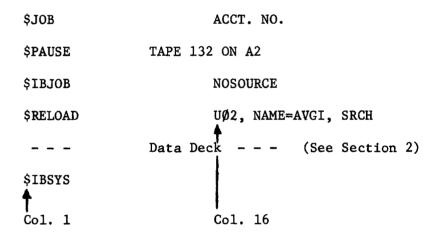## The Interferometer Averaging Program - AVGI

The program AVGI has been further modified and is now in what is hoped to be its final form. This note will describe the input, output and operation of the program.

1. Calling Procedure

This program is on the standard interferometer program tape, NRAO 132. The computer operator should be instructed to mount 132 on unit A2. The card deck should be the following.

```
$JOB                ACCT. NO.

$PAUSE        TAPE 132 ON A2

$IBJOB              NOSOURCE

$RELOAD             UØ2, NAME=AVGI, SRCH
                    ↑
- - -       Data Deck   - - -   (See Section 2)

$IBSYS              |
↑                   |
Col. 1          Col. 16
```

The data tape is mounted on A3, and the program pauses and calls for the tape on this unit.

2. Input Card Format

a. Tape No. Cols. 1-3, Format I3. The number of the interferometer tape on which the averaging is to be done. All sources appearing on this I tape will be averaged.

b. Maximum Gap (in minutes) Cols. 4-8, Format F5.1. If, for a given source, there is a time gap in the averaging interval, the program

will separately average the data on either side of the gap if the gap size exceeds this number. The gap could be caused by discarding part of the card output from the Fringe Reduction Program due to interference, etc. If no gap is specified, the maximum gap allowed is 5.0 minutes.

c. Maximum Interval (in minutes) Cols. 9-15, Format F7.1. If the length of time a given source was observed exceeds this number, the program will average separately each portion of this time length. If no maximum interval is specified, this will be set to 35 minutes. Intervals longer than 100 min are not allowed.

d. Maximum RMS, Cols. 16-20, Format F5.1. If the RMS which is shown on the Fringe Reduction Program exceeds this limit for a one minute sample, the sample will not be included in the average. If no maximum RMS is specified those observations whose RMS exceed 50 will be rejected.

3. Printed Output

The data under each of the column headings will be explained across the output page from left to right. Above the column headings appear the I tape number.

    a. SOURCE

       The number of the sources averaged.

    b. AVEHA

       The average hour angle for the averaging interval.

    c. AVEAMP

       The vector average fringe amplitude for the averaging interval.

d. ERROR

The RMS error of the vector average amplitude during one averaging interval.

e. AVEPHI

The vector average phase for the interval

f. AVEU

The average value of the baseline length U over the interval.

g. AVEV

The average of the baseline length V.

h. AVERMS

The average of the RMS which appear on the FRP output.

i. COUNT

The number of minutes of data in the averaging interval. These are not consecutive minutes if a gap appears in the interval.

j. AR AVAMP

The arithmetic average fringe amplitude over the interval.

k. DELPHI

The phase drift over the interval in degrees. If the averaging interval is 10 minutes or longer, this is the vector average of the last 5 minutes phase minus the average of the first 5 minutes phase. If the interval is from 6 through 9 minutes the average of the first and last 3 minutes are used. If the interval is shorter than 6 minutes, the message "NO PHASE CHECK" appears. In all cases the phase drift is extended to the ends of the averaging interval. That is, if the interval is say 10 minutes, DELPHI is the phase drift in 10 minutes.

1. PHIRMS

   The RMS phase noise in the interval.

m. CORRF

   The factor by which the vector average amplitude must be multiplied to correct for the phase drift DELPHI. This factor is $(\Delta\phi/2)/\sin(\Delta\phi/2)$. No correction is applied to the data, it is merely indicated.

n. DELAMP

   The amplitude drift between the centers of the first 5 minutes and last 5 minutes of the averaging interval, if the interval is 10 minutes or longer, or between the first and last 3 minutes for intervals from 6 through 9 minutes. This number is set to zero if the amplitude drift is less than twice the amplitude error.

o. REJ

   The number of minutes of data rejected by the maximum RMS criterion.

p. Asterisk

   If the phase drift is greater than the phase RMS, an asterisk appears.

4. <u>Card Output</u>

   <u>If no card output is desired, depress sense switch 1.</u>

   a. <u>Output Card Format</u>

   i) Tape number, Cols. 1-4, Format I4.
   ii) Source number, Cols. 5-11, Format F7.1.
   iii) Average hour angle, hours, Cols. 12-14, Format I3.
   iv)   , minutes, Cols. 15-17, Format I3.
   v)   , seconds, Cols. 18-22, Format F5.1
   vi) Average amplitude, Cols. 23-29, Format F7.2.

vii) Amplitude RMS, Cols. 30-35, Format F6.2.
viii) Average phase, Cols. 36-44, Format F9.2.
  ix) Average U, Cols. 45-52, Format F8.0.
   x) Average V, Cols. 53-59, Format F7.0.
  xi) Average RMS, Cols. 60-65, Format F6.2.
 xii) Number of minutes in the averaging interval, Cols. 66-68,
       Format I3.
xiii) Phase drift, Cols. 69-74, Format F6.1.

Frank Bash

(6/6/66)