C  002:0016:5
C***PAR ERR ON ORIG TAPE (GSFC)                                         C  002:0018:2
      ERRMSG=.TRUE.                                                     C  002:0018:2
      WRITE(6,601)NSEG,TYPE                                             C  002:0019:C
601   FORMAT(1HO,"*****RDINV8***** PAR ERR ON ORIG GSFC TAPE-   BLOCK ",  C  002:0021:2
     1       I5," TYPE =",Z12)                                          C  002:0021:2
      GO TO 205                                                         C  002:0021:2
C***PAR ERR ON CONVERTED TAPE                                           C  002:0021:5
201   ERRMSG=.TRUE.                                                     C  002:0021:5
      WRITE(6,602)LSEG                                                  C  002:0022:3
602   FORMAT(1HO,"*****RDINV8***** PAR ERR BLOCK#",I5)                  C  002:0029:2
      LSEG=LSEG+1                                                       C  002:0029:2
      GO TO 202                                                         C  002:002A:4
200   EOF=.TRUE.;BLOCK 8                                                C  002:002B:1
      RETURN                                                            C  002:0034:4
      END                                                               C  002:0035:1
                                                                      FORMAT SEGMENT IS 0028 LONG
     002:004A:2  IS THE LOCATION FOR EXCEPTIONAL ACTION ON THE I/O STATEMENT AT 002:0001
                                                                      SEGMENT 002 IS 004B LONG

*****************************************************************************************************************

                                                                          START OF SEGMENT 005
                                                                      SEGMENT 005 IS 0018 LONG

     NO ERRORS DETECTED.  NUMBER OF CARDS = 34.
     COMPILATION TIME = 14 SECONDS ELAPSED,  1.00 SECONDS PROCESSING.
     02 STACK SIZE = 9 WORDS.  FILESIZE = 156 WORDS.  ESTIMATED CORE STORAGE REQUIREMENT = 1068 WORDS.
     TOTAL PROGRAM CODE = 132 WORDS.  ARRAY STORAGE = 757 WORDS.
     NUMBER OF PROGRAM SEGMENTS = 5.  NUMBER OF DISK SEGMENTS = 20.
     PROGRAM CODE FILE = (112AGG)MSLIB/RDINV8 ON PACK.
     COMPILER COMPILED ON 09/07/79 (FORTRAN ON PACK).
```

```
BURROUGHS B6700 PROGRAM BINDER - VERSION 2.9.001,  THURSDAY, 04/02/81, 00:09.

                                S E L E C T B
                                * * * * * * *

BIND = FROM MSLIB/*                                                    ;
BEGIN BINDING RDINVB OF *CUT FROM MSLIB/PDINVB
      RDINVB              (02,0002) CHANGED TO (02,000C)
      FILE6               (02,0007) CHANGED TO (02,000B)
      FILE8               (02,0006) CHANGED TO (02,0010)
      /INBUF/             (02,0003) CHANGED TO (02,0002)
      <SEG DICT ITEM>     (01,0002) CHANGED TO (01,0008) = 03 000004BC000A
      <SEG DICT ITEM>     (01,0004) CHANGED TO (01,000A) = 05 070000000004
      <SEG DICT ITEM>     (01,0006) CHANGED TO (01,000B) = 05 0800028400OE
END OF BINDING RDINVB


*****************************************************************************
NUMBER OF ERRORS DETECTED = 0.
HOST FILE = HOST
SEGMENT DICTIONARY LENGTH = 12.  GLOBAL STACK SIZE = 18.  STACK ESTIMATE = 512.
CORE ESTIMATE = 2061 WORDS.  CODE FILE LENGTH = 39 DISK SEGMENTS.
BINDING TIME = 13 SECONDS ELAPSED, 3.05 SECONDS PROCESSOR, 2.32 SECONDS I/O.
*****************************************************************************
```

```
 $SET AUTOBIND
 $BIND = FROM MSLIB/=
FILE  10(KIND=DISK,MAXRECSIZE=33,BLOCKSIZE=990,PROTECTION=SAVE)
FILE  11(KIND=DISK,MAXRECSIZE=757,PROTECTION=SAVE,AREASIZE=5)
C
C
C    THIS PROGRAM GENERATES THE FILES MS/NODES & MS/MODEL
C       FROM INVB INPUT TAPES
C
 $INCLUDE "MS/INCLFILE/INVB" *

      REAL LAT,LONG,MLT,INVLAT
      INTEGER EFLAG,QUAL
      DIMENSION B(757)
      DIMENSION ASCX(2),DSCX(2),MSECX(2),ALTMX(2),ALONX(2),IKP(2),
     1GSM(2,3),DST(2,6),COMM(30),GH(17,17),GHT(14,14),E(3)
      COMMON/INBUF/NSECB,ITYPEB,NTYPEB,MJDB,MSECB,IPASSB,
     1   TINTB,LAT(30),LONG(30),RAD(30),MLT(30),INVLAT(30),
     2              DIPLAT(30),BS(30),BV(30),X(30),Y(30),Z(30),
     3              BVA(30),XA(30),YA(30),ZA(30),BVSD(30),
     4            XSD(30),YSD(30),ZSD(30),BMD(30),XMD(30),YMD(30),
     5          ZMD(30),QUAL(30),SPARE(30)
      EQUIVALENCE(NSECB,B)
 $SET CMIT
C   OLD HEADER FORMAT
      DIMENSION ASCX(2),DSCX(2),MSECX(2),ALTMX(2),ALONX(2),IKP(2)
      DIMENSION GSM(2,3),DST(2,6),COMM(1*),E(3),GH(14,14),GHT(14,14)
      EQUIVALENCE(NSECX,B(1)),(ITYPEX,B(2)),(NTYPEX,B(3)),(MJDX,B(4))
      EQUIVALENCE(IPASSX,B(5)),(ASCX,B(6)),(DSCX,B(8)),(MSECX,B(10))
      EQUIVALENCE(ALTMX,B(12)),(ALONX,B(14)),(IKP,B(16)),(GSM,B(18))
      EQUIVALENCE(DST,B(24)),(JFLAG,B(36)),(KFLAG,B(37)),(EFLAG,B(38))
      EQUIVALENCE(TZERO,B(39)),(COMM,B(40)),(E,B(58))
      EQUIVALENCE (GH,B(61)),(GHT,B(257))
 $POP CMIT
C-----------------------------------------------------------------
C    HEADER RECORD FORMAT MODIFIED AS DESCRIBED IN
C    "INVESTIGATOR'S TAPES" NOTES OF MARCH 25,1981
C-----------------------------------------------------------------
      EQUIVALENCE (NSECX,B(1)),(ITYPEX,B(2)),(NTYPEX,B(3)),(MJDX,B(4)),
     1(IPASSX,B(5)),(ASCX,B(6)),(DSCX,B(8)),(MSECX,B(10)),(ALTMX,B(12)),
     2(ALONX,B(14)),(IKP,B(16)),(GSM,B(18)),(DST,B(24)),(COMM,B(36)),
     3(NMAX,B(66)),(NMAXT,B(67)),(MODEXT,B(68)),(TZERO,B(69)),
     4(ABAR,B(70)),(GH,B(71)),(GHT,B(360)),(E,B(556))
      LOGICAL ERRMSG/.FALSE./,EOF/.FALSE./
C
C    DECLARATIONS PERTINENT TO THIS PROGRAM
C
      DIMENSION BUF(33)
      DATA ASC,DSC,REJ/"ASC   ","DSC   ","REJ***"/
      READ(5,*)AL,AU,DL,DU

      WRITE(6,*)AL,AU,DL,DU

200   CALL RDINVB(ERRMSG,EOF)
      IF(EOF)GO TO 201
```

```
C   000:0000:5
C   000:0000:5
C   0000:0001
C   0000:0002
C   0000:0003
C   0000:0004
C   0000:0005
C   0000:0006
C   0000:0007
C   0000:0001
 START OF SEGMENT 002
1   002:0000:0
1   002:0000:0
1   002:0000:0
1   002:0000:0
1   002:0000:0
1   002:0000:0
1   002:0000:0
1   002:0000:0
1   002:0000:0
1   002:0000:0
1   002:0000:0
1     CMIT
1     CMIT
1     CMIT
1     CMIT
1     CMIT
1     CMIT
1     CMIT
1     CMIT
1     CMIT
1     CMIT
1   002:0000:0
1   002:0000:0
1   002:0000:0
1   002:0000:0
1   002:0000:0
1   002:0000:0
1   002:0000:0
1   002:0000:0
1   002:0000:0
1   002:0000:0
C   002:0000:0
C   002:0000:0
C   002:0000:0
C   002:0000:0
C   002:0000:0
C   002:0000:0
C   002:0000:0
      FIB IS 0006 LONG
C   002:000E:0
      FIB IS 0006 LONG
C   002:001A:2
C   002:001C:0
```

```
      IF(ITYPEX.NE.1)GO TO 200                                                  C  002:001C:5
      ALON=ALONX(1)$ DLON=ALONX(2)                                              C  002:001E:1
      IF(ALON.LT.AL.OR.ALON.GT.AU)GO TO 202                                     C  002:0020:3
      ALONX(2)=ASC$GO TO 203                                                    C  002:0022:5
202   IF(DLON.LT.DL.OR.DLON.GT.OU)GO TO 204                                     C  002:0024:4
      ALONX(1)=DLON                                                             C  002:0027:0
      ALONX(2)=DSC$ GO TO 203                                                   C  002:0028:2
204   ALONX(1)=99999.                                                           C  002:002A:1
      ALONX(2)=REJ                                                              C  002:002D:1
203   CONTINUE                                                                  C  002:002E:3
      WRITE(10)NSEQX,IPASSX,MJDX,MSECX,ALTMX,ALONX,IKP,ASCX,DSCX,               C  002:002E:3
     .         GSM,DST                                                          C  002:0043:4
      GO TO 200                                                                 C  002:005C:3
201   WRITE(11)B                                                                C  002:0051:0
      CLOSE(10,DISP=CRUNCH)                                                     C  002:0056:0
      CLOSE(11,DISP=CRUNCH)                                                     C  002:0057:3
      WRITE(6,600)NSEQX                                                         C  002:0059:0
600   FORMAT("0EOT. ",I6,"RECORDS PROCESSED")                                   C  002:005F:2
      STOP                                                                      C  002:005F:2
      END                                                                       C  002:006C:1
      002:0061:4  IS THE LOCATION FOR EXCEPTIONAL ACTION ON THE I/O STATEMENT AT 002:0051
      002:0063:0  IS THE LOCATION FOR EXCEPTIONAL ACTION ON THE I/O STATEMENT AT 002:0043
      002:0064:2  IS THE LOCATION FOR EXCEPTIONAL ACTION ON THE I/O STATEMENT AT 002:0000
                                                                  SEGMENT 002 IS 006E LONG

*****************************************************************************************************************

                                                                  FORMAT SEGMENT IS 0009 LONG
                                                                      START OF SEGMENT 007
                                                                              (15C)
WARNING:THE SUBROUTINE "RCINVE" WAS NOT FOUND

                                                                      START OF SEGMENT 009
                                                                  SEGMENT 009 IS 000B LONG
                                                                  SEGMENT 007 IS 001B LONG

      NO ERRORS DETECTED.  NUMBER OF CARDS = 72.
      COMPILATION TIME = 10 SECONDS ELAPSED,  1.62 SECONDS PROCESSING.
      D2 STACK SIZE = 16 WORDS.  FILESIZE = 3634 WORDS.  ESTIMATED CORE STORAGE REQUIREMENT = 4610 WORDS.
      TOTAL PROGRAM CODE = 192 WORDS.  ARRAY STORAGE = 757 WORDS.
      NUMBER OF PROGRAM SEGMENTS = 8.  NUMBER OF DISK SEGMENTS = 23.
      PROGRAM CODE FILE = (112AGS)NODEGEN ON PACK.
      COMPILER COMPILED ON 09/07/79 (FORTRAN ON PACK).
```

MSLIB/SUBS

```
 $SET SEPARATE                                                                  C  000:0000:5
                                                                                 START OF SEGMENT 002
       SUBROUTINE RDINVB(ERRMSG,EOF)                                            C  002:0000:0
       LOGICAL ERRMSG,EOF                                                       C  002:0000:0
        COMMON/INBUF/BUF(757)                                                   C  002:0000:0
       EQUIVALENCE (BUF(1),NSEG),(BUF(2),TYPE)                                  C  002:0000:0
C                                                                               C  002:0000:0
C          INVESTIGATOR B READER ROUTINE                                        C  002:0000:0
C                                                                               C  002:0000:0
205    LSEG=NSEG+1                                                              C  002:0000:0
202    READ(8,END=200,ERR=201)BUF                                               C  002:0001:3
                                                                                   F16 IS 0006 LONG
       IF(NSEG-LSEG)202,203,204                                                 C  002:0007:0
C***READ ERROR - BLOCK(S) MISSING                                               C  002:000E:0
C                                                                               C  002:000E:0
204    ERRMSG=.TRUE.                                                            C  002:000E:0
       DO 100 LSEG=LSEG,NSEG      -1                                            C  002:000E:4
       WRITE(6,600)LSEG                                                         C  002:000F:4
                                                                                   F18 IS 0006 LONG
600    FORMAT(1HO,"      RDINVB***** READ ERR - BLOCK#",I5," IS MISSING")      C  002:0016:2
100    CONTINUE                                                                 C  002:0016:2
C*** CHECK TYPE CODE                                                            C  002:0016:5
203    IF(TYPE.LE.2)RETURN                                                      C  002:0016:5
C***PAR ERR ON ORIG TAPE (GSFC)                                                 C  002:0018:2
       ERRMSG=.TRUE.                                                            C  002:0018:2
       WRITE(6,601)NSEG,TYPE                                                    C  002:0019:0
601    FORMAT(1HO,"*****RDINVB***** PAR ERR ON ORIG GSFC TAPE-   BLOCK #,       C  002:0021:2
     1        I5," TYPE =",Z12)                                                 C  002:0021:2
       GO TO 205                                                                C  002:0021:2
C***PAR ERR ON CONVERTED TAPE                                                   C  002:0021:5
201    ERRMSG=.TRUE.                                                            C  002:0021:5
       WRITE(6,602)LSEG                                                         C  002:0022:3
602    FORMAT(1HO,"*****RDINVB***** PAR ERR BLOCK#",I5)                         C  002:0029:2
       LSEG=LSEG+1                                                              C  002:0029:2
       GO TO 202                                                                C  002:002A:4
200    EOF=.TRUE.;BLOCK 8                                                       C  002:002E:1
       RETURN                                                                   C  002:0034:4
       END                                                                      C  002:0035:1
                                                                              FORMAT SEGMENT IS 0028 LONG
       002:004A:2  IS THE LOCATION FOR EXCEPTIONAL ACTION ON THE I/O STATEMENT AT 002:0001
                                                                              SEGMENT 002 IS 0048 LONG

**********************************************************************************************************************

                                                                                 START OF SEGMENT 005
                                                                              SEGMENT 005 IS 0016 LONG
       NO ERRORS DETECTED.  NUMBER OF CARDS = 34.
       COMPILATION TIME = 11 SECONDS ELAPSED,  1.00 SECONDS PROCESSING.
       02 STACK SIZE = 9 WORDS.  FILESIZE = 156 WORDS.  ESTIMATED CORE STORAGE REQUIREMENT = 1068 WORDS.
       TOTAL PROGRAM CODE = 132 WORDS.  ARRAY STORAGE = 757 WORDS.
       NUMBER OF PROGRAM SEGMENTS = 5.  NUMBER OF DISK SEGMENTS = 20.
       PROGRAM CODE FILE = (112AGG)MSLIB/RDINVB ON PACK.
       COMPILER COMPILED ON 09/07/79 (FORTRAN ON PACK).
```

BURROUGHS B6700 PROGRAM BINDER - VERSION 2.9.001, TUESDAY, 09/22/81, 01:28.

N C D E G E N

```
SIND = FROM MSLIB/=                                                    ;
BEGIN BINDING RDINVB OF .OUT FROM MSLIB/RDINVB
      RDINVB              (02,0002) CHANGED TO (02,000E)
      FILE6               (02,0007) CHANGED TO (02,000C)
      FILE8               (02,0006) CHANGED TO (02,0010)
      /INBUF/             (02,0003) CHANGED TO (02,0004)
      <SEG DICT ITEM>     (01,0002) CHANGED TO (01,0009) = 03 000004B00007
      <SEG DICT ITEM>     (01,0004) CHANGED TO (01,000B) = 05 07000000004
      <SEG DICT ITEM>     (01,0006) CHANGED TO (01,000C) = 05 02000284000B
END OF BINDING RDINVB
```

```
NUMBER OF ERRORS DETECTED = 0.
HOST FILE = HOST
SEGMENT DICTIONARY LENGTH = 13.  GLOBAL STACK SIZE = 18.  STACK ESTIMATE = 512.
CORE ESTIMATE = 4010 WORDS.  CODE FILE LENGTH = 31 DISK SEGMENTS.
BINDING TIME = 7 SECONDS ELAPSED, 2.45 SECONDS PROCESSOR, 1.74 SECONDS I/O.
```

NODELISTER

```
FILE  6(KIND=PRINTER, MAXRECSIZE=22,PAGESIZE=60)                                C  00000001
FILE  10(KIND=DISK,MAXRECSIZE=33,BLOCKSIZE=990)                                 C  00000002
C                                                                               C  00000003
C                                                                               C  00000004
C   THIS PROGRAM LISTS THE FILE MS/NODES                                        C  00000005
C                                                                               C  00000006
                                                                                 START OF SEGMENT 002
      DIMENSION  TIT(14),B(33),MSECX(2),ALTMX(2),ALONX(2),IKP(2),               C  002:0000:0
     .          ASCX(2),DSCX(2),GSM(2,3),DST(2,6)                               C  002:0000:0
      EQUIVALENCE(NSEQX,B(1)),(IPASSX,B(2)),(MJDX,B(3)),(MSECX,B(4)),           C  002:0000:0
     .           (ALTMX,B(6)),(ALONX,B(8)),(IKP,B(10)),(ASCX,B(12)),           C  002:0000:0
     .           (DSCX,B(14)),(GSM,B(16)),(DST,B(22))                          C  002:0000:0
      READ(5,500,END=200)TIT                                                    C  002:0000:0
                                                                                   FIB IS 0006 LONG
500   FORMAT(13A6,A2)                                                          C  002:0006:0
200   CONTINUE                                                                  C  002:0006:0
      GO TO 201                                                                 C  002:0006:0
204   READ(10,END=205)B                                                         C  002:0006:3
      KONT=KONT+1                                                               C  002:0006:0
      WRITE(6,600,END=203)NSEQX,IPASSX,MJDX,MSECX,ALTMX,ALONX,                  C  002:0006:2
     .                    IKP,ASCX,DSCX                                         C  002:0022:2
600   FORMAT(" ",I5,I6,I7,1X,2I9,1X,2F7.3,1X,F9.3,2X,A6,4X,                    C  002:0042:0
     .       2I3,5X,2F8.1,2X,2F8.1)                                            C  002:0042:0
      GO TO 204                                                                 C  002:0042:0
203   WRITE(6,601)                                                              C  002:0042:3
601   FORMAT("1")                                                               C  002:0031:2
201   INQUIRE(6,PAGE=IPG)                                                       C  002:0031:2
      WRITE(6,602)TIT,IPG+10000                                                 C  002:0036:2
602   FORMAT("+",24X,13A6,A2,T126,"PAG",I5,T129,1X,"//",1X," SEC  PASS          C  002:003F:2
     .MJD",T27,"MSEC 1/2",T44,"LTM 1/2",T60,"LNODE A/C",T76,"IKP 1/2",          C  002:003F:2
     .   T93,"ASCX 1/2",T111,"DSCX 1/2")                                        C  002:003F:2
      GO TO 204                                                                 C  002:003F:2
205   WRITE(6,603,END=206)KONT                                                  C  002:003F:5
206   CONTINUE                                                                  C  002:0047:0
603   FORMAT("0ECT. ",I4," RECORDS PROCESSED")                                  C  002:0047:0
      STOP                                                                      C  002:0047:0
      END                                                                       C  002:0047:5
      002:004B:1  IS THE LOCATION FOR EXCEPTIONAL ACTION ON THE I/O STATEMENT AT 002:003F
      002:004E:2  IS THE LOCATION FOR EXCEPTIONAL ACTION ON THE I/O STATEMENT AT 002:0020
      002:0051:3  IS THE LOCATION FOR EXCEPTIONAL ACTION ON THE I/O STATEMENT AT 002:0008
      002:0054:4  IS THE LOCATION FOR EXCEPTIONAL ACTION ON THE I/O STATEMENT AT 002:0000
                                                                                SEGMENT 002 IS 0068 LONG
```

****

```
                                                                                FORMAT SEGMENT IS 0051 LONG
                                                                                   START OF SEGMENT 006
                                                                                SEGMENT 006 IS 0012 LONG

      NO ERRORS DETECTED.  NUMBER OF CARDS = 35.
      COMPILATION TIME = 16 SECONDS ELAPSED,  1.28 SECONDS PROCESSING.
      D2 STACK SIZE = 9 WORDS.  FILESIZE = 2086 WORDS;  ESTIMATED CORE STORAGE REQUIREMENT = 2310 WORDS.
      TOTAL PROGRAM CODE = 155 WORDS.  ARRAY STORAGE = 47 WORDS.
      NUMBER OF PROGRAM SEGMENTS = 6.  NUMBER OF DISK SEGMENTS = 23.
      PROGRAM CODE FILE = (1124GG)NODELISTER ON PACK.
      COMPILER COMPILED ON 09/07/79 (FORTRAN ON PACK).
```

ORIGINAL PAGE IS OF POOR QUALITY

ORIGINAL PAGE IS
OF POOR QUALITY

AL=-144.0 AU=6.0 CL=-126.0 DU=24.0
EOT. 5743RECORDS PROCESSED

MS/NODES FROM OF8023 QUIET TIME/ PASS # ORDERED

SEC	PASS	MJD	PSEC 1/2		LTH 1/2		LNODE A/D		INP 1/2		ASCX 1/2		DSCX 1/2	
1	12	44179	66041376	68806704	17.959	5.959	-5.788	ASC	17	17	55.9	21.3	33.2	9.7
8	13	44179	71671072	74435968	17.959	5.959	-29.248	ASC	17	17	50.1	9.7	29.8	11.1
16	14	44179	77300736	80065536	17.958	5.958	-52.710	ASC	10	10	41.9	10.1	33.9	6.7
31	15	44179	82930416	85695168	17.958	5.958	-76.171	ASC	10	10	42.6	7.2	26.3	7.2
42	16	44180	2160184	4924761	-6.042	5.958	-99.631	ASC	7	7	43.6	11.3	31.5	0.1
53	17	44180	7789993	10554304	-6.042	5.958	-123.092	ASC	7	7	44.9	8.8	32.2	3.0
61	18	44180	13419496	15702810	-6.043	6.234	99999.000	REJ***	3	3	40.3	8.4	31.2	2.7
63	19	44180	19049000	21813152	-6.043	5.957	-1.533	DSC	3	10	37.6	10.4	33.5	3.7
73	20	44180	24678464	27442480	17.957	5.957	-24.993	DSC	10	10	37.2	6.5	30.0	-4.0
87	38	44181	39603776	42365936	17.952	5.952	-47.248	DSC	27	27	51.1	14.5	10.8	-0.7
91	39	44181	45232736	47994640	17.952	5.952	-110.709	DSC	20	20	41.4	10.7	19.3	2.3
101	41	44181	56490448	59252032	17.951	5.951	99999.000	REJ***	17	17	37.6	12.9	20.7	-2.4
103	43	44181	67747792	0509072	17.951	5.950	-13.023	ASC	20	20	37.7	15.1	20.2	1.2
115	44	44181	73376416	76137584	17.950	5.950	-35.484	ASC	20	10	38.4	7.0	13.3	2.4
125	45	44181	79004976	81766176	17.950	5.950	-59.937	ASC	10	10	30.4	5.5	25.2	2.6
138	46	44181	84633616	994736	17.950	5.950	-83.393	ASC	10	3	32.7	8.4	18.7	1.9
149	47	44182	3362314	6623257	-6.050	5.950	-106.848	ASC	3	3	31.8	6.0	23.1	-0.2
161	48	44182	9490992	12251722	-6.051	5.949	-130.305	ASC	3	0	27.4	5.5	25.5	0.1
165	49	44182	15119391	17880080	-6.051	5.949	14.734	DSC	0	0	26.4	4.9	27.5	0.2
169	50	44182	20747824	23508432	-6.051	5.949	-8.722	DSC	0	3	34.1	3.8	26.3	-1.8
183	51	44182	26376176	29136688	17.948	5.948	-32.177	DSC	3	3	30.0	7.6	10.4	-1.0
197	52	44182	32004496	34764912	17.948	5.948	-55.632	DSC	3	7	24.8	8.0	11.8	-1.4
210	53	44182	37632832	40393408	17.948	5.948	-79.089	DSC	7	7	25.6	11.3	14.9	3.3
220	54	44182	43261232	46021600	17.948	5.948	-102.544	DSC	10	10	27.6	7.4	20.1	1.4
232	57	44182	60146144	62906032	17.947	5.947	99999.000	REJ***	7	7	29.4	7.7	14.9	-1.3
234	58	44182	65774256	68534016	17.947	5.946	-4.861	ASC	10	10	26.9	9.4	11.7	1.7
241	59	44182	71402352	74161984	17.946	5.946	-28.315	ASC	10	10	28.6	6.8	9.8	3.0
252	60	44182	77030368	79790048	17.946	5.946	-51.770	ASC	3	3	27.3	7.1	21.0	2.0
264	61	44182	82658432	85418032	17.946	5.946	-75.224	ASC	3	3	30.7	5.4	13.6	2.1

SEC	PASS	MJD	MSEC 1/2		LTN 1/2		LNODE A/C		INP 1/2		ASCX 1/2		DSCX 1/2	
275	62	44183	1886578	4646017	-6.054	5.945	-98.677	ASC	7	7	31.9	6.8	23.4	-3.1
286	63	44183	7514675	10273990	-6.055	5.945	-122.131	ASC	7	7	27.7	5.6	23.7	-2.2
294	64	44183	13142672	15901870	-6.055	5.945	22.916	DSC	10	10	27.7	3.2	19.3	-3.7
296	65	44183	18770544	21529696	-6.055	5.945	-0.538	DSC	10	10	24.1	1.6	18.5	-2.7
306	66	44183	24398416	27157424	17.944	5.944	-23.991	DSC	7	7	21.6	4.7	12.1	1.1
314	67	44183	30026192	32785120	17.944	5.944	-47.444	DSC	7	13	24.9	1.9	6.7	0.5
327	68	44183	35653968	38412864	17.944	5.944	-70.896	DSC	13	13	23.7	9.9	7.0	0.7
340	69	44183	41281808	44040704	17.944	5.944	-94.350	DSC	13	16	24.6	6.1	12.9	-2.0
353	70	44183	46909664	49668656	17.943	5.943	-117.804	DSC	10	10	19.7	4.3	10.7	-2.1
360	73	44183	-99999	66551120	*******	5.942	99999.000	REJ***	***	3	99999.0	99999.0	10.0	-0.5
362	74	44183	6942072	7217856	17.942	5.942	-20.117	ASC	3	3	1.3	4.9	7.7	1.6
374	75	44183	7508760	7806032	17.942	5.942	-43.569	ASC	3	3	17.9	3.5	11.5	0.1
385	76	44183	8075248	8394520	17.942	5.942	-67.022	ASC	3	3	19.2	4.3	10.6	-2.5
397	77	44183	8642784	2660972	17.942	5.941	-90.472	ASC	3	10	20.8	5.6	11.8	-5.0
406	77	44183	8642784	2660972	17.942	5.941	-90.472	ASC	3	10	20.8	5.6	11.8	-5.0
409	78	44184	5530378	8288412	-4.059	5.941	-113.923	ASC	10	10	32.0	3.2	17.8	-3.9
420	79	44184	11157827	13915769	-4.059	5.941	-137.376	ASC	20	20	27.0	3.7	19.4	-2.8
422	80	44184	16785168	19543040	-4.059	5.941	7.680	DSC	20	20	29.9	7.4	19.9	-3.5
427	81	44184	22412432	25170272	17.940	5.940	-15.771	DSC	17	17	29.1	3.3	20.7	-6.8
441	82	44184	28039664	30797408	17.940	5.940	-39.222	DSC	17	17	24.9	7.5	5.7	0.2
454	124	44187	5144260	7899504	-6.071	5.929	-112.498	ASC	13	13	59.0	10.2	44.3	7.8
466	125	44187	10769523	13524711	-6.071	5.929	-135.941	ASC	13	20	55.4	11.4	38.3	7.9
469	126	44187	16394311	19149808	-6.071	5.928	9.135	DSC	20	20	51.4	12.0	43.9	7.5
474	127	44187	22019728	24774864	17.928	5.928	-14.307	DSC	17	17	54.8	10.5	45.9	3.8
488	128	44187	27644720	30399808	17.928	5.928	-37.749	DSC	17	17	52.5	14.3	30.9	9.8
500	129	44187	-99999	36024752	*******	5.928	-61.189	DSC	***	13	99999.0	99999.0	99999.0	99999.0
512	130	44187	3889680	41649760	17.927	5.927	-84.631	DSC	13	13	46.0	16.5	36.8	5.4
525	131	44187	44519648	47274784	17.927	5.927	-108.073	DSC	13	13	50.3	11.1	37.5	6.2
535	133	44187	55769472	58524480	17.926	5.926	99999.000	REJ***	13	13	41.6	14.4	35.9	6.1