TBM format

Info on the old Ampex TBM format and converting it to GENPRO

How to extract old TBM file from the tBM envelope

Files are GENPRO-I files, either have a CDC-DPC display code header record with 20-bit binary data packed into 60-bit CDC words followed by data records or an ASCII header and 32-bit binary data. Orig files were not cos-blocked, may be in plib/pstore format which was used in the TBM days.

Note: One can read COS blocked files using bufferin.

1998 Notes:

documentation on the old Ampex TBM format

```
Hi Ron,
   The internal format of the TBM tapes themselves should be transparent..
the user bytes read back looked just like what was written.  The files
that were stored on the TBM tapes, however, might have been COS-blocked
format (either "CH" or "BI"), and/or "PLIB" format, or the follow-on to
PLIB called "PSTORE" (I think it was).  This format is all but lost to
antiquity.. unless the Consulting Services Group has any info on PLIB and/or
PSTORE.
   The COS-blocked files can be un-blocked using the cosconvert software,
which is still around (you probably have access to this).
   I'll cc CSG on this reply in case they have any info about PLIB/PSTORE.
I'm not sure how you could even determine if a file was in this format.
It might even be in CDC disply code, rather than ASCII!
  --John
  In looking at Ron's orig. email again, I don't think there would have
been any PLIB or PSTORE files involved.  So maybe there's no need to look
for documentation about these formats.
   The only other thing besides possibly being in COS-blocked format is the
thing we did at one time to convert "dedicated tapes" that were on the AMPEX
system into MSS files written to to the new (current) MSS.  This may be
another possibility to look into.  I don't remember much about how we did
this, but I could try to find out.
   -- John
*****************************************************************
* John Merrill          email: jhm@ucar.edu
*                       phone: (303)-497-1273
*****************************************************************
```

John,

We already have the "ncaru" utilities and have used them on our Linux

systems for quite awhile.

It certainly is true that all the TBM-format files we have on the MSS

were put there with the "dedicated tape" conversion. Their file names

have not changed since then, e.g., /RAF/TL0910/G55546. If you can find

info on that process, I'd greatly appreciate it.

I remember, just before "shavano" was retired, that I ran a program

(TBMconvert ?) to translate TBM files to COS-block. I guess this was

to make the TBM files easier to handle. If they really are just binary

files and byte oriented, then it may not be too hard to translate them.

However, I spendt a lot of time making COS-blocked copies of all the TBM

files in the RAF archive. (Originally, hey were written by the CDC7600

with 60-bit word sizes.) I know we used "gbytes" in the Cray days to

march down through the files to decode them.

Should I go to the consultants to see what they could find for me?

I thought, since you are more intimately involved with all the mass-store
systems we've had here, that you'd be a good starting point for my search.
I don't think anyone in that office has been around long enough to remember

any of this.

Ron

```
Ron,
   I took a look at the file /RAF/TL0910/G55546.. the "data format" field
has "C1" (the "DF" field in the msallinfo output).  This is the old notation
for COS-blocked, but I'm not sure if it's "character" or "binary" COS-blocked.
It does look like ASCII, thought, with the COS control words interspersed.
Here's a hex dump of the first part of the file.. the first 8 bytes are part
of a COS control word:
  0  0  0  0  0  0  0 64   .......d
 20 42 45 47 49 4e 48 44    BEGINHD
 20 20 20 20 20 20 20 20
 20 20 20 20 20 20 20 20
 20 20 20 20 20 20 20 20
 20 20 2f 47 45 4e 50 52     /GENPR
 4f 20 4f 55 54 50 55 54   O OUTPUT
 20 48 45 41 44 45 52 20    HEADER
 20 20 20 20 20 20 20 20
 20 20 20 20 20 20 20 20
 20 20 20 20 20 20 20 20
 2f 48 44 52 4f 50 54 20   /HDROPT
 3d 20 28 48 45 41 44 45   = (HEADE
 52 2c 4e 4f 53 50 41 4e   R,NOSPAN
 2c 41 53 43 49 49 29 20   ,ASCII)
 20 20 2f 48 45 41 44 45     /HEADE
 52 20 52 45 43 4f 52 44   R RECORD
 20 4f 50 54 49 4f 4e 53    OPTIONS
 20 20 20 20 20 20 20 20
 20 20 20 20 20 20 20 20
 20 20 20 20 20 20 20 20
 2f 48 44 52 4c 4f 47 20   /HDRLOG
 3d 20 20 20 31 30 20 20   =   10
 20 20 20 20 20 20 20 20
 20 20 20 20 20 20 20 20
 20 20 2f 4c 4f 47 49 43     /LOGIC
 41 4c 20 48 45 41 44 45   AL HEADE
 52 20 52 45 43 4f 52 44   R RECORD
 53 20 50 45 52 20 50 48   S PER PH
 59 53 49 43 41 4c 20 52   YSICAL R
 45 43 4f 52 44 20 20 20   ECORD
 2f 48 44 52 53 49 5a 20   /HDRSIZ
 3d 20 20 20 20 20 36 34   =     64
 30 30 20 20 20 20 20 20   00
     ...
       ...
  I won't have any time today to work with you on this, or tomorrow either,
since we have an IBM guy here to help us install a new system, and it is
taking all my time.  But I can get back to this more next week.
   You can read these files in "transparent" format using msrcp.
I'm not sure how to get
"cosconvert" to work on it, or how you use it exactly.  It looks like
this particular file is made up of multiple files internally.
   I'll be more available next week, but I'll try to check my email off
and on today, if I have time.
   -- John
```

Hi John and Ron -

The Data Support Section maintains the COS blocking/unblocking software. You can

download it from their web page

http://www.dss.ucar.edu/libraries/io/

Also, if there is question as to the format, I remember that DSS has some software to

help discover how it was written.

Ron, I know you are familiar with DSS. Their contact email is datahelp@ucar.edu

but

you may have other avenues.

--Dick

Dick Valent <valent@ucar.edu>

```
John,
You dumped a newer file that was written by a Cray.  The files I need to
handle are in CDC display code and have 60-bit word sizes.  One group of
examples would be:
          Name           Size
 /RAF/TL0152/G51038 000020889600
 /RAF/TL0152/G51042 000031457280
 /RAF/TL0152/G51044 000021258240
 /RAF/TL0152/G51046 000037969920
 /RAF/TL0152/G51048 000028876800
 /RAF/TL0152/G51049 000015114240
 /RAF/TL0152/G51050 000014254080
 /RAF/TL0152/G51051 000007004160
 /RAF/TL0152/G51053 000018800640
 /RAF/TL0152/G51054 000004423680
 /RAF/TL0152/G51055 000027033600
 /RAF/TL0152/G51056 000025313280
 /RAF/TL0152/G51057 000018677760
 /RAF/TL0152/G51058 000025559040
 /RAF/TL0152/G51060 000002088960
They are in TBM format.
I also have an example of one of these files where I ran the TBM-to-COS
conversion on shavano not long before it was retired:
 /RAF/TL0152/G51036 000037478400         <-- TBM
 /RAF/TL0152/G51036C 000037396480        <-- COS-blocked TBM
Do you think I can still retrieve useful data from the above files?
Thanks for any help and info.
Ron

Ron,
   I took a look at the example files (/RAF/TL0152/G51036 and
/RAF/TL0152/G51036C) and dumped out the first part.  The only thing I can
tell is that the G51036C one does seem to be in COS-blocked format, but
that's about all I can tell by looking at it.  It looks like a mixture of
text and data, but I can't really tell.  I don't see any strings that are
8-bit ASCII bytes.
   Without knowing what utilities you used to do the conversion, I wouldn't
be able to determine if you would still be able to do this today or not.
I vaguely remember the "gbytes" and "sbytes" subroutines, but don't know
what they did exactly, or if they're still around.
   You could probably come up with a CDC Dispay code to ASCII converter,
but I'm not sure this is all you need.
   Might be a good project for a summer student assistant to work on..
  -- John
```

John,

I absolutely know that the files were written with a CDC display code

header record (or records) followed by binary data (60-bit words with

program output packing 3 values at 20 bits each). I do have routines

for CDC display code --> ASCII and gbytes which will march down the

bits and unpack all the data. From talks a long time ago with Dennis

Joseph, I understand that the MSS reads the data as bytes totally

ignoring the 60-bit word size (why gbytes is needed).

To unpack the straight TBM format, I need to find out how they write

tape images (things like inter-record gaps and eofs). That will go

a long way to being able to unpack the data. That was my original

reason to COS-block those files; those delimiters would be in place.

You are right that it would be a good student project.

Thanks for looking into this.

P.S. I'm into my last two weeks before retirement.

Ron

```
To: datahelp@ucar.edu
EOL/RAF has many data sets on the Mass Store in the old TBM format.  These
data were written in the 70s and early 80s by our GENPRO processor.  It
ran on the Control Data machines, so the output format was a magnetic-tape
image with a header record (or records) in CDC display code followed by
integer binary data records corresponding to the header.  In those days to
conserve space, the data values were written as integers which were first
rounded, scaled and truncated to 20-bit positive integers, packed 3 per
60-bit CDC word.
I have routines to translate CDC display code to ASCII and a version of
gbytes which, I hope, will work to unpack the data.
I'm actually looking for a treatise on the old TBM format that can be
used to write a program to read the old TBM files that would separate
the records and files within a MSS bitfile.  That done, I can convert
the header to ASCII and unpack then unscale the data.
Have you any old software or documentation that would help me?
Thanks.
Ron
```

spangler@ucar.edu

Will Spangler wrote:

Ron,

Can you give me a mss file to peruse, so I can

determine what you have and how to recover it.

Will

Will,

Sure. Here is one group of files. The first one has a COS-block

companion (ends with C) while the others are all just TBM written

to the MSS when the TBM was retired.

Name Size

/RAF/TL0152/G51036 000037478400 <-- TBM

/RAF/TL0152/G51036C 000037396480 <-- COS-blocked TBM

/RAF/TL0152/G51038 000020889600

/RAF/TL0152/G51042 000031457280

/RAF/TL0152/G51044 000021258240

/RAF/TL0152/G51046 000037969920

/RAF/TL0152/G51048 000028876800

/RAF/TL0152/G51049 000015114240

/RAF/TL0152/G51050 000014254080

/RAF/TL0152/G51051 000007004160

/RAF/TL0152/G51053 000018800640

/RAF/TL0152/G51054 000004423680

/RAF/TL0152/G51055 000027033600

/RAF/TL0152/G51056 000025313280

/RAF/TL0152/G51057 000018677760

/RAF/TL0152/G51058 000025559040

/RAF/TL0152/G51060 000002088960

I've attached a header dump for G51036.

Thanks for looking into this, Will!

Ron

John,
Do you have any documentation on the old TBM record structure? I
believe it was similar to COS-blocking and the one time utility to convert from
TBM to COS-blocking was TBMCONV. The actual data record structure which
Ron Ruth indicates below is straight forward, but the unknown is how the
TBM blocked these records for recording.
Thanks,
Will

Hi Will,
I've been emailing Ron Ruth back and forth about this, and I still don't
get what Ron needs, or is asking for. The AMPEX TBM tapes just stored raw
bits, with no knowledge of the internal format of the data. The data was
stored in 1 Megabit blocks on tape, but that had nothing to do with the
internal structure of the file being written (if there was any internal
structure).
I vaguely remember "TBMCONV", but I don't know what it did, exactly.
Must have been something like "cosconvert". But in either case (as with
PLIB and PSTORE), any formatting of data was done before it was written to
the MSS, and could be "undone" after reading the file back from the MSS
by using the appropriate utilities. But the data on the MSS has always been
an uninterpreted string of bits, no matter what type of media it was on.
If you could still read a file from an old TBM tape, you'd get the exact
same string of bits that you'd get by reading the copy of it that now
resides on our current tape media. When we moved the remaning file off of
the AMPEX, we just copied the files bit-for-bit with no conversion of any
kind.
The "data format" field in the msallinfo output is really kind of
misleading. A lot of older files have DF=C1 (for Cray-1, I think it was).
This format should be able to be "undone" using cosconvert, but I don't know
for sure. And whether the text parts of a file are in ASCII or CDC "display
code" or 60-bit words packed into 64 bit words, etc., can't be determined by
the MSS software or the MFD (Master File Directory). You either have to

```
read the file in "transparent" mode, and dump it out, or have some knowledge
as to how the data was written initially, and what internal formatting it
may have had.
   Sorry I can't give you any more information about this.  Let me know if
any of the above was unclear, or if I'm missing the point of Ron's question.
  -- John
```

To all,

In some respects I, too, don't really know what I'm asking for. Before the TBM, RAF obviously wrote data to magnetic tape which had inter-record gaps and file marks. After this first mass-storage system was put in place RAF wrote output files to it. Then, when users asked for copies of data, we would send a request for the TBM (or MSS) to write the data files to tape. I recall not having to specify anything; the records and files would copy to the tapes. I was under the (perhaps mistaken) impression that TBM and COS-blocked tape images had codes embedded in the files to indicate those boundaries and the I/O software would translate them into records and file marks.

As an added tidbit, I doubt that any of our data files were written in the PSTORE or PLIB format. I don't recall that even being available when the TBM was active.

In the past I have been able to handle COS-blocked files, and I used the "TBMCONV" program (tbmconvert.exe on shavano back in 1995), attributed to Jay Chalmers, to make COS-blocked copies of the TBM files that were not COS-blocked. I resurrected some email messages from 1997 that pointed out a couple of errors from a few TBM files that failed to convert:

" tce28 - label buffer table error

tce08 - record control word from tbm volume is in error

The first error most invariably comes from a file that is not in TBM format, and I have verified that in most cases when I have gotten this error, the file already was COS-blocked. In this case tbmconv.exe produces NO output file. The second error seems to indicate a corrupted TBM format bitfile. A partial conversion occurs, and a new output file is written. When retrieved, it is COS-blocked but much shorter than the original."

If the TBM (or COS-block) format had a bit/byte count indicating record length, that could easily translate to tape records. (An email from John in 1997 seemed to indicate that the TBM format had to sync to each record, and if an error occurred, there was no way to recover any data afterwards.) Otherwise, I have no idea how those output tapes would have been written

correctly.

So that's why I was asking about the TBM format. We just had a recent purge where about 500 of the COS-blocked copies I made of TBM files were deleted, and I wanted to make sure I could still read/translate the original TBM-format versions.

I actually thought you'd have some old written manuals or documentation on a dusty shelf somewhere that would have detailed descriptions of the formats and how they were represented.

Thanks again for helping.

Ron

1997 Notes:

Email to John Merrill:

```
John,
For the past couple weeks I have been converting a bunch of old MSS bitfiles
from TBM format to COS-blocked using the Cray Y-MP (shavano) and a program
that Jay Chalmers apparently wrote (tbmconv.exe).  I want to finish this
entire conversion project before "shavano" goes away, because `tbmconv.exe'
has some CAL routines that only work with a Y-MP or earlier class machine.
I picked up the executable version of the program via anonymous ftp from the
SCD/DSS conversion library.  It is dated Sun Dec 18 00:00:00 1994 which brings
up the obvious question:  Is it possible that changes to UNICOS and other
libraries on "shavano" could have made `tbmconv.exe' more prone to erroneous
conversion on its own (rather than from a corrupted input file)?
For the most part these conversions have gone very well.  The program reports
the number of files converted for each bitfile unless some kind of error
occurs.  The program has never core dumped, only quitting with one of the
following two messages:
    tce28 - label buffer table error
    tce08 - record control word from tbm volume is in error
The first error most invariably comes from a file that is not in TBM format,
and I have verified that in most cases when I have gotten this error, the
file already was COS-blocked.  In this case tbmconv.exe produces NO output
file.
The second error seems to indicate a corrupted TBM format bitfile.  A partial
conversion occurs, and a new output file is written.  When retrieved, it is
COS-blocked but much shorter than the original.
Knowing TBM format (as you do), is a file non-convertable if a "tce08"
error occurs, or is it possible to recover from it and somehow convert
all the data possible from such a file?  To be honest, I only got this
error from 7 out of over 1,000 bitfiles, but I thought you may be willing
to look at one (or more) of them to see what you think.
     /RAF/TL0372/G51008
     /RAF/TL0372/G51014
     /RAF/TL0372/G51014
     /RAF/TL0519/G51500
     /RAF/TL0519/G51502
     /RAF/TL0519/G51507
     /RAF/TL0152/ONE192
Ron



Hi Ron,
I looked at tbmconv.exe a little bit.  I found out it runs on Echo (a Cray EL)
as well as shavano.  It also runs on Aztec (a Cray J90).  I looked at one of
the files that is getting the tce08 - record control word error.
  What is the output file supposed to look like?  I tried doing a tbmconv on
one of the files that is not messed up.  It still came back with the error
  sys-9 tbmconv: FATAL error in termination
even tho it says it converted 2 files.  If I use the "cosfile" command on the
resulting output file it says
  Error on record 11584.  Dataset probably not COS-blocked.
Is this normal?  It doesn't seem right.
  If you can give me an example of a file that converts successfully, it would
```

help. Maybe the one I picked has a problem.
  I also have a call in to Dennis Joseph. I'm waiting to hear from him.
I'll let you know if I make any more headway.
  John M.

Thou spake thusly:

     >
     > Hi Ron,
     >
     >   Sorry it took me so long to get back to you on this problem..
     >
     > I looked at tbmconv.exe a little bit. I found out it runs on Echo (a Cray EL)
     > as well as shavano. It also runs on Aztec (a Cray J90). I looked at one of
     > the files that is getting the tce08 - record control word error.

That's good news. Perhaps my panic was unwarranted, thinking it would only
run on shavano which will go away soon.

     >   What is the output file supposed to look like? I tried doing a tbmconv on
     > one of the files that is not messed up. It still came back with the error
     >   sys-9 tbmconv: FATAL error in termination
     > even tho it says it converted 2 files.

The file should be a COS-blocked CDC-7600 pair of files. The first one is
a one-record header file in CDC display code. The second file should be
a binary file with 60-bit integers. These integers actually are comprised
of 3 20-bit packed unsigned itegers. The header file describes the format
of the data file that follows it including the size of each data record.
(The data records are all the same size.)
I have gotten some kind of termination error message when successfully
converting other MSS bitfiles. When we created them, we routinely put
a double EOF at the end of the data file. It may be that tbmconv doesn't
like that.

     > If I use the "cosfile" command on the
     > resulting output file it says
     >
     >   Error on record 11584. Dataset probably not COS-blocked.
     >
     > Is this normal? It doesn't seem right.

That is not a normal respons unless it is beyond the EOD. I suppose it is
possible that the file was corrupt before it was transferred from the TBM
to the MSS.

     >   If you can give me an example of a file that converts successfully, it would
     > help. Maybe the one I picked has a problem.

All the files whose names I sent you have a problem. A number of them with
similar numbers apparently converted successfully. Since I've done over 1,000
of them, I have not checked very many, perhaps 25. These all looked fine.
Examples of "good" file conversions (whose numbers are close to the failed
ones) are:

/RAF/TL0372/G51008	Bitfile before conversion
/RAF/TL0372/G51008C	Bitfile after conversion (verified by dumping header)
/RAF/TL0372/G51015	Bitfile before conversion
/RAF/TL0372/G51015C	Bitfile after conversion (not checked)
/RAF/TL0152/G51116	(failed to convert but I forgot to put it on your list)
/RAF/TL0152/G51117	Bitfile before conversion
/RAF/TL0152/G51117C	Bitfile after conversion (not checked)
/RAF/TL0519/G51501	Bitfile before conversion
/RAF/TL0519/G51501C	Bitfile after conversion (not checked)
/RAF/TL0152/ONE191	Bitfile before conversion
/RAF/TL0152/ONE191C	Bitfile after conversion (not checked)

     >   I also have a call in to Dennis Joseph. I'm waiting to hear from him.
     > I'll let you know if I make any more headway.

John,
I'm not sure how much he really knows about the program either, but he may
have had much more experience with it than I.
Thanks for all your work on this. Obviously if only 8 of 1,070 files fail
to convert, I am still quite satisfied with my conversion project, because
these files that have a problem are very old--vintage 1978 and 1982.
In a separate email, I'll send you the header dump from /RAF/TL0372/G51008C.
It was read by a dump program I have, and it has been converted from CDC
display code to ASCII and formatted into normal-sized records. I hope it
helps.

-- Ron Ruth RAF Data Manager NCAR/ATD/RDP&RAF Voice: (303)497-1084 <ron@raf.atd.ucar.edu> Fax: (303)497-1092

John,
Here is the header I promised you -- between the =-=-=-= lines. The dump
program that created this added the carriage control characters in line one
and spaced it in by two characters. It also added the little heading on top.

and the final line at the bottom.
On the line that begins with "13)" is some kind of error (non fatal), and this type of problem appears somewhere in the header of virtually EVERY converted file. Whatever causes this glitch may also corrupt the real data later on, but I don't know what causes it. In this case the corrupt line without an error should be:

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   13)  20     RAW INS GROUND SPD X COMPONENT (M/S)     XVI       M/S       = (N/ 1000.0) -  500.0
```

Good luck, and thanks again.

```
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
RAF GENPRO tape dump for /RAF/TL0372/G51008C
   revision RLR -- 961008
1
  601-2  M.E.T.  08AUG78          06/14/05          FIRST TIME ON THIS FILE  6 14  7       THIS FILE I
  S ALL OR PART OF TIME PERIOD  6 14  5 TO  9 40  0  DESCRIPTION OF RECORD --  68 PARAMETERS WERE SAVE
  D AT THEIR RESPECTIVE RATES.  THIS REPRESENTS 1208 SAMPLES/PROGRAM CYCLE WHERE A CYCLE IS 1.000 SEC
   THE  1 CYCLES OF1208 SAMP/CYC = 1208 WERE THEN SCALED INTO 20 BIT INTEGERS AND PACKED 3 SAMPLES/WOR
  D INTO 403 60 BIT PACKED WORDS          --METHOD OF SCALING--  A BIAS AD(I) WAS ADDED TO EACH SAMPLE
   OF EACH PARAMETER  TO ELIMINATE ANY NEGATIVE VALUES. THE BIASED SAMPLE WAS THEN MULTIPLIED BY P(I)
  TO INSURE THE PROPER NUMBER OF DECIMAL PLACES WERE SAVED.  THE PACKED RECORD MAY BE UNPACKED BY RIGH
  T JUSTIFYING 20 BITS AT A TIME AND REVERSING THE ABOVE SCALING PROCESS. AS EXAMPLE, S(I)=N/P(I)-AD(I
  ), WHERE N IS THE 20 BIT SCALED INTEGER, S(I) THE DESIRED UNSCALED PARAMETER, AD(I),P(I) THE CORRESP
  ONDING SCALE FACTORS  THE ORDER, RATE, PLOT TITLE, PRINT LAB, UNITS, AD AND P SCALE FACTORS OF EACH
  PARAMETER FOLLOW
    1)  1     PROCESSOR TIME (SECONDS) AFTER MIDNIGHT    TIME       SEC    = (N/    1.0) -    0.0
    2)  1     UNALTERED TAPE TIME (SEC) AFTER MIDNIGHT TPTIME    SEC       = (N/    1.0) -    0.0
    3)  1     LTN-51 ARINC TIME LAG (SEC)               TMLAG    SEC       = (N/ 1000.0) -  100.0
    4)  1       EVENT MARKER 16 BIT WORD               EVMRKS    COUNTS    = (N/    1.0) -    0.0
    5)  1     MAIN CONSOLE SPECIAL EVENTS              EVMAIN    COUNTS    = (N/ 1000.0) -  100.0
    6)  1     EVENT MARKS REMOTE (COUNTS)              EVRMT     COUNTS    = (N/ 1000.0) -  100.0
    7)  1     PILOT MICROPHONE SWITCH (XMIT) (VDC)          XMIT  VDC      = (N/ 1000.0) -  100.0
    8)  1     FIXED ZERO VOLTAGE (VDC)                   FZV     V         = (N/ 1000.0) -  100.0
    9)  20    RAW INS LATITUDE (DEG)                   ALAT      DEG       = (N/ 1000.0) -  100.0
   10)  20    RAW INS LONGITUDE (DEG)                  ALONG     DEG       = (N/ 1000.0) -  200.0
   11)  20    AIRCRAFT TRUE HEADING (ARINC) (DEG)      THI       DEG       = (N/ 1000.0) -  100.0
   12)  20    INS WANDER ANGLE (DEG)                   ALPHA     DEG       = (N/ 1000.0) -  100.0
   13)  20                      ENT (M/S)     XVI       M/S       = (N/ 1000.0) -  500.0
   14)  20    RAW INS GROUND SPD Y COMPONENT (M/S)     YVI       M/S       = (N/ 1000.0) -  500.0
   15)  20    RAW INS GROUND SPEED (M/S)                 GSF       M/S     = (N/ 1000.0) -  100.0
   16)  20    AIRCRAFT PITCH ATTITUDE ANGLE (DEG)      PITCH     DEG       = (N/ 1000.0) -  100.0
   17)  20    AIRCRAFT COARSE ROLL ANGLE (DEG)         CROLL     DEG       = (N/ 1000.0) -  100.0
   18)  20    AIRCRAFT ROLL ATTITUDE ANGLE (DEG)       ROLL      DEG       = (N/ 1000.0) -  100.0
   19)  20    AIRCRAFT TRUE HEADING (YAW) (DEG)          THF     DEG       = (N/ 1000.0) -  100.0
   20)  20    RAW INS VERTICAL VELOCITY (M/S)          VZI       M/S       = (N/ 1000.0) -  500.0
   21)  20    RAW DYNAMIC PRESSURE (WING) (MB)           QCW       MB      = (N/ 1000.0) -  100.0
   22)  20    RAW DYNAMIC PRESSURE (GUST PROBE) (MB)     QCG       MB      = (N/ 1000.0) -  100.0
   23)  20    CORRECTED DYNAMIC PRESR (WING) (MB)        QCWC      MB      = (N/ 1000.0) -  100.0
   24)  20    CORRCTD DYNAMIC PRESR (GUST PROBE) (MB)    QCGC      MB      = (N/ 1000.0) -  100.0
   25)  20    RAW STATIC PRESSURE (FUSELAGE) (MB)           PSF    MB      = (N/ 1000.0) -    0.0
   26)  20    RAW STATIC PRESSURE (BOOM) (MB)            PSB       MB      = (N/ 1000.0) -    0.0
   27)  20    CORRECTED STATIC PRESR (FUSELAGE) (MB)     PSFC      MB      = (N/ 1000.0) -    0.0
   28)  20    CORRECTED STATIC PRESSURE (BOOM) (MB)    PSBC      MB        = (N/ 1000.0) -    0.0
   29)  20    NACA PRESSURE ALTITUDE (M)               HP        M         = (N/   10.0) -  500.0
   30)  20    GEOMETRIC (RADIO) ALTITUDE (M)             HGM       M       = (N/ 1000.0) -  100.0
   31)  20    TOTAL TEMPERATURE (WING ROSEMOUNT) (C)        TTW     C      = (N/ 1000.0) -  100.0
   32)  20    TOTAL TEMPERATURE (REVERSE FLOW) (C)       TTRF       C      = (N/ 1000.0) -  100.0
   33)  20    TOTAL TEMPERATURE (FAST RESPONSE) (C)    TTKP        C       = (N/ 1000.0) -  100.0
   34)  20    AMBIENT TEMPERATURE (ROSEMOUNT) (C)      ATW       C         = (N/ 1000.0) -  100.0
   35)  20    AMBIENT TEMPERATURE (REVERSE-FLOW) (C)   ATRF      C         = (N/ 1000.0) -  100.0
   36)  20    AMBIENT TEMPERATURE (FAST RESPONSE) (C)  ATKP      C         = (N/ 1000.0) -  100.0
   37)  20    DEW/FROSTPOINT TEMP (THERMOELEC) (C)          DP      DEG C  = (N/ 1000.0) -  100.0
   38)  20    DEWPOINT TEMPERATURE (THERMOELEC) (C)    DPC       C         = (N/ 1000.0) -  100.0
   39)  20    ABSOLUTE HUMIDITY (THERMOELEC) (G/M3)    RHOTD      G/M3     = (N/ 1000.0) -  100.0
   40)  20    REFRACTIVE INDEX (N-UNITS)                 RFI      VOLTS    = (N/ 1000.0) -  100.0
   41)  20    ABSOLUTE HUMIDITY (REFRACT) (G/M3)       RHORF      G/M3     = (N/ 1000.0) -  100.0
   42)  20    AIRCRAFT TRUE AIRSPEED (WING) (M/S)        TASW      M/S     = (N/ 1000.0) -  100.0
   43)  20    AIRCRAFT TRUE AIRSPEED (GUST) (M/S)        TASG      M/S     = (N/ 1000.0) -  100.0
   44)  20    RAW J-W LIQUID WATER CONTENT (G/M3)        LWC       G/M3    = (N/ 1000.0) -  100.0
   45)  20    CORRCTD J-W LIQUID WATER CONTENT (G/M3)   LWCC       G/M3    = (N/ 1000.0) -  100.0
   46)  20    ATTACK ANGLE (FIXED VANE) (DEG)          AFIX      DEG       = (N/ 1000.0) -  100.0
   47)  20    ATTACK ANGLE (ROTATING VANE) (DEG)          AROT      DEG    = (N/ 1000.0) -  100.0
   48)  20    SIDESLIP ANGLE (FIXED VANE) (DEG)        BFIX      DEG       = (N/ 1000.0) -  100.0
   49)  20    SIDESLIP ANGLE (ROTATING VANE) (DEG)       BROT      DEG     = (N/ 1000.0) -  100.0
   50)  20    GUST PROBE TIP VERT ACCEL (M/S2)         VAC       M/S2      = (N/ 1000.0) -  100.0
   51)  20    GUST PROBE TIP LATERAL ACCEL (M/S2)      LAC       M/S2      = (N/ 1000.0) -  100.0
   52)  20    WIND VECTOR EAST GUST COMPONENT (M/S)    UI        M/S       = (N/ 1000.0) -  200.0
   53)  20    WIND VECTOR NORTH GUST COMPONENT (M/S)   VI        M/S       = (N/ 1000.0) -  200.0
   54)  20    WIND VECTOR VERTICAL GUST COMP (H) (M/S) WI        M/S       = (N/ 1000.0) -  100.0
   55)  20    WIND VECTOR LNGTDNL GUST COMPONENT (M/S) UX        M/S       = (N/ 1000.0) -  200.0
   56)  20    WIND VECTOR LATERAL GUST COMPONENT (M/S) VY        M/S       = (N/ 1000.0) -  200.0
   57)  20    HORIZONTAL WIND DIRECTION (DEG)            WDRCTN    DEG     = (N/ 1000.0) -  100.0
   58)  20    HORIZONTAL WIND SPEED (M/S)                WSPD      M/S     = (N/ 1000.0) -  200.0
   59)  20    RAW INS GROUND SPD EAST COMP (M/S)        VEW      M/S       = (N/ 1000.0) -  500.0
   60)  20    RAW INS GROUND SPD NORTH COMP (M/S)      VNS       M/S       = (N/ 1000.0) -  500.0
   61)  20    DISTANCE EAST OF START (KM)                DEI       KM      = (N/  100.0) - 1000.0
   62)  20    DISTANCE NORTH OF START (KM)               DNI       KM      = (N/ 1000.0) -  100.0
   63)  20    AIRCRAFT C.G. ACCELERATION (M/S2)        CGAC      M/S2      = (N/ 1000.0) -  100.0
   64)  20    DAMPED AIRCRAFT VERT VELOCITY (M/S)        WP3       M/S     = (N/ 1000.0) -  100.0
   65)  20    PRESSURE-DAMPED INERTIAL ALTITUDE (M)      HI3        M      = (N/   10.0) -  500.0
   66)  20    SECONDARY BOOM PITOT PRESSURE (MB)         QCB       MB      = (N/ 1000.0) -  100.0
```

```
   67)  20     DASIBI OZONE (VDC)                        DASIBI     VDC     = (N/ 1000.0) -  100.0
   68)  20     CCN (MEE) (VDC)                            CCN       VDC     = (N/ 1000.0) -  100.0
 THERE ARE   1 PHYSICAL RECORDS IN THE HEADER FILE
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
```

Ron

Ron,
I tried recompiling tbmconv on shavano (Unicos 8.0) and Aztec (Unicos 9.0) from the tar file of the source that Dennis Joseph had. It compiled and linked OK (using /usr/local/lib/libncaro.a), but when I try to use the binary, I get this error:
tce13 - unknown record mode - cannot perform conversion
and no output file is produced. So DON'T LOSE the binary file tbmconv.exe. It can't be regenerated. It runs on Shavano, and also Aztec.
As far as the 7 or 8 bad files -- there is no way to get past the bad part of the file and continue conversion. Once it gets the tce08 error (bad record control word), there's no hope of getting back in sync.
The best you can do is get the file or files at the beginning of the dataset, and convert those.
You probably already know about using cossplit to break out the files that are good. Here's a procedure I used on a couple of the bad files to recover what I could:
1. tbmconv.exe -l -d rawfile conv01
2. cossplit -p split conv01
3. This should produce one or more files called split.f001, split.f002, etc. that should be normal COS-blocked files. Use "cosfile" to check if they are really OK.
4. You can then use "cosconvert" to convert the split.. files possibly.
You may already have done all this, but if not, give it a try. Beyond that, there is really nothing I can do to help you get the remainder of the data in the bad files. It would be a good "rainy day" project for a student assistant to try dumping the raw files, following the pointers, etc, but would be very time consuming. There is an NCAR publi-cation "The NCAR Terabit Memory System" that shows the format of the label buffer, file control pointer, etc. Digging through the file would be complicated by the fact that there's a conversion from 60 bit words to 64 bit words involved.
Sorry I can't provide any more help with this.
John M.

John,
Again, thanks for all your work. I have not tried "cossplit" or "cosconvert" after doing the conversion. If the conversion was successful and "tbmconv" didn't provide an error, I just wrote the resulting converted file back to the MSS as tbmconv created it. Also I didn't use the two options you chose (-l -d) and just ran it straight without options. Is there any reason to add those?
I have the executable version of the code residing in my home directory on shavano. I guess it would be a good idea to archive it to the MSS so I won't lose it through some disk crash. SCD/DSS also has the executable version at their ftp site:
ftp://ncardata.ucar.edu/libraries/tbmconvert/tbmconv.exe
What does "cosconvert" do besides check the files to see if they really are COS-blocked? I don't need or want to convert them to any other format. (What I'm really asking is why should I want to use "cosconvert?" Is it just a way of viewing the files after splitting?)
Ron

It just lists the names of the files it is converting, as it encounters them. (-l option). The -d (debug) option causes it to print the number and size of the records in each file.
"cosconvert" removes the COS-blocking of a file. I guess you don't really want to do this in your case. cosconvert strips off the COS-blocking envelope and leaves either a pure binary file, or pure character file. I don't know what it does with 7600 Display Code data. There's a man page for cosconvert on shavano..
cosfile just looks at a file and tries to determine if it is COS blocked.
John M.

1995 Notes:

1995 from Dennis Joseph, x1216, joseph@ncar:

tbmconvert.exe G51508 G51508C (executed on shavano)
code from our ftp area under "libraries/tbmconvert".
DSS anonymous ftp information area - ncardata.ucar.edu (128.117.8.111)
WWW - http://www.ucar.edu/dss

Contacts that new about this in the past: Ken Hansen, Gene Harano

Dennis Joseph — email - joseph@ncar.ucar.edu
Data Support Section — voice - (303)-497-1216
NCAR/SCD — fax - (303)-497-1298
PO Box 3000
Boulder, CO 80307

Dennis,
I studied the "t.f" FORTRAN code that I grabbed from the SCD ftp site (which
is supposed to be the source for "tbmconv.exe") and found some BUFFER IN and
BUFFER OUT statements which could possibly point to units 5 and 6, but I get
the impression that they would only be internal assignments. I didn't see
where the command line arguments were read and decoded for use by the program,
since that is the method of specifying the input and output file names.
I suppose UNICOS may not release a unit number after the program ends.
Ron

Ken,
Here is the information you wanted.
   The MSS bitfile is the one that `tbmconv.exe' converted to COS-block
before failing to dump. We could have as many as 3600 of these TBM-formatted
bitfiles. It is important for us to be able to access any of these (in
COS-blocked form) in the future.
   The shavano job script shows the sequence of events. I obviously convert
the selected bitfile to a COS-blocked file before calling upon the `tdump.exe'
program to execute. `tdump.exe' redirects both standard input and standard
output, and it gave me no trouble until I added the commands associated
with the `tbmconv.exe' program.
   The example output at the end is vintage July 1996, but it is a relatively
short example of the kind of output produced by the `tdump.exe' program when
it works correctly.
   Would it be reasonable to just reload the tbmconv.exe program using the
current version of the operating system and libraries?
=-=-=-=-=-=-=-=-=-=-=-=-=-=   TBM-coded MSS bitfile   =-=-=-=-=-=-=-=-=-=-=-=-=-=
                                 /RAF/TL0519/G51482
=-=-=-=-=-=-=-=-=-=-=-=-=-=   shavano job script   =-=-=-=-=-=-=-=-=-=-=-=-=-=

```
# QSUB -eo
# q-class (premium-prem, regular-reg, economy-econ)
# QSUB -q prem
# To use c-shell
# QSUB -s /bin/csh
# To set time limit
# QSUB -lt 600
# QSUB -lT 600
#
set timestamp
set echo
#
# Change to the temporary directory
cd ${TMPDIR}
#
# Start up the job accounting process
ja jacct
#
# Set needed script variables here
set USER = ron
set HOST = chinook
set DOMAIN = atd.ucar.edu
set SOURCE = /home/local/genpro/Cray/tdump
#
#---------------------------  Begin change area  ------------------------------
#
# Warning:  dump program's data file and output file are in following directory
set USERDIR = /home/local/genpro/Cray/tdump
#
set PRGDATA = tdumpRF01.638
set OUTPUT =  tdoutRF01.638
set VOLUME = /RAF/TL0519/G51482
#  Is the bitfile COS blocked ?
set COSBLOCK = no
#set COSBLOCK = yes
#
#---------------------------   End  change area  ------------------------------
#
#  Acquire the executable program
echo "RAF GENPRO tape dump for $VOLUME" >! tdout
echo "   revision RLR -- 961008" >> tdout
cp ~ruth/tdump.exe .
set result = $status
if ($result != 0) then
  echo Could not retrieve tdump.exe from shavano >> tdout
#  No executable on Cray, so try to get executable from MSS, if possible
  msread tdump.exe /RAF/TDUMP/TDUMP.EXE.R6
  set result = $status
  if ($result != 0) then
    echo Could not retrieve tdump.exe from MSS >> tdout
#  No executable on MSS, so try to get executable from $HOST, if possible
    rcp $USER@$HOST.$DOMAIN":"$SOURCE/tdump.exe tdump.exe
    set result = $status
    if ($result != 0) then
      echo   Error $result acquiring tdump.exe from $HOST >> tdout
      goto done
    endif
  endif
endif
#
```

```
# Get program's data file
rcp $USER@$HOST.$DOMAIN":"$USERDIR/$PRGDATA tdump.dat
set result = $status
if ($result != 0) then
   echo "Error $result trying to acquire $PRGDATA from $HOST"
   goto done
endif
#
# Get MSS volume
msread gdata $VOLUME
set result = $status
if ($result != 0) then
   echo "Error $result trying to acquire $VOLUME from MSS"
   goto done
endif
#
#  Convert to COS-blocked file, if necessary
if ($COSBLOCK == "no") then
   ~ruth/tbmconv.exe gdata gdatac
#   Assign unit to input volume
   assign -a gdatac fort.9
else
   assign -a gdata fort.9
endif
#
#  This didn't work either, after the first failure
#assign -a tdump.dat fort.5
#
# Run it
tdump.exe < tdump.dat >> tdout
set result = $status
if ($result != 0) echo   Error $result running tdump.exe >> tdout
#
done:
# Send output back
rcp tdout $USER@$HOST.$DOMAIN":"$USERDIR/$OUTPUT
if ($status != 0) then
   netng FLNM=tdout DF=bi flnm=$OUTPUT
endif
#
ls -l
#
# Done
ja -clfst jacct
=-=-=-=-=-=-=-=-=-=-=-=-=-=    example `tdout' file     =-=-=-=-=-=-=-=-=-=-=-=-=-=
RAF GENPRO tape dump for /RAF/1992/225/HRT/RF07
   revision RLR -- 940311
1
   BEGINHD                          /GENPRO OUTPUT HEADER
  /HDROPT = (HEADER,NOSPAN,ASCII)   /HEADER RECORD OPTIONS
  /HDRLOG =   10                    /LOGICAL HEADER RECORDS PER PHYSICAL RECORD
  /HDRSIZ =     6400                /PHYSICAL HEADER RECORD SIZE (BITS)
  /PROJECT= "2-225-RF07 FIRE2-Cirrus KingAir 26NOV91 "
  /PRDATE = ("26","NOV","91")       /PROJECT DATE
  /PRTIME = ("18H","07M","01S")     /PROJECT TIME
  /BEGSNP = (  18.000    ,  7.0000    ,  1.0000    )
  /ENDSNP = (  21.000    ,  28.000    ,  7.0000    )
  /COMMENT= "            NCAR RAF MAGNETIC TAPE FORMATS                          ",
  /          "  THE CALIBRATED MAGNETIC TAPES ARE PRODUCED BY THE NCAR RAF DATA ",
  /          " MANAGEMENT GROUP, WITH THE GENPRO-II DATA PROCESSING SOFTWARE.   ",
  /          " THE FORMAT OF THESE TAPES INCLUDES A HEADER FILE AND A DATA FILE ",
  /          " WHICH CORRESPONDS TO ALL OR PART OF A PARTICULAR AIRCRAFT FLIGHT ",
  /          " - HEADER FILE DESCRIPTION                                        ",
  /          " THE HEADER FILE DESCRIBING THE DATA FORMATS IS IN ASCII          ",
  /          " CHARACTER FORMAT, 80 CHARACTERS TO A LOGICAL RECORD AND 10       ",
  /          " LOGICAL RECORDS TO A PHYSICAL RECORD.                            ",
  /          " THE HEADER FILE IS DIVIDED INTO THE FOLLOWING FIVE SECTIONS:     ",
  /          " 1. THE GENERAL INFORMATION SECTION CONSISTS OF THREE PARTS:      ",
  /          "    A) THE TITLE LINE IS (BEGINHD).  THIS PART CONTAINS THE       ",
  /          "       INFORMATION PERTAINING TO HEADER FILE: HEADER RECORD OP-    ",
  /          "       TIONS(HDRDPT), LOGICAL HEADER RECORDS PER PHYSICAL RECORD  ",
  /          "       (HDRLOG), PHYSICAL HEADER RECORD SIZE IN BITS(HDRSIZ),     ",
  /          "       RESEARCH FLIGHT PROJECT TITLE(PROJECT), RESEARCH FLIGHT    ",
  /          "       DATE(PRDATE), RESEARCH FLIGHT TIME(PRTIME), BEGINNING TIME ",
  /          "       (BEGSNP), AND ENDING TIME(ENDSNP).                         ",
  /          "     B) THE TITLE LINE IS (COMMENT= NCAR RAF MAGNETIC TAPE        ",
  /          "        FORMATS).  THIS PART DESCRIBES THE DATA FORMAT OF         ",
  /          "        GENPRO-II GENERATED DATA SETS.                            ",
  /          "     C) THIS PART CONTAINS INFORMATION PERTAINING TO DATA SET     ",
  /          "        GENERATION AND THE DATA FILE: PRODUCTION JOB EXECUTION    ",
  /          "        DATE(EXDATE), EXECUTION TIME(EXTIME), COMPUTER USED FOR   ",
  /          "        THE JOB(MACHINE), JOB IDENTIFICATION(JOBID), MEDIA NUMBER ",
  /          "        (MEDIA), DATA RECORD OPTIONS(DATOPT), BITS PER LOGICAL    ",
  /          "        DATA RECORD(LOGBIT), LOGICAL DATA RECORDS PER PHYSICAL    ",
  /          "        RECORD(DATLOG) AND PHYSICAL DATA RECORD SIZE IN BITS      ",
  /          "        (DATSIZ).                                                 ",
  /          "  2. THE TITLE LINE OF THE VARIABLE NAME LIST SECTION IS          ",
  /          "     (/VARIABLE WRITTEN FOR THIS SNAPSHOT PERIOD).  VARIABLE      ",
  /          "     NAMES ARE LISTED ON THE FOLLOWING LINES THAT BEGIN WITH      ",
```

```
/          "     (APPVAR=). THIS SECTION CONTAINS ALL THE VARIABLE NAMES THAT ",
/          "     ARE ON THE DATA FILE.  A BRIEF DESCRIPTION OF EACH VARIABLE  ",
/          "     IS GIVEN IN SECTION 3.                                       ",
/          "  3. THE TITLE LINE OF THIS SECTION IS (ORDVAR  = TITLE).  EACH   ",
/          "     LINE FOLLOWING WILL BEGIN WITH (LETVAR=) AND BE FOLLOWED BY  ",
/          "     THE VARIABLE TITLE.  AT THE END OF THAT LINE, (%FOR,) IS     ",
/          "     FOLLOWED BY THE VARIABLE NAME.                               ",
/          "  4. THE TITLE LINE OF THIS SECTION IS (ORDVAR  = UNITS, SAMPLE,  ",
/          "     RATE, BITS, FSTBIT, SKIP).  EACH LINE FOLLOWING WILL BEGIN   ",
/          "     WITH (LETVAR =), AND BE FOLLOWED BY THE VARIABLE UNITS       ",
/          "     (UNITS),SAMPLING RATE(SAMPLE), OUTPUT RATE(RATE), BIT        ",
/          "     LENGTH OF EACH DATA VALUE(BITS), FIRST BIT LOCATION OF EACH  ",
/          "     VARIABLE(FSTBIT) AND NUMBER OF BITS BETWEEN TWO SEQUENTIAL   ",
/          "     DATA VALUES FOR THE SAME VARIABLE(SKIP).  AT THE END OF      ",
/          "     THAT LINE, (%FOR,) IS FOLLOWED BY THE VARIABLE NAME.         ",
/          "  5. THE TITLE LINE OF THIS SECTION IS (ORDVAR = CONKEY, SCLKEY,  ",
/          "     TERM, FACTOR).  EACH LINE FOLLOWING WILL BEGIN WITH          ",
/          "     (LETVAR =) AND BE FOLLOWED BY THE CONVERSION CODE USED BY    ",
/          "     GENPRO(CONKEY), THE SCALING ALGORITHM SELECTION(SCLKEY),     ",
/          "     THE VALUE OF THE SCALING TERM(TERM), AND THE SCALING FACTOR  ",
/          "     (FACTOR).  AT THE END OF THAT LINE, (%FOR,) IS FOLLOWED BY   ",
/          "     THE VARIABLE NAME.                                           ",
/          " - DATA FILE DESCRIPTION                                          ",
/          "   THE DATA FILE CONTAINS DATA VALUES OF VARIABLES OVER A         ",
/          " SPECIFIED TIME PERIOD (FROM BEGSNP TO ENDSNP) OF A PROJECT       ",
/          " PRODUCTION FLIGHT.  A GENPRO CYCLE INTERVAL OF DATA IS OUTPUT AS ",
/          " A DATA LOGICAL RECORD, WHERE ONE GENPRO CYCLE INTERVAL IS 1      ",
/          " SECOND(S) FOR THIS PROJECT.  BEFORE THE DATA ARE WRITTEN TO THE  ",
/          " OUTPUT DESTINATION, EACH DATA VALUE IS SCALED AND TRUNCATED TO A ",
/          " SPECIFIED NUMBER OF BINARY BITS ("BITS") AND THEN WRITTEN AS A   ",
/          " POSITIVE INTEGER. (I.E. A "TERM" IS ADDED TO EACH VALUE OF       ",
/          " VARIABLE AND THE RESULT IS MULTIPLED BY A "FACTOR".)             ",
/          "   EACH VARIABLE IN THE DATA FILE HAS A CORRESPONDING "FSTBIT",   ",
/          " "BITS","RATE","TERM", AND "FACTOR".  A GIVEN VARIABLE CAN BE     ",
/          " CONVERTED FROM A PACKED INTEGER VALUE TO AN UNPACKED REAL VALUE  ",
/          " BY FOLLOWING THIS PROCEDURE:                                     ",
/          "       TAKE "BITS" NUMBER OF BITS STARTING AT "FSTBIT"            ",
/          "       FROM THIS INTEGER VALUE DIVIDE BY THE "FACTOR"             ",
/          "       AND THEN SUBTRACT THE BIAS "TERM" FROM THE RESULT.         ",
/          "   IF THE VARIABLE HAS MORE THAN ONE SAMPLE PER GENPRO CYCLE      ",
/          " INTERVAL IN A LOGICAL RECORD, THE PROCEDURE MUST BE REPEATED     ",
/          " "RATE" TIMES IN A LOOP WHERE I=1 TO "RATE". THE STARTING BIT     ",
/          " NUMBER FOR EACH SEPARATE ITERATION IS THEN:                      ",
/          "       FSTBIT + BITS*(I-1)                                        ",
/          "   IF ALL PACKED VALUES ARE UNPACKED AND PLACED IN AN ARRAY,      ",
/          " THE FOLLOWING EQUATION MAY BE USED TO OBTAIN THE STARTING        ",
/          " INDEX OF A GIVEN VARIABLE (IVAR) WITHIN THE UNPACKED ARRAY:      ",
/          "       INDEX(IVAR) = ((FSTBIT(IVAR)-1)/BITS)+1                    "
/EXDATE = ("29","DEC","93")       /EXECUTION DATE
/EXTIME = ("15H","33M","53S")     /EXECUTION TIME
/MACHINE= "CRAY"                  /EXECUTION MACHINE
/JOBID  = "CK6496                          " /JOB IDENTIFICATION
 MEDIA  =  1                      /MEDIA NUMBER
 DATOPT = (AUTO,NOSPAN)           /DATA RECORD OPTIONS
 LOGBIT =    30048                /BITS PER LOGICAL DATA RECORD
 DATLOG =    3                    /LOGICAL DATA RECORDS PER PHYSICAL RECORD
 DATSIZ =    90176                /PHYSICAL DATA RECORD SIZE (BITS)
/VARIABLES WRITTEN FOR THIS SNAPSHOT PERIOD
 APPVAR = HR        , MIN       , SEC       , TPTIME    , PTIME     , ALAT
 APPVAR = ALON      , GLAT      , GLON      , CLAT      , CLON      , DEI
 APPVAR = DNI       , PSFDC     , PSWC      , DPTC      , DPBC      , DPCRC
 APPVAR = HGM       , PALT      , RHODT     , RHODB     , RHOCR     , RHUM
 APPVAR = MR        , SPHUM     , PLWCCZ    , LWCCZ     , CON2C1    , CON2P1
 APPVAR = RICE      , SEV       , SWT       , SWB       , IRTC      , IRBC
 APPVAR = CGS       , GVEW      , GVNS      , PSFD      , PSW       , CRHP
 APPVAR = DPT       , DPB       , FPCRC     , VCRH      , PLWC      , LWC
 APPVAR = IRT       , IRB       , DTT       , STT       , DTB       , STB
 APPVAR = SDWC1     , SDWP1     , TWDA1     , TWDB1     , TWCH1     , GALT
 APPVAR = GGEOH     , GMODE     , V10       , V10R      , TADS      , TV10
 APPVAR = FLOADS    , FZV       , FZVR      , VDREF     , PLWCF     , SUM15F
 APPVAR = DBARF     , DISPF     , FACT      , FBMFR     , FRANGE    , FRESET
 APPVAR = FSTROB    , AFSP01    , AFSP02    , AFSP03    , AFSP04    , AFSP05
 APPVAR = AFSP06    , AFSP07    , AFSP08    , AFSP09    , AFSP10    , AFSP11
 APPVAR = AFSP12    , AFSP13    , AFSP14    , AFSP15    , CFSP01    , CFSP02
 APPVAR = CFSP03    , CFSP04    , CFSP05    , CFSP06    , CFSP07    , CFSP08
 APPVAR = CFSP09    , CFSP10    , CFSP11    , CFSP12    , CFSP13    , CFSP14
 APPVAR = CFSP15    , ATB       , ATRF      , WD        , WS        , UI
 APPVAR = VI        , WI        , UX        , VY        , THETA     , THETAE
 APPVAR = RHOLA     , THI       , ROLL      , PITCH     , ACINS     , IVSPD
 APPVAR = GSI       , VEW       , VNS       , TASW      , TASR      , QCWC
 APPVAR = QCRC      , QCW       , QCR       , AKRD      , SSRD      , ADIFR
 APPVAR = BDIFR     , TTB       , TTRF      , VLA       , RFLAG     , ACCFSPH
 ORDVAR = TITLE
 LETVAR = "UNALTERED TAPE TIME                    ", %FOR, HR
 LETVAR = "UNALTERED TAPE TIME                    ", %FOR, MIN
 LETVAR = "UNALTERED TAPE TIME                    ", %FOR, SEC
 LETVAR = "RAW TAPE TIME                          ", %FOR, TPTIME
 LETVAR = "PROCESSOR TIME                         ", %FOR, PTIME
 LETVAR = "IRS LATITUDE                           ", %FOR, ALAT
```

```
LETVAR = "IRS LONGITUDE                              ", %FOR, ALON
LETVAR = "GPS LATITUDE                               ", %FOR, GLAT
LETVAR = "GPS LONGITUDE                              ", %FOR, GLON
LETVAR = "LORAN C LATITUDE                           ", %FOR, CLAT
LETVAR = "LORAN C LONGITUDE                          ", %FOR, CLON
LETVAR = "DISTANCE EAST OF START                     ", %FOR, DEI
LETVAR = "DISTANCE NORTH OF START                    ", %FOR, DNI
LETVAR = "CORRECTED STATIC PRESSURE (FUSELAGE DI)    ", %FOR, PSFDC
LETVAR = "CORRECTED STATIC PRESSURE (WING)           ", %FOR, PSWC
LETVAR = "DEW POINT TEMPERATURE (THERMOELEC) (TOP)   ", %FOR, DPTC
LETVAR = "DEW POINT TEMPERATURE (THERMOELEC) (BOT)   ", %FOR, DPBC
LETVAR = "CORRECTED CYROGENIC DEW POINT TEMP         ", %FOR, DPCRC
LETVAR = "GEOMETRIC (RADIO) ALTITUDE                 ", %FOR, HGM
LETVAR = "NACA PRESSURE ALTITUDE                     ", %FOR, PALT
LETVAR = "ABSOLUTE HUMIDITY (THERMOELEC) (TOP)       ", %FOR, RHODT
LETVAR = "ABSOLUTE HUMIDITY (THERMOELEC) (BOT)       ", %FOR, RHODB
LETVAR = "ABSOLUTE HUMIDITY (CRYOGENIC)              ", %FOR, RHOCR
LETVAR = "RELATIVE HUMIDITY                          ", %FOR, RHUM
LETVAR = "MIXING RATIO                               ", %FOR, MR
LETVAR = "SPECIFIC HUMIDITY                          ", %FOR, SPHUM
LETVAR = "CORRECTED PMS-KING LIQUID WATER CONTENT    ", %FOR, PLWCCZ
LETVAR = "CORRECTED C-T LIQUID WATER CONTENT         ", %FOR, LWCCZ
LETVAR = "PMS 2DC PARTICLE CONCENTRATIONS            ", %FOR, CON2C1
LETVAR = "PMS 2DP PARTICLE CONCENTRATION             ", %FOR, CON2P1
LETVAR = "RAW ICING RATE INDICATOR                   ", %FOR, RICE
LETVAR = "ICE IMPACTOR EXPOSURE MONITOR              ", %FOR, SEV
LETVAR = "TOP SHORTWAVE IRRADIANCE                   ", %FOR, SWT
LETVAR = "BOTTOM SHORTWAVE IRRADIANCE                ", %FOR, SWB
LETVAR = "TOP INFRARED CORRECTED IRRADIANCE          ", %FOR, IRTC
LETVAR = "BOTTOM INFRARED CORRECTED IRRADIANCE       ", %FOR, IRBC
LETVAR = "LORAN C GROUND SPEED                       ", %FOR, CGS
LETVAR = "GPS EAST-WEST GROUND SPD COMP              ", %FOR, GVEW
LETVAR = "GPS NORTH-SOUTH GROUND SPD COMP            ", %FOR, GVNS
LETVAR = "RAW STATIC PRESSURE (FUSELAGE DI)          ", %FOR, PSFD
LETVAR = "RAW STATIC PRESSURE (WING)                 ", %FOR, PSW
LETVAR = "CYROGENIC INLET PRESSURE                   ", %FOR, CRHP
LETVAR = "DEW/FROST POINT TEMP (THERMOELEC) (TOP)    ", %FOR, DPT
LETVAR = "DEW/FROST POINT TEMP (THERMOELEC) (BOT)    ", %FOR, DPB
LETVAR = "CORRECTED CRYOGENIC FROSTPOINT TEMP        ", %FOR, FPCRC
LETVAR = "RAW CYROGENIC DEW POINT TEMP               ", %FOR, VCRH
LETVAR = "RAW PMS-KING POWER                         ", %FOR, PLWC
LETVAR = "RAW C-T LIQUID WATER CONTENT               ", %FOR, LWC
LETVAR = "RAW TOP INFRARED IRRADIANCE                ", %FOR, IRT
LETVAR = "RAW BOTTOM INFRARED IRRADIANCE             ", %FOR, IRB
LETVAR = "TOP PYRGEOMETER DOME TEMPERATURE           ", %FOR, DTT
LETVAR = "TOP PYRGEOMETER SINK TEMPERATURE           ", %FOR, STT
LETVAR = "BOTTOM PYRGEOMETER DOME TEMPERATURE        ", %FOR, DTB
LETVAR = "BOTTOM PYRGEOMETER SINK TEMPERATURE        ", %FOR, STB
LETVAR = "SHADOW-OR, 2D-C, PROBE 1                   ", %FOR, SDWC1
LETVAR = "SHADOW-OR, 2D-P, PROBE 1                   ", %FOR, SDWP1
LETVAR = "PMS-2D-C1 HOUSEKEEPING                     ", %FOR, TWDA1
LETVAR = "PMS-2D-P1 HOUSEKEEPING                     ", %FOR, TWDB1
LETVAR = "PMS-2D PROBE 1 HOUSEKEEPING                ", %FOR, TWCH1
LETVAR = "GPS ALTITUDE                               ", %FOR, GALT
LETVAR = "GPS GEOIDAL HEIGHT                         ", %FOR, GGEOH
LETVAR = "GPS MODE OF OPERATION                      ", %FOR, GMODE
LETVAR = "10-V REFERENCE                             ", %FOR, V10
LETVAR = "10-V REFERENCE THROUGH RESISTOR            ", %FOR, V10R
LETVAR = "AIR TEMP ADS INTERFACE                     ", %FOR, TADS
LETVAR = "TEMP OF VOLTAGE REFERENCE                  ", %FOR, TV10
LETVAR = "AIR TEMP FLOW MONITOR - ADS                ", %FOR, FLOADS
LETVAR = "FIXED ZERO VOLTAGE                         ", %FOR, FZV
LETVAR = "FIXED ZERO VOLTAGE THRU RESISTOR           ", %FOR, FZVR
LETVAR = "DIFFERENCE OF 10-V REFERENCES              ", %FOR, VDREF
LETVAR = "FSSP LIQUID WATER CONTENT                  ", %FOR, PLWCF
LETVAR = "PMS FSSP PROBE (TOTAL COUNTS)              ", %FOR, SUM15F
LETVAR = "FSSP MEAN DIAMETER                         ", %FOR, DBARF
LETVAR = "FSSP DISPERSION (SIGMA/DBARF)              ", %FOR, DISPF
LETVAR = "FSSP CALCULATED ACTIVITY FRACTION          ", %FOR, FACT
LETVAR = "FSSP BEAM FRACTION (FSSP/FSTROB)           ", %FOR, FBMFR
LETVAR = "FSSP RANGE                                 ", %FOR, FRANGE
LETVAR = "FSSP FAST RESETS                           ", %FOR, FRESET
LETVAR = "FSSP TOTAL STROBES                         ", %FOR, FSTROB
LETVAR = "PMS PROBE FSSP RAW COUNT CELL 01           ", %FOR, AFSP01
LETVAR = "PMS PROBE FSSP RAW COUNT CELL 02           ", %FOR, AFSP02
LETVAR = "PMS PROBE FSSP RAW COUNT CELL 03           ", %FOR, AFSP03
LETVAR = "PMS PROBE FSSP RAW COUNT CELL 04           ", %FOR, AFSP04
LETVAR = "PMS PROBE FSSP RAW COUNT CELL 05           ", %FOR, AFSP05
LETVAR = "PMS PROBE FSSP RAW COUNT CELL 06           ", %FOR, AFSP06
LETVAR = "PMS PROBE FSSP RAW COUNT CELL 07           ", %FOR, AFSP07
LETVAR = "PMS PROBE FSSP RAW COUNT CELL 08           ", %FOR, AFSP08
LETVAR = "PMS PROBE FSSP RAW COUNT CELL 09           ", %FOR, AFSP09
LETVAR = "PMS PROBE FSSP RAW COUNT CELL 10           ", %FOR, AFSP10
LETVAR = "PMS PROBE FSSP RAW COUNT CELL 11           ", %FOR, AFSP11
LETVAR = "PMS PROBE FSSP RAW COUNT CELL 12           ", %FOR, AFSP12
LETVAR = "PMS PROBE FSSP RAW COUNT CELL 13           ", %FOR, AFSP13
LETVAR = "PMS PROBE FSSP RAW COUNT CELL 14           ", %FOR, AFSP14
LETVAR = "PMS PROBE FSSP RAW COUNT CELL 15           ", %FOR, AFSP15
LETVAR = "FSSP CORRECTED CONCENTRATION CELL 01       ", %FOR, CFSP01
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LETVAR = "FSSP CORRECTED CONCENTRATION CELL 02    ", %FOR, CFSP02
LETVAR = "FSSP CORRECTED CONCENTRATION CELL 03    ", %FOR, CFSP03
LETVAR = "FSSP CORRECTED CONCENTRATION CELL 04    ", %FOR, CFSP04
LETVAR = "FSSP CORRECTED CONCENTRATION CELL 05    ", %FOR, CFSP05
LETVAR = "FSSP CORRECTED CONCENTRATION CELL 06    ", %FOR, CFSP06
LETVAR = "FSSP CORRECTED CONCENTRATION CELL 07    ", %FOR, CFSP07
LETVAR = "FSSP CORRECTED CONCENTRATION CELL 08    ", %FOR, CFSP08
LETVAR = "FSSP CORRECTED CONCENTRATION CELL 09    ", %FOR, CFSP09
LETVAR = "FSSP CORRECTED CONCENTRATION CELL 10    ", %FOR, CFSP10
LETVAR = "FSSP CORRECTED CONCENTRATION CELL 11    ", %FOR, CFSP11
LETVAR = "FSSP CORRECTED CONCENTRATION CELL 12    ", %FOR, CFSP12
LETVAR = "FSSP CORRECTED CONCENTRATION CELL 13    ", %FOR, CFSP13
LETVAR = "FSSP CORRECTED CONCENTRATION CELL 14    ", %FOR, CFSP14
LETVAR = "FSSP CORRECTED CONCENTRATION CELL 15    ", %FOR, CFSP15
LETVAR = "AMBIENT TEMPERATURE (BOOM)              ", %FOR, ATB
LETVAR = "AMBIENT TEMPERATURE (REVERSE FLOW)      ", %FOR, ATRF
LETVAR = "HORIZONTAL WIND DIRECTION               ", %FOR, WD
LETVAR = "HORIZONTAL WIND SPEED                   ", %FOR, WS
LETVAR = "WIND EAST COMPONENT                     ", %FOR, UI
LETVAR = "WIND NORTH COMPONENT                    ", %FOR, VI
LETVAR = "WIND VERTICAL COMPONENT                 ", %FOR, WI
LETVAR = "WIND LONGITUDINAL COMPONENT             ", %FOR, UX
LETVAR = "WIND LATERAL COMPONENT                  ", %FOR, VY
LETVAR = "POTENTIAL TEMPERATURE                   ", %FOR, THETA
LETVAR = "EQUIVALENT POTENTIAL TEMPERATURE        ", %FOR, THETAE
LETVAR = "CORRECTED L-A ABSOLUTE HUMIDITY         ", %FOR, RHOLA
LETVAR = "IRS AIRCRAFT TRUE HEADING               ", %FOR, THI
LETVAR = "AIRCRAFT ROLL ATTITUDE ANGLE            ", %FOR, ROLL
LETVAR = "AIRCRAFT PITCH ATTITUDE ANGLE           ", %FOR, PITCH
LETVAR = "IRS AIRCRAFT VERTICAL ACCELERATION      ", %FOR, ACINS
LETVAR = "IRS AIRCRAFT VERTICAL VELOCITY          ", %FOR, IVSPD
LETVAR = "IRS GROUND SPEED                        ", %FOR, GSI
LETVAR = "IRS GROUND SPEED EAST COMPONENT         ", %FOR, VEW
LETVAR = "IRS GROUND SPEED NORTH COMPONENT        ", %FOR, VNS
LETVAR = "AIRCRAFT TRUE AIRSPEED (WING)           ", %FOR, TASW
LETVAR = "AIRCRAFT TRUE AIRSPEED (RADOME)         ", %FOR, TASR
LETVAR = "CORRECTED DYNAMIC PRESSURE (WING)       ", %FOR, QCWC
LETVAR = "CORRECTED DYNAMIC PRESSURE (RADOME)     ", %FOR, QCRC
LETVAR = "RAW DYNAMIC PRESSURE (WING)             ", %FOR, QCW
LETVAR = "RAW DYNAMIC PRESSURE (RADOME)           ", %FOR, QCR
LETVAR = "ATTACK ANGLE (RADOME)                   ", %FOR, AKRD
LETVAR = "SIDESLIP ANGLE (RADOME)                 ", %FOR, SSRD
LETVAR = "ATTACK DIFFERENTIAL PRESSURE (RADOME)   ", %FOR, ADIFR
LETVAR = "SIDESLIP DIFFERENTIAL PRESSURE (RADOME) ", %FOR, BDIFR
LETVAR = "TOTAL TEMPERATURE (BOOM)                ", %FOR, TTB
LETVAR = "TOTAL TEMPERATURE (REVERSE FLOW)        ", %FOR, TTRF
LETVAR = "RAW LYMAN-ALPHA VOLTAGE                 ", %FOR, VLA
LETVAR = "FLAG=-1.0,((RHOLA-RHOTD)/RHOTD) > .20   ", %FOR, RFLAG
LETVAR = "FSSP ACCUMULATED RAW COUNT(1-15) HIGH RT", %FOR, ACCFSPH
ORDVAR = UNITS, SAMPLE, RATE, BITS, FSTBIT, SKIP
LETVAR = " HR     ",     1,     1, 32,       1,     0, %FOR, HR
LETVAR = " MIN    ",     1,     1, 32,      33,     0, %FOR, MIN
LETVAR = " S      ",     1,     1, 32,      65,     0, %FOR, SEC
LETVAR = " S      ",     1,     1, 32,      97,     0, %FOR, TPTIME
LETVAR = " S      ",     1,     1, 32,     129,     0, %FOR, PTIME
LETVAR = " DEG    ",     1,     1, 32,     161,     0, %FOR, ALAT
LETVAR = " DEG    ",     1,     1, 32,     193,     0, %FOR, ALON
LETVAR = " DEG    ",     1,     1, 32,     225,     0, %FOR, GLAT
LETVAR = " DEG    ",     1,     1, 32,     257,     0, %FOR, GLON
LETVAR = " DEG    ",     1,     1, 32,     289,     0, %FOR, CLAT
LETVAR = " DEG    ",     1,     1, 32,     321,     0, %FOR, CLON
LETVAR = " KM     ",     1,     1, 32,     353,     0, %FOR, DEI
LETVAR = " KM     ",     1,     1, 32,     385,     0, %FOR, DNI
LETVAR = " MB     ",     1,     1, 32,     417,     0, %FOR, PSFDC
LETVAR = " MB     ",     1,     1, 32,     449,     0, %FOR, PSWC
LETVAR = " C      ",     1,     1, 32,     481,     0, %FOR, DPTC
LETVAR = " C      ",     1,     1, 32,     513,     0, %FOR, DPBC
LETVAR = " C      ",     1,     1, 32,     545,     0, %FOR, DPCRC
LETVAR = " M      ",     1,     1, 32,     577,     0, %FOR, HGM
LETVAR = " M      ",     1,     1, 32,     609,     0, %FOR, PALT
LETVAR = " G/M3   ",     1,     1, 32,     641,     0, %FOR, RHODT
LETVAR = " G/M3   ",     1,     1, 32,     673,     0, %FOR, RHODB
LETVAR = " G/M3   ",     1,     1, 32,     705,     0, %FOR, RHOCR
LETVAR = " PCT    ",     1,     1, 32,     737,     0, %FOR, RHUM
LETVAR = " G/KG   ",     1,     1, 32,     769,     0, %FOR, MR
LETVAR = " G/KG   ",     1,     1, 32,     801,     0, %FOR, SPHUM
LETVAR = " G/M3   ",     1,     1, 32,     833,     0, %FOR, PLWCCZ
LETVAR = " G/M3   ",     1,     1, 32,     865,     0, %FOR, LWCCZ
LETVAR = " N/L    ",     1,     1, 32,     897,     0, %FOR, CON2C1
LETVAR = " N/L    ",     1,     1, 32,     929,     0, %FOR, CON2P1
LETVAR = " VDC    ",     1,     1, 32,     961,     0, %FOR, RICE
LETVAR = " vdc    ",     1,     1, 32,     993,     0, %FOR, SEV
LETVAR = " W/M2   ",     1,     1, 32,    1025,     0, %FOR, SWT
LETVAR = " W/M2   ",     1,     1, 32,    1057,     0, %FOR, SWB
LETVAR = " W/M2   ",     1,     1, 32,    1089,     0, %FOR, IRTC
LETVAR = " W/M2   ",     1,     1, 32,    1121,     0, %FOR, IRBC
LETVAR = " M/S    ",     1,     1, 32,    1153,     0, %FOR, CGS
LETVAR = " M/S    ",     1,     1, 32,    1185,     0, %FOR, GVEW
LETVAR = " M/S    ",     1,     1, 32,    1217,     0, %FOR, GVNS
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LETVAR = " MB     ",     1,     1, 32,    1249,     0, %FOR, PSFD
LETVAR = " MB     ",     1,     1, 32,    1281,     0, %FOR, PSW
LETVAR = " MB     ",     1,     1, 32,    1313,     0, %FOR, CRHP
LETVAR = " C      ",     1,     1, 32,    1345,     0, %FOR, DPT
LETVAR = " C      ",     1,     1, 32,    1377,     0, %FOR, DPB
LETVAR = " C      ",     1,     1, 32,    1409,     0, %FOR, FPCRC
LETVAR = " C      ",     1,     1, 32,    1441,     0, %FOR, VCRH
LETVAR = " W      ",     1,     1, 32,    1473,     0, %FOR, PLWC
LETVAR = " G/M3   ",     1,     1, 32,    1505,     0, %FOR, LWC
LETVAR = " W/M2   ",     1,     1, 32,    1537,     0, %FOR, IRT
LETVAR = " W/M2   ",     1,     1, 32,    1569,     0, %FOR, IRB
LETVAR = " C      ",     1,     1, 32,    1601,     0, %FOR, DTT
LETVAR = " C      ",     1,     1, 32,    1633,     0, %FOR, STT
LETVAR = " C      ",     1,     1, 32,    1665,     0, %FOR, DTB
LETVAR = " C      ",     1,     1, 32,    1697,     0, %FOR, STB
LETVAR = " CNTS   ",     1,     1, 32,    1729,     0, %FOR, SDWC1
LETVAR = " CNTS   ",     1,     1, 32,    1761,     0, %FOR, SDWP1
LETVAR = " VDC    ",     1,     1, 32,    1793,     0, %FOR, TWDA1
LETVAR = " VDC    ",     1,     1, 32,    1825,     0, %FOR, TWDB1
LETVAR = " VDC    ",     1,     1, 32,    1857,     0, %FOR, TWCH1
LETVAR = " M      ",     1,     1, 32,    1889,     0, %FOR, GALT
LETVAR = " M      ",     1,     1, 32,    1921,     0, %FOR, GGEOH
LETVAR = "        ",     1,     1, 32,    1953,     0, %FOR, GMODE
LETVAR = " VDC    ",     1,     1, 32,    1985,     0, %FOR, V10
LETVAR = " VDC    ",     1,     1, 32,    2017,     0, %FOR, V10R
LETVAR = " C      ",     1,     1, 32,    2049,     0, %FOR, TADS
LETVAR = " C      ",     1,     1, 32,    2081,     0, %FOR, TV10
LETVAR = " C      ",     1,     1, 32,    2113,     0, %FOR, FLOADS
LETVAR = " VDC    ",     1,     1, 32,    2145,     0, %FOR, FZV
LETVAR = " VDC    ",     1,     1, 32,    2177,     0, %FOR, FZVR
LETVAR = " VDC    ",     1,     1, 32,    2209,     0, %FOR, VDREF
LETVAR = " G/M3   ",     1,     1, 32,    2241,     0, %FOR, PLWCF
LETVAR = " CNTS   ",     1,     1, 32,    2273,     0, %FOR, SUM15F
LETVAR = " uM     ",     1,     1, 32,    2305,     0, %FOR, DBARF
LETVAR = "        ",     1,     1, 32,    2337,     0, %FOR, DISPF
LETVAR = "        ",     1,     1, 32,    2369,     0, %FOR, FACT
LETVAR = "        ",     1,     1, 32,    2401,     0, %FOR, FBMFR
LETVAR = "        ",     1,     1, 32,    2433,     0, %FOR, FRANGE
LETVAR = " CNTS   ",     1,     1, 32,    2465,     0, %FOR, FRESET
LETVAR = " CNTS   ",     1,     1, 32,    2497,     0, %FOR, FSTROB
LETVAR = " CNTS   ",     1,     1, 32,    2529,     0, %FOR, AFSP01
LETVAR = " CNTS   ",     1,     1, 32,    2561,     0, %FOR, AFSP02
LETVAR = " CNTS   ",     1,     1, 32,    2593,     0, %FOR, AFSP03
LETVAR = " CNTS   ",     1,     1, 32,    2625,     0, %FOR, AFSP04
LETVAR = " CNTS   ",     1,     1, 32,    2657,     0, %FOR, AFSP05
LETVAR = " CNTS   ",     1,     1, 32,    2689,     0, %FOR, AFSP06
LETVAR = " CNTS   ",     1,     1, 32,    2721,     0, %FOR, AFSP07
LETVAR = " CNTS   ",     1,     1, 32,    2753,     0, %FOR, AFSP08
LETVAR = " CNTS   ",     1,     1, 32,    2785,     0, %FOR, AFSP09
LETVAR = " CNTS   ",     1,     1, 32,    2817,     0, %FOR, AFSP10
LETVAR = " CNTS   ",     1,     1, 32,    2849,     0, %FOR, AFSP11
LETVAR = " CNTS   ",     1,     1, 32,    2881,     0, %FOR, AFSP12
LETVAR = " CNTS   ",     1,     1, 32,    2913,     0, %FOR, AFSP13
LETVAR = " CNTS   ",     1,     1, 32,    2945,     0, %FOR, AFSP14
LETVAR = " CNTS   ",     1,     1, 32,    2977,     0, %FOR, AFSP15
LETVAR = " N/CM3  ",     1,     1, 32,    3009,     0, %FOR, CFSP01
LETVAR = " N/CM3  ",     1,     1, 32,    3041,     0, %FOR, CFSP02
LETVAR = " N/CM3  ",     1,     1, 32,    3073,     0, %FOR, CFSP03
LETVAR = " N/CM3  ",     1,     1, 32,    3105,     0, %FOR, CFSP04
LETVAR = " N/CM3  ",     1,     1, 32,    3137,     0, %FOR, CFSP05
LETVAR = " N/CM3  ",     1,     1, 32,    3169,     0, %FOR, CFSP06
LETVAR = " N/CM3  ",     1,     1, 32,    3201,     0, %FOR, CFSP07
LETVAR = " N/CM3  ",     1,     1, 32,    3233,     0, %FOR, CFSP08
LETVAR = " N/CM3  ",     1,     1, 32,    3265,     0, %FOR, CFSP09
LETVAR = " N/CM3  ",     1,     1, 32,    3297,     0, %FOR, CFSP10
LETVAR = " N/CM3  ",     1,     1, 32,    3329,     0, %FOR, CFSP11
LETVAR = " N/CM3  ",     1,     1, 32,    3361,     0, %FOR, CFSP12
LETVAR = " N/CM3  ",     1,     1, 32,    3393,     0, %FOR, CFSP13
LETVAR = " N/CM3  ",     1,     1, 32,    3425,     0, %FOR, CFSP14
LETVAR = " N/CM3  ",     1,     1, 32,    3457,     0, %FOR, CFSP15
LETVAR = " C      ",    20,    20, 32,    3489,     0, %FOR, ATB
LETVAR = " C      ",    20,    20, 32,    4129,     0, %FOR, ATRF
LETVAR = " DEG    ",    20,    20, 32,    4769,     0, %FOR, WD
LETVAR = " M/S    ",    20,    20, 32,    5409,     0, %FOR, WS
LETVAR = " M/S    ",    20,    20, 32,    6049,     0, %FOR, UI
LETVAR = " M/S    ",    20,    20, 32,    6689,     0, %FOR, VI
LETVAR = " M/S    ",    20,    20, 32,    7329,     0, %FOR, WI
LETVAR = " M/S    ",    20,    20, 32,    7969,     0, %FOR, UX
LETVAR = " M/S    ",    20,    20, 32,    8609,     0, %FOR, VY
LETVAR = " K      ",    20,    20, 32,    9249,     0, %FOR, THETA
LETVAR = " K      ",    20,    20, 32,    9889,     0, %FOR, THETAE
LETVAR = " G/M3   ",    20,    20, 32,   10529,     0, %FOR, RHOLA
LETVAR = " DEG    ",    20,    20, 32,   11169,     0, %FOR, THI
LETVAR = " DEG    ",    20,    20, 32,   11809,     0, %FOR, ROLL
LETVAR = " DEG    ",    20,    20, 32,   12449,     0, %FOR, PITCH
LETVAR = " M/S2   ",    20,    20, 32,   13089,     0, %FOR, ACINS
LETVAR = " M/S    ",    20,    20, 32,   13729,     0, %FOR, IVSPD
LETVAR = " M/S    ",    20,    20, 32,   14369,     0, %FOR, GSI
LETVAR = " M/S    ",    20,    20, 32,   15009,     0, %FOR, VEW
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LETVAR = " M/S    ",    20,    20, 32,   15649,     0, %FOR, VNS
LETVAR = " M/S    ",    20,    20, 32,   16289,     0, %FOR, TASW
LETVAR = " M/S    ",    20,    20, 32,   16929,     0, %FOR, TASR
LETVAR = " MB     ",    20,    20, 32,   17569,     0, %FOR, QCWC
LETVAR = " MB     ",    20,    20, 32,   18209,     0, %FOR, QCRC
LETVAR = " MB     ",    20,    20, 32,   18849,     0, %FOR, QCW
LETVAR = " MB     ",    20,    20, 32,   19489,     0, %FOR, QCR
LETVAR = " DEG    ",    20,    20, 32,   20129,     0, %FOR, AKRD
LETVAR = " DEG    ",    20,    20, 32,   20769,     0, %FOR, SSRD
LETVAR = " MB     ",    20,    20, 32,   21409,     0, %FOR, ADIFR
LETVAR = " MB     ",    20,    20, 32,   22049,     0, %FOR, BDIFR
LETVAR = " C      ",    20,    20, 32,   22689,     0, %FOR, TTB
LETVAR = " C      ",    20,    20, 32,   23329,     0, %FOR, TTRF
LETVAR = " VDC    ",    20,    20, 32,   23969,     0, %FOR, VLA
LETVAR = "        ",    20,    20, 32,   24609,     0, %FOR, RFLAG
LETVAR = " CNTS   ",   150,   150, 32,   25249,     0, %FOR, ACCFSPH
ORDVAR = CONKEY, SCLKEY, TERM, FACTOR
LETVAR =  1, 2,  1000.0000    , 1000.0000    , %FOR, HR
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LETVAR =  1, 2,  1000.0000    , 1000.0000    , %FOR, PSWC
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LETVAR =  1, 2,  1000.0000    , 1000.0000    , %FOR, DPBC
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  LETVAR =  1, 2,  1000.0000    , 1000.0000    , %FOR, AFSP01
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  LETVAR =  1, 2,  1000.0000    , 1000.0000    , %FOR, AFSP10
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  LETVAR =  1, 2,  1000.0000    , 1000.0000    , %FOR, VY
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  LETVAR =  1, 2,  1000.0000    , 1000.0000    , %FOR, THETAE
  LETVAR =  1, 2,  1000.0000    , 1000.0000    , %FOR, RHOLA
  LETVAR =  1, 2,  1000.0000    , 1000.0000    , %FOR, THI
  LETVAR =  1, 2,  1000.0000    , 1000.0000    , %FOR, ROLL
  LETVAR =  1, 2,  1000.0000    , 1000.0000    , %FOR, PITCH
  LETVAR =  1, 2,  1000.0000    , 1000.0000    , %FOR, ACINS
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  LETVAR =  1, 2,  1000.0000    , 1000.0000    , %FOR, QCRC
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  ENDHD
 EOF SENSED IN HEADER; DATA FILE REC. NO.      56
 THERE ARE  56 PHYSICAL RECORDS IN THE HEADER FILE
1  2-225-RF07 FIRE2-Cirrus KingAir 26NOV91
  THIS FILE IS ALL OR PART OF THE TIME PERIOD  18.000    7.0000    1.0000    TO    21.000    28.000    7.0000
  DESCRIPTION OF TAPE:
          HEADER FILE --   640 BITS (104 ASCII CHARACTERS) PER LOGICAL RECORD
                            10 LOGICAL HEADER RECORDS PER PHYSICAL RECORD
                          6400 BITS PER PHYSICAL HEADER RECORD
            DATA FILE -- 30048 BITS PER LOGICAL DATA RECORD
                             3 LOGICAL DATA RECORDS PER PHYSICAL RECORD
                         90176 BITS PER PHYSICAL DATA RECORD
  PROJECT FLIGHT DATE 26NOV91
  PROJECT FLIGHT TIME 18  07  01
  MACHINE = CRAY
   144 PARAMETERS WERE SAVED AT THEIR RESPECTIVE RATES
   939 SAMPLES WERE SCALED INTO 32 BIT INTEGER WORDS.
```

METHOD OF SCALING -- A BIAS TERM WAS ADDED TO EACH SAMPLE OF EACH PARAMETER TO ELIMINATE ANY NEGATIVE VALUES. THE BIASED SAMPLE WAS THEN MULTIPLIED BY FACTOR TO INSURE THAT THE PROPER NUMBER OF DECIMAL PLACES WERE SAVED. THE RECORD MAY BE DECODED BY RIGHT JUSTIFYING 32 BITS AT A TIME AND REVERSING THE ABOVE SCALING PROCESS. FOR EXAMPLE: S(I)=N/FACTOR(I)-TERM(I), WHERE N IS THE 32 BIT SCALED INTEGER WORD, AND S(I) IS THE DESIRED UNSCALED PARAMETER.

I	NFSTWD	NFSTBT	RATE	TITLE	NAME	UNITS	FACTOR	TERM
1	1	1	1	UNALTERED TAPE TIME	HR	HR	(N/ 1000.0) -	1000.0
2	2	33	1	UNALTERED TAPE TIME	MIN	MIN	(N/ 1000.0) -	1000.0
3	3	65	1	UNALTERED TAPE TIME	SEC	S	(N/ 1000.0) -	1000.0
4	4	97	1	RAW TAPE TIME	TPTIME	S	(N/ 1000.0) -	1000.0
5	5	129	1	PROCESSOR TIME	PTIME	S	(N/ 1000.0) -	1000.0
6	6	161	1	IRS LATITUDE	ALAT	DEG	(N/ 1000.0) -	1000.0
7	7	193	1	IRS LONGITUDE	ALON	DEG	(N/ 1000.0) -	1000.0
8	8	225	1	GPS LATITUDE	GLAT	DEG	(N/ 1000.0) -	1000.0
9	9	257	1	GPS LONGITUDE	GLON	DEG	(N/ 1000.0) -	1000.0
10	10	289	1	LORAN C LATITUDE	CLAT	DEG	(N/ 1000.0) -	1000.0
11	11	321	1	LORAN C LONGITUDE	CLON	DEG	(N/ 1000.0) -	1000.0
12	12	353	1	DISTANCE EAST OF START	DEI	KM	(N/ 1000.0) -	1000.0
13	13	385	1	DISTANCE NORTH OF START	DNI	KM	(N/ 1000.0) -	1000.0
14	14	417	1	CORRECTED STATIC PRESSURE (FUSELAGE DI)	PSFDC	MB	(N/ 1000.0) -	1000.0
15	15	449	1	CORRECTED STATIC PRESSURE (WING)	PSWC	MB	(N/ 1000.0) -	1000.0
16	16	481	1	DEW POINT TEMPERATURE (THERMOELEC) (TOP)	DPTC	C	(N/ 1000.0) -	1000.0
17	17	513	1	DEW POINT TEMPERATURE (THERMOELEC) (BOT)	DPBC	C	(N/ 1000.0) -	1000.0
18	18	545	1	CORRECTED CYROGENIC DEW POINT TEMP	DPCRC	C	(N/ 1000.0) -	1000.0
19	19	577	1	GEOMETRIC (RADIO) ALTITUDE	HGM	M	(N/ 1000.0) -	1000.0
20	20	609	1	NACA PRESSURE ALTITUDE	PALT	M	(N/ 1000.0) -	1000.0
21	21	641	1	ABSOLUTE HUMIDITY (THERMOELEC) (TOP)	RHODT	G/M3	(N/ 1000.0) -	1000.0
22	22	673	1	ABSOLUTE HUMIDITY (THERMOELEC) (BOT)	RHODB	G/M3	(N/ 1000.0) -	1000.0
23	23	705	1	ABSOLUTE HUMIDITY (CRYOGENIC)	RHOCR	G/M3	(N/ 1000.0) -	1000.0
24	24	737	1	RELATIVE HUMIDITY	RHUM	PCT	(N/ 1000.0) -	1000.0
25	25	769	1	MIXING RATIO	MR	G/KG	(N/ 1000.0) -	1000.0
26	26	801	1	SPECIFIC HUMIDITY	SPHUM	G/KG	(N/ 1000.0) -	1000.0
27	27	833	1	CORRECTED PMS-KING LIQUID WATER CONTENT	PLWCCZ	G/M3	(N/ 1000.0) -	1000.0
28	28	865	1	CORRECTED C-T LIQUID WATER CONTENT	LWCCZ	G/M3	(N/ 1000.0) -	1000.0
29	29	897	1	PMS 2DC PARTICLE CONCENTRATIONS	CON2C1	N/L	(N/ 1000.0) -	1000.0
30	30	929	1	PMS 2DP PARTICLE CONCENTRATION	CON2P1	N/L	(N/ 1000.0) -	1000.0
31	31	961	1	RAW ICING RATE INDICATOR	RICE	VDC	(N/ 1000.0) -	1000.0
32	32	993	1	ICE IMPACTOR EXPOSURE MONITOR	SEV	vdc	(N/ 1000.0) -	1000.0
33	33	1025	1	TOP SHORTWAVE IRRADIANCE	SWT	W/M2	(N/ 1000.0) -	1000.0
34	34	1057	1	BOTTOM SHORTWAVE IRRADIANCE	SWB	W/M2	(N/ 1000.0) -	1000.0
35	35	1089	1	TOP INFRARED CORRECTED IRRADIANCE	IRTC	W/M2	(N/ 1000.0) -	1000.0
36	36	1121	1	BOTTOM INFRARED CORRECTED IRRADIANCE	IRBC	W/M2	(N/ 1000.0) -	1000.0
37	37	1153	1	LORAN C GROUND SPEED	CGS	M/S	(N/ 1000.0) -	1000.0
38	38	1185	1	GPS EAST-WEST GROUND SPD COMP	GVEW	M/S	(N/ 1000.0) -	1000.0
39	39	1217	1	GPS NORTH-SOUTH GROUND SPD COMP	GVNS	M/S	(N/ 1000.0) -	1000.0
40	40	1249	1	RAW STATIC PRESSURE (FUSELAGE DI)	PSFD	MB	(N/ 1000.0) -	1000.0
41	41	1281	1	RAW STATIC PRESSURE (WING)	PSW	MB	(N/ 1000.0) -	1000.0
42	42	1313	1	CYROGENIC INLET PRESSURE	CRHP	MB	(N/ 1000.0) -	1000.0
43	43	1345	1	DEW/FROST POINT TEMP (THERMOELEC) (TOP)	DPT	C	(N/ 1000.0) -	1000.0
44	44	1377	1	DEW/FROST POINT TEMP (THERMOELEC) (BOT)	DPB	C	(N/ 1000.0) -	1000.0
45	45	1409	1	CORRECTED CRYOGENIC FROSTPOINT TEMP	FPCRC	C	(N/ 1000.0) -	1000.0
46	46	1441	1	RAW CYROGENIC DEW POINT TEMP	VCRH	C	(N/ 1000.0) -	1000.0
47	47	1473	1	RAW PMS-KING POWER	PLWC	W	(N/ 1000.0) -	1000.0
48	48	1505	1	RAW C-T LIQUID WATER CONTENT	LWC	G/M3	(N/ 1000.0) -	1000.0
49	49	1537	1	RAW TOP INFRARED IRRADIANCE	IRT	W/M2	(N/ 1000.0) -	1000.0
50	50	1569	1	RAW BOTTOM INFRARED IRRADIANCE	IRB	W/M2	(N/ 1000.0) -	1000.0
51	51	1601	1	TOP PYRGEOMETER DOME TEMPERATURE	DTT	C	(N/ 1000.0) -	1000.0
52	52	1633	1	TOP PYRGEOMETER SINK TEMPERATURE	STT	C	(N/ 1000.0) -	1000.0
53	53	1665	1	BOTTOM PYRGEOMETER DOME TEMPERATURE	DTB	C	(N/ 1000.0) -	1000.0
54	54	1697	1	BOTTOM PYRGEOMETER SINK TEMPERATURE	STB	C	(N/ 1000.0) -	1000.0
55	55	1729	1	SHADOW-OR, 2D-C, PROBE 1	SDWC1	CNTS	(N/ 1000.0) -	1000.0
56	56	1761	1	SHADOW-OR, 2D-P, PROBE 1	SDWP1	CNTS	(N/ 1000.0) -	1000.0
57	57	1793	1	PMS-2D-C1 HOUSEKEEPING	TWDA1	VDC	(N/ 1000.0) -	1000.0
58	58	1825	1	PMS-2D-P1 HOUSEKEEPING	TWDB1	VDC	(N/ 1000.0) -	1000.0
59	59	1857	1	PMS-2D PROBE 1 HOUSEKEEPING	TWCH1	VDC	(N/ 1000.0) -	1000.0
60	60	1889	1	GPS ALTITUDE	GALT	M	(N/ 1000.0) -	1000.0
61	61	1921	1	GPS GEOIDAL HEIGHT	GGEOH	M	(N/ 1000.0) -	1000.0
62	62	1953	1	GPS MODE OF OPERATION	GMODE		(N/ 1.0) -	0.0
63	63	1985	1	10-V REFERENCE	V10	VDC	(N/ 1000.0) -	1000.0
64	64	2017	1	10-V REFERENCE THROUGH RESISTOR	V10R	VDC	(N/ 1000.0) -	1000.0
65	65	2049	1	AIR TEMP ADS INTERFACE	TADS	C	(N/ 1000.0) -	1000.0
66	66	2081	1	TEMP OF VOLTAGE REFERENCE	TV10	C	(N/ 1000.0) -	1000.0
67	67	2113	1	AIR TEMP FLOW MONITOR - ADS	FLOADS	C	(N/ 1000.0) -	1000.0
68	68	2145	1	FIXED ZERO VOLTAGE	FZV	VDC	(N/ 1000.0) -	1000.0
69	69	2177	1	FIXED ZERO VOLTAGE THRU RESISTOR	FZVR	VDC	(N/ 1000.0) -	1000.0
70	70	2209	1	DIFFERENCE OF 10-V REFERENCES	VDREF	VDC	(N/ 1000.0) -	1000.0
71	71	2241	1	FSSP LIQUID WATER CONTENT	PLWCF	G/M3	(N/ 1000.0) -	1000.0
72	72	2273	1	PMS FSSP PROBE (TOTAL COUNTS)	SUM15F	CNTS	(N/ 1000.0) -	1000.0
73	73	2305	1	FSSP MEAN DIAMETER	DBARF	uM	(N/ 1000.0) -	1000.0
74	74	2337	1	FSSP DISPERSION (SIGMA/DBARF)	DISPF		(N/ 1000.0) -	1000.0
75	75	2369	1	FSSP CALCULATED ACTIVITY FRACTION	FACT		(N/ 1000.0) -	1000.0
76	76	2401	1	FSSP BEAM FRACTION (FSSP/FSTROB)	FBMFR		(N/ 1000.0) -	1000.0
77	77	2433	1	FSSP RANGE	FRANGE		(N/ 1000.0) -	1000.0
78	78	2465	1	FSSP FAST RESETS	FRESET	CNTS	(N/ 1000.0) -	1000.0
79	79	2497	1	FSSP TOTAL STROBES	FSTROB	CNTS	(N/ 1000.0) -	1000.0
80	80	2529	1	PMS PROBE FSSP RAW COUNT CELL 01	AFSP01	CNTS	(N/ 1000.0) -	1000.0
81	81	2561	1	PMS PROBE FSSP RAW COUNT CELL 02	AFSP02	CNTS	(N/ 1000.0) -	1000.0
82	82	2593	1	PMS PROBE FSSP RAW COUNT CELL 03	AFSP03	CNTS	(N/ 1000.0) -	1000.0

83	83	2625	1	PMS PROBE FSSP RAW COUNT CELL 04	AFSP04	CNTS	(N/ 1000.0) -	1000.0
84	84	2657	1	PMS PROBE FSSP RAW COUNT CELL 05	AFSP05	CNTS	(N/ 1000.0) -	1000.0
85	85	2689	1	PMS PROBE FSSP RAW COUNT CELL 06	AFSP06	CNTS	(N/ 1000.0) -	1000.0
86	86	2721	1	PMS PROBE FSSP RAW COUNT CELL 07	AFSP07	CNTS	(N/ 1000.0) -	1000.0
87	87	2753	1	PMS PROBE FSSP RAW COUNT CELL 08	AFSP08	CNTS	(N/ 1000.0) -	1000.0
88	88	2785	1	PMS PROBE FSSP RAW COUNT CELL 09	AFSP09	CNTS	(N/ 1000.0) -	1000.0
89	89	2817	1	PMS PROBE FSSP RAW COUNT CELL 10	AFSP10	CNTS	(N/ 1000.0) -	1000.0
90	90	2849	1	PMS PROBE FSSP RAW COUNT CELL 11	AFSP11	CNTS	(N/ 1000.0) -	1000.0
91	91	2881	1	PMS PROBE FSSP RAW COUNT CELL 12	AFSP12	CNTS	(N/ 1000.0) -	1000.0
92	92	2913	1	PMS PROBE FSSP RAW COUNT CELL 13	AFSP13	CNTS	(N/ 1000.0) -	1000.0
93	93	2945	1	PMS PROBE FSSP RAW COUNT CELL 14	AFSP14	CNTS	(N/ 1000.0) -	1000.0
94	94	2977	1	PMS PROBE FSSP RAW COUNT CELL 15	AFSP15	CNTS	(N/ 1000.0) -	1000.0
95	95	3009	1	FSSP CORRECTED CONCENTRATION CELL 01	CFSP01	N/CM3	(N/ 1000.0) -	1000.0
96	96	3041	1	FSSP CORRECTED CONCENTRATION CELL 02	CFSP02	N/CM3	(N/ 1000.0) -	1000.0
97	97	3073	1	FSSP CORRECTED CONCENTRATION CELL 03	CFSP03	N/CM3	(N/ 1000.0) -	1000.0
98	98	3105	1	FSSP CORRECTED CONCENTRATION CELL 04	CFSP04	N/CM3	(N/ 1000.0) -	1000.0
99	99	3137	1	FSSP CORRECTED CONCENTRATION CELL 05	CFSP05	N/CM3	(N/ 1000.0) -	1000.0
100	100	3169	1	FSSP CORRECTED CONCENTRATION CELL 06	CFSP06	N/CM3	(N/ 1000.0) -	1000.0
101	101	3201	1	FSSP CORRECTED CONCENTRATION CELL 07	CFSP07	N/CM3	(N/ 1000.0) -	1000.0
102	102	3233	1	FSSP CORRECTED CONCENTRATION CELL 08	CFSP08	N/CM3	(N/ 1000.0) -	1000.0
103	103	3265	1	FSSP CORRECTED CONCENTRATION CELL 09	CFSP09	N/CM3	(N/ 1000.0) -	1000.0
104	104	3297	1	FSSP CORRECTED CONCENTRATION CELL 10	CFSP10	N/CM3	(N/ 1000.0) -	1000.0
105	105	3329	1	FSSP CORRECTED CONCENTRATION CELL 11	CFSP11	N/CM3	(N/ 1000.0) -	1000.0
106	106	3361	1	FSSP CORRECTED CONCENTRATION CELL 12	CFSP12	N/CM3	(N/ 1000.0) -	1000.0
107	107	3393	1	FSSP CORRECTED CONCENTRATION CELL 13	CFSP13	N/CM3	(N/ 1000.0) -	1000.0
108	108	3425	1	FSSP CORRECTED CONCENTRATION CELL 14	CFSP14	N/CM3	(N/ 1000.0) -	1000.0
109	109	3457	1	FSSP CORRECTED CONCENTRATION CELL 15	CFSP15	N/CM3	(N/ 1000.0) -	1000.0
110	110	3489	20	AMBIENT TEMPERATURE (BOOM)	ATB	C	(N/ 1000.0) -	1000.0
111	130	4129	20	AMBIENT TEMPERATURE (REVERSE FLOW)	ATRF	C	(N/ 1000.0) -	1000.0
112	150	4769	20	HORIZONTAL WIND DIRECTION	WD	DEG	(N/ 1000.0) -	1000.0
113	170	5409	20	HORIZONTAL WIND SPEED	WS	M/S	(N/ 1000.0) -	1000.0
114	190	6049	20	WIND EAST COMPONENT	UI	M/S	(N/ 1000.0) -	1000.0
115	210	6689	20	WIND NORTH COMPONENT	VI	M/S	(N/ 1000.0) -	1000.0
116	230	7329	20	WIND VERTICAL COMPONENT	WI	M/S	(N/ 1000.0) -	1000.0
117	250	7969	20	WIND LONGITUDINAL COMPONENT	UX	M/S	(N/ 1000.0) -	1000.0
118	270	8609	20	WIND LATERAL COMPONENT	VY	M/S	(N/ 1000.0) -	1000.0
119	290	9249	20	POTENTIAL TEMPERATURE	THETA	K	(N/ 1000.0) -	1000.0
120	310	9889	20	EQUIVALENT POTENTIAL TEMPERATURE	THETAE	K	(N/ 1000.0) -	1000.0
121	330	10529	20	CORRECTED L-A ABSOLUTE HUMIDITY	RHOLA	G/M3	(N/ 1000.0) -	1000.0
122	350	11169	20	IRS AIRCRAFT TRUE HEADING	THI	DEG	(N/ 1000.0) -	1000.0
123	370	11809	20	AIRCRAFT ROLL ATTITUDE ANGLE	ROLL	DEG	(N/ 1000.0) -	1000.0
124	390	12449	20	AIRCRAFT PITCH ATTITUDE ANGLE	PITCH	DEG	(N/ 1000.0) -	1000.0
125	410	13089	20	IRS AIRCRAFT VERTICAL ACCELERATION	ACINS	M/S2	(N/ 1000.0) -	1000.0
126	430	13729	20	IRS AIRCRAFT VERTICAL VELOCITY	IVSPD	M/S	(N/ 1000.0) -	1000.0
127	450	14369	20	IRS GROUND SPEED	GSI	M/S	(N/ 1000.0) -	1000.0
128	470	15009	20	IRS GROUND SPEED EAST COMPONENT	VEW	M/S	(N/ 1000.0) -	1000.0
129	490	15649	20	IRS GROUND SPEED NORTH COMPONENT	VNS	M/S	(N/ 1000.0) -	1000.0
130	510	16289	20	AIRCRAFT TRUE AIRSPEED (WING)	TASW	M/S	(N/ 1000.0) -	1000.0
131	530	16929	20	AIRCRAFT TRUE AIRSPEED (RADOME)	TASR	M/S	(N/ 1000.0) -	1000.0
132	550	17569	20	CORRECTED DYNAMIC PRESSURE (WING)	QCWC	MB	(N/ 1000.0) -	1000.0
133	570	18209	20	CORRECTED DYNAMIC PRESSURE (RADOME)	QCRC	MB	(N/ 1000.0) -	1000.0
134	590	18849	20	RAW DYNAMIC PRESSURE (WING)	QCW	MB	(N/ 1000.0) -	1000.0
135	610	19489	20	RAW DYNAMIC PRESSURE (RADOME)	QCR	MB	(N/ 1000.0) -	1000.0
136	630	20129	20	ATTACK ANGLE (RADOME)	AKRD	DEG	(N/ 1000.0) -	1000.0
137	650	20769	20	SIDESLIP ANGLE (RADOME)	SSRD	DEG	(N/ 1000.0) -	1000.0
138	670	21409	20	ATTACK DIFFERENTIAL PRESSURE (RADOME)	ADIFR	MB	(N/ 1000.0) -	1000.0
139	690	22049	20	SIDESLIP DIFFERENTIAL PRESSURE (RADOME)	BDIFR	MB	(N/ 1000.0) -	1000.0
140	710	22689	20	TOTAL TEMPERATURE (BOOM)	TTB	C	(N/ 1000.0) -	1000.0
141	730	23329	20	TOTAL TEMPERATURE (REVERSE FLOW)	TTRF	C	(N/ 1000.0) -	1000.0
142	750	23969	20	RAW LYMAN-ALPHA VOLTAGE	VLA	VDC	(N/ 1000.0) -	1000.0
143	770	24609	20	FLAG=-1.0,((RHOLA-RHOTD)*/RHOTD) > .20*	*RFLAG*		*(N/* 1000.0) -	1000.0
144	790	25249	150	FSSP ACCUMULATED RAW COUNT(1-15) HIGH RT	ACCFSPH	CNTS	(N/ 1000.0) -	1000.0

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HR MI SEC	HR	MIN	SEC	TPTIME	PTIME	ALAT	ALON	GLAT	GLON	CLAT
	HR	MIN	S	S	S	DEG	DEG	DEG	DEG	DEG
19:60: 0.000	20.000	0.000	0.000	72000.000	72000.000	37.089	-95.617	37.080	-95.612	37.070
20:00: 1.000	20.000	0.000	1.000	72001.000	72001.000	37.088	-95.617	37.079	-95.611	37.069
20:00: 2.000	20.000	0.000	2.000	72002.000	72002.000	37.088	-95.616	37.078	-95.610	37.069
20:00: 3.000	20.000	0.000	3.000	72003.000	72003.000	37.087	-95.615	37.077	-95.609	37.068
20:00: 4.000	20.000	0.000	4.000	72004.000	72004.000	37.086	-95.614	37.077	-95.608	37.067
20:00: 5.000	20.000	0.000	5.000	72005.000	72005.000	37.086	-95.612	37.076	-95.607	37.067

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HR MI SEC	CLON	DEI	DNI	PSFDC	PSWC	DPTC	DPBC	DPCRC	HGM	PALT
	DEG	KM	KM	MB	MB	C	C	C	M	M
19:60: 0.000	-95.610	-3.325	-0.961	343.246	343.844	-46.254	-45.618	-44.370	710.648	8247.780
20:00: 1.000	-95.609	-3.239	-1.042	343.230	343.810	-46.202	-45.610	-44.290	710.646	8248.107
20:00: 2.000	-95.608	-3.156	-1.121	343.218	343.802	-46.156	-45.603	-44.177	710.641	8248.350
20:00: 3.000	-95.606	-3.065	-1.197	343.230	343.809	-46.107	-45.596	-44.137	710.648	8248.108
20:00: 4.000	-95.605	-2.974	-1.268	343.214	343.808	-46.064	-45.590	-44.172	710.634	8248.418
20:00: 5.000	-95.604	-2.882	-1.340	343.174	343.801	-46.015	-45.583	-44.218	710.624	8249.230

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HR MI SEC	RHODT	RHODB	RHOCR	RHUM	MR	SPHUM	PLWCCZ	LWCCZ	CON2C1	CON2P1
	G/M3	G/M3	G/M3	PCT	G/KG	G/KG	G/M3	G/M3	N/L	N/L
19:60: 0.000	0.091	0.098	0.112	63.765	0.176	0.176	0.000	0.000	6.394	75.767
20:00: 1.000	0.092	0.098	0.113	64.115	0.177	0.177	0.000	0.000	8.158	75.701
20:00: 2.000	0.092	0.098	0.114	64.351	0.178	0.178	0.000	0.000	16.329	79.243

20:00: 3.000	0.092	0.098	0.114	64.652	0.179	0.179	0.000	0.000	25.950	86.521
20:00: 4.000	0.093	0.098	0.114	64.910	0.180	0.180	0.000	0.000	30.490	93.967
20:00: 5.000	0.093	0.098	0.113	65.135	0.181	0.181	0.000	0.000	38.062	93.878

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HR MI SEC	RICE	SEV	SWT	SWB	IRTC	IRBC	CGS	GVEW	GVNS	PSFD
	VDC	vdc	W/M2	W/M2	W/M2	W/M2	M/S	M/S	M/S	MB
19:60: 0.000	1.457	8.592	229.929	255.884	129.551	193.182	103.137	73.600	-86.300	343.131
20:00: 1.000	1.458	8.591	231.894	257.945	131.125	191.522	103.549	77.600	-83.700	343.119
20:00: 2.000	1.458	8.592	236.244	261.551	133.532	189.428	104.063	81.500	-81.000	343.107
20:00: 3.000	1.458	8.592	241.510	265.890	136.009	187.090	104.578	85.200	-78.200	343.125
20:00: 4.000	1.458	8.592	249.493	268.239	139.094	185.310	105.195	88.800	-75.300	343.112
20:00: 5.000	1.458	8.591	259.758	266.917	142.688	184.491	105.195	92.300	-72.100	343.090

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HR MI SEC	PSW	CRHP	DPT	DPB	FPCRC	VCRH	PLWC	LWC	IRT	IRB
	MB	MB	C	C	C	C	W	G/M3	W/M2	W/M2
19:60: 0.000	345.278	314.264	-42.443	-41.835	-40.664	-41.452	0.372	0.003	-67.484	4.114
20:00: 1.000	345.242	314.414	-42.393	-41.828	-40.588	-41.371	0.372	0.004	-65.973	2.434
20:00: 2.000	345.234	314.452	-42.349	-41.821	-40.480	-41.263	0.372	0.004	-63.599	0.273
20:00: 3.000	345.237	314.442	-42.302	-41.815	-40.442	-41.226	0.373	0.003	-61.146	-2.074
20:00: 4.000	345.234	314.494	-42.262	-41.808	-40.475	-41.257	0.374	0.004	-58.081	-3.879
20:00: 5.000	345.214	314.562	-42.215	-41.803	-40.519	-41.298	0.374	0.004	-54.472	-4.777

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HR MI SEC	DTT	STT	DTB	STB	SDWC1	SDWP1	TWDA1	TWDB1	TWCH1	GALT
	C	C	C	C	CNTS	CNTS	VDC	VDC	VDC	M
19:60: 0.000	-36.628	-35.501	-35.508	-34.964	148.989	1650.512	0.000	0.000	0.000	8331.400
20:00: 1.000	-36.636	-35.505	-35.511	-34.965	189.857	1646.959	0.000	0.000	0.000	8331.900
20:00: 2.000	-36.642	-35.508	-35.518	-34.968	379.899	1723.851	0.000	0.000	0.000	8332.500
20:00: 3.000	-36.648	-35.512	-35.522	-34.970	603.133	1879.920	0.000	0.000	0.000	8333.100
20:00: 4.000	-36.654	-35.516	-35.525	-34.972	708.025	2040.227	0.000	0.000	0.000	8333.600
20:00: 5.000	-36.658	-35.520	-35.531	-34.973	879.105	2027.426	0.000	0.000	0.000	8334.000

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HR MI SEC	GGEOH	GMODE	V10	V10R	TADS	TV10	FLOADS	FZV	FZVR	VDREF
	M		VDC	VDC	C	C	C	VDC	VDC	VDC
19:60: 0.000	-27.800	3.000	10.000	9.301	17.642	19.299	21.928	-0.002	-0.006	0.000
20:00: 1.000	-27.800	3.000	9.999	9.301	17.636	19.305	21.928	-0.002	-0.007	-0.001
20:00: 2.000	-27.800	3.000	10.000	9.301	17.642	19.305	21.928	-0.001	-0.006	-0.001
20:00: 3.000	-27.800	3.000	9.999	9.301	17.648	19.299	21.928	-0.002	-0.007	-0.001
20:00: 4.000	-27.800	3.000	10.000	9.301	17.648	19.305	21.941	-0.001	-0.006	0.000
20:00: 5.000	-27.800	3.000	9.999	9.229	17.642	19.311	21.941	-0.001	-0.007	0.000

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HR MI SEC	PLWCF	SUM15F	DBARF	DISPF	FACT	FBMFR	FRANGE	FRESET	FSTROB	AFSP01
	G/M3	CNTS	uM					CNTS	CNTS	CNTS
19:60: 0.000	0.012	44.000	23.477	0.352	0.003	0.605	1.000	820.000	71.000	1.000
20:00: 1.000	0.017	58.000	21.966	0.371	0.004	0.505	1.000	1110.000	116.000	2.000
20:00: 2.000	0.019	89.000	21.331	0.333	0.006	0.585	1.000	1880.000	148.000	1.000
20:00: 3.000	0.028	129.000	22.523	0.329	0.007	0.664	1.000	2240.000	193.000	1.000
20:00: 4.000	0.030	137.000	22.069	0.353	0.007	0.663	1.000	2210.000	201.000	3.000
20:00: 5.000	0.032	171.000	21.360	0.332	0.009	0.684	1.000	2810.000	248.000	2.000

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HR MI SEC	AFSP02	AFSP03	AFSP04	AFSP05	AFSP06	AFSP07	AFSP08	AFSP09	AFSP10	AFSP11
	CNTS	CNTS	CNTS	CNTS	CNTS	CNTS	CNTS	CNTS	CNTS	CNTS
19:60: 0.000	0.000	0.000	1.000	6.000	10.000	7.000	5.000	5.000	3.000	0.000
20:00: 1.000	0.000	1.000	2.000	12.000	10.000	8.000	8.000	4.000	3.000	4.000
20:00: 2.000	0.000	0.000	8.000	16.000	18.000	18.000	10.000	7.000	5.000	1.000
20:00: 3.000	0.000	2.000	14.000	14.000	19.000	20.000	25.000	8.000	14.000	3.000
20:00: 4.000	0.000	1.000	12.000	19.000	26.000	26.000	13.000	12.000	7.000	6.000
20:00: 5.000	0.000	4.000	17.000	24.000	36.000	24.000	20.000	22.000	11.000	4.000

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HR MI SEC	AFSP12	AFSP13	AFSP14	AFSP15	CFSP01	CFSP02	CFSP03	CFSP04	CFSP05	CFSP06
	CNTS	CNTS	CNTS	CNTS	N/CM3	N/CM3	N/CM3	N/CM3	N/CM3	N/CM3
19:60: 0.000	2.000	3.000	0.000	1.000	0.030	0.000	0.000	0.030	0.179	0.299
20:00: 1.000	2.000	1.000	0.000	1.000	0.072	0.000	0.036	0.072	0.430	0.359
20:00: 2.000	1.000	2.000	1.000	1.000	0.031	0.000	0.000	0.248	0.496	0.558
20:00: 3.000	3.000	5.000	1.000	0.000	0.027	0.000	0.055	0.384	0.384	0.521
20:00: 4.000	9.000	1.000	1.000	1.000	0.082	0.000	0.027	0.330	0.522	0.714
20:00: 5.000	4.000	1.000	0.000	2.000	0.054	0.000	0.107	0.455	0.643	0.965

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HR MI SEC	CFSP07	CFSP08	CFSP09	CFSP10	CFSP11	CFSP12	CFSP13	CFSP14	CFSP15
	N/CM3	N/CM3	N/CM3	N/CM3	N/CM3	N/CM3	N/CM3	N/CM3	N/CM3
19:60: 0.000	0.209	0.149	0.149	0.090	0.000	0.060	0.090	0.000	0.030
20:00: 1.000	0.287	0.287	0.143	0.108	0.143	0.072	0.036	0.000	0.036
20:00: 2.000	0.558	0.310	0.217	0.155	0.031	0.031	0.062	0.031	0.031
20:00: 3.000	0.549	0.686	0.220	0.384	0.082	0.082	0.137	0.027	0.000
20:00: 4.000	0.714	0.357	0.330	0.192	0.165	0.247	0.027	0.027	0.027
20:00: 5.000	0.643	0.536	0.589	0.295	0.107	0.107	0.027	0.000	0.054

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HR MI SEC	ATB	ATRF	WD	WS	UI	VI	WI	UX	VY	THETA
	C	C	DEG	M/S	M/S	M/S	M/S	M/S	M/S	K
19:60: 0.000	-42.089	-41.573	240.652	18.305	15.956	8.972	0.401	2.310	18.159	313.642
19:60: 0.050	-42.097	-41.515	240.603	18.259	15.908	8.963	0.410	2.322	18.111	313.630

19:60: 0.100	-42.089	-41.500	240.999	18.277	15.985	8.861	0.415	2.484	18.107	313.639
19:60: 0.150	-42.089	-41.474	240.814	18.341	16.013	8.944	0.500	2.468	18.174	313.636
19:60: 0.200	-42.079	-41.509	241.077	18.382	16.089	8.890	0.608	2.592	18.198	313.649
19:60: 0.250	-42.093	-41.518	240.631	18.302	15.950	8.976	0.562	2.473	18.134	313.630
19:60: 0.300	-42.108	-41.521	240.159	18.242	15.823	9.077	0.455	2.350	18.090	313.611
19:60: 0.350	-42.095	-41.498	240.523	18.218	15.860	8.965	0.496	2.496	18.046	313.632
19:60: 0.400	-42.095	-41.507	240.541	18.257	15.896	8.979	0.534	2.541	18.079	313.635
19:60: 0.450	-42.100	-41.515	240.575	18.257	15.902	8.969	0.556	2.587	18.073	313.629
19:60: 0.500	-42.094	-41.561	240.738	18.185	15.865	8.889	0.527	2.661	17.989	313.637
19:60: 0.550	-42.092	-41.516	240.899	18.261	15.955	8.881	0.474	2.757	18.051	313.640
19:60: 0.600	-42.085	-41.479	240.995	18.330	16.031	8.888	0.534	2.832	18.110	313.649
19:60: 0.650	-42.087	-41.465	241.028	18.375	16.076	8.901	0.642	2.885	18.148	313.646
19:60: 0.700	-42.082	-41.501	241.056	18.430	16.128	8.919	0.626	2.937	18.195	313.649
19:60: 0.750	-42.083	-41.516	241.554	18.319	16.108	8.726	0.509	3.111	18.053	313.646
19:60: 0.800	-42.087	-41.539	241.355	18.288	16.050	8.767	0.534	3.078	18.027	313.638
19:60: 0.850	-42.082	-41.498	241.378	18.367	16.122	8.798	0.531	3.134	18.097	313.644
19:60: 0.900	-42.096	-41.568	241.123	18.260	15.989	8.818	0.515	3.071	18.000	313.625
19:60: 0.950	-42.089	-41.488	241.231	18.371	16.103	8.842	0.567	3.159	18.097	313.635
20:00: 1.000	-42.097	-41.551	240.989	18.283	15.989	8.867	0.643	3.104	18.017	313.624
20:00: 1.050	-42.092	-41.531	241.061	18.227	15.951	8.820	0.676	3.153	17.952	313.632
20:00: 1.100	-42.089	-41.484	241.252	18.227	15.980	8.766	0.659	3.249	17.935	313.639
20:00: 1.150	-42.094	-41.497	241.114	18.170	15.909	8.777	0.607	3.233	17.880	313.635
20:00: 1.200	-42.087	-41.489	241.257	18.198	15.956	8.751	0.553	3.320	17.893	313.647
20:00: 1.250	-42.082	-41.508	241.281	18.061	15.839	8.679	0.555	3.339	17.750	313.654
20:00: 1.300	-42.081	-41.552	241.106	17.766	15.555	8.584	0.573	3.267	17.463	313.654
20:00: 1.350	-42.084	-41.554	241.045	17.736	15.519	8.586	0.590	3.280	17.430	313.649
20:00: 1.400	-42.094	-41.555	240.806	17.679	15.433	8.623	0.621	3.234	17.381	313.635
20:00: 1.450	-42.086	-41.535	240.976	17.783	15.549	8.628	0.773	3.341	17.466	313.649
20:00: 1.500	-42.094	-41.515	240.910	17.794	15.550	8.651	0.745	3.362	17.474	313.641
20:00: 1.550	-42.088	-41.535	240.852	17.778	15.527	8.659	0.744	3.380	17.454	313.651
20:00: 1.600	-42.070	-41.509	241.388	17.832	15.655	8.540	0.744	3.594	17.466	313.679
20:00: 1.650	-42.071	-41.528	241.400	17.909	15.724	8.573	0.694	3.655	17.532	313.678
20:00: 1.700	-42.069	-41.545	241.622	17.837	15.694	8.478	0.503	3.749	17.439	313.681
20:00: 1.750	-42.081	-41.527	241.064	17.838	15.611	8.631	0.435	3.621	17.466	313.663
20:00: 1.800	-42.089	-41.495	240.883	17.707	15.469	8.616	0.449	3.582	17.341	313.651
20:00: 1.850	-42.087	-41.553	240.691	17.793	15.515	8.710	0.393	3.585	17.428	313.652
20:00: 1.900	-42.084	-41.566	240.563	17.821	15.520	8.759	0.441	3.596	17.455	313.653
20:00: 1.950	-42.076	-41.530	240.801	17.837	15.570	8.702	0.387	3.716	17.446	313.661
20:00: 2.000	-42.089	-41.605	240.412	17.814	15.491	8.796	0.283	3.638	17.439	313.642
20:00: 2.050	-42.080	-41.578	240.403	17.834	15.507	8.808	0.287	3.684	17.450	313.653
20:00: 2.100	-42.072	-41.556	240.585	17.836	15.537	8.760	0.333	3.785	17.430	313.665
20:00: 2.150	-42.061	-41.565	241.038	17.914	15.674	8.674	0.428	3.986	17.465	313.681
20:00: 2.200	-42.069	-41.542	241.199	17.887	15.674	8.618	0.513	4.074	17.417	313.672
20:00: 2.250	-42.063	-41.536	241.251	17.870	15.667	8.595	0.638	4.132	17.386	313.680
20:00: 2.300	-42.062	-41.516	241.560	17.923	15.760	8.536	0.727	4.284	17.404	313.683
20:00: 2.350	-42.065	-41.592	241.577	17.864	15.711	8.503	0.701	4.320	17.334	313.678
20:00: 2.400	-42.059	-41.586	241.876	17.837	15.731	8.408	0.657	4.450	17.273	313.687
20:00: 2.450	-42.069	-41.550	241.777	17.963	15.828	8.495	0.820	4.496	17.392	313.672
20:00: 2.500	-42.073	-41.545	241.651	18.077	15.909	8.584	0.809	4.531	17.500	313.664
20:00: 2.550	-42.057	-41.492	241.955	18.064	15.943	8.493	0.731	4.665	17.451	313.684
20:00: 2.600	-42.065	-41.490	241.866	17.865	15.754	8.424	0.643	4.631	17.254	313.670
20:00: 2.650	-42.062	-41.525	241.968	17.976	15.867	8.448	0.629	4.734	17.342	313.671
20:00: 2.700	-42.065	-41.520	242.009	17.880	15.788	8.392	0.606	4.763	17.234	313.664
20:00: 2.750	-42.060	-41.534	241.940	17.889	15.786	8.415	0.599	4.787	17.237	313.668
20:00: 2.800	-42.056	-41.557	242.041	17.892	15.804	8.389	0.585	4.858	17.220	313.673
20:00: 2.850	-42.048	-41.521	242.323	17.877	15.831	8.304	0.574	4.978	17.170	313.688
20:00: 2.900	-42.073	-41.526	241.588	17.840	15.691	8.488	0.566	4.787	17.186	313.657
20:00: 2.950	-42.077	-41.540	241.321	17.819	15.633	8.551	0.524	4.740	17.177	313.657

HR MI SEC	ATB	ATRF	WD	WS	UI	VI	WI	UX	VY	THETA
	C	C	DEG	M/S	M/S	M/S	M/S	M/S	M/S	K
20:00: 3.000	-42.071	-41.578	241.756	17.785	15.667	8.416	0.767	4.899	17.096	313.670
20:00: 3.050	-42.082	-41.519	241.393	17.834	15.657	8.539	0.753	4.842	17.164	313.655
20:00: 3.100	-42.073	-41.554	241.547	17.753	15.609	8.458	0.779	4.903	17.063	313.667
20:00: 3.150	-42.065	-41.564	241.812	17.713	15.612	8.367	0.770	5.008	16.990	313.679
20:00: 3.200	-42.069	-41.565	241.899	17.657	15.575	8.317	0.764	5.054	16.918	313.672
20:00: 3.250	-42.073	-41.576	241.589	17.662	15.535	8.403	0.782	5.001	16.940	313.666
20:00: 3.300	-42.072	-41.540	241.629	17.723	15.594	8.422	0.747	5.066	16.984	313.668
20:00: 3.350	-42.068	-41.567	241.731	17.704	15.592	8.385	0.735	5.126	16.945	313.673
20:00: 3.400	-42.075	-41.536	241.553	17.652	15.520	8.408	0.772	5.093	16.901	313.664
20:00: 3.450	-42.079	-41.540	241.428	17.587	15.445	8.411	0.805	5.072	16.840	313.657
20:00: 3.500	-42.072	-41.516	241.617	17.622	15.504	8.377	0.833	5.173	16.846	313.669
20:00: 3.550	-42.064	-41.539	241.815	17.652	15.559	8.338	0.820	5.274	16.846	313.680
20:00: 3.600	-42.073	-41.574	241.668	17.682	15.564	8.391	0.942	5.273	16.877	313.667
20:00: 3.650	-42.076	-41.583	241.415	17.641	15.491	8.441	0.994	5.220	16.851	313.663
20:00: 3.700	-42.072	-41.541	241.484	17.670	15.527	8.436	1.008	5.282	16.862	313.668
20:00: 3.750	-42.068	-41.566	241.706	17.781	15.657	8.428	0.994	5.415	16.937	313.675
20:00: 3.800	-42.063	-41.549	241.866	17.763	15.664	8.376	1.077	5.491	16.893	313.682
20:00: 3.850	-42.067	-41.547	241.726	17.643	15.538	8.357	1.032	5.446	16.782	313.675
20:00: 3.900	-42.064	-41.550	241.896	17.674	15.590	8.326	1.060	5.538	16.784	313.680
20:00: 3.950	-42.064	-41.553	241.952	17.705	15.626	8.325	1.018	5.598	16.797	313.680
20:00: 4.000	-42.078	-41.546	241.549	17.702	15.564	8.433	1.037	5.512	16.822	313.660
20:00: 4.050	-42.064	-41.560	241.608	17.720	15.588	8.426	1.114	5.568	16.822	313.679
20:00: 4.100	-42.060	-41.554	241.664	17.650	15.535	8.378	1.081	5.595	16.740	313.685
20:00: 4.150	-42.073	-41.576	240.775	17.887	15.611	8.733	0.915	5.440	17.040	313.665
20:00: 4.200	-42.050	-41.563	241.702	18.118	15.952	8.589	0.849	5.822	17.157	313.700
20:00: 4.250	-42.057	-41.553	241.842	17.932	15.809	8.462	0.960	5.837	16.955	313.690
20:00: 4.300	-42.064	-41.535	241.732	17.785	15.664	8.423	1.211	5.790	16.816	313.680

20:00: 4.350	-42.054	-41.552	241.559	17.912	15.751	8.531	1.205	5.813	16.943	313.694
20:00: 4.400	-42.053	-41.510	241.828	17.918	15.795	8.459	1.155	5.928	16.909	313.696
20:00: 4.450	-42.038	-41.539	241.992	18.008	15.899	8.456	1.406	6.040	16.965	313.715
20:00: 4.500	-42.043	-41.558	241.868	18.201	16.051	8.582	1.397	6.102	17.148	313.705
20:00: 4.550	-42.040	-41.547	242.100	18.312	16.184	8.569	1.333	6.244	17.215	313.707
20:00: 4.600	-42.031	-41.503	242.698	18.456	16.400	8.465	1.495	6.509	17.270	313.720
20:00: 4.650	-42.049	-41.501	242.480	18.524	16.428	8.559	1.523	6.503	17.345	313.696
20:00: 4.700	-42.041	-41.492	242.938	18.497	16.472	8.415	1.511	6.669	17.253	313.710
20:00: 4.750	-42.043	-41.504	243.354	18.280	16.339	8.198	1.468	6.751	16.988	313.710
20:00: 4.800	-42.026	-41.495	243.916	18.481	16.599	8.126	1.417	7.029	17.092	313.738
20:00: 4.850	-42.035	-41.523	244.234	18.221	16.409	7.921	1.243	7.058	16.798	313.728
20:00: 4.900	-42.055	-41.566	243.680	18.381	16.476	8.150	1.168	6.992	16.999	313.703
20:00: 4.950	-42.053	-41.553	243.660	18.422	16.510	8.174	0.986	7.037	17.025	313.707
20:00: 5.000	-42.059	-41.570	243.174	18.311	16.341	8.263	0.806	6.887	16.967	313.700
20:00: 5.050	-42.051	-41.585	243.450	18.336	16.402	8.196	0.835	7.014	16.941	313.711
20:00: 5.100	-42.045	-41.570	243.623	18.400	16.484	8.175	0.816	7.127	16.964	313.720
20:00: 5.150	-42.041	-41.587	243.315	18.706	16.713	8.401	0.984	7.189	17.269	313.725
20:00: 5.200	-42.032	-41.507	243.603	18.830	16.867	8.372	1.093	7.362	17.332	313.740
20:00: 5.250	-42.057	-41.575	242.770	18.800	16.717	8.602	1.206	7.136	17.393	313.705
20:00: 5.300	-42.035	-41.577	243.154	18.862	16.829	8.518	1.045	7.313	17.387	313.740
20:00: 5.350	-42.027	-41.563	244.062	18.743	16.855	8.198	1.112	7.577	17.143	313.754
20:00: 5.400	-42.027	-41.549	244.260	18.671	16.819	8.109	1.105	7.644	17.035	313.756
20:00: 5.450	-42.040	-41.514	244.110	18.476	16.622	8.068	0.963	7.556	16.861	313.736
20:00: 5.500	-42.038	-41.528	244.204	18.450	16.612	8.029	0.908	7.609	16.808	313.736
20:00: 5.550	-42.044	-41.574	243.967	18.303	16.446	8.033	0.928	7.514	16.690	313.724
20:00: 5.600	-42.037	-41.571	244.194	18.249	16.429	7.944	0.906	7.591	16.596	313.731
20:00: 5.650	-42.036	-41.598	244.281	18.352	16.534	7.964	0.942	7.692	16.662	313.734
20:00: 5.700	-42.035	-41.580	244.344	18.479	16.657	8.001	0.886	7.798	16.753	313.736
20:00: 5.750	-42.023	-41.557	245.112	18.423	16.712	7.753	1.052	8.031	16.581	313.753
20:00: 5.800	-42.040	-41.548	244.976	18.491	16.756	7.822	0.908	8.054	16.645	313.729
20:00: 5.850	-42.042	-41.542	244.775	18.527	16.761	7.896	0.912	8.044	16.690	313.725
20:00: 5.900	-42.033	-41.529	244.761	18.676	16.893	7.963	1.115	8.137	16.809	313.735
20:00: 5.950	-42.030	-41.582	244.928	18.783	17.013	7.959	1.142	8.267	16.866	313.738

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HR MI SEC	THETAE	RHOLA	THI	ROLL	PITCH	ACINS	IVSPD	GSI	VEW	VNS
	K	G/M3	DEG	DEG	DEG	M/S2	M/S	M/S	M/S	M/S
19:60: 0.000	314.326	0.070	143.403	-25.068	3.355	-0.033	0.637	114.704	79.447	-82.807
19:60: 0.050	314.314	0.070	143.296	-25.052	3.361	-0.052	0.641	114.734	79.640	-82.671
19:60: 0.100	314.323	0.070	143.187	-25.041	3.367	-0.079	0.644	114.758	79.827	-82.535
19:60: 0.150	314.321	0.071	143.081	-25.039	3.368	-0.067	0.647	114.782	80.019	-82.401
19:60: 0.200	314.334	0.071	142.972	-25.037	3.378	-0.024	0.651	114.812	80.205	-82.266
19:60: 0.250	314.315	0.071	142.866	-25.039	3.382	0.067	0.659	114.862	80.368	-82.130
19:60: 0.300	314.296	0.070	142.758	-25.041	3.390	0.086	0.667	114.919	80.530	-81.994
19:60: 0.350	314.317	0.070	142.648	-25.047	3.390	-0.017	0.676	114.976	80.716	-81.855
19:60: 0.400	314.321	0.070	142.539	-25.052	3.390	-0.045	0.680	115.027	80.909	-81.723
19:60: 0.450	314.315	0.070	142.430	-25.060	3.390	-0.089	0.683	115.058	81.099	-81.619
19:60: 0.500	314.323	0.071	142.324	-25.064	3.394	-0.014	0.689	115.082	81.289	-81.508
19:60: 0.550	314.326	0.069	142.215	-25.074	3.400	0.091	0.700	115.109	81.478	-81.348
19:60: 0.600	314.335	0.070	142.106	-25.084	3.402	0.010	0.702	115.136	81.667	-81.182
19:60: 0.650	314.332	0.070	141.996	-25.097	3.401	-0.028	0.710	115.160	81.857	-81.043
19:60: 0.700	314.336	0.070	141.887	-25.107	3.406	-0.007	0.716	115.190	82.047	-80.911
19:60: 0.750	314.333	0.070	141.778	-25.120	3.406	0.009	0.719	115.241	82.232	-80.779
19:60: 0.800	314.325	0.070	141.666	-25.146	3.406	-0.019	0.727	115.299	82.425	-80.641
19:60: 0.850	314.332	0.070	141.554	-25.163	3.408	-0.056	0.729	115.357	82.645	-80.478
19:60: 0.900	314.312	0.070	141.441	-25.185	3.406	-0.177	0.723	115.408	82.859	-80.315
19:60: 0.950	314.323	0.070	141.329	-25.206	3.404	-0.165	0.723	115.438	83.026	-80.173
20:00: 1.000	314.311	0.070	141.214	-25.236	3.402	-0.088	0.723	115.462	83.185	-80.044
20:00: 1.050	314.320	0.070	141.100	-25.255	3.402	-0.038	0.728	115.489	83.371	-79.940
20:00: 1.100	314.327	0.070	140.983	-25.274	3.402	-0.033	0.732	115.516	83.563	-79.829
20:00: 1.150	314.323	0.070	140.866	-25.294	3.402	-0.061	0.734	115.543	83.756	-79.673
20:00: 1.200	314.335	0.070	140.746	-25.306	3.398	-0.120	0.730	115.570	83.943	-79.503
20:00: 1.250	314.343	0.070	140.628	-25.319	3.396	-0.130	0.731	115.594	84.105	-79.338
20:00: 1.300	314.343	0.070	140.509	-25.337	3.386	-0.148	0.729	115.625	84.267	-79.179
20:00: 1.350	314.338	0.070	140.388	-25.337	3.386	-0.260	0.722	115.678	84.457	-79.040
20:00: 1.400	314.323	0.070	140.267	-25.341	3.382	-0.309	0.709	115.731	84.647	-78.908
20:00: 1.450	314.337	0.071	140.146	-25.339	3.376	-0.310	0.700	115.762	84.809	-78.775
20:00: 1.500	314.330	0.070	140.019	-25.341	3.375	-0.124	0.698	115.786	84.971	-78.636
20:00: 1.550	314.340	0.070	139.892	-25.337	3.373	-0.063	0.698	115.813	85.157	-78.471
20:00: 1.600	314.369	0.070	139.760	-25.333	3.371	-0.053	0.702	115.840	85.351	-78.312
20:00: 1.650	314.368	0.070	139.626	-25.328	3.371	-0.155	0.700	115.867	85.543	-78.201
20:00: 1.700	314.371	0.069	139.490	-25.317	3.371	-0.225	0.693	115.894	85.729	-78.095
20:00: 1.750	314.353	0.069	139.350	-25.308	3.363	-0.271	0.685	115.918	85.892	-77.966
20:00: 1.800	314.341	0.070	139.210	-25.294	3.359	-0.249	0.676	115.948	86.054	-77.824
20:00: 1.850	314.342	0.069	139.067	-25.292	3.353	-0.338	0.667	115.999	86.243	-77.662
20:00: 1.900	314.344	0.070	138.923	-25.282	3.351	-0.270	0.660	116.057	86.432	-77.500
20:00: 1.950	314.352	0.069	138.775	-25.277	3.347	-0.258	0.650	116.115	86.599	-77.364
20:00: 2.000	314.333	0.070	138.629	-25.267	3.347	-0.206	0.644	116.166	86.758	-77.229
20:00: 2.050	314.344	0.069	138.481	-25.267	3.341	-0.203	0.639	116.196	86.918	-77.069
20:00: 2.100	314.356	0.070	138.334	-25.263	3.340	-0.242	0.631	116.220	87.084	-76.903
20:00: 2.150	314.373	0.069	138.183	-25.267	3.344	-0.247	0.621	116.244	87.270	-76.741
20:00: 2.200	314.364	0.070	138.034	-25.267	3.347	-0.155	0.619	116.274	87.462	-76.579
20:00: 2.250	314.372	0.070	137.883	-25.270	3.347	-0.065	0.622	116.329	87.655	-76.409
20:00: 2.300	314.375	0.071	137.733	-25.279	3.355	0.048	0.627	116.383	87.842	-76.253
20:00: 2.350	314.370	0.070	137.582	-25.284	3.357	0.078	0.636	116.413	88.004	-76.146
20:00: 2.400	314.379	0.070	137.430	-25.294	3.363	0.079	0.648	116.437	88.166	-76.038
20:00: 2.450	314.364	0.070	137.282	-25.302	3.367	0.119	0.656	116.463	88.353	-75.882
20:00: 2.500	314.357	0.071	137.135	-25.314	3.367	0.191	0.669	116.489	88.546	-75.712
20:00: 2.550	314.377	0.070	136.988	-25.327	3.373	0.256	0.687	116.516	88.732	-75.549

20:00: 2.600	314.363	0.070	136.842	-25.341	3.367	0.263	0.702	116.544	88.924	-75.387
20:00: 2.650	314.365	0.071	136.699	-25.360	3.361	0.186	0.718	116.567	89.145	-75.228
20:00: 2.700	314.357	0.070	136.559	-25.380	3.347	0.010	0.726	116.598	89.358	-75.063
20:00: 2.750	314.361	0.070	136.420	-25.399	3.337	-0.088	0.724	116.652	89.527	-74.869
20:00: 2.800	314.367	0.070	136.285	-25.426	3.324	-0.029	0.727	116.707	89.682	-74.683
20:00: 2.850	314.382	0.070	136.153	-25.450	3.312	0.003	0.735	116.737	89.842	-74.545
20:00: 2.900	314.351	0.070	136.022	-25.469	3.308	-0.093	0.732	116.761	90.008	-74.413
20:00: 2.950	314.351	0.070	135.895	-25.491	3.297	-0.176	0.731	116.788	90.193	-74.254

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HR MI SEC	THETAE	RHOLA	THI	ROLL	PITCH	ACINS	IVSPD	GSI	VEW	VNS
	K	G/M3	DEG	DEG	DEG	M/S2	M/S	M/S	M/S	M/S
20:00: 3.000	314.365	0.070	135.767	-25.516	3.289	-0.187	0.727	116.815	90.386	-74.088
20:00: 3.050	314.350	0.070	135.640	-25.536	3.285	-0.030	0.731	116.839	90.579	-73.925
20:00: 3.100	314.362	0.071	135.515	-25.547	3.285	0.091	0.731	116.869	90.766	-73.762
20:00: 3.150	314.374	0.071	135.390	-25.575	3.283	0.119	0.745	116.920	90.929	-73.600
20:00: 3.200	314.368	0.070	135.266	-25.586	3.285	0.024	0.752	116.978	91.092	-73.438
20:00: 3.250	314.362	0.071	135.142	-25.606	3.285	-0.095	0.747	117.036	91.281	-73.275
20:00: 3.300	314.364	0.070	135.020	-25.625	3.285	-0.055	0.744	117.087	91.470	-73.112
20:00: 3.350	314.369	0.070	134.901	-25.639	3.285	0.006	0.748	117.117	91.633	-72.954
20:00: 3.400	314.360	0.070	134.783	-25.652	3.285	0.022	0.748	117.141	91.796	-72.789
20:00: 3.450	314.353	0.071	134.666	-25.676	3.287	0.023	0.748	117.168	91.985	-72.598
20:00: 3.500	314.364	0.071	134.548	-25.692	3.293	-0.045	0.749	117.195	92.174	-72.408
20:00: 3.550	314.376	0.070	134.432	-25.701	3.297	-0.071	0.745	117.219	92.340	-72.243
20:00: 3.600	314.362	0.071	134.317	-25.715	3.300	0.077	0.752	117.250	92.499	-72.085
20:00: 3.650	314.358	0.071	134.204	-25.727	3.307	0.187	0.762	117.299	92.658	-71.925
20:00: 3.700	314.364	0.071	134.090	-25.730	3.312	0.141	0.774	117.356	92.823	-71.759
20:00: 3.750	314.371	0.071	133.976	-25.730	3.318	0.089	0.780	117.414	93.013	-71.569
20:00: 3.800	314.379	0.071	133.861	-25.730	3.328	0.105	0.792	117.465	93.203	-71.379
20:00: 3.850	314.372	0.071	133.746	-25.728	3.336	0.211	0.804	117.495	93.365	-71.214
20:00: 3.900	314.377	0.071	133.634	-25.727	3.340	0.206	0.815	117.519	93.527	-71.055
20:00: 3.950	314.378	0.071	133.520	-25.719	3.341	0.130	0.829	117.546	93.717	-70.896
20:00: 4.000	314.358	0.071	133.408	-25.711	3.343	0.024	0.835	117.573	93.907	-70.729
20:00: 4.050	314.377	0.071	133.295	-25.706	3.347	0.060	0.838	117.600	94.073	-70.540
20:00: 4.100	314.384	0.071	133.183	-25.692	3.343	0.155	0.843	117.628	94.233	-70.351
20:00: 4.150	314.363	0.070	133.071	-25.676	3.343	0.188	0.855	117.655	94.391	-70.185
20:00: 4.200	314.398	0.071	132.959	-25.652	3.340	0.117	0.860	117.682	94.557	-70.026
20:00: 4.250	314.388	0.070	132.846	-25.631	3.331	0.006	0.861	117.706	94.747	-69.867
20:00: 4.300	314.379	0.071	132.732	-25.610	3.328	0.069	0.867	117.736	94.937	-69.702
20:00: 4.350	314.393	0.071	132.621	-25.587	3.322	0.181	0.877	117.790	95.102	-69.512
20:00: 4.400	314.394	0.071	132.510	-25.567	3.320	0.230	0.882	117.845	95.260	-69.322
20:00: 4.450	314.414	0.073	132.397	-25.548	3.318	0.193	0.890	117.875	95.420	-69.155
20:00: 4.500	314.404	0.074	132.279	-25.528	3.312	0.220	0.894	117.899	95.586	-68.996
20:00: 4.550	314.407	0.073	132.165	-25.510	3.312	0.228	0.902	117.926	95.775	-68.834
20:00: 4.600	314.420	0.075	132.047	-25.493	3.316	0.323	0.911	117.953	95.964	-68.672
20:00: 4.650	314.397	0.074	131.927	-25.479	3.316	0.370	0.923	117.977	96.130	-68.513
20:00: 4.700	314.411	0.074	131.805	-25.477	3.316	0.366	0.936	118.008	96.290	-68.346
20:00: 4.750	314.411	0.073	131.681	-25.479	3.312	0.287	0.949	118.058	96.450	-68.157
20:00: 4.800	314.439	0.074	131.562	-25.489	3.305	0.165	0.950	118.114	96.616	-67.968
20:00: 4.850	314.429	0.071	131.444	-25.514	3.289	0.170	0.955	118.172	96.805	-67.806
20:00: 4.900	314.404	0.071	131.323	-25.544	3.273	0.110	0.958	118.223	96.994	-67.643
20:00: 4.950	314.409	0.071	131.203	-25.569	3.256	-0.085	0.956	118.253	97.163	-67.454
20:00: 5.000	314.401	0.071	131.080	-25.586	3.238	-0.280	0.939	118.277	97.319	-67.265
20:00: 5.050	314.413	0.071	130.959	-25.609	3.223	-0.428	0.921	118.301	97.451	-67.102
20:00: 5.100	314.422	0.071	130.835	-25.633	3.207	-0.270	0.903	118.331	97.589	-66.939
20:00: 5.150	314.428	0.071	130.713	-25.644	3.199	-0.227	0.885	118.386	97.776	-66.749
20:00: 5.200	314.442	0.072	130.590	-25.664	3.191	-0.268	0.875	118.440	97.969	-66.559
20:00: 5.250	314.407	0.071	130.465	-25.685	3.189	-0.275	0.860	118.471	98.134	-66.393
20:00: 5.300	314.442	0.071	130.341	-25.711	3.191	-0.189	0.845	118.494	98.293	-66.235
20:00: 5.350	314.457	0.073	130.218	-25.729	3.197	-0.078	0.839	118.518	98.459	-66.076
20:00: 5.400	314.458	0.073	130.094	-25.730	3.199	-0.038	0.835	118.549	98.619	-65.909
20:00: 5.450	314.439	0.071	129.971	-25.738	3.203	-0.184	0.832	118.599	98.754	-65.720
20:00: 5.500	314.439	0.071	129.848	-25.742	3.203	-0.359	0.817	118.657	98.890	-65.531
20:00: 5.550	314.428	0.071	129.729	-25.742	3.203	-0.351	0.805	118.715	99.048	-65.368
20:00: 5.600	314.434	0.071	129.614	-25.742	3.203	-0.280	0.792	118.766	99.214	-65.205
20:00: 5.650	314.437	0.071	129.499	-25.737	3.203	-0.239	0.783	118.796	99.373	-65.016
20:00: 5.700	314.439	0.071	129.384	-25.723	3.203	-0.206	0.778	118.820	99.540	-64.827
20:00: 5.750	314.457	0.071	129.269	-25.706	3.207	-0.338	0.766	118.846	99.729	-64.664
20:00: 5.800	314.433	0.071	129.154	-25.672	3.207	-0.316	0.752	118.872	99.918	-64.502
20:00: 5.850	314.429	0.071	129.042	-25.637	3.213	-0.160	0.747	118.896	100.087	-64.313
20:00: 5.900	314.440	0.071	128.929	-25.598	3.219	-0.045	0.743	118.927	100.243	-64.124
20:00: 5.950	314.443	0.072	128.817	-25.543	3.227	-0.071	0.738	118.978	100.383	-63.957

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HR MI SEC	TASW	TASR	QCWC	QCRC	QCW	QCR	AKRD	SSRD	ADIFR	BDIFR
	M/S	M/S	MB	MB	MB	MB	DEG	DEG	MB	MB
19:60: 0.000	111.876	111.592	33.495	33.315	32.096	33.140	3.696	0.275	9.976	0.777
19:60: 0.050	111.863	111.610	33.488	33.328	32.089	33.156	3.682	0.238	9.942	0.685
19:60: 0.100	111.871	111.478	33.495	33.246	32.096	33.071	3.685	0.228	9.926	0.658
19:60: 0.150	111.870	111.531	33.495	33.280	32.095	33.096	3.739	0.230	10.086	0.663
19:60: 0.200	111.880	111.438	33.502	33.221	32.102	33.026	3.790	0.211	10.213	0.616
19:60: 0.250	111.853	111.572	33.484	33.306	32.085	33.120	3.760	0.189	10.156	0.562
19:60: 0.300	111.871	111.711	33.495	33.394	32.096	33.222	3.700	0.189	10.010	0.565
19:60: 0.350	111.868	111.594	33.492	33.318	32.093	33.142	3.710	0.151	10.016	0.469
19:60: 0.400	111.864	111.588	33.488	33.313	32.089	33.134	3.729	0.152	10.069	0.472
19:60: 0.450	111.859	111.603	33.485	33.323	32.086	33.143	3.737	0.146	10.095	0.457
19:60: 0.500	111.865	111.581	33.488	33.309	32.089	33.134	3.703	0.114	9.993	0.378
19:60: 0.550	111.869	111.503	33.492	33.260	32.093	33.086	3.683	0.140	9.922	0.440
19:60: 0.600	111.863	111.441	33.488	33.221	32.089	33.039	3.721	0.135	10.019	0.429

HR MI SEC										
19:60: 0.650	111.856	111.425	33.485	33.212	32.086	33.020	3.774	0.122	10.165	0.395
19:60: 0.700	111.871	111.414	33.495	33.205	32.096	33.014	3.771	0.142	10.154	0.446
19:60: 0.750	111.861	111.276	33.491	33.121	32.092	32.941	3.687	0.098	9.892	0.335
19:60: 0.800	111.866	111.346	33.495	33.166	32.096	32.988	3.685	0.070	9.900	0.268
19:60: 0.850	111.867	111.329	33.495	33.155	32.096	32.976	3.687	0.080	9.902	0.291
19:60: 0.900	111.855	111.423	33.488	33.215	32.089	33.045	3.652	0.012	9.824	0.123
19:60: 0.950	111.845	111.359	33.482	33.174	32.083	32.995	3.698	0.049	9.939	0.215
20:00: 1.000	111.855	111.441	33.488	33.226	32.089	33.045	3.717	0.002	10.010	0.098
20:00: 1.050	111.848	111.455	33.482	33.233	32.083	33.053	3.718	-0.026	10.015	0.028
20:00: 1.100	111.859	111.423	33.488	33.212	32.089	33.033	3.707	-0.026	9.976	0.030
20:00: 1.150	111.845	111.468	33.478	33.240	32.079	33.069	3.666	-0.049	9.869	-0.027
20:00: 1.200	111.852	111.399	33.482	33.195	32.083	33.026	3.642	-0.040	9.790	-0.004
20:00: 1.250	111.842	111.381	33.475	33.183	32.076	33.019	3.611	-0.101	9.698	-0.155
20:00: 1.300	111.854	111.458	33.482	33.231	32.083	33.077	3.558	-0.235	9.561	-0.488
20:00: 1.350	111.870	111.488	33.492	33.250	32.093	33.098	3.553	-0.250	9.553	-0.526
20:00: 1.400	111.864	111.584	33.488	33.311	32.089	33.159	3.564	-0.279	9.604	-0.598
20:00: 1.450	111.854	111.512	33.481	33.265	32.082	33.094	3.662	-0.257	9.865	-0.543
20:00: 1.500	111.866	111.521	33.488	33.270	32.089	33.102	3.653	-0.231	9.841	-0.480
20:00: 1.550	111.858	111.529	33.482	33.273	32.083	33.106	3.647	-0.237	9.826	-0.494
20:00: 1.600	111.850	111.352	33.475	33.161	32.077	32.988	3.649	-0.225	9.799	-0.463
20:00: 1.650	111.845	111.368	33.472	33.170	32.074	32.999	3.649	-0.162	9.800	-0.305
20:00: 1.700	111.850	111.347	33.475	33.157	32.077	33.001	3.556	-0.136	9.536	-0.242
20:00: 1.750	111.841	111.521	33.469	33.267	32.070	33.117	3.547	-0.081	9.543	-0.106
20:00: 1.800	111.840	111.591	33.469	33.312	32.070	33.165	3.537	-0.111	9.528	-0.182
20:00: 1.850	111.835	111.629	33.466	33.335	32.067	33.190	3.538	-0.044	9.537	-0.015
20:00: 1.900	111.819	111.657	33.456	33.353	32.058	33.203	3.572	-0.022	9.638	0.038
20:00: 1.950	111.807	111.583	33.449	33.307	32.051	33.156	3.565	0.020	9.605	0.143
20:00: 2.000	111.806	111.703	33.449	33.384	32.051	33.241	3.533	0.080	9.536	0.293
20:00: 2.050	111.808	111.681	33.450	33.369	32.052	33.222	3.556	0.115	9.596	0.381
20:00: 2.100	111.787	111.603	33.436	33.320	32.039	33.165	3.585	0.128	9.663	0.412
20:00: 2.150	111.802	111.443	33.446	33.219	32.049	33.049	3.651	0.147	9.822	0.457
20:00: 2.200	111.794	111.399	33.443	33.193	32.045	33.014	3.697	0.129	9.942	0.412
20:00: 2.250	111.801	111.382	33.446	33.181	32.049	32.991	3.760	0.106	10.116	0.355
20:00: 2.300	111.784	111.277	33.436	33.116	32.039	32.913	3.817	0.126	10.256	0.404
20:00: 2.350	111.779	111.308	33.433	33.135	32.036	32.933	3.816	0.148	10.260	0.458
20:00: 2.400	111.773	111.246	33.429	33.096	32.032	32.894	3.804	0.184	10.213	0.548
20:00: 2.450	111.760	111.252	33.423	33.102	32.026	32.878	3.921	0.232	10.544	0.665
20:00: 2.500	111.747	111.264	33.416	33.111	32.020	32.881	3.947	0.305	10.620	0.845
20:00: 2.550	111.726	111.170	33.403	33.052	32.007	32.827	3.902	0.327	10.476	0.898
20:00: 2.600	111.704	111.247	33.390	33.101	31.994	32.894	3.827	0.274	10.281	0.769
20:00: 2.650	111.719	111.217	33.400	33.083	32.004	32.873	3.832	0.335	10.290	0.920
20:00: 2.700	111.732	111.245	33.410	33.102	32.013	32.900	3.794	0.301	10.188	0.837
20:00: 2.750	111.725	111.230	33.406	33.093	32.009	32.892	3.786	0.322	10.163	0.887
20:00: 2.800	111.741	111.163	33.416	33.051	32.020	32.849	3.775	0.340	10.120	0.930
20:00: 2.850	111.726	111.084	33.406	33.000	32.009	32.799	3.758	0.356	10.055	0.967
20:00: 2.900	111.735	111.327	33.410	33.152	32.013	32.957	3.758	0.390	10.103	1.057
20:00: 2.950	111.728	111.419	33.403	33.208	32.007	33.018	3.739	0.403	10.065	1.091

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HR MI SEC	TASW	TASR	QCWC	QCRC	QCW	QCR	AKRD	SSRD	ADIFR	BDIFR
	M/S	M/S	MB	MB	MB	MB	DEG	DEG	MB	MB
20:00: 3.000	111.730	111.301	33.403	33.132	32.007	32.925	3.827	0.318	10.290	0.879
20:00: 3.050	111.725	111.408	33.400	33.199	32.004	32.994	3.827	0.358	10.311	0.979
20:00: 3.100	111.721	111.386	33.397	33.185	32.001	32.982	3.815	0.311	10.273	0.862
20:00: 3.150	111.716	111.307	33.393	33.135	31.997	32.934	3.795	0.292	10.201	0.815
20:00: 3.200	111.709	111.286	33.390	33.123	31.994	32.925	3.777	0.274	10.146	0.769
20:00: 3.250	111.721	111.386	33.397	33.185	32.001	32.987	3.793	0.277	10.212	0.777
20:00: 3.300	111.710	111.368	33.390	33.174	31.994	32.976	3.789	0.304	10.196	0.845
20:00: 3.350	111.700	111.339	33.384	33.155	31.988	32.958	3.778	0.299	10.160	0.832
20:00: 3.400	111.690	111.396	33.377	33.191	31.982	32.995	3.787	0.273	10.196	0.769
20:00: 3.450	111.689	111.441	33.377	33.220	31.982	33.026	3.782	0.222	10.192	0.642
20:00: 3.500	111.700	111.367	33.384	33.173	31.988	32.976	3.792	0.204	10.205	0.599
20:00: 3.550	111.711	111.296	33.391	33.128	31.995	32.928	3.795	0.207	10.200	0.604
20:00: 3.600	111.709	111.327	33.390	33.149	31.994	32.938	3.861	0.198	10.391	0.582
20:00: 3.650	111.695	111.408	33.380	33.199	31.985	32.987	3.880	0.177	10.459	0.531
20:00: 3.700	111.679	111.374	33.371	33.177	31.975	32.963	3.888	0.177	10.476	0.531
20:00: 3.750	111.679	111.273	33.371	33.114	31.975	32.896	3.893	0.198	10.470	0.582
20:00: 3.800	111.668	111.226	33.364	33.085	31.969	32.862	3.913	0.143	10.518	0.446
20:00: 3.850	111.690	111.296	33.377	33.128	31.982	32.916	3.871	0.100	10.412	0.341
20:00: 3.900	111.689	111.238	33.377	33.092	31.982	32.875	3.889	0.098	10.450	0.336
20:00: 3.950	111.684	111.232	33.374	33.088	31.979	32.875	3.865	0.107	10.383	0.357
20:00: 4.000	111.678	111.367	33.371	33.174	31.975	32.963	3.873	0.105	10.434	0.353
20:00: 4.050	111.697	111.328	33.381	33.148	31.986	32.930	3.904	0.078	10.512	0.287
20:00: 4.100	111.692	111.311	33.377	33.137	31.982	32.925	3.868	0.040	10.408	0.191
20:00: 4.150	111.675	111.502	33.366	33.257	31.971	33.053	3.847	0.219	10.386	0.636
20:00: 4.200	111.691	111.163	33.377	33.044	31.982	32.830	3.843	0.295	10.307	0.820
20:00: 4.250	111.680	111.198	33.371	33.067	31.975	32.856	3.842	0.171	10.312	0.516
20:00: 4.300	111.660	111.293	33.357	33.126	31.963	32.906	3.912	0.046	10.527	0.208
20:00: 4.350	111.667	111.292	33.361	33.124	31.966	32.901	3.926	0.104	10.565	0.349
20:00: 4.400	111.660	111.190	33.357	33.061	31.963	32.843	3.883	0.095	10.425	0.327
20:00: 4.450	111.650	111.112	33.350	33.011	31.956	32.768	4.007	0.070	10.756	0.265
20:00: 4.500	111.668	111.098	33.364	33.004	31.969	32.755	4.040	0.161	10.848	0.488
20:00: 4.550	111.634	111.015	33.344	32.954	31.950	32.706	4.015	0.210	10.761	0.608
20:00: 4.600	111.611	110.811	33.331	32.827	31.937	32.559	4.098	0.200	10.950	0.582
20:00: 4.650	111.597	110.865	33.324	32.862	31.931	32.589	4.127	0.235	11.044	0.668
20:00: 4.700	111.609	110.733	33.331	32.779	31.937	32.508	4.101	0.207	10.942	0.599
20:00: 4.750	111.609	110.664	33.332	32.736	31.938	32.480	4.017	0.097	10.694	0.330
20:00: 4.800	111.609	110.416	33.331	32.581	31.937	32.318	4.014	0.163	10.637	0.488
20:00: 4.850	111.617	110.439	33.337	32.595	31.943	32.363	3.858	0.064	10.209	0.249

20:00: 4.900	111.671	110.573	33.371	32.679	31.975	32.451	3.850	0.177	10.213	0.522
20:00: 4.950	111.667	110.559	33.368	32.670	31.973	32.457	3.756	0.232	9.951	0.656
20:00: 5.000	111.654	110.728	33.357	32.774	31.963	32.584	3.651	0.246	9.688	0.692
20:00: 5.050	111.654	110.622	33.357	32.708	31.963	32.513	3.661	0.251	9.698	0.704
20:00: 5.100	111.654	110.537	33.357	32.655	31.963	32.458	3.660	0.285	9.680	0.786
20:00: 5.150	111.644	110.529	33.351	32.650	31.956	32.426	3.799	0.387	10.063	1.033
20:00: 5.200	111.634	110.410	33.344	32.575	31.950	32.337	3.859	0.384	10.205	1.024
20:00: 5.250	111.631	110.685	33.342	32.747	31.948	32.504	3.926	0.392	10.446	1.047
20:00: 5.300	111.608	110.554	33.325	32.662	31.931	32.426	3.864	0.439	10.247	1.159
20:00: 5.350	111.628	110.335	33.338	32.525	31.944	32.288	3.853	0.321	10.172	0.870
20:00: 5.400	111.617	110.309	33.331	32.509	31.937	32.274	3.839	0.280	10.129	0.769
20:00: 5.450	111.627	110.402	33.339	32.568	31.944	32.354	3.740	0.237	9.874	0.667
20:00: 5.500	111.603	110.359	33.325	32.543	31.931	32.331	3.718	0.230	9.807	0.650
20:00: 5.550	111.624	110.495	33.338	32.628	31.944	32.422	3.711	0.178	9.813	0.524
20:00: 5.600	111.633	110.465	33.344	32.610	31.950	32.407	3.690	0.142	9.748	0.438
20:00: 5.650	111.622	110.394	33.338	32.566	31.944	32.356	3.723	0.160	9.828	0.481
20:00: 5.700	111.610	110.326	33.331	32.524	31.937	32.312	3.717	0.209	9.799	0.599
20:00: 5.750	111.600	110.156	33.325	32.419	31.931	32.196	3.761	0.088	9.888	0.303
20:00: 5.800	111.607	110.204	33.331	32.451	31.937	32.236	3.716	0.143	9.773	0.438
20:00: 5.850	111.591	110.253	33.322	32.481	31.928	32.266	3.725	0.156	9.808	0.470
20:00: 5.900	111.585	110.192	33.318	32.443	31.925	32.205	3.852	0.161	10.146	0.480
20:00: 5.950	111.567	110.094	33.308	32.384	31.915	32.136	3.889	0.190	10.228	0.549

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HR MI SEC	TTB	TTRF	VLA	RFLAG
	C	C	VDC	
19:60: 0.000	-36.201	-37.846	-6.258	0.000
19:60: 0.050	-36.208	-37.786	-6.256	0.000
19:60: 0.100	-36.214	-37.779	-6.257	0.000
19:60: 0.150	-36.208	-37.750	-6.254	0.000
19:60: 0.200	-36.208	-37.792	-6.254	0.000
19:60: 0.250	-36.208	-37.792	-6.255	0.000
19:60: 0.300	-36.208	-37.785	-6.258	0.000
19:60: 0.350	-36.208	-37.769	-6.257	0.000
19:60: 0.400	-36.208	-37.779	-6.258	0.000
19:60: 0.450	-36.211	-37.787	-6.257	0.000
19:60: 0.500	-36.208	-37.834	-6.254	0.000
19:60: 0.550	-36.214	-37.794	-6.261	0.000
19:60: 0.600	-36.214	-37.761	-6.256	0.000
19:60: 0.650	-36.217	-37.747	-6.257	0.000
19:60: 0.700	-36.214	-37.785	-6.256	0.000
19:60: 0.750	-36.229	-37.809	-6.258	0.000
19:60: 0.800	-36.226	-37.828	-6.257	0.000
19:60: 0.850	-36.222	-37.788	-6.258	0.000
19:60: 0.900	-36.226	-37.853	-6.256	0.000
19:60: 0.950	-36.226	-37.775	-6.257	0.000
20:00: 1.000	-36.226	-37.834	-6.258	0.000
20:00: 1.050	-36.219	-37.813	-6.256	0.000
20:00: 1.100	-36.220	-37.767	-6.256	0.000
20:00: 1.150	-36.219	-37.777	-6.256	0.000
20:00: 1.200	-36.220	-37.773	-6.257	0.000
20:00: 1.250	-36.217	-37.794	-6.257	0.000
20:00: 1.300	-36.208	-37.834	-6.258	0.000
20:00: 1.350	-36.208	-37.834	-6.258	0.000
20:00: 1.400	-36.208	-37.828	-6.256	0.000
20:00: 1.450	-36.207	-37.813	-6.254	0.000
20:00: 1.500	-36.214	-37.792	-6.256	0.000
20:00: 1.550	-36.207	-37.811	-6.256	0.000
20:00: 1.600	-36.208	-37.798	-6.257	0.000
20:00: 1.650	-36.207	-37.816	-6.261	0.000
20:00: 1.700	-36.208	-37.834	-6.262	0.000
20:00: 1.750	-36.201	-37.804	-6.261	0.000
20:00: 1.800	-36.201	-37.767	-6.261	0.000
20:00: 1.850	-36.195	-37.824	-6.262	0.000
20:00: 1.900	-36.189	-37.834	-6.261	0.000
20:00: 1.950	-36.190	-37.803	-6.262	0.000
20:00: 2.000	-36.189	-37.871	-6.261	0.000
20:00: 2.050	-36.183	-37.846	-6.262	0.000
20:00: 2.100	-36.183	-37.828	-6.261	0.000
20:00: 2.150	-36.189	-37.848	-6.263	0.000
20:00: 2.200	-36.201	-37.828	-6.261	0.000
20:00: 2.250	-36.198	-37.823	-6.259	0.000
20:00: 2.300	-36.208	-37.810	-6.253	0.000
20:00: 2.350	-36.208	-37.885	-6.256	0.000
20:00: 2.400	-36.208	-37.883	-6.256	0.000
20:00: 2.450	-36.217	-37.845	-6.256	0.000
20:00: 2.500	-36.220	-37.840	-6.254	0.000
20:00: 2.550	-36.214	-37.793	-6.256	0.000
20:00: 2.600	-36.214	-37.785	-6.256	0.000
20:00: 2.650	-36.214	-37.823	-6.255	0.000
20:00: 2.700	-36.214	-37.816	-6.257	0.000
20:00: 2.750	-36.211	-37.831	-6.257	0.000
20:00: 2.800	-36.214	-37.859	-6.258	0.000
20:00: 2.850	-36.214	-37.827	-6.257	0.000
20:00: 2.900	-36.214	-37.816	-6.258	0.000
20:00: 2.950	-36.208	-37.824	-6.259	0.000

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HR MI SEC	TTB	TTRF	VLA	RFLAG

	C	C	VDC	
20:00: 3.000	-36.214	-37.871	-6.257	0.000
20:00: 3.050	-36.214	-37.804	-6.258	0.000
20:00: 3.100	-36.208	-37.840	-6.254	0.000
20:00: 3.150	-36.207	-37.856	-6.254	0.000
20:00: 3.200	-36.214	-37.859	-6.256	0.000
20:00: 3.250	-36.207	-37.863	-6.256	0.000
20:00: 3.300	-36.208	-37.828	-6.256	0.000
20:00: 3.350	-36.208	-37.858	-6.257	0.000
20:00: 3.400	-36.208	-37.822	-6.256	0.000
20:00: 3.450	-36.208	-37.822	-6.255	0.000
20:00: 3.500	-36.208	-37.804	-6.254	0.000
20:00: 3.550	-36.207	-37.832	-6.256	0.000
20:00: 3.600	-36.214	-37.865	-6.254	0.000
20:00: 3.650	-36.208	-37.869	-6.253	0.000
20:00: 3.700	-36.208	-37.828	-6.252	0.000
20:00: 3.750	-36.214	-37.860	-6.253	0.000
20:00: 3.800	-36.214	-37.846	-6.253	0.000
20:00: 3.850	-36.211	-37.840	-6.254	0.000
20:00: 3.900	-36.214	-37.846	-6.254	0.000
20:00: 3.950	-36.214	-37.851	-6.254	0.000
20:00: 4.000	-36.214	-37.834	-6.256	0.000
20:00: 4.050	-36.204	-37.851	-6.255	0.000
20:00: 4.100	-36.201	-37.846	-6.254	0.000
20:00: 4.150	-36.195	-37.856	-6.257	0.000
20:00: 4.200	-36.208	-37.865	-6.254	0.000
20:00: 4.250	-36.211	-37.853	-6.256	0.000
20:00: 4.300	-36.208	-37.828	-6.252	0.000
20:00: 4.350	-36.198	-37.846	-6.255	0.000
20:00: 4.400	-36.208	-37.810	-6.254	0.000
20:00: 4.450	-36.201	-37.844	-6.243	0.000
20:00: 4.500	-36.208	-37.865	-6.240	0.000
20:00: 4.550	-36.213	-37.859	-6.241	0.000
20:00: 4.600	-36.226	-37.828	-6.235	0.000
20:00: 4.650	-36.238	-37.822	-6.238	0.000
20:00: 4.700	-36.244	-37.822	-6.236	0.000
20:00: 4.750	-36.253	-37.838	-6.243	0.000
20:00: 4.800	-36.262	-37.846	-6.239	0.000
20:00: 4.850	-36.268	-37.873	-6.251	0.000
20:00: 4.900	-36.274	-37.907	-6.252	0.000
20:00: 4.950	-36.274	-37.895	-6.253	0.000
20:00: 5.000	-36.262	-37.901	-6.253	0.000
20:00: 5.050	-36.265	-37.924	-6.255	0.000
20:00: 5.100	-36.268	-37.914	-6.253	0.000
20:00: 5.150	-36.265	-37.932	-6.252	0.000
20:00: 5.200	-36.268	-37.859	-6.250	0.000
20:00: 5.250	-36.265	-37.909	-6.251	0.000
20:00: 5.300	-36.256	-37.920	-6.252	0.000
20:00: 5.350	-36.271	-37.920	-6.245	0.000
20:00: 5.400	-36.274	-37.907	-6.245	0.000
20:00: 5.450	-36.277	-37.866	-6.252	0.000
20:00: 5.500	-36.280	-37.883	-6.252	0.000
20:00: 5.550	-36.271	-37.921	-6.252	0.000
20:00: 5.600	-36.268	-37.920	-6.253	0.000
20:00: 5.650	-36.274	-37.952	-6.254	0.000
20:00: 5.700	-36.280	-37.938	-6.251	0.000
20:00: 5.750	-36.286	-37.926	-6.251	0.000
20:00: 5.800	-36.298	-37.914	-6.251	0.000
20:00: 5.850	-36.295	-37.904	-6.252	0.000
20:00: 5.900	-36.292	-37.895	-6.252	0.000
20:00: 5.950	-36.299	-37.956	-6.249	0.000

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