Range Commanders Council

METEOROLOGY GROUP

Document 352-87

IRIG STANDARDS FOR RANGE METEOROLOGICAL DATA REDUCTION PART I - RAWINSONDE

WHITE SANDS MISSILE RANGE
KWAJALEIN MISSILE RANGE
YUMA PROVING GROUND
ELECTRONIC PROVING GROUND
DUGWAY PROVING GROUND

NAVAL AIR WARFARE CENTER - WEAPONS DIVISION
ATLANTIC FLEET WEAPONS TRAINING FACILITY
NAVAL AIR WARFARE CENTER - AIRCRAFT DIVISION
NAVAL UNDERSEA WARFARE CENTER DIVISION, NEWPORT

45TH SPACE WING
AIR FORCE DEVELOPMENT TEST CENTER
30TH SPACE WING
CONSOLIDATED SPACE TEST CENTER
AIR FORCE FLIGHT TEST CENTER
AIR FORCE TACTICAL FIGHTER WEAPONS CENTER

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DOCUMENT 352-87

RAWINSONDE DATA REDUCTION

Prepared by the
Committee on Standardization of
Range Meteorological Data Reduction
of the
Meteorology Group
Range Commanders Council

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FOREWORD

The measurement of atmospheric parameters to support activities on National Ranges involves the entire meteorological environment from the simplest observation of data near the surface to the complex and difficult measurements of high altitude parameters using rocket and satellite-borne instrumentation. The need for accurate assessment of the meteorological environment in which missile and space system operations are conducted do not vary significantly from one range to another, though the frequency and quantity of observations may be considerably different. In recent years, many test programs have involved the use of more than one range and required similar types of meteorological measurements from each range involved.

Measurements of the atmospheric environment are, in most cases, made by using the same types of instruments on the several ranges. To ensure the highest quality processed data, the Meteorological Group (MG) of the Range Commanders Council is assigned the task of standardizing the methods used in the reduction of range meteorological data. A committee has been formed to pursue a task titled "Standardization of Range Meteorological Data Reduction." The committee is currently composed of the following members:

H. C. Herring	- ESMC, Chairman
F. J. Schmidlin	- NASA, WFC
D. Dunaway	- WSMR
E. J. Keppel	- AD
G. Boire	- WSMC
D. A. Lea	- PMTC
E. E. Fisher	- AFSC/AWS
R. Noonan	- AFFTC
R. Titus	- NTS/DOE
E. Gibeau	- KMR

The original issue of this document was published as IRIG Document 108-67 in August 1967. Both Parts I and II of the document were later published as IRIG Document 108-72. The current revision of the Document comprises computer program documentation for a large central computer to process data from transponder radiosondes. The program for use in minicomputer operations uses the same precepts and has been subdivided somewhat to allow the program to run on the smaller machines. The two programs produce virtually identical results.

Input consists of positional and meteorological data as recorded by the tracking system real-time program. This data consists of slant range, elevation angle, azimuth, temperature, and relative humidity. Data from nontransponder radiosondes is converted to a transponder radiosonde format by a preprocessing program (NTRE).

The output data consists of height, wind direction and speed, temperature, dewpoint, relative humidity, absolute humidity, density, refractive index, sound velocity, wind shear, vapor pressure, and precipitable water. This disk file is used to send data out via magnetic tape or 80-column cards. It is also used as an input file to other programs.

The output data is controlled by a system of records accessible to the operator. This system allows the data to be changed in minimum time between the different data types required by the users. The standard rawinsonde output is in 1,000-foot increments with the wind speed in knots.

Range meteorological agencies are encouraged to conform to the standard data-reduction techniques and to use the formulas contained in this document in an effort to achieve the highest possible degree of standardization of meteorological data at all ranges. In addition, the committee encourages other agencies involved in machine processing of meteorological data to conform to these standardized procedures to the maximum extent possible. The committee and the Meteorological Group invite and solicit comments and recommendations for improvement in the data-reduction techniques and associated information contained in this document.

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1.0 OVERVIEW

This program is used to reduce the rawinsonde data output by the Meteorological Sounding System (MSS) tracker. Daily, the output of this program is used by the Cape Canaveral Forecast Facility (CCFF) and by the World Meteorological Organization (WMO). The output is also archived daily and sent monthly to the Environmental Technical Applications Center (ETAC). During test operations, the data is used by Range Safety, CCFF, the launch controllers, and the test engineers as a part of the launch-no-launch criteria, and for post-launch study and evaluation.

The output data is in both the English and metric system units. These outputs go to the printer for the various local users, to a teletype file for distribution as needed by that medium, and to a disk file for further use as input to specialized programs. These specialized programs include CODE which creates the coded message for worldwide distribution, ROCK which uses the data to baseline the pressure and density calculations for a metrocket reduction, RSAO which creates an analysis report for use by the duty forecaster, THIK which is a rawinsonde quality-control program, and UXUS which creates a preliminary coded message for worldwide distribution.

2.0 MATHEMATICAL DESCRIPTION

2.1 Program RSRC

None

2.2 Function WDIRF

2.2.1 Computation of Wind Speed (C)

$$C = \sqrt{VX^2 + VY^2}$$

where VX = east-west wind velocity component [feet per second (ft/s) or meters per second (m/s)]

VY = north-south wind velocity component (ft/s or m/s)

2.2.2 Computation of Wind Direction

If $VX = 0$

and $VY \geqslant 0$

then $D = 360.0$

else $D = 180.0$

else $D_c = RAD \cdot [\tan^{-1} (VY/VX)]$

If $VX < 0$

then $D = 270 - D_c$

else $D = 90 - D_c$

If $D < 0.5$

then $D = 360.0$

where D_c = Cartesian wind direction (degrees)

D = meteorological wind direction (degrees)

RAD = 57.29578 (degrees per radian)

VX = east-west wind velocity component (ft/s or m/s)

VY = north-south wind velocity component (ft/s or m/s)

2.3 Subroutine WIND

2.3.1 Computation Wind Velocity Components

$$VX_j = (X_i - X_k)/(G_k - G_i)$$

$$VY_j = (Y_i - Y_k)/(G_k - G_i)$$

where VX = east-west velocity component (ft/s or m/s)

VY = north-south velocity component (ft/s or m/s)

X = east-west position component (ft or m)

Y = north-south position component (ft or m)

G = elapsed time (s)

i = lower bounding level index

j = index of layer in question

k = upper bounding level index

2.4 Subroutine TSIGN

None

2.5 Subroutine FORM

2.5.1 Conversion of Shear in seconds^{-1} to knots/foot

$$THR = SHR \cdot 592.085$$

where THR = shear in kn/ft

SHR = shear in $\frac{ft/s}{1000\ ft}$ = shear in s^{-1}

592.085 = kn/ft · 1000

2.6 Subroutine TRHC

2.6.1 Computation of the Thermistor Time Constant

$$\lambda = 9.8 \cdot (\varrho \cdot V)^{-0.43}$$

where λ = thermistor time constant

ϱ = density (g/cm^3)

V = ventilation velocity = 6 m/s — held constant to prevent extreme variation in time constant

2.6.2 Computation of the True Thermistor Temperature

$$TC = TCP + DG \cdot \left\{\left[T - TCP \cdot \left(1 - e^{-DG/\lambda}\right) - TP \cdot e^{-DG/\lambda}\right] / \left[DG - \lambda \cdot \left(1 - e^{-DG/\lambda}\right)\right]\right\}$$

where TC = true thermistor temperature (°C)

TCP = previous true thermistor temperature (°C)

DG = time interval (s)

T = indicated thermistor temperature (°C)

TP = previous indicated thermistor temperature (°C)

λ = thermistor time constant

e = base of the Naperian logarithmic system

2.6.3 Computation of the Temperature Lapse Rate

$$LR = \left[T - TCP \cdot \left(1 - e^{-DG/\lambda}\right) - TP \cdot e^{-DG/\lambda}\right] / \left[DG - \lambda \cdot \left(1 - e^{-DG/\lambda}\right)\right]$$

where LR = temperature lapse rate

T = indicated thermistor temperature (°C)

TCP = previous true thermistor temperature (°C)

DG = time interval (s)

λ = thermistor time constant

TP = previous indicated thermistor temperature (°C)

e = base of the Naperian logarithmic system

2.6.4 Computation of the Hygristor Substrate Temperature Time Constant

$$\lambda = 52.0 \cdot (\varrho \cdot V)^{-0.71}$$

where λ = hygristor substrate temperature time constant

ϱ = density (g/cm^3)

V = ventilation velocity = 6 m/s

2.6.5 Computation of the Substrate Temperature

$$TS = (TCP - \lambda \cdot LR) \cdot (1 - e^{-DG/\lambda}) + LR \cdot DG + TSP \cdot e^{-DG/\lambda}$$

where TS = substrate temperature (°C)

TCP = previous true thermistor temperature (°C)

λ = hygristor substrate temperature time constant

LR = temperature lapse rate

DG = time interval (s)

TSP = previous substrate temperature (°C)

e = base of the Naperian logarithmic system

2.6.6 Computation of the Insolation Error

$$\Delta T = -0.0659 \cdot \sqrt{P} + 2.464$$

where ΔT = insolation error (°C)

P = pressure (mbars)

2.6.7 Computation of the Vapor Pressure Ratio

$$COR = \frac{e^{(17.269 \cdot TSD)/(237.3 + TSD)}}{e^{(17.269 \cdot TC)/(237.3 + TC)}}$$

where COR = vapor pressure ratio

TSD = true temperature of the sensor substrate (°C)

= TS + ΔT for a daytime run

= TS for a night run

TS = substrate temperature (°C)

ΔT = insolation error (°C)

TC = true thermistor temperature (°C)

e = base of the Naperian logarithmic system

2.6.8 Computation of the True Relative Humidity

$$RC = R \cdot COR$$

where RC = true relative humidity (%)

R = indicated relative humidity (%)

COR = vapor pressure ratio

2.7 Subroutine COMPUT

2.7.1 Conversion of Range in Meters to Range in Feet

$$RF = RM/0.3048$$

where RF = range (ft)

RM = range (m)

2.7.2 Conversion of Temperature in Degrees Celsius to Degrees Kelvin

$$TK = T + 273.15$$

where TK = temperature (K)

T = temperature (°C)

273.15 = conversion factor

2.7.3 Computation of Vapor Pressure (e) in Millibars

$$e = 0.0611 \cdot RH \cdot 10^{\frac{7.5 \cdot T}{237.3 + T}}$$

where RH = relative humidity (%)

T = temperature (°C)

2.7.4 Computation of Dewpoint Temperature (TD) in Degrees Celsius

$$TD = [237.3 \cdot \log(e) - 186.527]/[8.286 - \log(e)]$$

where e = vapor pressure (mbars)

2.7.5 Computation of Absolute Humidity (ϱw) in Grams per Cubic Meter

$$\varrho w = 216.7\ (e/TK)$$

where TK = temperature (K)

e = vapor pressure (mbars)

2.7.6 Computation of Correction to Elevation Angle for Refractive Index

$$EN = \cot \phi \cdot [(RI - RIS) \cdot 10^{-6}] \cdot 57.29578$$

$$\phi_r = \phi + EN$$

where EN = correction to angle for refractive index (degrees)

ϕ = measured elevation angle (degrees)

RI = refractive index at level

RIS = refractive index at the surface

ϕ_r = corrected elevation angle (degrees)

2.7.7 Computation of the Geometric Height (Z) and the Geopotential Height (H)

$$Z = \left(\sqrt{(R_e + HA + TRKHGT)^2 + R^2 + 2R \cdot (R_e + HA + TRKHGT) \cdot \sin \phi_r} - R_e\right) \cdot SF$$

$$H = (R_e \cdot Z)/(R_e + Z) \cdot GRAT$$

where R_e = radius of the Earth (ft)

R = slant range (ft)

HA = station height (ft)

$TRKHGT$ = tracker height above station height (ft)

SF = constant used to convert feet to meters or leave in feet

$GRAT$ = ratio of local gravity to gravity at 45° latitude

$= 1 - 0.0026373 \cos \theta_L + 0.0000059 \cos^2 \theta_L$

θ_L = local latitude (degrees)

2.7.8 Computation of Correction of Elevation Angle for Earth's Curvature

$$\phi_{rc} = \phi_r + \left[(Z \cdot \cos \phi_r / \sin \phi_r)/(2.2 \cdot R_e)\right] \cdot 57.29578$$

where ϕ_{rc} = elevation angle corrected for Earth's curvature and refractive index (degrees)

ϕ_r = elevation angle corrected for refractive index (degrees)

Z = geometric height (ft)

R_e = radius of the Earth (ft)

2.7.9 Computation of the East-West (X), North-South (Y) Position Components

$$X = R \cdot \cos \phi_{rc} \cdot \sin \theta \cdot SF$$

$$Y = R \cdot \cos \phi_{rc} \cdot \cos \theta \cdot SF$$

where θ = azimuth angle from tracker (degrees)

ϕ_{rc} = elevation angle corrected for Earth's curvature and refractive index (degrees)

X = east-west component of position in meters or feet depending on value of SF

Y = north-south component of position in meters or feet depending on value of SF

R = slant range (ft)

SF = conversion factor for feet or meters

2.7.10 Computation of the Logarithm of Density (LOG ϱ)

$$\log \varrho = \log (348.38 \cdot P/TV)$$

where 348.38 = gas constant for dry air combined with a conversion factor. Ref. p 290, SMT, List 1968.

P = barometric pressure (mbars)

TV = virtual temperature

2.7.11 Computation of Preliminary Virtual Temperature (TV)

This preliminary temperature is used as a virtual temperature in computing the initial pressure at the level.

$$TV = TK$$

where TK = temperature at the first level (K)

2.7.12 Computation of Virtual Temperature (TV)

The true virtual temperature and a mean virtual temperature are computed at the level using

$$TV = TK/(1.0 - 0.379\ e/P)$$

$$\overline{TV} = (TV + TVP)/2$$

where TK = temperature (K)

e = vapor pressure (mbars)

TVP = previous level virtual temperature (K)

P = barometric pressure (mbars)

$\overline{TV}$ = mean virtual temperature (K)

2.7.13 Computation of Barometric Pressure

The barometric pressure (P) at each level is initially computed using the preliminary value of TV and recomputed using the same expression and the true $\overline{TV}$.

$$P = {}_{10}[\log (PP) - (H - HP) / (HV \cdot \overline{TV})]$$

where PP = previous level pressure (mbars)

H = geopotential height of the level (ft)

HP = geopotential height of the previous level (ft)

$\overline{TV}$ = mean virtual temperature (K)

HV = constant containing the general gas constant, acceleration of gravity, and a conversion factor for feet or meters

2.7.14 Computation of the Velocity of Sound (VS) in Knots

$$VS = \sqrt{1.4028 \cdot P_{kp}/\varrho} \cdot 1.94254$$

where P_{kp} = pressure (kPa)

ϱ = density (g/cm^3)

1.4028 = ratio of specific heat of air at constant pressure to that at constant volume. Ref. p 292, SMT.

1.94254 = converts meters/second to knots

2.7.15 Computation of the Refractive Index (RI) at Microwave Frequencies

$$RI = \frac{77.6P - 5.6e + 374808e/TK}{TK}$$

where P = barometric pressure (mbars)

e = vapor pressure (mbars)

TK = temperature (K)

2.7.16 Computation of the Refractive Index at Optical Frequencies (ORI)

$$ORI = (77.6P/TK) + (0.584P/\lambda^2 TK) - 0.06e$$

where λ = wavelength of light source (μm) (normally 0.56μ for sky background)

P = barometric pressure (mbars)

TK = temperature (K)

e = vapor pressure (mbars)

2.7.17 Mixing Ratio

$$W = 622\ [E/(P - E)]$$

where W = mixing ratio (g/kg)

E = vapor pressure (mbars)

P = pressure (mbars)

622 = Ref. *Smithsonian Meteorological Tables*, saturation mixing ratio equation, 1968, p 302.

2.7.18 Precipitable Water

$$PW = (5/980.616) \cdot \sum_{i}^{i+1} (W_{i+1} + W_i) \cdot (P_i - P_{i+1})$$

where PW = precipitable water

980.616 = acceleration of gravity (cm/s^2)

W = mixing ratio (g/kg)

P = pressure (mbars)

i = index ranging from the surface to the current level

2.8 Subroutine TITLE

2.8.1 Computation of Ratio of Local Gravity to Gravity at 45°

The ratio of local gravity to gravity at 45° latitude (GRAT) is computed for those stations not listed in the subroutine data statement (see Section 10.8 for those listed) using

$$GRAT = 1 - 0.0026373 \cdot \cos 2\ La + 0.0000059 \cdot \cos^2 2\ La$$

where La = latitude of the station

0.0026373, 0.0000059 } are constants found in *Smithsonian Meteorological Tables* 1951, p 488, equation 1.

This expression is developed using 980.616 cm/s^2 as the standard value of gravity at 45° latitude.

2.9 Subroutine HED

None

2.10 Subroutine TABDAT

None

2.11 Subroutine INTERP

2.11.1 Computation of a Linear Altitude Ratio (RAT)

$$RAT = \frac{ZZ_2 - HS}{ZZ_2 - ZZ_1}$$

where ZZ_1 = altitude of the lower bounding level

ZZ_2 = altitude of the upper bounding level

HS = constant altitude desired for output

2.11.2 Linear Interpolation

Temperature, speed of sound, refractive index, dewpoint, relative humidity, absolute humidity, vapor pressure, precipitable water, and the horizontal velocity components are linearly interpolated using the equation

$$X = RAT\ [X_1 - X_2] + X_2$$

where X = the interpolated value

X_2 = the value at the upper bounding level

X_1 = the value at the lower bounding level

RAT = linear altitude ratio

2.11.3 Interpolation of Pressure and Density

Pressure and density are interpolated logarithmically using

$$X = 10^{\left(RAT\ [\log (X_1) - \log (X_2)] + \log (X_2)\right)}$$

where X = the interpolated value

X_2 = the value at the upper bounding level

X_1 = the value at the lower bounding level

RAT = linear altitude ratio

Wind shear is computed by the function WDIRF at its WSPDF entry point using the interpolated values of the horizontal velocity components as input. Wind shear direction is computed in the same manner by the function WDIRF.

2.11.4 Calculation of the Magnitude of Wind Shear (SHR)

The magnitude of wind shear is calculated using the equation

$$SHR = \frac{\left[(VX - VX_p)^2 + (VY - VY_p)^2 \right]^{1/2}}{\Delta ALT}$$

where VX & VY = velocity components (ft/s or m/s)

VX_p & VY_p = velocity components of previous levels (ft/s or m/s)

ΔALT = difference between altitudes (ft or m)

2.12 Subroutine MAND

None

2.12.1 Computation of Logarithmic Pressure Ratio

$$K_p = \frac{\log (P_i) - \log (P_l)}{\log (P_i) - \log (P_{i+1})}$$

where K_p = pressure ratio

P_i = pressure of the lower bounding level (mbars)

P_{i+1} = pressure of the upper bounding level (mbars)

P_l = pressure of the standard constant pressure surface being selected (mbars)

2.12.2 Interpolation of Dewpoint

$$Td_m = K_p \cdot (Td_{i+1} - Td_i) + Td_i$$

where Td_m = interpolated dewpoint for mandatory level (°C)

Td_{i+1} = dewpoint of the upper bounding level (°C)

Td_i = dewpoint of the lower bounding level (°C)

K_p = logarithmic pressure ratio

2.12.3 Interpolation of Temperature

$$T_m = K_p \cdot (T_{i+1} - T_i) + T_i$$

where T_m = interpolated temperature for the mandatory level (°C)

T_{i+1} = temperature of the upper bounding level (°C)

T_i = temperature of the lower bounding level (°C)

K_p = logarithmic pressure ratio

2.12.4 Interpolation of Relative Humidity

$$Rh_m = K_p \cdot (Rh_{i+1} - Rh_i) + Rh_i$$

where Rh_m = interpolated relative humidity for the mandatory level (%)

Rh_{i+1} = relative humidity of the upper bounding level (%)

Rh_i = relative humidity of the lower bounding level (%)

K_p = logarithmic pressure ratio

2.12.5 Interpolation of Height

$$Hm = K_p \cdot (H_{i+1} - H_i) + H_i$$

where Hm = interpolated height for the mandatory level (ft)

H_{i+1} = height of the upper bounding level (ft)

H_i = height of the lower bounding level (ft)

K_p = logarithmic pressure ratio

2.12.6 Interpolation of X Wind Velocity

$$Vx_m = K_p \cdot (Vx_{i+1} - Vx_i) + Vx_i$$

where Vx_m = interpolated X wind velocity for the mandatory level (kn)

Vx_{i+1} = X wind velocity of the upper bounding level (kn)

Vx_i = X wind velocity of the lower bounding level (kn)

K_p = logarithmic pressure ratio

2.12.7 Interpolation of Y Wind Velocity

$$Vy_m = K_p \cdot (Vy_{i+1} - Vy_i) + Vy_i$$

where Vy_m = interpolated Y wind velocity for mandatory level (kn)

Vy_{i+1} = Y wind velocity of the upper bounding level (kn)

Vy_i = Y wind velocity of the lower bounding level (kn)

K_p = logarithmic pressure ratio

2.13 Subroutine SIG

2.13.1 Significant Relative Humidity Level Check

$$\Delta R = \left| R_\ell - \left[R_s + \left(\frac{(TM_\ell - TM_s) \cdot (R_t - R_s)}{TM_t - TM_s} \right) \right] \right| - K_r$$

where ΔR = resultant of the absolute predicted and computed RH within 10%

R_ℓ = relative humidity of the level being examined (%)

R_s = relative humidity of the last significant level (%)

R_t = relative humidity of the top level (%)

TM_ℓ = time of the level being examined (s)

TM_s = time of the last significant level (s)

TM_t = time of the top level (s)

K_r = significant relative humidity criteria value

2.13.2 Significant Temperature Level Check

$$\Delta T = \left| T_\ell - \left[T_s + \left(\frac{(TM_\ell - TM_s) \cdot (T_t - T_s)}{TM_t - TM_s} \right) \right] \right| - K_t$$

where ΔT = resultant of the absolute predicted temperature and computed temperature at temperature differential (°C)

T_ℓ = temperature of the level being examined (°C)

T_s = temperature of the last significant level (°C)

T_t = temperature of the top level (°C)

K_t = significant temperature criteria value

TM_ℓ = time of the level being examined (s)

TM_s = time of the last significant level (s)

TM_t = time of the top level (s)

3.0 GENERAL INPUTS

Data input is on logical unit 3 and has a 40-character record size. The typical input has data records at 60-second intervals for a 100-minute track. The format of the data is as follows:

1st line: TTTTT = test number can be more than one group but must contain 5 digits

2d line: ST MM DD YY TTTT AAAA

ST = station number
See Section 10.8 for a list of all stations in the program

MM = month of year

DD = day of month

YY = year

TTTT = time of balloon release

AAAA = ascension number numerically from 1st day of calendar year

3d line: surface calibration data

IE HHH DDD VV T_hT_h PPPP.PP

where I = type of sonde

3 = MSS

4 = AN/AMQ-9

E = type of elements

1 = military

3 = Gold Line

HHH = altitude of station above MSL (geometric ft)

DDD = direction of surface wind (degrees from true north)

VV = speed of surface wind (kn)

T_hT_h = tracker height (feet above station altitude)

PPPP.PP = release point pressure (mbars)

4th line: data begins here and continues until the rawinsonde observation is complete.

GGGG RRRRR EE.EE AAA.AA HHH.H TTT.T C

where GGGG = time (s)
RRRRR = slant range (meters)
EE.EE = elevation angle (degrees from horizontal)
AAA.AA = azimuth angle (degrees from true north)
HHH.H = relative humidity (%)
TTT.T = temperature (°C)
C = 9 if a manually-selected significant level
= 5 if the data has been manually corrected
= blank if neither of the above apply

termination line:

999 ABCD

where 999 = termination indicator
ABCD = termination group
A 0 = complete observation
1 = incomplete observation
B 1 = obligated observation
2 = delayed obligated observation
3 = special observation
C termination reason
1 = balloon burst
2 = failure of attachments
3 = ground equipment failure
4 = project limitation
5 = chart limitation (pressure)
6 = leaking balloon
7 = power failure (ground)
8 = forced down (icing)
D type of observation
0 = Rawinsonde/Omegasonde (Met/Wind data)
1 = Rawin (Wind only)
2 = Windsonde (Wind only)
3 = RAOB (Met only)

3.1 Operator Dialogue

The purpose of the operator's input is to set the necessary constants and parameters for the desired output information, and to set the units of the output to either metric or English. Questions on the operator's console may be answered through a control file specified by the operator or through a terminal entry. The operator's console is assigned logical unit 7 for output to the CRT and logical unit 6 for input from the keyboard.

The first question of the dialogue asks if the operator will use the program's default options. The default options are listed at the same time. If the answer is YES, all subsequent dialogue is bypassed. The output on the CRT is

```
USER DEFAULT OPTIONS--YES/NO ?
INTERPOLATED OUTPUT
1000 FOOT INCREMENT
OUTPUT IN FEET
SPEED IN KNOTS
MICROWAVE IR
DAYLIGHT RUN
MOTHER CORRECTION
SHEAR--/SEC
SIGNIFICANT CRITERIA
  STANDARD 1 DEG C/10% RH
```

The second question asks if BLAST data is required. This is a special output to be used as input to an acoustic-propagation program called BLAST. All units in this output are metric, the data is uninterpolated, and the wind speed is output to the nearest 10th of a meter per second. In all other output options, the wind-speed data is a whole number. The output on the CRT is

```
BLAST DATA REQUIRED--YES/NO ?
```

If the answer is YES, the next five questions are skipped.

The third question asks if interpolated output is required. If the answer is NO, the fourth question (altitude increment) is skipped. The message on the CRT is

```
INTERPOLATED OUTPUT--YES/NO ?
```

The fourth question asks for the altitude increment desired on interpolated output data. The message on the CRT is

```
ALTITUDE INCREMENT
  XXXX
```

The fifth question asks if output will be in metric or English units. If the answer is metric units, the next question (wind speed) is skipped since metric units (m/s) will be used. The message on the CRT is

```
OUTPUT UNITS--FEET/METERS ?
```

If the output is in English units, the sixth question asks if the speeds will be in knots or feet per second. The default value in case of a NO answer is knots. The message on the CRT is

```
WIND SPEED IN FPS--YES/NO ?
```

The refractive index at microwave frequencies is the output normally desired. If it is desired in optical frequencies the answer to the seventh question is YES. The message on the CRT is

```
OPTICAL IR OUTPUT--YES/NO ?
```

In determining the lag correction for the relative-humidity instrument, insolation error is computed and used for a daytime run only. The eighth question asks if it is a daytime run. The message on the CRT is

DAYLIGHT RUN--YES/NO ?

There are times when temperature and humidity lag corrections are not desired. The ninth question asks if these corrections will be made. The message on the CRT is

MOTHER CORRECTION--YES/NO ?

Wind shear is normally output in seconds^{-1}. If desired it may be output in knots per foot. The 10th question asks if this is desired. The message on the CRT is

SHEAR OUTPUT IN KTS--YES/NO ?

The 11th question asks to choose the significant data selection criteria. Answer "1" signifies standard criteria will be used while "2" signifies special criteria will be used. The message on the CRT is

SIGNIFICANT CRITERIA:
(1) STANDARD 1 DEG C/10% RH
(2) SPECIAL 0.5 DEG C/5% RH

4.0 OUTPUT

4.1 Printer File

The printer file is assigned to logical unit 61. Its record size varies from 110 characters for the main section of the output to 56 characters for the mandatory data. The main section of the output has the following parameters:

Altitude	m or ft (geometric)
Wind direction	degrees
Wind speed	kn or m/s or ft/s
Temperature	°C
Dewpoint	°C
Pressure	mbars
Relative humidity	%
Absolute humidity	g/m^3
Density	g/m^3
Refractive index	microwave or optical (N units)
Velocity of sound	kn or ft/s or m/s
Shear	s^{-1} or kn^{-1}
Vapor pressure	mbars
Precipitable water	mm

At the end of this section are two lines of data. The first is the termination data which is the termination altitude in geopotential feet and geopotential meters and the barometric pressure in millibars. The second line is the tropopause data which is the height in geometric feet, barometric pressure in millibars, temperature and dewpoint in degrees Celsius, and refractive index in N units.

The mandatory section of the output has the following parameters:

Altitude	m or ft (geopotential)
Wind direction	degrees
Wind speed	kn or ft/s or m/s
Temperature	°C
Dewpoint	°C
Pressure	mbars
Relative humidity	%

The significant data section of the output has the following parameters:

Altitude	m or ft (geometric)
Wind direction	degrees
Wind speed	kn or ft/s or m/s
Temperature	°C
Dewpoint	°C
Pressure	mbars
Refractive index	microwave or optical (N units)
Relative humidity	%

4.2 Teletype file

The teletype file is assigned to logical unit 40. Its record size varies from 71 characters for the main section of the output to 37 characters for the mandatory data. The main section of the output has the following parameters:

Altitude	m or ft (geometric)
Wind direction	degrees
Wind speed	kn or m/s or ft/s
Temperature	°C
Dewpoint	°C
Pressure	mbars
Relative humidity	%
Absolute humidity	g/m^3
Density	g/m^3
Refractive index	microwave or optical (N units)
Velocity of sound	kn or ft/s or m/s
Shear	s^{-1} or kn^{-1}
Vapor pressure	mbars
Precipitable water	mm

At the end of this section are two lines of data. The first is the termination data which is the termination altitude in geopotential feet and geopotential meters and the barometric pressure in millibars. The second line is the tropopause data which is the height in geometric feet, barometric pressure in millibars, temperature and dewpoint in degrees Celsius, and refractive index in N units.

The mandatory section of the output has the following parameters:

Altitude	m or ft (geopotential)
Wind direction	degrees
Wind speed	kn or ft/s or m/s
Temperature	°C
Dewpoint	°C
Pressure	mbars
Relative humidity	%

The significant data section of the output has the following parameters:

Altitude	m or ft (geometric)
Wind direction	degrees
Wind speed	kn or ft/s or m/s
Temperature	°C
Dewpoint	°C
Pressure	mbars
Refractive index	microwave or optical (N units)
Relative humidity	%

4.3 Disk File

The disk file is assigned to logical unit 1. Its record size is 80 characters. The main section of the output has the following parameters:

Altitude	m or ft (geometric)
Wind direction	degrees
Wind speed	kn or m/s or ft/s
Temperature	°C
Dewpoint	°C
Pressure	mbars
Relative humidity	%
Absolute humidity	g/m^3
Density	g/m^3
Refractive index	microwave or optical (N units)
Velocity of sound	kn or ft/s or m/s
Shear	s^{-1} or kn^{-1}
Vapor pressure	mbars
Precipitable water	mm

At the end of this section are two lines of data. The first is the termination data which is the termination altitude in geopotential feet and geopotential meters and the barometric pressure in millibars. The second line is the tropopause data which is the height in geometric feet, barometric pressure in millibars, temperature and dewpoint in degrees Celsius, and refractive index in N units.

The mandatory section of the output has the following parameters:

Altitude	m or ft (geopotential)
Wind direction	degrees
Wind speed	kn or ft/s or m/s
Temperature	°C
Dewpoint	°C
Pressure	mbars
Relative humidity	%

The significant data section of the output has the following parameters:

Altitude	m or ft (geometric)
Wind direction	degrees
Wind speed	kn or ft/s or m/s
Temperature	°C
Dewpoint	°C
Pressure	mbars
Refractive index	microwave or optical (N units)
Relative humidity	%

4.4 Intermediate Scratch File

This unformatted file is assigned to logical unit 2. Its record size is 17 words. This file is created in subroutine COMPUT and is used in subroutines TABDAT and MAND. This file has the following parameters:

Time	min
East-west position component	ft or m
North-south position component	ft or m
Geometric height	ft or m
Geopotential height	ft or m
Pressure	mbars
Logarithm of pressure	
Temperature	°C
Dewpoint	°C
Relative humidity	%
Absolute humidity	g/m^3
Density	g/m^3
Velocity of sound	kn or ft/s or m/s
Refractive index	microwave or optical (N units)
Significant level flag	
Vapor pressure	mbars
Precipitable water	mm

5.0 DATA BASE

Not applicable

6.0 PROCESSING

6.1 Module Configuration

6.1.1 Directory of Program Units for RSRC

7	COMPUT	11	INTERP	13	SIG	6	TRHC	3	WIND
5	FORM	12	MAND	10	TABDAT	4	TSIGN	2	WSPDF
9	HED	1	RSRC	8	TITLE	2	WDIRF		

13 ROUTINES, 14 ENTRY POINTS ON FILE RSRC2

6.1.2 Cross Reference of Internal Program Units

```
1  PROGRAM     RSRC
   COMMON:        A        DATAID   HEAD     NIG      SFC
   CALLS:         COMPUT   ENDRUN   HED      ID       MAND  SIG
                  TABDAT   TITLE

2  FUNCTION    WDIRF
   ENTRY POINTS:  WDIRF    WSPDF
   CALLED FROM:   INTERP   MAND     SIG

3  SUBROUTINE WIND
   CALLED FROM:   TABDAT

4  SUBROUTINE TSIGN
   CALLED FROM:   FORM     MAND     SIG

5  SUBROUTINE FORM
   COMMON:        A        HEAD
   CALLED FROM:   INTERP   TABDAT
   CALLS:         TSIGN

6  SUBROUTINE TRHC
   COMMON:        NIG
   CALLED FROM:   COMPUT

7  SUBROUTINE COMPUT
   COMMON:        SFC                DATAID
   CALLED FROM:   RSRC
   CALLS:         TRHC

8  SUBROUTINE TITLE
   COMMON:        SFC
   CALLED FROM:   RSRC
```

```
 9  SUBROUTINE HED
    COMMON:        A          HEAD
    CALLED FROM:   RSRC

10  SUBROUTINE TABDAT
    COMMON:        SIG
    CALLED FROM:   RSRC
    CALLS:         FORM       INTERP     WIND

11  SUBROUTINE INTERP
    COMMON:        A
    CALLED FROM:   TABDAT
    CALLS:         FORM       WDIRF      WSPDF

12  SUBROUTINE MAND
    COMMON:        MAND       SIG
    CALLED FROM:   RSRC
    CALLS:         TSIGN      WDIRF      WSPDF

13  SUBROUTINE SIG
    COMMON:        MAND       SIG
    CALLED FROM:   RSRC
    CALLS:         TSIGN      WDIRF      WSPDF
```

6.1.3 Cross Reference of External Program Units

```
1  EXTERNAL END UN
```

6.1.5 Tree Diagrams for Program

```
0 RSRC
    1 COMPUT
        2 TRHC
    1 HED
    1 MAND
        2 TSIGN
        2 WDIRF
        2 WSPDF
    1 SIG
        2 TSIGN
        2 WDIRF
        2 WSPDF
    1 TABDAT
        2 FORM
            3 TSIGN
        2 INTERP
            3 FORM
                4 TSIGN
            3 WDIRF
            3 WSPDF
        2 WIND
    1 TITLE
```

6.2 Description of Individual Modules

6.2.1 Program RSRC

Language: FORTRAN V
Programmer: R. E. Walters
Date: 6 May 1986

6.2.1.1 Function Description

Accepts reduction parameters input by the operator, initializes the program control constants, and initializes the output column headings.

6.2.1.2 Interface

IN		ORIGIN	UNITS
	RAD	/A/	degrees
	XINE	/A/	constant
OUT			
	DALT	/A/	ft or m
	IO	Argument	flag
	IP	/A/	flag
	ISIG	Argument	flag
	KSW1	/A/	flag
	KSW3	/A/	flag
	KSW5	/A/	flag
	KSW6	/A/	flag
	NAME	Argument	Hollerith

		ORIGIN	UNITS
	NNA	/A/	Hollerith
	NWDD	/A/	Hollerith
	NWWD	/A/	Hollerith
	SIGLH	/A/	ft or m
IN/OUT			
	HV	/A/	geopotential m/K or geopotential ft/K
	IDAY	/NIG/	flag
	RA	/A/	ft or m
	SF	/A/	m/ft
	SFC	/A/	ft/s/kn or m/s/kn
	WC	/A/	kn or ft/s or dimensionless

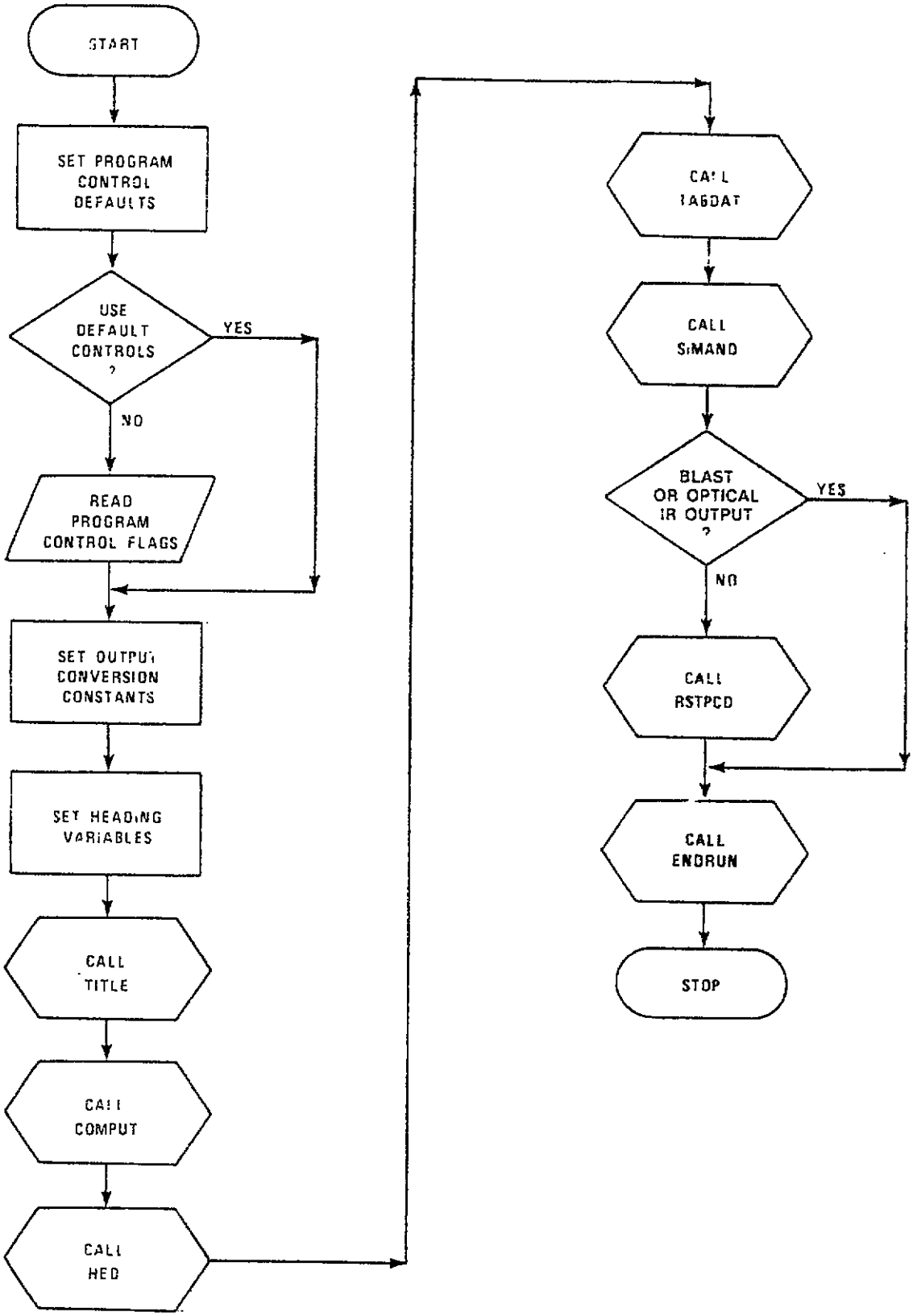
6.2.1.3 Internal Variables

I	Integer	operator dialogue variable
IO	Integer	flag for temperature and humidity lag correction
ISIG	Integer	flag for standard or special significant level output criteria
ITERM	Integer	loop termination counter
NAME	Integer	program name
PTBEG	Real	beginning teletype function and tape leader
PTEND	Real	ending teletype function
TRKHGT	Real	height of the tracker antenna above ground level (ft)

6.2.1.4 Algorithm

1. Assign default options.
2. Read user options.
3. Write paper-tape header if needed.
4. Define computation and conversion constants.
5. Call the computational and I/O subroutines.
6. Write paper-tape end function if needed.

6.2.1.5 Flowchart



6.2.2 Function WDIRF

Language: FORTRAN V
Programmer: R. E. Walters
Date: 6 May 1986

6.2.2.1 Function Description

Computes the direction or speed of the wind from the orthogonal components of the wind computed in subroutine WIND.

6.2.2.2 Interface

		ORIGIN	UNITS
IN			
	X	Parameter	ft/s or m/s
	Y	Parameter	ft/s or m/s
OUT			
	WDIRF	function name	degrees
	WSPDF	function name	ft/s or m/s

6.2.2.3 Internal Variables

D	Real	Cartesian wind direction (degrees)
WDIRF	Real	meteorological wind direction (degrees)
WSPDF	Real	wind speed (ft/s or m/s)
X	Real	east-west wind velocity component (ft/s or m/s)
Y	Real	north-south wind velocity component (ft/s or m/s)

6.2.2.4 Algorithm

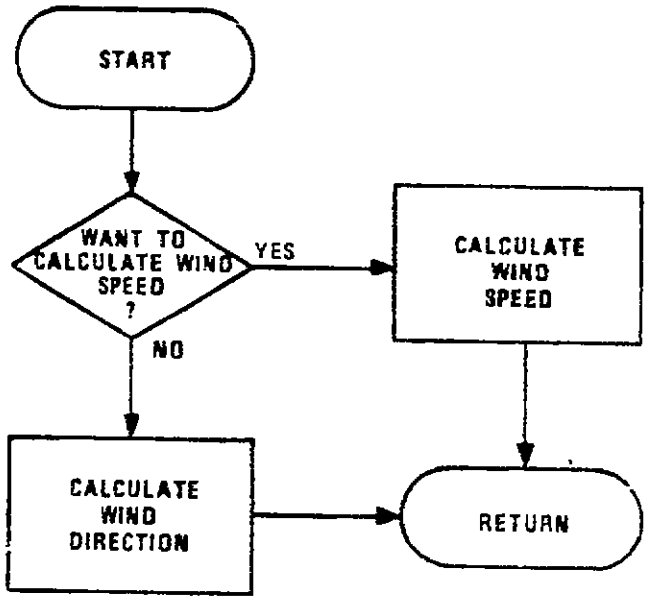
Direction

1. Determine if input data is missing data and assign "missing" to output if required.
2. Determine if the east-west component is zero. If so, determine north or south direction and assign value.
3. If east-west component is not zero compute direction.

Speed

1. Determine if input data is missing data and assign "missing" to output if required.
2. If not missing data, compute speed.

6.2.2.5 Flowchart



6.2.3 Subroutine WIND

Language: FORTRAN V
Programmer: R. E. Walters
Date: 6 May 1986

6.2.3.1 Function Description

Computes the east-west (VX) and north-south (VY) velocity components between positions.

6.2.3.2 Interface

IN		ORIGIN	UNITS
	GG	Parameter	s
	XX	Parameter	ft or m
	YY	Parameter	ft or m
OUT			
	VX	Parameter	ft/s or m/s
	VY	Parameter	ft/s or m/s
IN/OUT			
	XINE	Parameter	no units

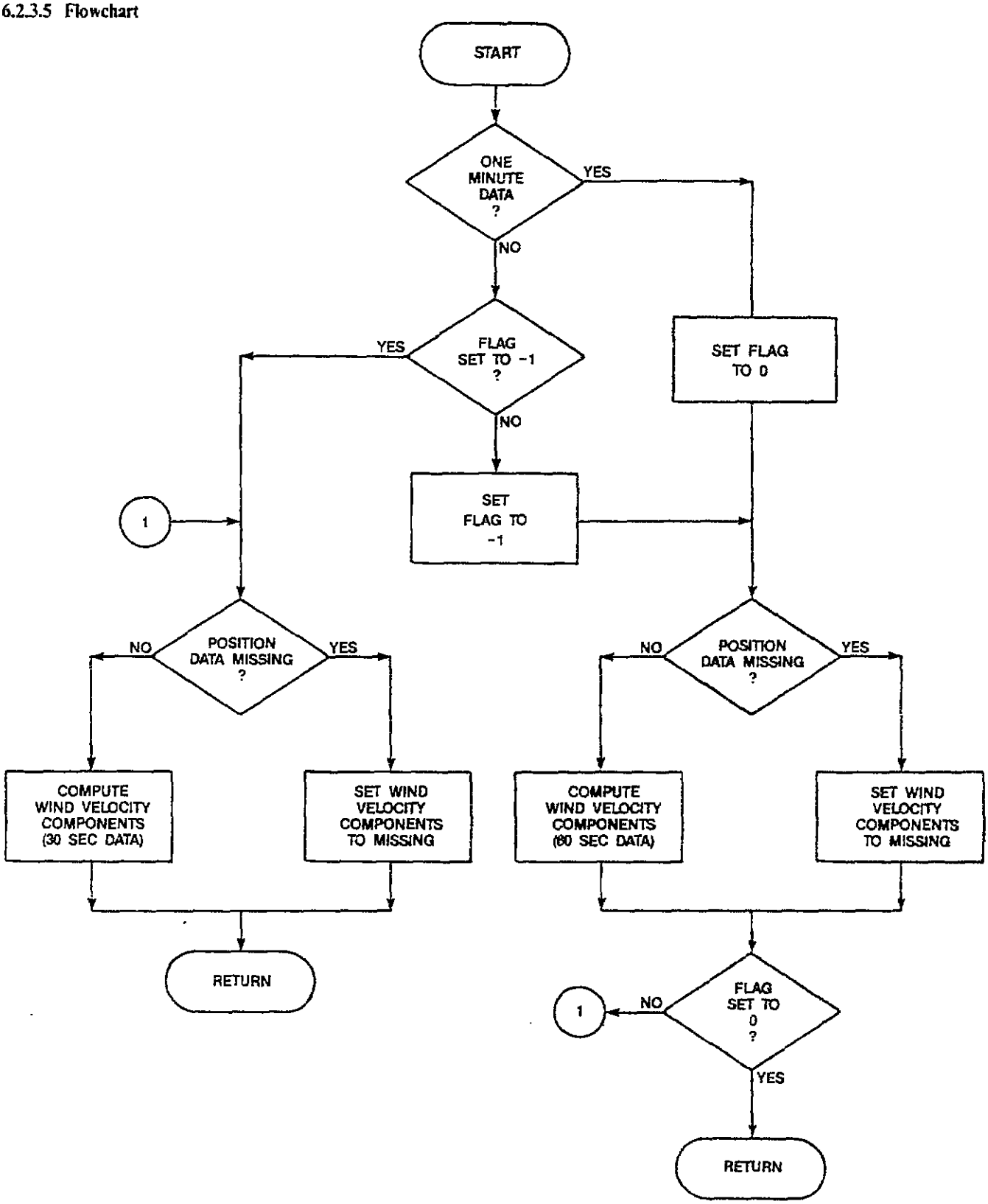
6.2.3.3 Internal Variables

GG	Real	elapsed time in seconds
VX	Real	east-west wind velocity component (ft/s or m/s)
VY	Real	north-south wind velocity component (ft/s or m/s)
WDSW	Real	flag — 0.0 = data interval greater than 30 seconds 1.0 = data interval less than or equal to 30 seconds
XINE	Real	constant for missing data
XX	Real	east-west position component (ft or m)
YY	Real	north-south position component (ft or m)

6.2.3.4 Algorithm

1. Determine if data interval is 30 seconds or less.
2. Determine if missing data.
3. Compute velocity components or assign missing data flag.

6.2.3.5 Flowchart



6.2.4 Subroutine TSIGN

Language: FORTRAN V
Programmer: R. E. Walters
Date: 6 May 1986

6.2.4.1 Function Description

Converts decimal to positive or negative character.

6.2.4.2 Interface

OUT		ORIGIN	UNITS
	K	Parameter	°C in tenths
	I	Parameter	°C

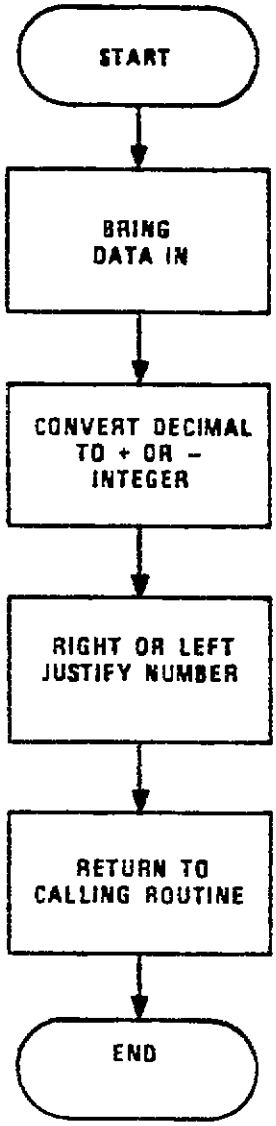
6.2.4.3 Internal Variables

I	Integer	input — temperature times 10 (°C) output — absolute value of temperature (°C)
II	Integer	temperature (°C)
K	Integer	tenths value of temperature (°C)

6.2.4.4 Algorithm

1. Determine if positive or negative temperature.
2. Compute whole value of temperature.
3. Compute tenths value of temperature and convert to proper character value.

6.2.4.5 Flowchart



6.2.5 Subroutine FORM

Language: FORTRAN V
Programmer: R. E. Walters
Date: 6 May 1986

6.2.5.1 Function Description

Examines the output data for possible errors in wind and temperature; outputs these errors to the CRT; outputs the tabulated data to the printer and disk files.

6.2.5.2 Interface

		ORIGIN	UNITS
IN			
	DALT	/A/	ft or m
	ID1	Argument	alphanumeric
	IP	/A/	flag
	IPAGE	/HEAD/	flag
	IT1	Argument	alphanumeric
	KSW5	/A/	flag
	KSW6	/A/	flag
	SFC	/A/	ft/s/kn or m/s/kn
IN/OUT			
	ABSH	/A/	g/cm^3
	E	/A/	mbars
	HEAD1	/HEAD/	alphanumeric
	HEAD2	/HEAD/	alphanumeric
	ID	Argument	°C
	JT	Argument	°C
	P	/A/	mbars
	PW	/A/	mm
	RH	/A/	%
	RI	/A/	N units
	SHR	/A/	s^{-1}
	T	/A/	°C
	TD	/A/	°C
	VS	/A/	kn, ft/s or m/s
	VX1	/A/	degrees from true north
	VY1	/A/	kn, ft/s or m/s
	Z	/A/	m or ft

6.2.5.3 Internal Variables

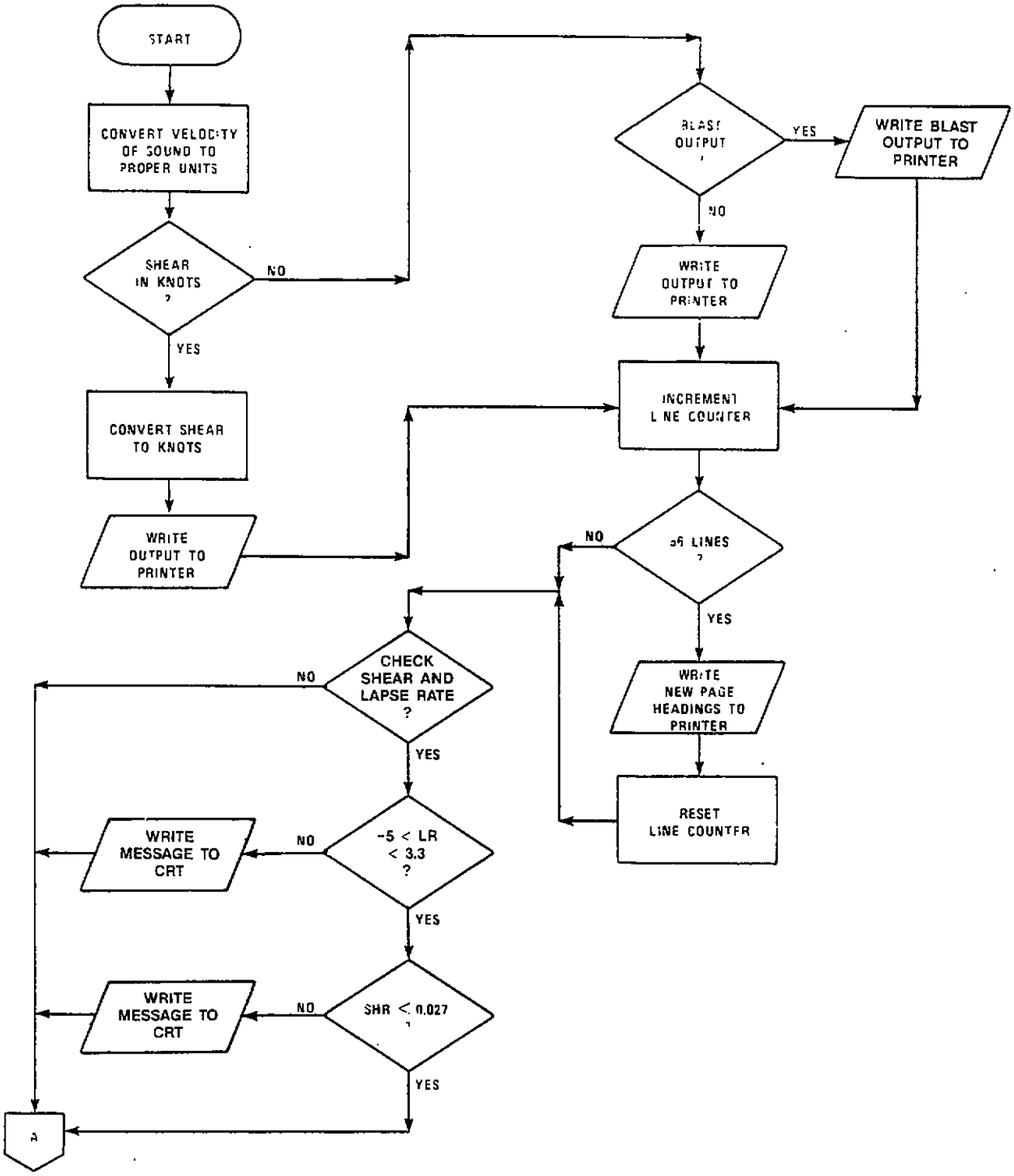
I	Integer	loop counter
IB	Integer	absolute humidity times 100 (g/cm^3)
ID	Integer	dewpoint times 10 (°C)
ID1	Integer	dewpoint temperature-coded tenths value (°C)

IPAGE	Integer	output line counter
IT1	Integer	temperature-coded tenths value (°C)
JT	Integer	temperature times 10 (°C)
LP	Integer	pressure times 100 (mbars)
LS	Integer	density times 100 (g/cm^3)
TEP	Real	temperature (°C) previous level
THR	Real	shear converted to knots
TLAP	Real	temperature lapse rate (°C)

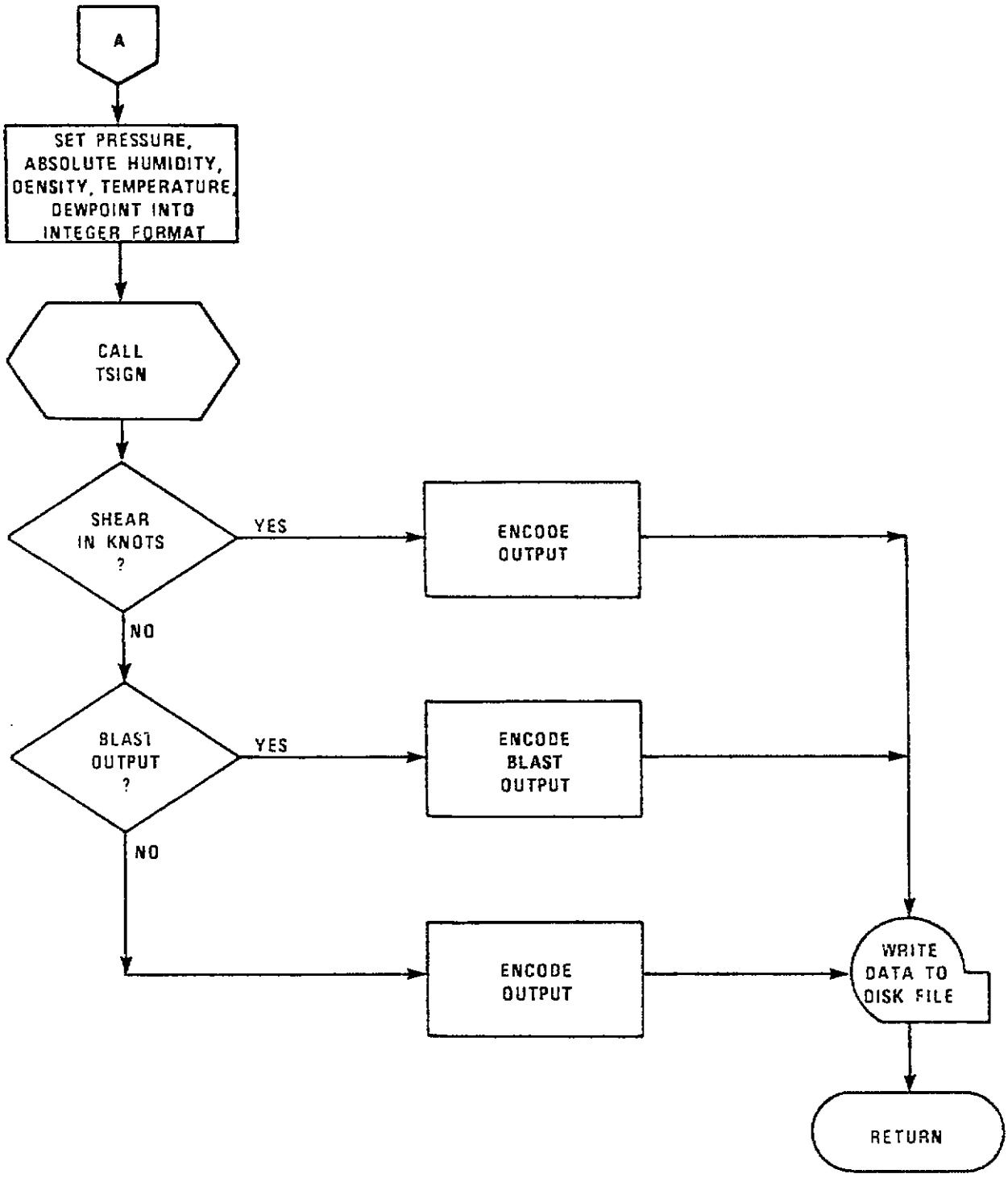
6.2.5.4 Algorithm

1. Determine if new page heading is needed on printer file and output heading as required.
2. Compute shear in knots.
3. Convert speed of sound if required.
4. Determine data format to printer and output a data line.
5. Determine if output quality control checks are to be performed. If so
   a. Check temperature lapse rate and output a warning to the CRT as required.
   b. Check wind shear and output a warning to the CRT as required.
6. Encode temperatures and dewpoints for output to the disk file.
7. Determine data format to disk file and teletype, and output a data line.

6.2.5.5.1 Flowchart



6.2.5.5.2 Flowchart



6.2.6 Subroutine TRHC

Language: FORTRAN V
Programmer: R. E. Walters
Date: 6 May 1986

6.2.6.1 Function Description

Corrects the temperature for response lag. Corrects the relative humidity for thermal and response lag.

6.2.6.2 Interface

IN		ORIGIN	UNITS
	IDAY	/NIG/	flag
	DEN	Parameter	g/cm^3
	G	Parameter	s
	GP	Parameter	s
	TCP	Parameter	°C
	T	Parameter	°C
	TP	Parameter	°C
	R	Parameter	%
	ISW60	Parameter	flag
	P	Parameter	mbars
	IELE	Parameter	flag
OUT			
	TC	Parameter	°C
	RC	Parameter	%

6.2.6.3 Internal Variables

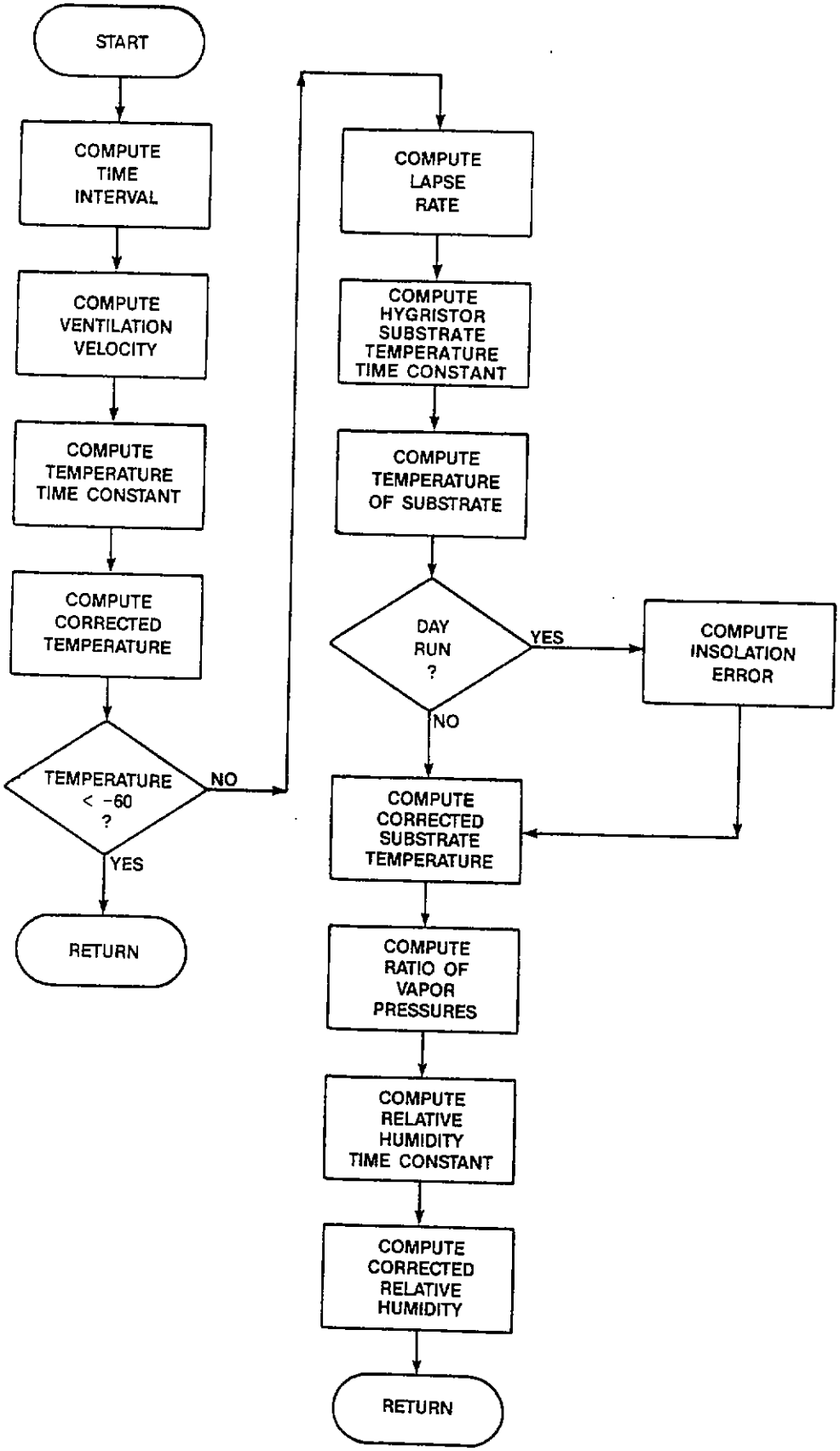
COR	Real	vapor pressure ratio (dimensionless)
DELTIN	Real	insolation error (°C)
DEN	Real	logarithm of density
DG	Real	time interval between data levels (s)
EX	Real	intermediate variable used in computing corrected temperature and substrate temperature
G	Real	time of the data level (s)
GP	Real	time of the previous data level (s)
ICHK	Integer	flag indicating initial entry into subroutine
IELE	Integer	flag indicating a rod or bead thermistor
ISW60	Integer	flag indicating that the temperature has or has not gotten colder than −60°C
LAMDA	Real	intermediate variable used in computing corrected temperature and substrate temperature
LR	Real	temperature lapse rate (°C)
P	Real	pressure (mbars)

R	Real	uncorrected relative humidity (%)
RC	Real	corrected relative humidity (%)
RHO	Real	density in g/cm^3 divided by 1000
T	Real	uncorrected temperature (°C)
TC	Real	corrected temperature (°C)
TCP	Real	previous level corrected temperature (°C)
TP	Real	previous level uncorrected temperature (°C)
TS	Real	substrate temperature (°C)
TSD	Real	substrate temperature corrected for insolation error (°C)
RSP	Real	substrate temperature, previous level (°C)
V	Real	ventilation velocity (ft/s)

6.2.6.4 Algorithm

1. Check for first call and set flag and variable.
2. Compute time difference between levels.
3. Compute time constant for the rod thermistor.
4. Compute corrected temperature for the rod thermistor.
5. Check if relative humidity is to be corrected. Return if not.
6. Compute temperature lapse rate.
7. Compute hygristor substrate temperature time constant
8. Compute temperature of the hygristor substrate.
9. Correct substrate temperature for insolation error.
10. Compute the ratio of vapor pressure.
11. Compute corrected relative humidity.

6.2.6.5 Flowchart



6.2.7 Subroutine COMPUT

Language: FORTRAN V
Programmer: R. E. Walters
Date: 6 May 1986

6.2.7.1 Function Description

Processes each data level, and writes the information to the intermediate data file.

6.2.7.2 Interface

		ORIGIN	UNITS
IN			
	GRAT	/A/	geopotential ft/geometric ft
	HA	/A/	ft or m
	HV	/A/	geopotential m/K or geopotential ft/K
	IELE	/A/	flag
	IO	Parameter	flag
	RA	/A/	ft or m
	RAD	/A/	degrees per radian
	RC	Argument	%
	TC	Argument	°C
	TRKHGT	Parameter	ft or m
OUT			
	ABSH	/A/	g/cm^3
	DEN	/A/	no units
	DLOG	/A/	no units
	EE	/A/	mbars
	HH	/A/	ft or m
	ISL	/A/	flag
	ITHK	/A/	no units
	P	/A/	mbars
	PLOG	/A/	no units
	PR	/A/	mbars
	PWA	/A/	mm
	RFI	/A/	N units
	TDEW	/A/	°C
	UABS	/A/	g/cm^3
	UU	/A/	%
	VSN	/A/	kn
	XX	/A/	ft or m
	YY	/A/	ft or m
	ZZ	/A/	ft or m
IN/OUT			
	RH	/A/	%
	T	/A/	°C

6.2.7.3 Internal Variables

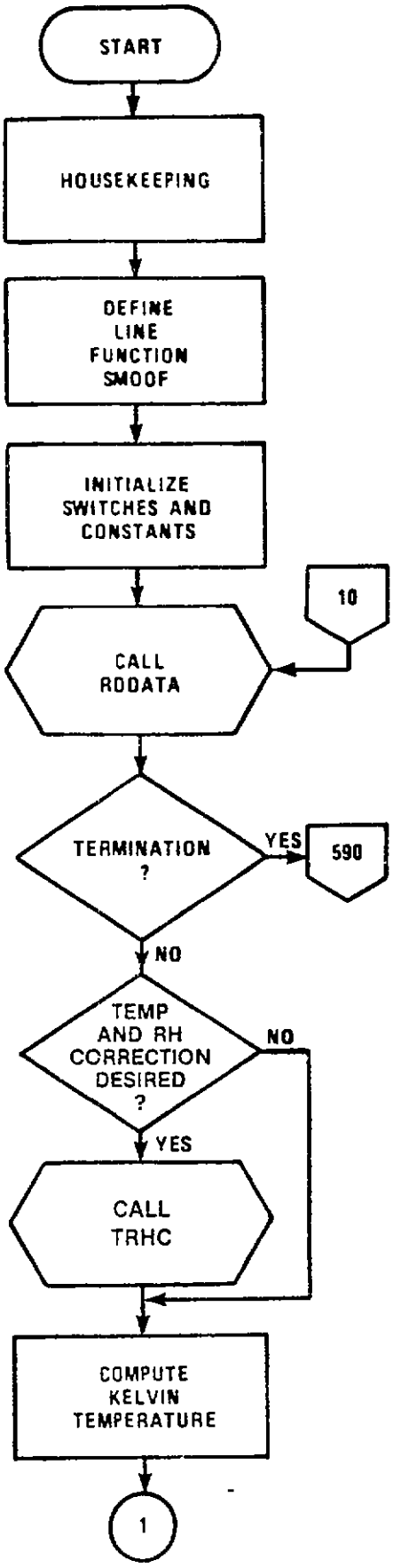
AZ	Real	azimuth (degrees from true north)
DF	Real	relative humidity (%)
DT	Real	temperature (°C)
EC	Real	elevation angle corrected for refractive index and Earth's curvature (degrees)
EL	Real	uncorrected elevation angle (degrees)
ELC	Real	elevation angle corrected for refractive index (degrees)
ELOG	Real	logarithm of vapor pressure
G	Real	elapsed time from release (s)
GA	Real	elapsed time from release — base time sent to line function SMOOF (s)
GB	Real	elapsed time from release — data level time sent to line function SMOOF (s)
GC	Real	elapsed time from release — upper level time sent to line function SMOOF (s)
GP	Real	time of previous data level (s)
HGTP	Real	geopotential height of the previous level (ft or m)
I	Integer	loop counter
IO	Integer	flag — temperature and humidity lag correction — yes/no
IS	Integer	manually chosen significant level flag.
ISW60	Integer	flag indicating that the temperature has or has not gotten colder than −60°C.
KI	Integer	index to working arrays
ORI	Real	optical refractive index (N units)
PP	Real	previous pressure level (mbars)
PPRLG	Real	logarithm of previous pressure
PRLG	Real	logarithm of pressure
RC	Real	corrected relative humidity (%)
REAS	Real	height of the instrument from the center of the Earth (ft)
RIS	Real	refractive index at the surface (N units)
RNG	Real	slant range (ft)
RX	Real	radius of the Earth (ft)
TC	Real	corrected temperature (°C)
TK	Real	absolute temperature (K)
TP1	Real	uncorrected temperature of the previous level (°C)
TRKHGT	Real	height of the tracker (ft)
TS	Real	corrected temperature of the previous level (°C)
TV	Real	virtual temperature (°C)
TVP	Real	virtual temperature of the previous level (°C)
W	Real	mixing ratio
WP	Real	mixing ratio of the previous level

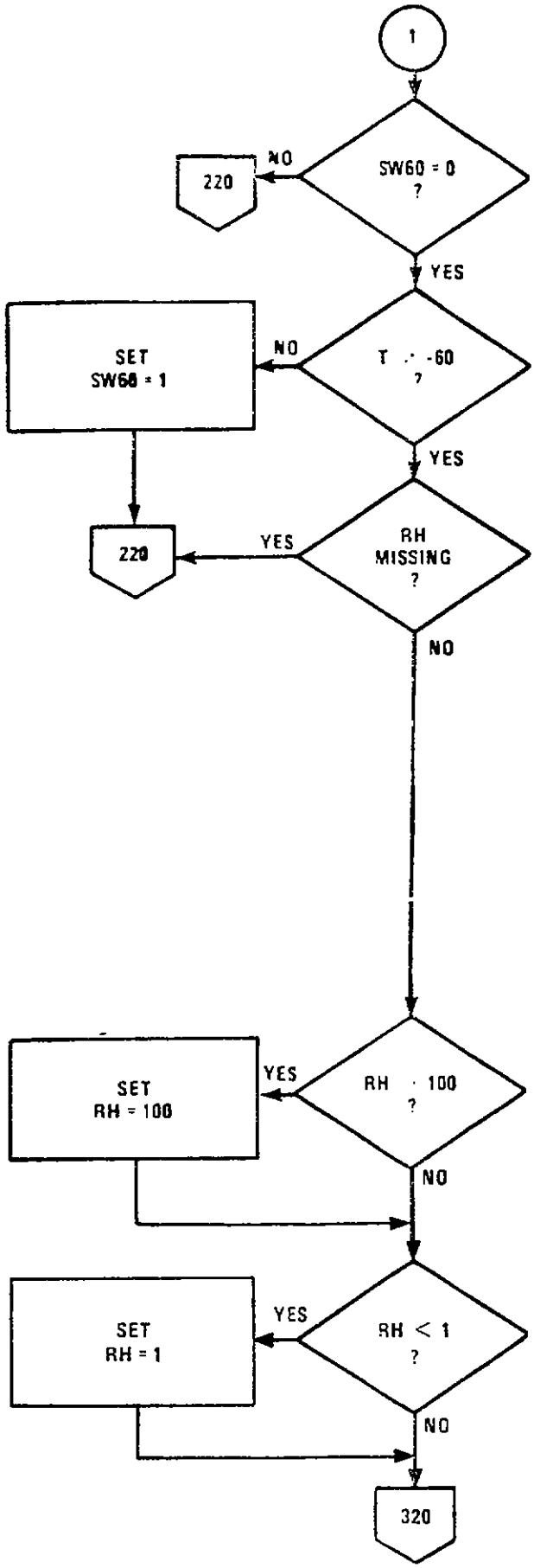
X	Real	east-west position component (ft or m)
XA	Real	position component sent to line-function SMOOF, lower data level (ft or m)
XB	Real	position component sent to line-function SMOOF, data level to be smoothed (ft or m)
XC	Real	position component sent to line-function SMOOF, upper-data level (ft or m)
Y	Real	north-south position component (ft or m)
ZP	Real	geometric height of the previous level (ft or m)

6.2.7.4 Algorithm

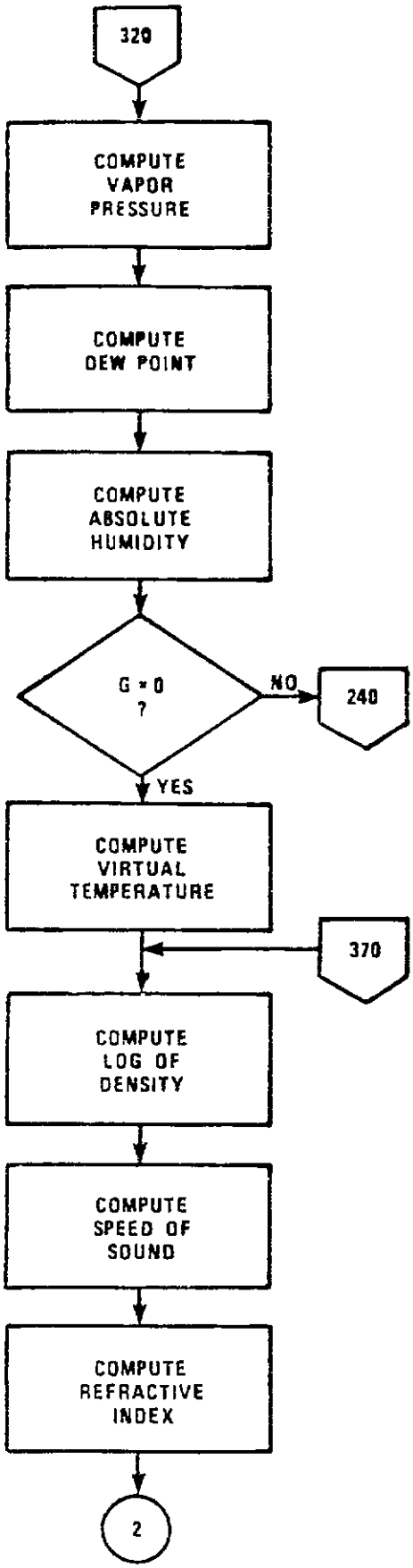
1. Read input data
   a. If not end of data, convert data to computational units.
   b. If it is end of data, store termination reason and exit routine.
2. Make temperature and relative humidity lag corrections.
3. Compute vapor pressure, mixing ratio, dewpoint, and absolute humidity.
4. Correct elevation angle for refractive index.
5. Compute geometric height, geopotential height, pressure, virtual temperature, and precipitable water.
6. Correct elevation angle for Earth's curvature.
7. Compute position components, density, velocity of sound, and refractive index.
8. Decrement working variables.
9. Write computed data to the scratch file.
10. Smooth position components.
11. Decrement stored variables and return to the read statement.

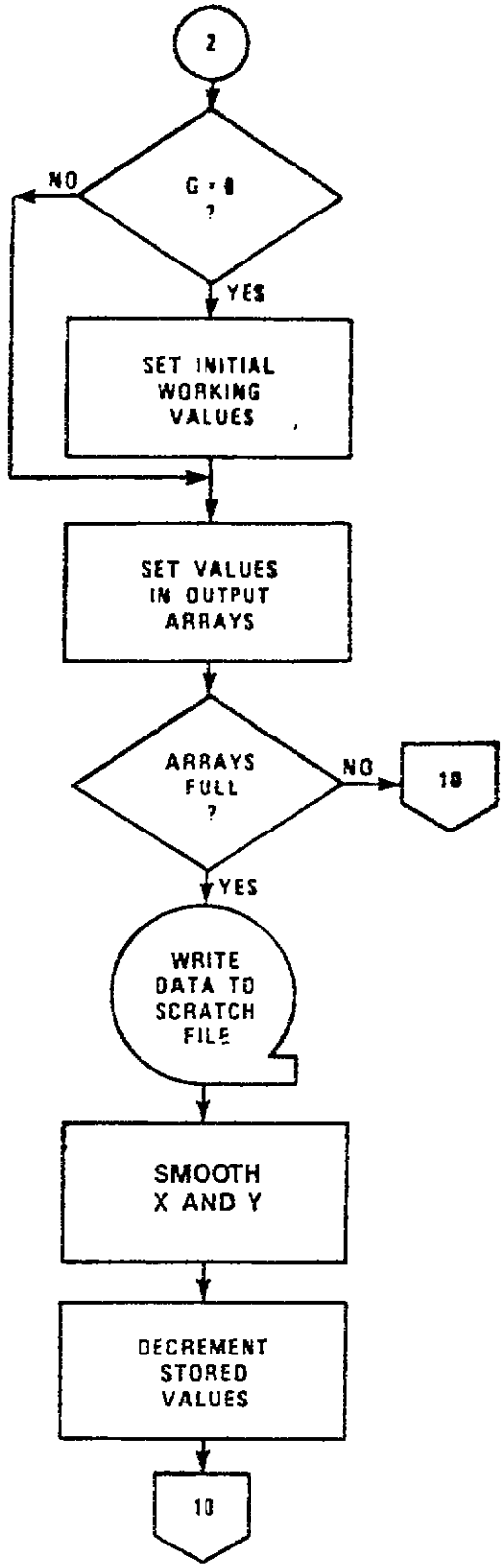
6.2.7.5.1 Flowchart



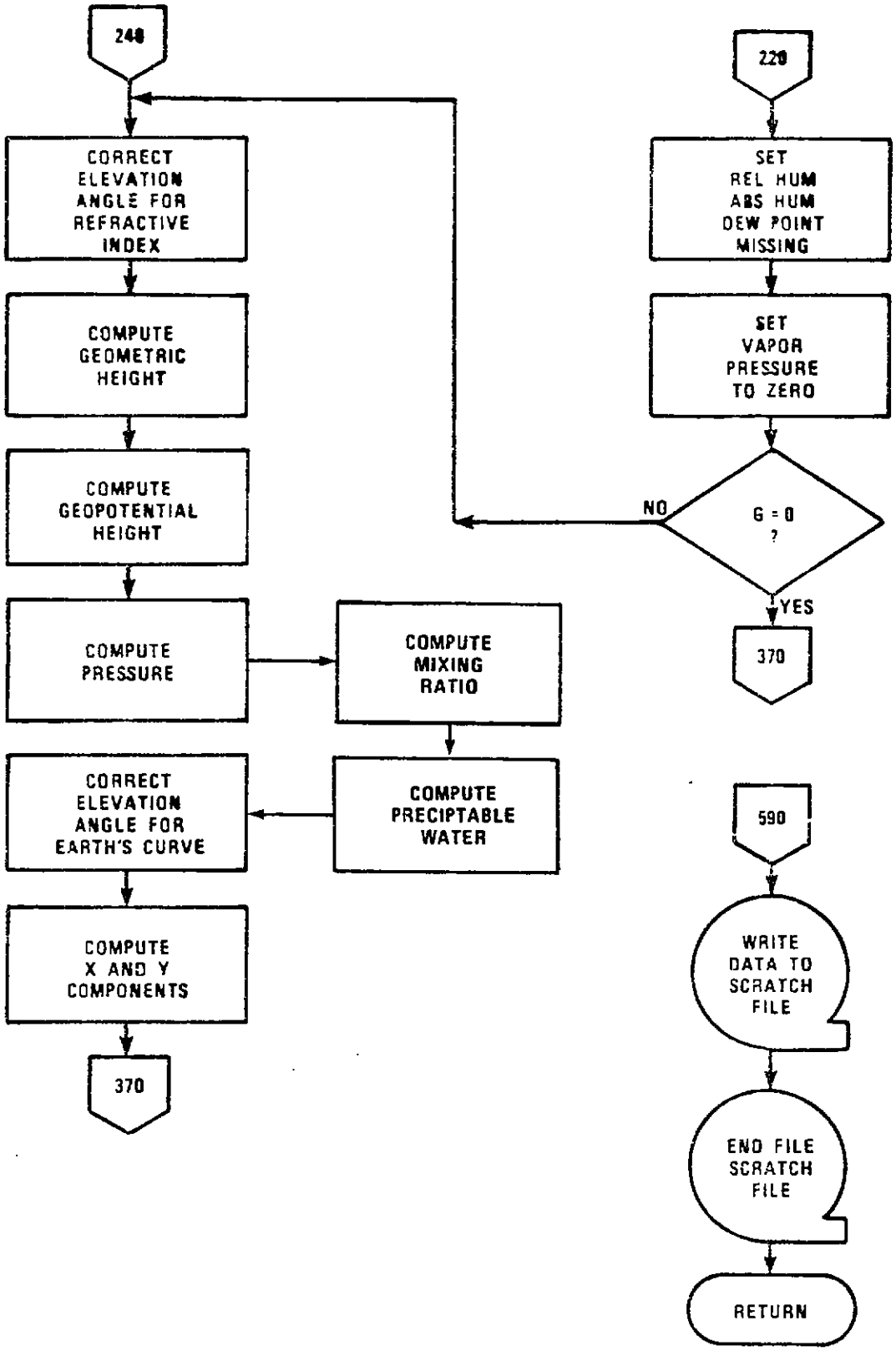


6.2.7.5.2 Flowchart





6.2.7.5.3 Flowchart



6.2.8 Subroutine TITLE

Language: FORTRAN V
Programmer: R. E. Walters
Date: 6 May 1986

6.2.8.1 Function Description

Reads the numerically coded input identification data and searches through tables in the program for corresponding plain-language sounding identification information which is then printed by an output device. The program selects the appropriate geometric-geopotential conversion constants to be used in sounding computations from a tabular listing for selected stations.

Reads the record containing the instrument and surface data. Converts surface height to geopotential height. Computes velocity components of the surface winds. Stores data in working variables.

6.2.8.2 Interface

		ORIGIN	UNITS
IN			
	ASC	Input data	no units
	DIR	Input data	degrees from true north
	RA	/A/	ft or m
	RAD	/A/	degrees per radian
	SF	/A/	m/ft
	SFC	/A/	ft/s/kn or m/s/kn
	SPD	Input data	kn
	WC	/A/	kn/ft/s or dimensionless
OUT			
	GRAT	/A/	geopotential ft/geometric ft
	SV	/A/	ft or m
	SY	/A/	ft or m
	TRKHGT	Parameter	ft
	VX	/A/	ft or m
	VXHP	/A/	ft or m
	VX1	/A/	ft or m
	VY	/A/	ft or m
	VYHP	/A/	ft or m
	VY1	/A/	ft or m
	Z	/A/	ft or m
IN/OUT			
	HA	/A/	ft or m
	HGT	/A/	ft or m
	IELE	/A/	flag
	ITYPE	/A/	flag
	KSW5	/A/	flag
	P	/A/	mbars
	TEST	Input data	no units
	TIME	Input data	hr and min

IDX	Input data	no units
MON	Input data	no units
IDA	Input data	no units
IYR	Input data	no units
LAT	Input data	degrees

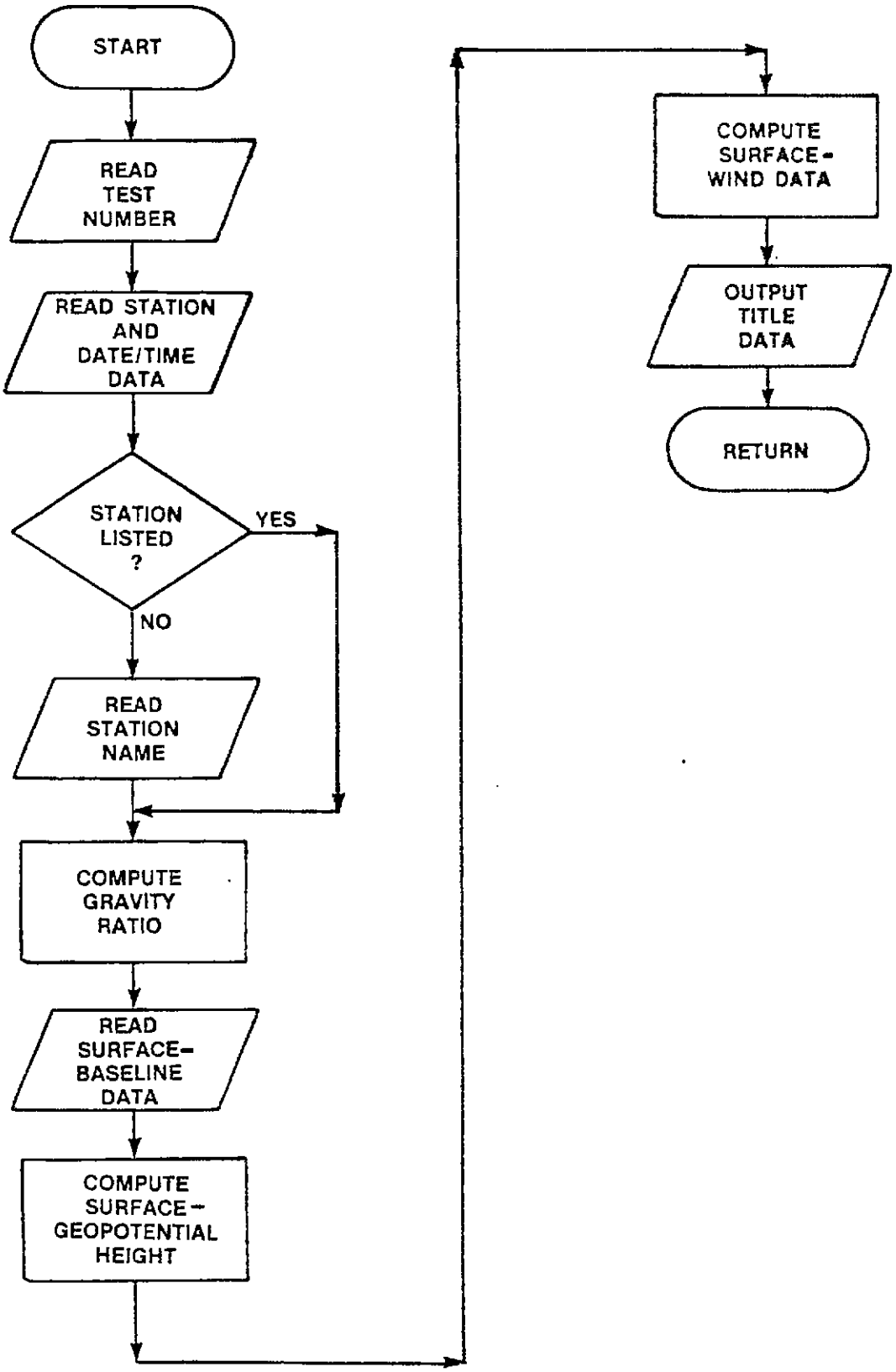
6.2.8.3 Internal Variables

ASC	Real	ascent number
DIR	Real	surface-wind direction (degrees from true north)
GRATE	Real	array of gravitational constants
I	Integer	do loop counter
IDA	Integer	day of release
IDX	Integer	station identifier
IYR	Integer	year of release
IZ	Integer	array of station identifiers
J	Integer	do loop counter
L	Integer	array index
LAT	Real	station latitude (degrees)
MON	Integer	month of release
MTH	Integer	array of months of the year
SPD	Real	surface-wind speed (ft/s or m/s)
TEMPS	Real	temporary input array
TEST	Real	test number
TIME	Integer	time of release (hr and min)
TRKHGT	Real	height of the tracker (ft)
WID	Integer	instrument identifiers
XID	Integer	array of station locations

6.2.8.4 Algorithm

1. Read test number and station identification lines.
2. Determine station gravitational constant.
3. Read initialization data.
4. Define initial computational variables.
5. Write title data to the printer, teletype, and disk files.

6.2.8.5 Flowchart



6.2.9 Subroutine HED

Language: FORTRAN V
Programmer: R. E. Walters
Date: 6 May 1986

6.2.9.1 Function Description

Outputs column headings for tabular data.

6.2.9.2 Interface

IN		ORIGIN	UNITS
	IP	Parameter	flag
	KSW1	Parameter	flag
	KSW5	Parameter	flag
	KSW6	Parameter	flag
OUT			
	IHEAD1	/IHEAD/	alphanumeric
	IHEAD2	/IHEAD/	alphanumeric

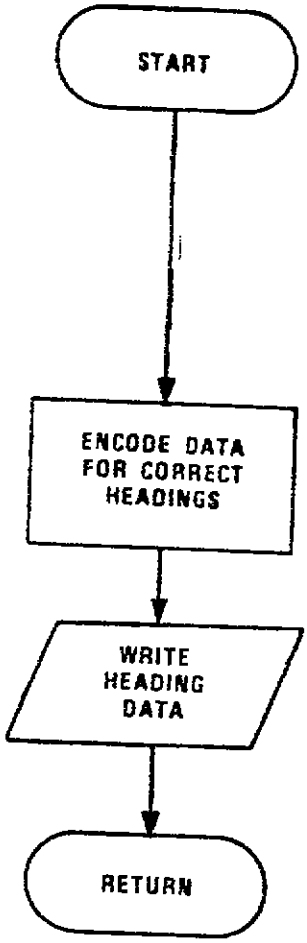
6.2.9.3 Internal Variables

IALT	Integer	column title — altitude
IP	Integer	flag — ft or m output
IR	Integer	column title — refractive index
ISHR	Integer	column title — shear
ISPD	Integer	column title — wind-speed
KSW1	Integer	flag — wind-speed units
KSW5	Integer	flag — microwave or optical-refractive index
KSW6	Integer	flag — shear units

6.2.9.4 Algorithm

1. Define column-heading variables.
2. Output column headings to printer file.
3. Encode column headings to holding arrays.
4. Output column headings to disk file.
5. Output column headings to teletype file.

6.2.9.5 Flowchart



6.2.10 Subroutine TABDAT

Language: FORTRAN V
Programmer: R. E. Walters
Date: 6 May 1986

6.2.10.1 Function Description

Reads the intermediate data file and selects the tropopause and termination data.

6.2.10.2 Interface

		ORIGIN	UNITS
IN			
	JP	/A/	flag
	KSW1	/A/	flag
	KSW5	/A/	flag
	NNA	/A/	alphanumeric
	XINE	/A/	no units
OUT			
	ABSH	/A/	g/cm^3
	E	/A/	mbars
	NWDD	/A/	alphanumeric
	NWWD	/A/	alphanumeric
	P	/A/	mbars
	PW	/A/	mm
	RH	/A/	%
	RI	/A/	N units
	SIGLH	/A/	ft
	T	/A/	°C
	TD	/A/	°C
	VS	/A/	kn or ft/s or m/s
	VXA	/SIG/	ft/s or m/s
	VYA	/SIG/	ft/s or m/s
	Z	/A/	ft or m
	DEN	/A/	g/cm^3
IN/OUT			
	DLOG	/A/	no units
	EE	/A/	mbars
	GG	/A/	s
	HH	/A/	geopotential ft or geopotential m
	ITHK	/A/	no units
	ISL	/A/	flag
	PLOG	/A/	
	PWA	/A/	mm
	PR	/A/	mbars
	RFI	/A/	N units
	TDEW	/A/	°C
	TP	/A/	°C

IN		ORIGIN	UNITS
	UABS	/A/	g/cm^3
	UU	/A/	%
	VSN	/A/	kn or ft/s or m/s
	VX	/A/	ft/s or m/s
	VY	/A/	ft/s or m/s
	XX	/A/	ft or m
	YY	/A/	ft or m
	ZZ	/A/	ft or m

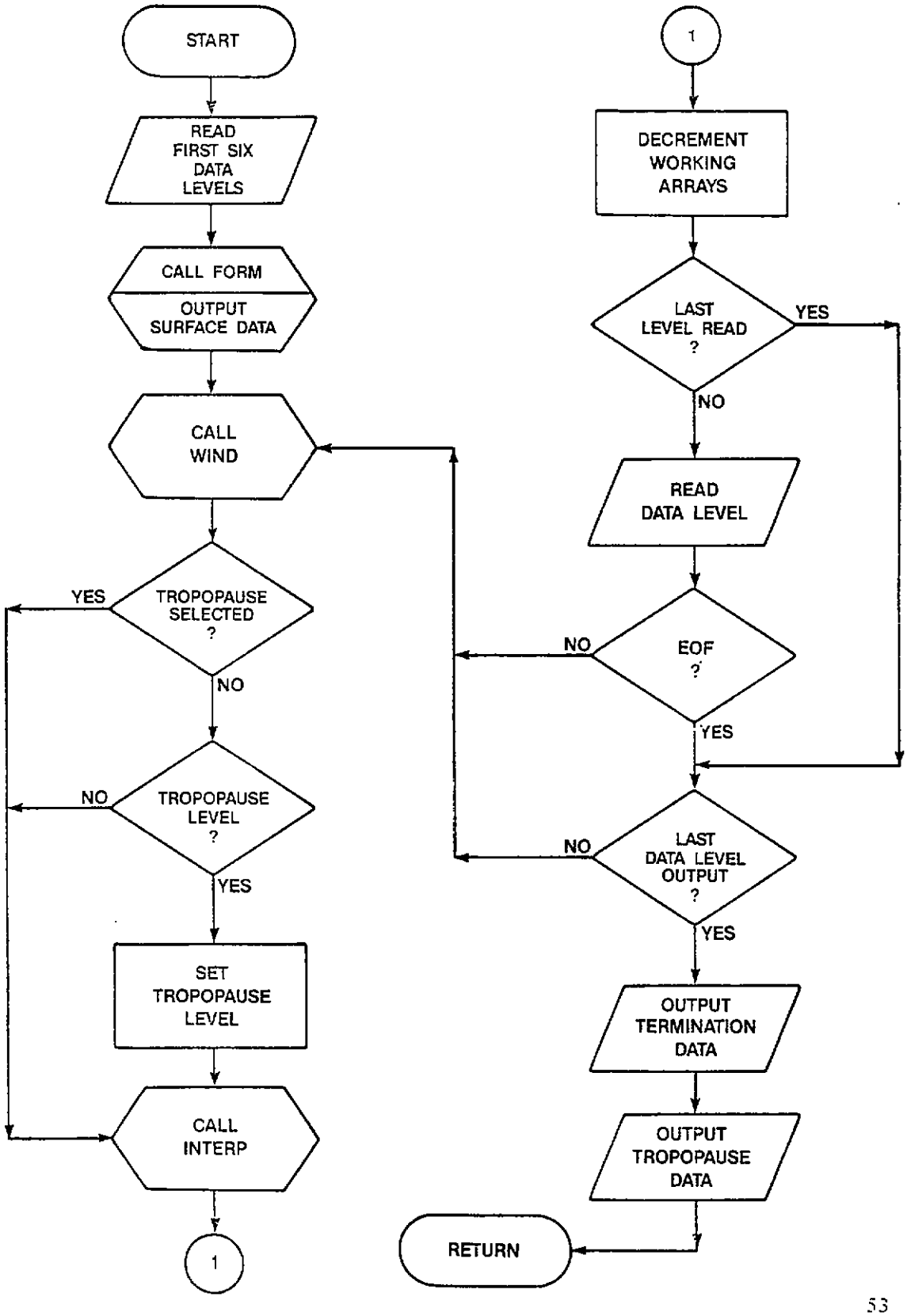
6.2.10.3 Internal Variables

BASESW	Real	flag — indicates if check for tropopause has started
CN1	Real	Lapse rate constant for tropopause checking (°C)
CN2	Real	maximum layer thickness over which tropopause is checked (ft or m)
DBA	Real	dewpoint at the tropopause (°C)
DHT	Real	Delta height for tropopause checking (ft or m)
HBA	Real	altitude of the tropopause (ft or m)
I	Integer	do loop counter
IDSW	Integer	flag — used to check for end of data
INX	Integer	flag — used to check for end of data
ITERM	Integer	flag — end of data
J	Integer	data arrays index
K	Integer	data arrays index
PBA	Real	pressure at the tropopause (mbars)
RBA	Real	refractive index at the tropopause (N units)
TBA	Real	temperature at the tropopause (°C)
TROPSW	Real	flag — indicating tropopause has been found
XHGT	Real	termination altitude (ft)
ZHGT	Real	termination altitude (m)

6.2.10.4 Algorithm

1. Initialize arrays, control-variables, and output-variables.
2. Read in the first six data points.
3. Output surface data.
4. Compute wind velocity components.
5. Check for tropopause and assign values if found.
6. Call interpolation routine to interpolate for output.
7. Decrement storage values.
8. Read another line of data if termination has not been reached and branch to item 4 above.
9. If termination has been reached, output last data lines.
10. Write termination and tropopause data to output files.

6.2.10.5 Flowchart



6.2.11 Subroutine INTERP

Language: FORTRAN V
Programmer: R. E. Walters
Date: 6 May 1986

6.2.11.1 Function Description

Calculates wind shear and interpolates at selected output levels.

6.2.11.2 Interface

IN		ORIGIN	UNITS
	DALT	/A/	ft or m
	DLOG	/A/	no units
	EE	/A/	mbars
	HS	/A/	ft or m
	KSW3	/A/	flag
	PLOG	/A/	no units
	PWA	/A/	mm
	RFI	/A/	N units
	TDEW	/A/	°C
	TP	/A/	°C
	UABS	/A/	g/cm^3
	UU	/A/	%
	VSN	/A/	kn or ft/s or m/s
	VX	/A/	ft/s or m/s
	VXHP	/A/	ft/s or m/s
	VY	/A/	ft/s or m/s
	VYHP	/A/	ft/s or m/s
	WC	/A/	kn/ft/s or dimensionless
	XINE	/A/	no units
	ZZ	/A/	ft or m
OUT			
	ABSH	/A/	g/cm^3
	DEN	/A/	g/cm^3
	E	/A/	mbars
	P	/A/	mbars
	PW	/A/	mm
	RH	/A/	%
	RI	/A/	N units
	SHR	/A/	s^{-1}
	T	/A/	°C
	TD	/A/	°C
	VS	/A/	kn or ft/s or m/s
	VX1	/A/	degrees from true north
	VY1	/A/	kn or ft/s or m/s
	Z	/A/	ft or m

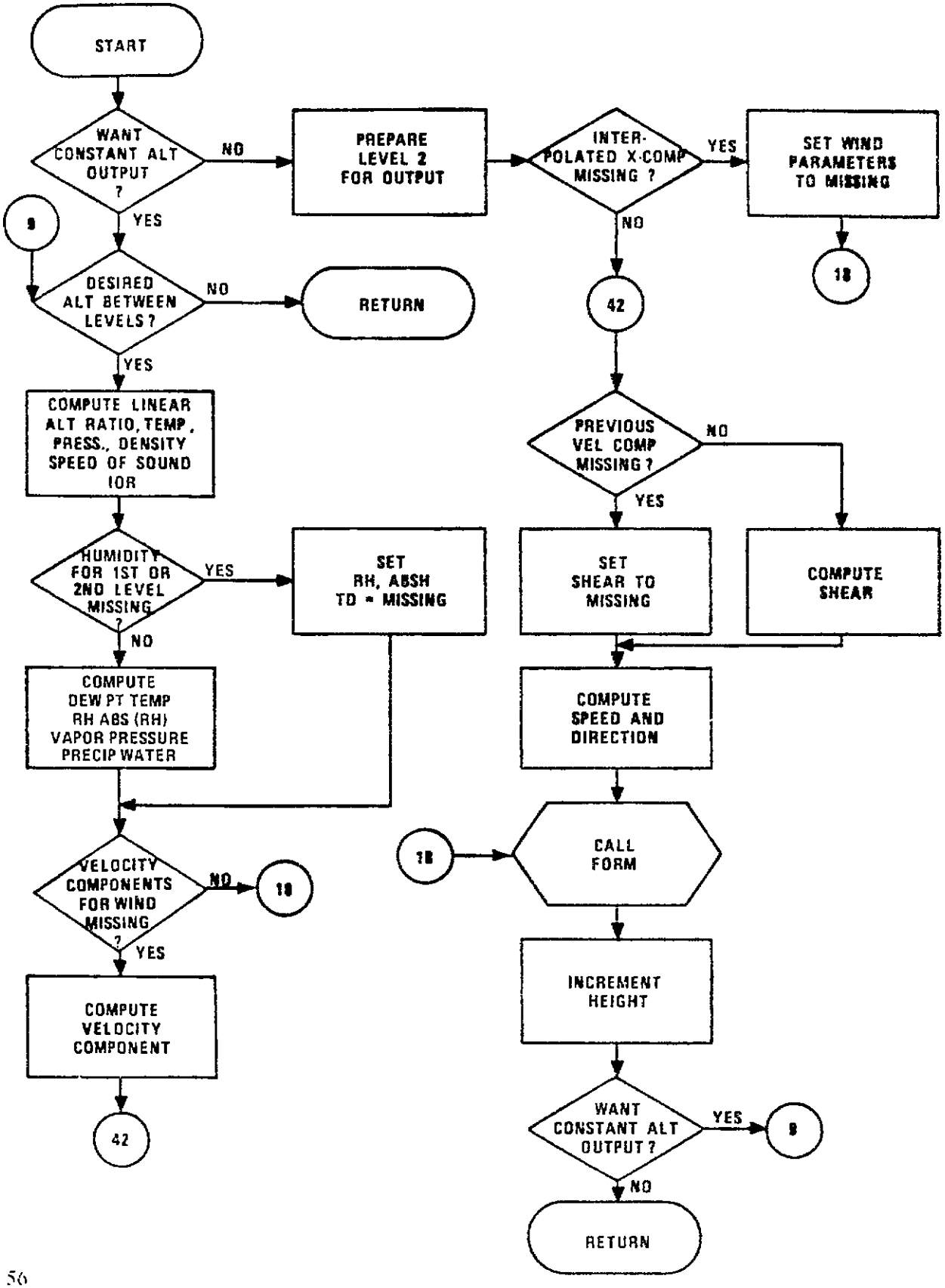
6.2.11.3 Internal Variables

AVX	Real	change in the east-west velocity component over the output interval (ft/s or m/s)
AVY	Real	change in the north-south velocity component over the output interval (ft/s or m/s)
RAT	Real	interpolation ratio
VXH	Real	east-west velocity component of the interpolated level (ft/s or m/s)
VYH	Real	north-south velocity component of the interpolated level (ft/s or m/s)

6.2.11.4 Algorithm

1. Check for the no-interpolation flag.
2. Check for correct levels to interpolate.
3. Compute an interpolation ratio.
4. Interpolate for output data.
5. Compute wind shear.
6. Check for missing data and assign output variables accordingly.

6.2.11.5 Flowchart



6.2.12 Subroutine MAND

Language: FORTRAN V
Programmer: R. E. Walters
Date: 6 May 1986

6.2.12.1 Function Description

Interpolates and outputs mandatory constant pressure levels.

6.2.12.2 Interface

		ORIGIN	UNITS
IN			
	IT1	Argument	alphanumeric
	ID1	Argument	alphanumeric
	KSW1	Parameter	flag
	KSW5	Parameter	flag
	IP	Parameter	flag
	XINE	Parameter	no units
	WC	Parameter	kn/ft/s or dimensionless
OUT			
	ITERM	Parameter	flag
IN/OUT			
	G	/MAND/	s
	H	/MAND/	geopotential ft or m
	HUM	/MAND/	%
	ID	Argument	°C
	JT	Argument	°C
	P	/MAND/	mbars
	PLOG	/MAND/	no units
	RFI	/MAND/	N units
	SL	/MAND/	flag
	T	/MAND/	°C
	TD	/MAND/	°C
	VXA	/SIG/	ft/s or m/s
	VYA	/SIG/	ft/s or m/s
	Z	/MAND/	ft or m

6.2.12.3 Internal Variables

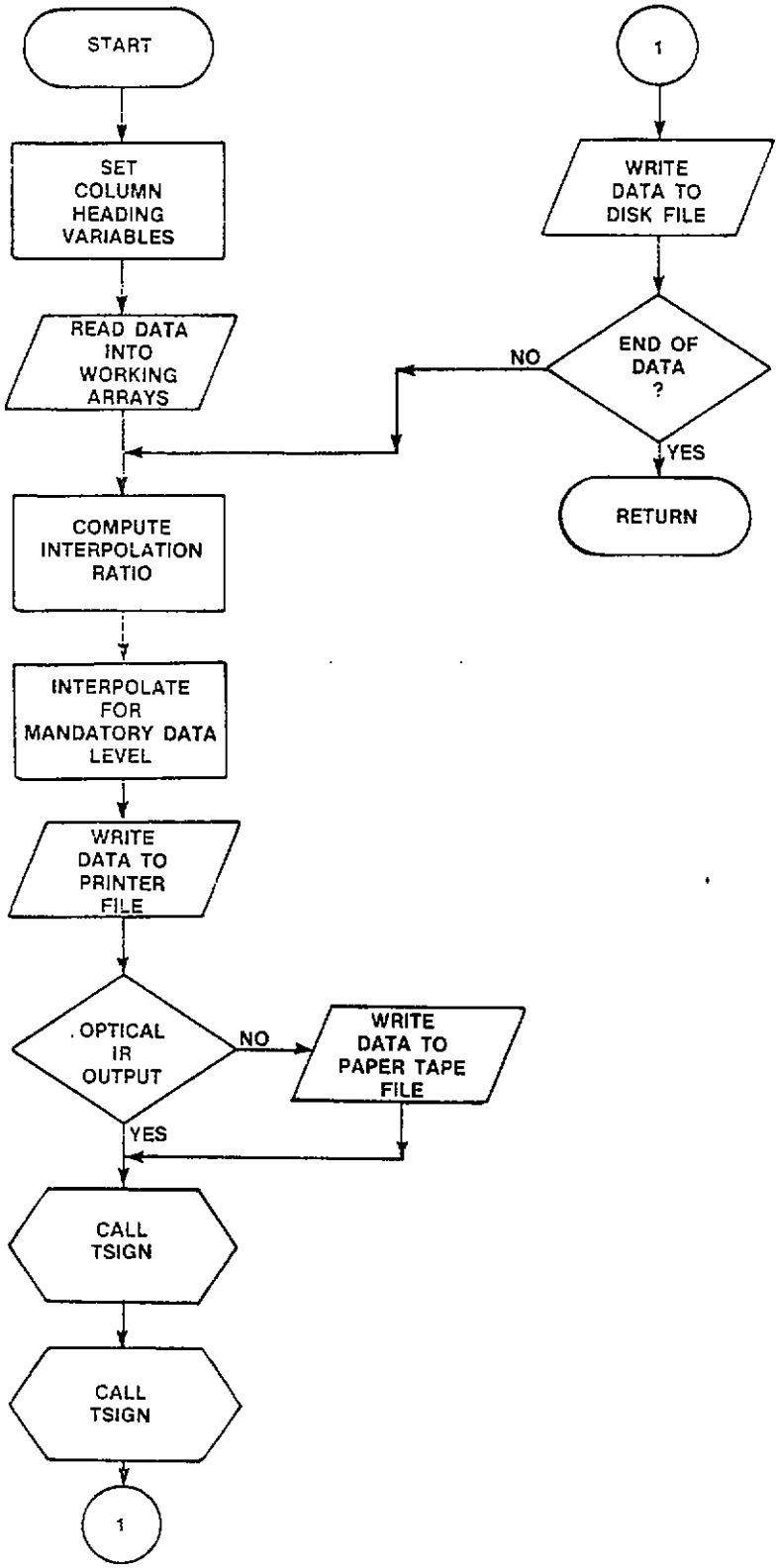
DLOG	Real	logarithm of density
DOUT	Real	wind direction (degrees from true north)
EE	Real	vapor pressure (mbars)
HOUT	Real	altitude (geopotential ft)
HUMOUT	Real	relative humidity (%)
I	Integer	do loop control index
ID	Integer	dewpoint (°C)

ID1	Integer	tenths value of dewpoint in character format
IP	Integer	flag — ft or m output
ITERM	Integer	flag — end of data
IT1	Integer	tenths value of temperature in character format
JT	Integer	temperature (°C)
KSW1	Integer	flag — wind speed units
KSW5	Integer	flag — index of refraction units
LP	Integer	pressure (mbars)
MH	Integer	column title — altitude
NH	Integer	column title — altitude
NM	Integer	array index counter
NS	Integer	column title — wind speed
PMAN	Real	array of mandatory pressures (mbars)
PWA	Real	precipitable water (mm)
RAT	Real	interpolation ratio
SOUT	Real	wind speed (kn or ft/s or m/s)
TDOUT	Real	dewpoint (°C)
TOUT	Real	temperature (°C)
UABS	Real	absolute humidity (g/cm^3)
VSN	Real	velocity of sound (kn or ft/s or m/s)
WC	Real	conversion constant for wind speed
X	Real	east-west position component (ft or m)
XINE	Real	flag — missing data
XX	Real	east-west velocity component (ft/s or m/s)
Y	Real	North-south position component (ft or m)
YY	Real	North-south velocity component (ft/s or m/s)

6.2.12.4 Algorithm

1. Set up column headings.
2. Read data from scratch file.
3. Interpolate at mandatory pressure levels.
4. Output data.

6.2.12.5 Flowchart



6.2.13 Subroutine SIG

Language: FORTRAN V
Programmer: R. E. Walters
Date: 6 May 1986

6.2.13.1 Function Description

Selects and outputs significant levels.

6.2.13.2 Interface

IN		ORIGIN	UNITS
	SIGLH	Parameter	ft or m
	ITERM	Parameter	flag
	ISIG	Parameter	flag
	WC	Parameter	kn/ft/s or dimensionless
	KSW1	Parameter	flag
	KSW5	Parameter	flag
	IP	Parameter	flag
IN/OUT			
	G	/MAND/	s
	H	/MAND/	ft or m
	HUM	/MAND/	%
	P	/MAND/	mbars
	PLOG	/MAND/	no units
	RFI	/MAND/	N units
	SL	/MAND/	flag
	T	/MAND/	°C
	TD	/MAND/	°C
	VXA	/SIG/	ft/s or m/s
	VYA	/SIG/	ft/s or m/s
	Z	/MAND/	ft or m

6.2.13.3 Internal Variables

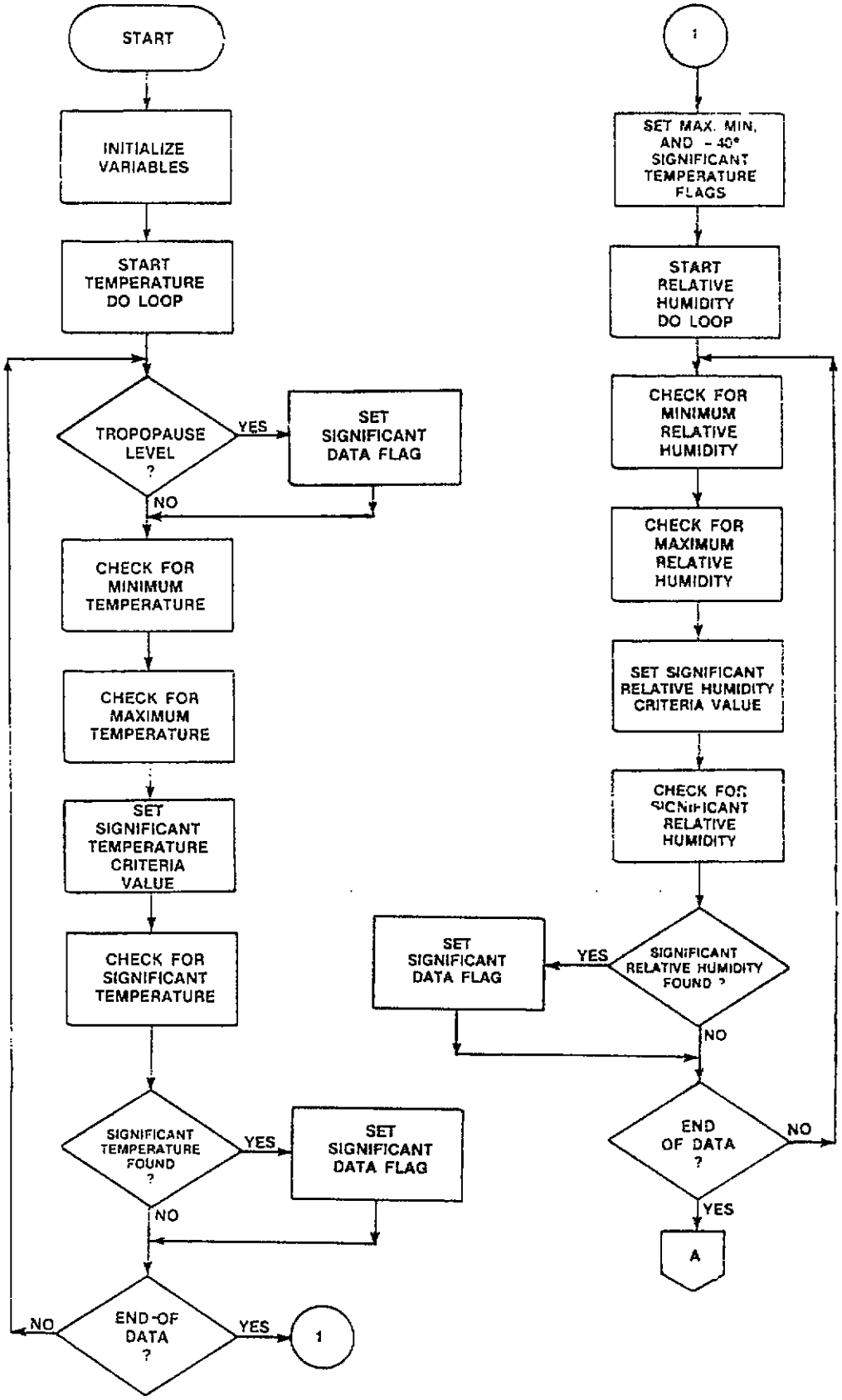
HMAX	Real	relative humidity (%)
HMIN	Real	relative humidity (%)
HSIG	Real	computed factor for determining significant relative humidity data
I	Integer	do loop index
IP	Integer	flag — ft or m output
IRN	Integer	column title — refractive index
ISIG	Integer	flag — standard or special significant data criteria
ITERM	Integer	flag — end of data
IWMAXL	Integer	maximum wind index for levels below 100 mbars

IWMAXU	Integer	maximum wind index for levels above 100 mbars
J	Integer	do loop index
JD	Integer	dewpoint (°C)
JD1	Integer	dewpoint — tenths value in character format
JMAX	Integer	maximum relative humidity index
JMIN	Integer	minimum relative humidity index
JT	Integer	temperature (°C)
JT1	Integer	temperature — tenths value in character format
K	Integer	do loop index
KMAX	Integer	maximum temperature index
KMIN	Integer	minimum temperature index
KSW1	Integer	flag — wind speed units
KSW5	Integer	flag — index of refraction
K40	Integer	index — significant level at −40°C
LP	Integer	barometric pressure times 100 — mbars
MH	Integer	column title — altitude
NH	Integer	column title — altitude
NS	Integer	column title — wind speed
RHCON	Real	constant for determining significant relative humidity data
SIGHUM	Real	relative humidity of the last significant level chose by the relative humidity algorithm (%)
SIGLH	Real	altitude of the tropopause (ft or m)
SIGTIM	Real	time of the significant level (s)
SIGTMP	Real	temperature of the last significant level chosen by the temperature of algorithm (°C)
SPD	Real	wind speed (kn or ft/s or m/s)
TKEPT	Real	temperature (°C)
TMAX	Real	maximum temperature (°C)
TMIN	Real	minimum temperature (°C)
TMPCON	Real	constant for determining significant temperature data
TSIG	Real	computed factor for determining significant temperature data
TTEMP	Real	temperature (°C)
WC	Real	conversion constant for wind speed
WMAXL	Real	maximum wind speed below 100 mbars
WMAXU	Real	maximum wind speed above 100 mbars

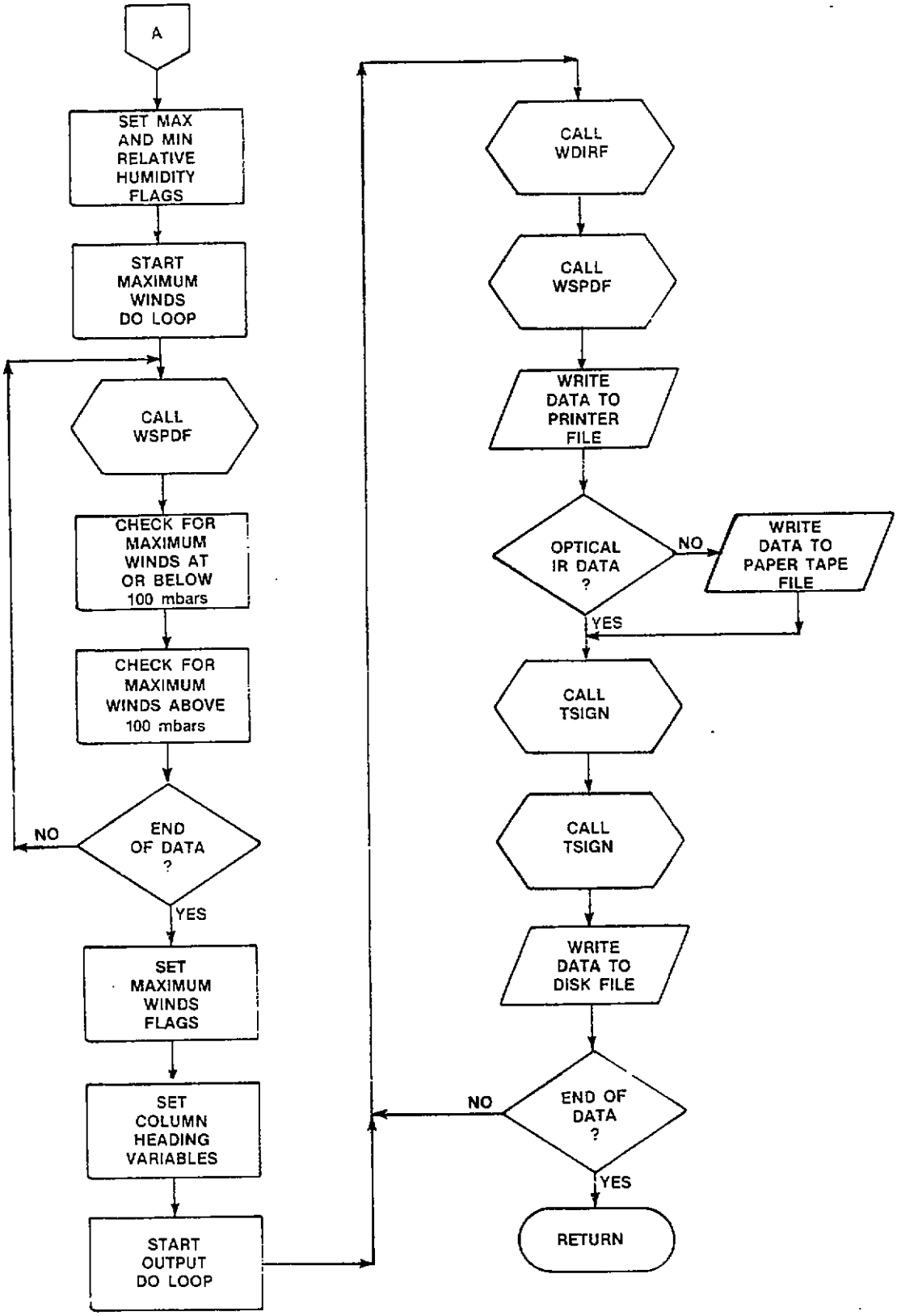
6.2.13.4 Algorithm

1. Choose surface data and terminating data as significant.
2. Choose significant levels based on tropopause and temperatures.
3. Choose significant levels based on relative humidity.
4. Choose significant levels based on wind speeds.
5. Set up column headings.
6. Output significant data.

6.2.13.5.1 Flowchart



6.2.13.5.2 Flowchart



6.3 Global Data Structures

6.3.1 /A/

ABSH	absolute humidity
DALT	output interval — height
DEN	logarithm of density
DLOG	logarithm of density — array
E	vapor pressure
EE	vapor pressure — array
GG	time of data levels — array
GRAT	gravitational constant
HA	surface altitude
HGT	geopotential height
HH	geopotential height — array
HS	output altitude
HV	constant in the hypsometric equation
IP	output flag — m or ft
ISL	array of flags indicating significant levels
ITHK	termination reason
IELE	flag indicating temperature sensing element type
ITYPE	flag indicating tracker type
KSW1	flag — wind speed units in the output (kn or ft/s or m/s)
KSW2	unused flag
KSW3	flag — indicate whether or not to interpolate
KSW4	unused flag
KSW5	flag — microwave or optical index of refraction
KSW6	flag — shear in s^{-1} or kn
NNA	column heading variable
NWDD	column heading variable
NWWD	column heading variable
P	barometric pressure
PLOG	array — logarithm of barometric pressure
PR	array — barometric pressure
PW	precipitable water
PWA	array — precipitable water
RA	radius of the Earth
RAD	conversion factor — number of degrees/radian
RFI	array — refractive index
RH	relative humidity
RI	refractive index
SF	conversion factor — linear measure
SFC	conversion factor — velocity measure
SHR	shear
SIGLH	height of the tropopause
T	temperature
TD	dewpoint temperature
TDEW	array — dewpoint temperature

TP	array — temperature
UABS	array — absolute humidity
UU	array — relative humidity
VS	velocity of sound
VSN	array — velocity of sound
VX	array — east-west wind velocity component
VXHP	east-west wind velocity component
VX1	east-west wind velocity component
VY	array — north-south wind velocity component
VYHP	north-south wind velocity comonent
VY1	north-south wind velocity component
WC	conversion factor — velocity measure
XINE	missing data flag
XX	array — east-west wind position component
YY	array — north-south wind position component
Z	geometric height
ZZ	array — geometric height

6.3.2 /NIG/

IDAY	flag — day or night release

6.3.3 /IHEAD/

IHEAD1	array — column headings
IHEAD2	array — column headings

6.3.4 /SIG/

VXA	array — east-west wind velocity components
VYA	array — north-south wind velocity components

6.3.5 /MAND/

G	array — data level times
Z	array — geometric heights
H	array — geopotential heights
P	array — barometric pressures
PLOG	array — logarithm of barometric pressures
T	array — temperatures
TD	array — dewpoint temperatures
HUM	array — relative humidities
RFI	array — refractive index
SL	array — significant level flags

7.0 SPECIAL MAINTENANCE

Not applicable

8.0 SECURITY AND PRIVACY

RSRC is an unclassified program.

9.0 ERROR CONDITIONS

Not applicable.

10.0 CONVENTIONS

10.1 Program RSRC

20,902,983.317	=	mean radius of Earth (ft)
6,371,229.315	=	mean radius of Earth (m)
1.68895	=	converts kn to ft/s
0.514792	=	converts kn to m/s
0.3048	=	converts ft to m
221.266	=	constant in hypsometric equation (SMT, List, 1968, page 224) when units desired are ft
67.442	=	constant in hypsometric equation when units desired are m
0.592085	=	converts ft/s to kn
57.29578	=	degrees per radian

10.2 Function WDIRF

90	=	true east (degrees)
180	=	true south (degrees)
270	=	true west (degrees)
360	=	true north (degrees)

10.3 Subroutine WIND

60	=	converts min to s

10.4 Subroutine TSIGN

None

10.5 Subroutine FORM

592.085	=	(ft/s to kn) X 10^3

10.6 Subroutine TRHC

273.15	Converts °C to K
−0.659 2.464	Empirical Constants Reference page 26 AFCRL-TR-74-0111
17.269 237.3	Constants from Teten's Expression, *Handbook of Meteorology* Berry, Bollay, Beers

9.8 0.43 52.0 −0.71	Empirical Constants Reference NOAA Technical Memorandum EDS CEDDA-7 Page 1 ABSTRACT

10.7 Subroutine COMPUT

273.15	converts temperature °C to K
0.379	empirical constant, U.S. Standard Atmosphere Supplements, 1966
0.3136	square of sky background light source wave length (0.56μ)
186.527 8.286 237.3 7.5	constants from Teten's Expression, page 343, *Handbook of Meteorology*
0.0611	saturation vapor pressure at 0°C ÷ 100, page 350, SMT, List 1968
77.6 0.584 5.6 374808 0.06	Reference *Radio Meteorology*, Bean and Dutton, 1966, page 7, Formula 1.16
1.4028	Ratio of specific heat of air at constant pressure to that at a constant volume
216.7	Reference Haurwitz *Dynamic Meteorology*, 1941
1.94254	m/s to kn
348.38	From gas constant for dry air and conversion factors with pressure in mbar and density in g/m^3. Reference page 290, SMT, List 1968.
980.616	Acceleration of gravity, cm/s^2
622	Reference *Handbook of Meteorology* saturation mixing ratio equation, page 302.
2.2	Constant used in curvature correction to elevation angle (Reference Bibliography No. 13)
0.3048	Number of m/ft

10.8 Subroutine TITLE

The Station identifier and gravitational ratio arrays are as follows:

IZ	XID	GRAT
1	Cape Canaveral AFS, Florida	0.9985630638
9	Antigua AAFB, West Indies	0.9978238080
12	Ascension AAFB	0.9974695597
99	Station (for read in)	0.9999999999

0.0026373 } constants found in *Smithsonian Meteorological Tables* (1951) page
0.0000059 } 488, equation 2

Sta	Name	Lat.	Long.
01	Cape Canaveral AFS, Florida	28.47N	80.55W
09	Antigua AAFB, West Indies	17.12N	61.78W
12	Ascension AAFB	7.97S	14.40W
99	Unassigned Station		

10.9 Subroutine HED

None

10.10 Subroutine TABDAT

Tropopause selection criteria

0.0006096 = maximum allowed lapse rate per 6,562 ft in °C/ft

6562 = thickness for checking maximum allowed lapse rate (ft)

0.002 = maximum allowed lapse rate per 2,000 m in °C/m

2000 = thickness for checking maximum allowed lapse rate (m)

10.11 Subroutine INTERP

None

10.12 Subroutine MAND

Mandatory data levels for output (mbars)

1000	250	10
950	200	7
900	175	5
850	150	4
800	125	3
750	100	2
700	80	1
650	70	
600	60	
550	50	
500	40	
450	30	
400	25	
350	20	
300	15	

10.13 Subroutine SIG

10.0, 5.0 } humidity deviations (%) at which significant levels are selected (user's option)

0.5, 1.0, 2.0 } temperature deviations (%) at which significant levels are selected (user's option)

11.0 TERMS AND ABBREVIATIONS

Not applicable.

12.0 PROJECT REFERENCES

1. Tetens, O., 1930, Z. Geophysik, Vol. 6, p. 297
2. Haurwitz, 1941, *Dynamic Meteorology*
3. *Compendium of Meteorology*, 1951, p. 1209
4. List, R.J., 1968, *Smithsonian Meteorological Tables*, Smithsonian Institution, Washington, D.C. Sixth Revised Edition
5. Daniel, O.H., 1961, 4th Wea. Gp Pamphlet 105–72, Electronic Computer Reduction of Upper Air Data, Andrews AFB, Maryland
6. Daniel, O.H., 1962, Digital Computer Reduction of AN/GMD-2 Rawinsonde Data, Pan American World Airways, Guided Missiles Range Division, Patrick AFB, Florida

7. Bean, B.R., and Dutton, E.J., 1966, *Radio Meteorology*, U.S. Department of Commerce, Washington, D.C.

8. Wheeler, R.S., 1968, Review of Rawinsonde Reduction Methods, NASA CR-61192, NASA - George C. Marshall SFC, Huntsville, Alabama

9. Billions, Novella S., 1970, Equations and Multi-Purpose GMC-Rawin Program for Automatic Processing of Any Type Radiosonde, U.S. Army Missile Command, Redstone Arsenal, Alabama, Report No. RR-TM-70-1

10. Meteorological Group, IRIG, Doc. 108-72, IRIG Standards for Range Meteorological Data Reduction, Part 1 - Rawinsonde, Range Commanders Council, White Sands Missile Range, New Mexico (Revised 1976)

11. Brousaides, 1974, AFCRL-TR-74-0111

12. Analytics Tech. Rept. 1167. An Engineering Prototype Processor Incorporating Compensated Data for Refractive Index Profiles, Sect. III, Para. 3.2. 4 March 1976

13. Gustafson, A. F., The Error in Rawin Computations Due To Neglecting the Earth's Curvature, Bull., AMS, Vol 35, No. 7, Pg 295-300, September 1954

14. Berry, Jr, F. A; Bollay, E; and Beers, N. R., 1945, *Handbook of Meteorology*, McGraw-Hill Book Co., Inc, New York

ATTACHMENT 1

INPUT

06308 T-0 5000

01 05 20 98 1647 0433

34 016 150 08 00 101450

0	43	0.00	290.24	69.2	26.8	0
60	475	34.94	351.90	91.4	24.7	0
120	962	33.85	13.22	59.9	24.9	0
180	1600	29.51	30.25	50.3	24.7	0
240	2315	26.47	39.03	50.2	22.5	0
300	3115	23.98	43.36	51.8	20.5	0
360	3983	22.19	45.63	56.2	18.0	0
420	4873	21.12	47.55	57.9	16.5	0
480	5611	20.89	46.96	57.6	14.2	0
540	6352	20.75	44.85	61.9	12.2	0
600	7064	20.71	41.66	72.4	10.2	0
660	7766	20.70	42.44	65.4	9.1	0
720	8344	21.15	41.07	60.5	8.4	0
780	8762	21.77	41.90	68.4	6.2	0
840	9231	22.27	43.46	78.7	3.8	0
850	9318	22.32	43.97	81.0	3.3	0
890	9666	22.52	46.01	63.2	3.3	0
900	9753	22.57	46.52	55.0	3.6	0
920	9958	22.58	47.60	41.6	3.7	0
960	10370	22.61	49.75	33.2	2.7	0
1020	10937	22.81	51.43	23.6	.8	0
1080	11562	22.86	52.96	27.9	-1.3	0
1140	12221	22.79	54.26	31.8	-3.9	0
1200	12866	22.78	55.58	34.0	-6.4	0
1260	13343	23.29	56.59	27.1	-8.4	0
1320	13743	23.94	57.01	23.5	-10.0	0
1380	14146	24.46	56.88	33.1	-11.6	0
1410	14384	24.59	56.61	42.0	-12.9	0
1440	14621	24.72	56.53	43.8	-13.4	0
1480	15038	24.71	56.65	41.4	-14.5	0
1500	15246	24.70	56.71	29.5	-14.7	0
1560	15826	24.81	57.20	19.4	-16.5	0
1620	16644	24.54	57.76	29.4	-18.5	0
1680	17582	24.13	58.49	33.7	-21.3	0
1700	17927	24.00	58.83	44.2	-22.1	0
1720	18271	23.88	59.17	64.3	-22.7	0
1740	18616	23.76	59.51	70.9	-23.4	0
1800	19926	22.94	60.05	75.5	-24.6	0
1860	21170	22.37	60.02	74.5	-26.5	0
1920	22203	22.09	59.54	74.9	-28.6	0
1980	23046	21.99	59.03	71.2	-30.9	0
2040	23718	21.98	58.45	58.5	-33.1	0
2100	24461	22.03	57.63	65.8	-35.5	0
2160	25243	21.95	57.07	63.6	-37.5	0
2220	26248	21.74	56.57	61.5	-39.9	0
2280	27443	21.35	56.00	59.7	-42.1	0
2340	28859	20.93	55.49	58.8	-44.6	0
2400	30324	20.40	55.13	57.4	-46.9	0
2460	32115	19.71	54.91	55.4	-49.2	0
2520	34095	19.01	54.84	53.5	-52.0	0
2580	36040	18.45	55.09	51.5	-54.9	0
2640	37931	18.01	55.18	49.5	-57.2	0
2700	40080	17.36	55.79	46.7	-58.4	0
2760	42319	16.83	56.58	44.3	-60.5	0
2820	44574	16.34	57.28	43.0	-62.2	0
2880	46926	15.92	58.09	42.3	-63.3	0
2940	49322	15.53	59.20	41.6	-64.7	0
3000	51709	15.06	60.44	41.5	-64.9	0
3060	53962	14.75	61.74	41.4	-64.4	0

3120	56328	14.39	62.74	41.9	-61.4	0
3180	58590	14.09	63.77	40.7	-61.5	0
3240	60265	14.03	64.53	40.2	-61.0	0
3300	61351	14.13	65.25	39.5	-59.0	0
3360	62180	14.25	65.52	38.2	-63.9	0
3420	62984	14.35	65.44	37.2	-63.4	0
3480	63670	14.43	65.29	36.5	-66.4	0
3540	64302	14.67	65.07	36.1	-68.7	0
3600	64975	14.80	64.95	36.1	-68.5	0
3660	65693	14.93	64.60	36.0	-68.7	0
3720	66329	15.13	64.67	36.1	-67.9	0
3780	66801	15.30	64.53	36.3	-66.3	0
3840	67349	15.43	64.51	36.3	-65.9	0
3900	67564	15.63	64.34	35.3	-65.2	0
3960	67799	15.95	64.04	35.2	-65.0	0
4020	67941	16.21	63.73	35.2	-63.9	0
4080	68235	16.45	63.51	35.5	-60.2	0
4140	68464	16.68	63.27	35.3	-58.8	0
4200	68572	16.92	63.12	35.0	-58.5	0
4260	68710	17.22	62.74	35.1	-58.7	0
4320	68908	17.50	62.45	34.5	-57.8	0
4380	68930	17.84	62.29	34.1	-56.4	0
4440	69044	18.15	62.34	33.6	-55.9	0
4500	68909	18.53	62.32	33.1	-55.1	0
4560	68698	18.96	62.12	31.9	-56.7	0
4620	68568	19.35	62.02	30.9	-55.9	0
4680	68399	19.76	61.87	29.9	-54.1	0
4740	68194	20.23	61.67	29.0	-53.4	0
4800	68013	20.64	61.34	28.1	-52.9	0
4860	68036	20.96	60.99	27.3	-51.4	0
4920	67950	21.37	60.67	26.6	-51.0	0
4980	67975	21.77	60.47	25.9	-50.8	0
5040	67948	22.15	60.28	25.3	-49.0	0
5100	67768	22.58	60.09	24.7	-48.0	0
5160	67662	23.00	59.92	24.3	-47.8	0
5220	67572	23.45	59.75	23.9	-46.9	0
5280	67630	23.99	59.41	23.5	-46.4	0
5340	67569	24.30	59.15	23.0	-45.2	0
5400	67450	24.75	58.82	22.9	-45.1	0
5460	67413	25.15	58.45	22.5	-44.4	0
5520	67585	25.57	58.11	22.3	-43.9	0
5580	67939	25.93	57.80	21.8	-39.7	0
5640	68143	26.22	57.60	21.5	-37.8	0
5700	68223	26.50	57.30	21.5	-39.4	0
5760	68314	27.04	57.05	21.4	-40.8	0
5820	68574	27.43	56.69	21.3	-39.8	0
5880	68865	27.75	56.43	21.3	-39.3	0
5940	68813	28.27	56.36	21.0	-36.8	0
6000	68734	28.72	55.17	21.2	-34.3	0

999 0310

ATTACHMENT 2

PRINTER OUTPUT

01

TEST NBR 06309 T-0 6300

RAWINSONDE MSS/MSS

CAPE CANAVERAL AFS, FLORIDA

1647Z 20 MAY 1986

ASCENT NBR 0433

GEOMFT	DIR	KTS	TEMP	DPT	PRESS	RH	AB HUM	DEN	IR VS	SHR	VPR	PW
000016	150	003	258	207	101460	059	1762	1167683540573		.00	24.39	0
001000	206	014	247	211	098079	030	1924	1135993610675		.02	25.07	5
002000	225	019	248	158	094745	057	1307	1099693220575		.01	217.98	10
003000	232	023	235	129	091514	051	1084	1067753020574		.00	314.34	14
004000	234	026	209	109	088371	053	0950	1040992390570		.00	513.04	17
005000	233	026	179	095	085307	058	0984	1015672800657		.00	111.87	19
006000	224	024	159	079	082320	059	0799	0987432690664		.00	710.65	22
007000	211	023	132	059	079414	061	0703	0961952580651		.00	9.29	24
008000	208	022	107	057	076587	071	0701	0935602520658		.00	9.18	26
009000	218	019	091	033	073841	037	0593	0907672390656		.00	7.73	28
010000	233	015	081	013	071179	052	0518	0879472280655		.00	5.73	30
011000	247	015	053	011	068595	075	0516	0855152230652		.00	5.53	31
012000	269	021	033	01P	066034	070	0425	0830202120649		.01	5.43	33
013000	265	021	029	10R	063655	035	0210	0802061920648		.00	2.67	34
014000	260	021	005	17L	061300	025	0125	0779231820645		.00	1.58	34
015000	258	021	021	17K	059011	030	0126	0757511770642		.00	1.58	34
016000	259	018	05K	18M	056784	034	0116	0737571720638		.00	1.43	35
017000	257	014	07P	22I	054618	031	0087	0716261650635		.00	1.07	35
018000	245	012	09N	25N	052520	026	0063	0693491590633		.00	.77	35
019000	236	011	11K	24R	050489	031	0067	0670951540631		.00	.81	35
020000	238	015	13L	22P	048523	045	0082	0649941500629		.00	.99	35
021000	248	019	14Q	28P	046619	029	0048	0628391430627		.00	.57	35
022000	249	023	15R	33J	044778	022	0030	0608521380624		.00	.35	35
023000	251	028	19L	31P	042994	032	0036	0589911340621		.00	.43	36
024000	254	032	22J	30J	041266	048	0043	0572461310618		.00	.50	35
025000	244	038	23R	26R	039591	076	0059	0552901270616		.01	.67	36
026000	240	037	25N	28J	037974	079	0052	0533861230614		.00	.60	37
027000	233	032	27O	30J	036412	079	0044	0516251180611		.01	.50	37
028000	227	027	29R	32N	034901	078	0035	0499631140608		.01	.40	37
029000	220	024	32N	35N	033439	074	0026	0483941100605		.00	.29	37
030000	219	025	35I	38L	032022	072	0020	0468331060602		.00	.22	37
031000	222	030	37M	41P	030653	054	0014	0452971020599		.00	.15	37
032000	224	035	39R	44M	029329	032	0011	0437930980595		.01	.12	37
033000	226	042	42L	47I	028048	060	0008	0423270950592		.01	.09	37
034000	228	047	44P	49M	026811	059	0006	0408820920589		.00	.07	37
035000	231	055	47L	52K	025616	057	0005	0395170880586		.01	.05	37
036000	234	060	50J	55J	024460	055	0003	0381990850582		.01	.03	37
037000	237	062	53I	58K	023343	053	0002	0369440820578		.00	.02	37
038000	240	065	55O	60R	022264	051	0002	0356580800575		.00	.02	37
039000	244	069	57O	63J	021225	049	0001	0343030770572		.01	.01	37
040000	248	073	59M	999	020225	999	9999	0329630730570		.01	.01	999
041000	251	076	61M	999	019265	999	9999	0316830710567		.00	.00	999
042000	254	079	62P	999	018343	999	9999	0303650680565		.00	.00	999
043000	258	081	63Q	999	017461	999	9999	0290530650564		.01	.00	999
044000	262	082	64Q	999	016617	999	9999	0277800620563		.01	.00	999
045000	265	082	64P	999	015812	999	9999	0264250590563		.00	.00	999
046000	266	080	63I	999	015049	999	9999	0249540560565		.00	.00	999
047000	268	071	61O	999	014329	999	9999	0235990530567		.01	.00	999
048000	270	057	61M	999	013645	999	9999	0224500500567		.02	.00	999
049000	270	044	60L	999	012997	999	9999	0212750470569		.02	.00	999
050000	265	034	59L	999	012331	999	9999	0201710450570		.01	.00	999
051000	253	025	61J	999	011794	999	9999	0193770430568		.01	.00	999
052000	239	023	63O	999	011230	999	9999	0186680420564		.01	.00	999
053000	230	021	65N	999	010636	999	9999	0180100400560		.00	.00	999
054000	226	021	68L	999	010162	999	9999	0172860390555		.00	.00	999

.3SRC 2

055000	227	021	53N	999	009651	999	9999	010453037055 8	.021	.00999
056000	233	019	53P	999	009195	999	9999	015549235055 7	.005	.00999
057000	236	017	69K	999	008733	999	9999	014845233055 8	.003	.00999
058000	235	015	67K	999	008305	999	9999	014051731055 9	.003	.00999
059000	226	013	65K	999	007899	999	9999	013295733055 1	.005	.00999
060000	206	010	65P	999	007515	999	9999	012513323055 1	.003	.00999
061000	186	010	65K	999	007150	999	9999	011977327055 2	.005	.00999
062000	178	010	65I	999	006804	999	9999	011398325055 2	.002	.00999
063000	179	011	64I	999	006475	999	9999	010795324055 4	.001	.00999
064000	180	010	61J	999	006156	999	9999	010131323055 8	.001	.00999
065000	173	009	59K	999	005874	999	9999	009564321057 0	.002	.00999
066000	164	010	57L	999	005599	999	9999	009037320057 3	.003	.00999
067000	160	010	57P	999	005336	999	9999	008623319057 2	.001	.00999
068000	157	009	53M	999	005087	999	9999	008253318057 1	.002	.00999
069000	148	007	57P	999	004848	999	9999	007638317057 2	.005	.00999
070000	120	004	550	999	004622	999	9999	007435017057 4	.006	.00999
071000	089	005	55J	999	004407	999	9999	007873016057 4	.005	.00999
072000	094	009	550	999	004203	999	9999	006732015057 5	.004	.00999
073000	086	010	55K	999	004008	999	9999	006407014057 5	.004	.00999
074000	088	011	550	999	003822	999	9999	005145014057 4	.001	.00999
075000	089	011	55K	999	003645	999	9999	005852013057 4	.001	.00999
076000	091	012	55J	999	003476	999	9999	005554012057 6	.002	.00999
077000	095	013	54I	999	003315	999	9999	005273012057 7	.003	.00999
078000	104	014	53N	999	003163	999	9999	005017011057 8	.003	.00999
079000	112	014	53J	999	003013	999	9999	004778011057 8	.003	.00999
080000	117	013	52L	999	002880	999	9999	004543010057 9	.002	.00999
081000	118	012	51L	999	002749	999	9999	004317010058 1	.002	.00999
082000	116	011	51I	999	002624	999	9999	004116009058 1	.002	.00999
083000	111	011	50R	999	002505	999	9999	003927009058 1	.002	.00999
084000	104	011	50K	999	002392	999	9999	003733008058 2	.002	.00999
085000	099	011	49R	999	002284	999	9999	003549008058 4	.002	.00999
086000	094	012	49K	999	002182	999	9999	003379008058 5	.001	.00999
087000	097	011	47R	999	002084	999	9999	003223007058 5	.001	.00999
088000	102	011	47N	999	001991	999	9999	003075007058 5	.002	.00999
089000	108	012	45R	999	001902	999	9999	002929007058 6	.002	.00999
090000	110	012	45O	999	001819	999	9999	002795006058 7	.001	.00999
091000	110	013	45J	999	001737	999	9999	002665006058 7	.001	.00999
092000	110	014	45K	999	001660	999	9999	002537006058 8	.002	.00999
093000	114	014	45J	999	001587	999	9999	002424005058 9	.002	.00999
094000	122	013	44Q	999	001517	999	9999	002314005058 9	.003	.00999
095000	134	012	44M	999	001450	999	9999	002207005059 0	.005	.00999
096000	144	011	44J	999	001386	999	9999	002103005059 0	.004	.00999
097000	150	010	42N	999	001325	999	9999	002002004059 2	.002	.00999
098000	149	009	39O	999	001268	999	9999	001910004059 6	.002	.00999
099000	139	009	38N	999	001213	999	9999	001801004059 7	.003	.00999
100000	132	010	38K	999	001151	999	9999	001722004059 7	.002	.00999
101000	130	010	39L	999	001111	999	9999	001656004059 6	.001	.00999
102000	135	010	40K	999	001053	999	9999	001593004059 5	.002	.00999
103000	140	010	40O	999	001017	999	9999	001524003059 4	.001	.00999
104000	139	009	40J	999	000973	999	9999	001455003059 5	.001	.00999
105000	129	008	39L	999	000931	999	9999	001389003059 6	.003	.00999
106000	109	008	38L	999	000891	999	9999	001322003059 7	.005	.00999
107000	098	009	37N	999	000853	999	9999	001261003059 8	.003	.00999
108000	999	999	35M	999	000817	999	9999	001202003052 0	.999	.00999
109000	999	999	34P	999	000782	999	9999	001143003058 2	.999	.00999

TERMINATION 108535 GEOPFT 33081 GEOPM 7.7 MBS - 23129

TROPOPAUSE 43755 GEOMFT 168.28 MB -54.7 C 99.9 C 63N 9

MANDATORY LEVELS - 9

GEOPFT	DIR	KTS	TEMP	DPT	PRESS	RH
000436	183	018	258	211	10000	075
001919	224	018	249	163	02500	053
003473	234	024	223	115	03000	051
005093	232	025	177	094	03500	058
006784	213	023	137	061	03000	050
008558	212	023	097	047	07500	071
010433	240	015	059	013	07000	059

012417	268	023	037	06N	06500	048
014533	259	021	00Q	17J	05000	028
016784	258	015	07L	21J	05500	032
019201	234	012	110	24K	05000	034
021824	249	023	150	33R	04500	021
024688	244	033	23N	26P	04000	075
027856	227	027	29P	32L	03500	078
031395	223	033	380	431	03000	053
035418	233	059	43P	53P	02500	056
040096	249	074	59R	999	02000	999
042805	258	081	63P	999	01750	999
045899	266	080	62Q	999	01500	999
049613	267	035	591	999	01250	999
054100	226	021	68P	999	01000	999
058497	230	013	66L	999	00800	999
061160	183	010	65J	999	00700	999
064269	177	009	59Q	999	00600	999
068036	154	008	58K	999	00500	999
072683	086	010	55L	999	00400	999
078718	113	014	53J	999	00300	999
082599	111	011	52R	999	00250	999
087407	101	011	470	999	00200	999
093686	124	013	44P	999	00150	999
102733	139	010	40M	999	00100	999

SIGNIFICANT LEVELS

GEOMFT	DIR	KTS	TEMP	DPT	PRESS	IR	RH
000016	150	008	268	207	101459	384	039
000909	204	014	247	216	098389	365	083
001774	223	018	249	165	095488	328	060
002602	231	022	247	137	092790	308	050
004953	233	026	180	096	085450	280	058
008217	208	022	182	058	075985	251	074
009901	231	015	084	013	071440	229	051
011503	251	015	038	009	067325	220	091
011635	269	020	033	009	056992	220	084
012172	269	021	033	031	055659	208	063
012307	270	024	035	04P	065329	204	054
012571	266	022	037	08K	064687	197	041
013107	264	021	027	110	063399	191	034
013939	260	021	008	17L	061441	182	024
016379	260	017	05M	19J	055958	170	036
018334	241	011	101	260	051835	157	024
019678	235	014	12Q	22N	049150	152	044
020667	241	017	140	24M	047245	147	043
020945	248	019	14P	28M	046721	144	030
021834	249	023	16N	341	045090	138	020
023637	252	029	21L	32L	041888	131	035
023979	254	032	22J	30L	041300	131	047
024328	249	037	22P	271	040714	130	057
027478	230	029	290	311	035684	116	030
037663	239	063	54R	60J	022625	381	052
040510	249	075	60N	999	019731	272	999
042616	257	080	63L	999	017795	036	999
043755	261	082	64P	999	016920	033	999
044554	264	083	64R	999	016166	060	999
046495	267	073	51M	999	014597	054	999
049819	267	035	591	999	012490	045	999
054185	225	021	68P	999	010057	038	999
055230	227	021	68N	999	009549	035	999
060757	188	010	65K	999	007237	027	999
063086	190	011	63R	999	006447	024	999
064301	190	010	60K	999	005875	022	999
066354	162	010	550	999	005504	020	999
067619	159	010	53P	999	005190	019	999
072924	086	010	55J	999	004022	014	999
074102	088	011	55P	999	003803	014	999

093504	116	014	45J	999	001550	005	999
096523	151	011	43R	999	001353	005	999
097943	149	009	39P	999	001270	004	999
099604	133	009	37Q	999	001181	004	999
102716	140	010	40Q	999	021030	003	999
109259	999	999	34L	999	000773	003	999

ATTACHMENT 3

TELETYPE OUTPUT

TEST NBR 06308 T-0 6000
RAWINSONDE MSS/MSS
CAPE CANAVERAL AFS, FLORIDA
1647Z 20 MAY 1986
ASCENT NBR 0433

ALT GEOMFT	DIR DEG	SPD KTS	TEMP DEG C	DPT DEG C	PRESS MBS	RH PCT	ABHUM G/M3	DENSITY G/M3	IR N	VS KTS	SHR /SEC	VPR MBS	PW MM
16	150	8	26.8	20.7	1014.6	69	17.62	1167.7	364	678	.000	24.39	0
1000	206	14	24.7	21.1	980.8	80	18.24	1136.0	361	676	.020	25.07	5
2000	225	19	24.8	15.8	947.5	57	13.07	1099.7	322	675	.012	17.93	10
3000	232	23	23.6	12.8	915.1	51	10.84	1067.8	302	674	.008	14.84	14
4000	234	26	20.9	10.9	883.7	53	9.60	1041.0	289	670	.005	13.04	17
5000	233	26	17.9	9.5	853.1	58	8.84	1015.7	280	667	.001	11.87	19
6000	224	24	15.9	7.9	823.2	59	7.99	987.4	269	664	.007	10.65	22
7000	211	23	13.2	5.9	794.1	61	7.03	961.9	258	661	.009	9.29	24
8000	208	22	10.7	5.7	765.9	71	7.01	935.6	252	658	.003	9.18	25
9000	218	18	9.1	3.3	738.4	67	5.93	907.7	239	656	.009	7.73	28
10000	233	15	8.1	1.3	711.8	62	5.18	879.5	228	655	.009	6.73	30
11000	247	15	5.3	1.1	686.0	75	5.16	855.2	223	652	.006	6.63	31
12000	269	21	3.3	-1.7	660.8	70	4.25	830.2	212	649	.016	5.43	33
13000	265	21	2.9	-10.9	636.6	35	2.10	802.1	192	648	.003	2.67	34
14000	260	21	.6	-17.3	613.0	25	1.25	779.2	182	645	.003	1.58	34
15000	258	21	-2.0	-17.2	590.1	30	1.26	757.5	177	642	.001	1.58	34
16000	259	18	-5.2	-18.4	567.8	34	1.18	737.6	172	638	.004	1.43	35
17000	257	14	-7.7	-22.0	546.2	31	.87	718.3	165	635	.007	1.07	35
18000	246	12	-9.5	-25.5	525.2	26	.63	693.5	159	633	.006	.77	35
19000	236	11	-11.2	-24.9	504.9	31	.67	671.0	154	631	.003	.81	35
20000	238	15	-13.3	-22.7	485.2	45	.82	649.9	150	629	.006	.99	35
21000	248	19	-14.8	-28.7	466.2	29	.48	623.4	143	627	.009	.57	36
22000	249	23	-16.9	-33.5	447.8	22	.30	603.5	138	624	.007	.35	35
23000	251	28	-19.3	-31.7	429.9	32	.35	589.9	134	621	.007	.43	35
24000	254	32	-22.1	-30.1	412.7	43	.43	572.5	131	618	.009	.50	35
25000	244	38	-23.9	-26.9	395.9	76	.59	552.9	127	616	.015	.67	35
26000	240	37	-25.5	-28.1	379.7	78	.52	533.9	123	614	.005	.60	37
27000	233	32	-27.6	-30.1	364.1	79	.44	516.3	118	611	.011	.50	37
28000	227	27	-29.9	-32.5	349.0	78	.35	499.6	114	608	.010	.40	37
29000	220	24	-32.5	-35.5	334.4	74	.25	483.9	110	605	.006	.29	37
30000	219	26	-35.0	-38.3	320.2	72	.20	468.3	106	602	.002	.22	37
31000	222	30	-37.4	-41.7	306.5	64	.14	453.0	102	599	.007	.15	37
32000	224	36	-39.9	-44.4	293.3	62	.11	437.9	98	595	.011	.12	37
33000	226	42	-42.3	-47.0	280.5	60	.08	423.3	95	592	.011	.09	37
34000	228	47	-44.7	-49.4	268.1	59	.06	408.8	92	589	.009	.07	37
35000	231	55	-47.3	-52.2	256.2	57	.05	395.2	88	586	.014	.05	37
36000	234	60	-50.1	-55.1	244.6	55	.03	382.0	85	582	.011	.03	37
37000	237	62	-53.0	-58.2	233.4	53	.02	369.4	82	578	.006	.02	37
38000	240	65	-55.6	-60.9	222.6	51	.02	356.6	80	575	.007	.02	37
39000	244	69	-57.6	-63.1	212.3	49	.01	343.1	77	572	.011	.01	37
40000	248	73	-59.4	99.9	202.3	999	99.99	329.7	73	570	.011	.01999	
41000	251	76	-61.4	99.9	192.6	999	99.99	316.9	71	567	.007	.00999	
42000	254	79	-62.7	99.9	183.4	999	99.99	303.7	68	565	.009	.00999	
43000	258	81	-63.8	99.9	174.6	999	99.99	290.5	65	564	.010	.00999	
44000	262	82	-64.8	99.9	166.2	999	99.99	277.8	62	563	.010	.00999	
45000	265	82	-64.7	99.9	158.1	999	99.99	264.2	59	563	.006	.00999	
46000	266	80	-63.0	99.9	150.5	999	99.99	249.5	56	565	.005	.00999	
47000	268	71	-61.6	99.9	143.3	999	99.99	236.0	53	567	.016	.00999	
48000	270	57	-61.4	99.9	136.5	999	99.99	224.5	50	567	.024	.00999	
49000	270	44	-60.3	99.9	130.0	999	99.99	212.8	47	569	.022	.00999	

RSRC 2

50000	265	34	-59.3	99.9	123.8	999	99.99	201.7	45	572	.019	.00999
51000	253	26	-61.1	99.9	117.9	999	99.99	193.8	43	568	.016	.00999
52000	239	23	-63.6	99.9	112.3	999	99.99	185.7	42	554	.012	.00999
53000	233	21	-66.5	99.9	105.9	999	99.99	180.1	40	560	.007	.00999
54000	226	21	-58.3	99.9	101.6	999	99.99	172.9	39	550	.003	.00999
55000	227	21	-58.5	99.9	96.6	999	99.99	164.5	37	558	.001	.00999
56000	233	19	-58.7	99.9	91.9	999	99.99	155.5	35	557	.005	.00999
57000	235	17	-58.2	99.9	87.3	999	99.99	143.4	33	558	.003	.00999
58000	235	15	-57.2	99.9	83.0	999	99.99	140.5	31	559	.003	.00999
59000	226	13	-56.2	99.9	79.0	999	99.99	132.9	30	561	.006	.00999
60000	205	10	-55.7	99.9	75.1	999	99.99	125.2	28	561	.008	.00999
61000	185	10	-65.2	99.9	71.5	999	99.99	119.8	27	562	.005	.00999
62000	178	10	-55.0	99.9	68.0	999	99.99	113.9	25	562	.002	.00999
63000	179	11	-64.0	99.9	64.8	999	99.99	107.9	24	564	.001	.00999
64000	180	10	-61.1	99.9	61.7	999	99.99	101.3	23	569	.001	.00999
65000	173	9	-59.2	99.9	58.7	999	99.99	95.5	21	570	.002	.00999
66000	164	10	-57.3	99.9	55.8	999	99.99	90.4	20	573	.003	.00999
67000	160	10	-57.7	99.9	53.4	999	99.99	85.3	19	572	.001	.00999
68000	157	9	-58.4	99.9	50.9	999	99.99	82.5	19	571	.002	.00999
69000	148	7	-57.7	99.9	48.5	999	99.99	78.4	17	572	.005	.00999
70000	120	4	-56.6	99.9	46.2	999	99.99	74.4	17	574	.006	.00999
71000	89	5	-56.1	99.9	44.1	999	99.99	70.7	16	574	.005	.00999
72000	84	8	-55.6	99.9	42.0	999	99.99	67.3	15	575	.004	.00999
73000	86	10	-55.2	99.9	40.1	999	99.99	64.1	14	575	.004	.00999
74000	88	11	-56.6	99.9	38.2	999	99.99	61.5	14	574	.001	.00999
75000	89	11	-56.2	99.9	36.4	999	99.99	58.5	13	574	.001	.00999
76000	91	12	-55.1	99.9	34.8	999	99.99	55.5	12	576	.002	.00999
77000	96	13	-54.0	99.9	33.2	999	99.99	52.7	12	577	.003	.00999
78000	104	14	-53.5	99.9	31.6	999	99.99	50.2	11	578	.003	.00999
79000	112	14	-53.1	99.9	30.2	999	99.99	47.8	11	578	.003	.00999
80000	117	13	-52.3	99.9	28.8	999	99.99	45.4	10	579	.002	.00999
81000	118	12	-51.3	99.9	27.5	999	99.99	43.2	10	581	.002	.00999
82000	116	11	-51.0	99.9	26.2	999	99.99	41.2	9	581	.002	.00999
83000	111	11	-50.9	99.9	25.1	999	99.99	39.3	9	581	.002	.00999
84000	104	11	-50.2	99.9	23.9	999	99.99	37.4	8	582	.002	.00999
85000	98	11	-48.9	99.9	22.8	999	99.99	35.5	8	584	.002	.00999
86000	94	12	-48.2	99.9	21.8	999	99.99	33.8	8	585	.001	.00999
87000	97	11	-47.9	99.9	20.8	999	99.99	32.2	7	585	.001	.00999
88000	102	11	-47.5	99.9	19.9	999	99.99	30.7	7	585	.002	.00999
89000	108	12	-46.9	99.9	19.0	999	99.99	29.3	7	586	.002	.00999
90000	110	12	-46.6	99.9	18.2	999	99.99	28.0	6	587	.001	.00999
91000	110	13	-46.1	99.9	17.4	999	99.99	26.7	6	587	.001	.00999
92000	110	14	-45.2	99.9	16.6	999	99.99	25.4	6	588	.002	.00999
93000	114	14	-45.1	99.9	15.9	999	99.99	24.2	5	589	.002	.00999
94000	122	13	-44.8	99.9	15.2	999	99.99	23.1	5	589	.003	.00999
95000	134	12	-44.4	99.9	14.5	999	99.99	22.1	5	590	.005	.00999
96000	144	11	-44.1	99.9	15.9	999	99.99	21.1	5	590	.004	.00999
97000	158	10	-42.5	99.9	13.3	999	99.99	20.0	4	592	.002	.00999
98000	149	9	-39.6	99.9	12.7	999	99.99	19.3	4	596	.002	.00999
99000	139	9	-39.5	99.9	12.1	999	99.99	18.0	4	597	.003	.00999
100000	132	10	-39.2	99.9	11.6	999	99.99	17.2	4	597	.002	.00999
101000	139	10	-39.3	99.9	11.1	999	99.99	16.5	4	595	.001	.00999
102000	135	10	-40.2	99.9	10.6	999	99.99	15.9	4	595	.002	.00999
103000	140	10	-40.5	99.9	10.2	999	99.99	15.2	3	594	.001	.00999
104000	130	9	-40.1	99.9	9.7	999	99.99	14.5	3	595	.001	.00999
105000	129	9	-39.3	99.9	9.3	999	99.99	13.9	3	596	.003	.00999
106000	108	8	-38.3	99.9	8.9	999	99.99	13.2	3	597	.005	.00999
107000	98	9	-37.5	99.9	8.5	999	99.99	12.5	3	598	.003	.00999
108000	999	999	-36.4	99.9	8.2	999	99.99	12.0	3	600	.999	.00999
109000	999	999	-34.7	99.9	7.8	999	99.99	11.4	3	602	.999	.00999

TERMINATION 108535 GEOPFT 33081 GEOPM 7.7 MBS

TROPOPAUSE 43755 GEOMFT 158.20 MB -54.7 C 99.9 C 63%

MANDATORY LEVELS

GEOPFT	DIR	KTS	TEMP	DPT	PRESS	RH
436	183	10	25.8	21.1	1000.0	75

1919	224	18	24.9	16.0	950.0	58
3473	234	24	22.3	11.8	900.0	51
5093	232	26	17.7	9.4	850.0	53
6784	213	23	13.7	6.1	800.0	60
8558	212	20	9.7	4.7	750.0	71
10433	240	15	6.9	1.3	700.0	68
12417	268	23	3.7	-6.5	650.0	43
14533	259	21	-.8	-17.1	600.0	29
16784	258	15	-7.3	-21.1	550.0	32
19201	234	12	-11.6	-24.2	500.0	34
21824	249	23	-16.6	-33.9	450.0	21
24688	244	38	-23.5	-26.7	400.0	75
27856	227	27	-29.7	-32.3	350.0	78
31395	223	33	-39.6	-43.0	300.0	63
35418	233	59	-48.7	-53.7	250.0	55
40096	249	74	-59.9	99.9	200.0	999
42805	258	81	-53.7	99.9	175.0	999
45899	266	80	-62.8	99.9	150.0	999
49613	267	35	-59.0	99.9	125.0	999
54100	226	21	-58.7	99.9	100.0	999
58497	230	13	-66.3	99.9	80.0	999
61160	183	10	-55.1	99.9	70.0	999
64269	177	9	-59.8	99.9	60.0	999
68036	154	8	-58.2	99.9	50.0	999
72683	86	10	-55.3	99.9	40.0	999
79718	113	14	-53.1	99.9	30.0	999
82599	111	11	-50.9	99.9	25.0	999
87407	101	11	-47.6	99.9	20.0	999
93686	124	13	-44.7	99.9	15.0	999
102733	139	10	-40.4	99.9	10.0	999

SIGNIFICANT LEVELS

GEOMFT	DIR	KTS	TEMP	DPT	PRESS	IR	RH
16	150	8	26.8	20.7	1014.60	364	69
909	204	14	24.7	21.5	983.89	355	93
1774	223	18	24.9	16.5	954.89	328	50
2602	231	22	24.7	13.7	927.91	308	50
4953	233	26	18.0	9.5	854.51	280	53
8217	208	22	10.2	5.8	759.95	251	74
9901	231	15	8.4	1.3	714.41	229	61
11503	251	15	3.8	.9	673.25	220	91
11635	269	20	3.3	.9	669.92	220	94
12172	269	21	3.3	-3.0	655.59	208	63
12307	270	24	3.6	-4.7	653.29	204	54
12571	266	22	3.7	-9.2	645.88	197	41
13107	264	21	2.7	-11.5	634.00	191	34
13939	260	21	.8	-17.3	614.41	182	24
16379	260	17	-6.4	-19.1	559.59	170	36
19334	241	11	-10.0	-26.5	513.35	157	24
19678	235	14	-12.8	-22.5	491.50	152	44
20667	241	17	-14.5	-24.4	472.46	147	43
20945	248	19	-14.7	-28.4	467.22	144	30
21834	249	23	-16.5	-34.0	450.81	139	20
23637	252	29	-21.3	-32.3	413.88	131	36
23979	254	32	-22.1	-30.3	413.01	131	47
24326	249	37	-22.7	-27.0	407.14	130	57
27478	230	29	-28.6	-31.0	355.94	116	30
37663	239	63	-54.9	-60.1	226.25	81	52
40510	249	75	-60.5	99.9	197.32	72	999
42616	257	80	-63.3	99.9	177.95	66	999
43755	261	82	-54.7	99.9	168.20	63	999
44554	264	83	-54.9	99.9	161.66	60	999
45495	267	78	-61.4	99.9	146.87	54	999
49819	267	35	-59.0	99.9	124.90	45	999
54185	225	21	-68.7	99.9	100.67	38	999
55230	227	21	-68.5	99.9	95.50	36	999

60757	188	10	-65.2	99.9	72.37	27	999
63086	180	11	-53.9	99.9	64.48	24	999
64301	180	10	-60.2	99.9	60.76	22	999
66354	162	10	-56.6	99.9	55.04	20	999
67619	159	10	-58.7	99.9	51.81	19	999
72924	86	10	-55.1	99.9	40.23	14	999
74102	88	11	-56.7	99.9	38.04	14	999
93504	116	14	-45.1	99.9	15.51	5	999
96523	151	11	-43.9	99.9	13.54	5	999
97943	149	9	-39.7	99.9	12.71	4	999
99604	133	9	-37.8	99.9	11.81	4	999
102716	140	10	-40.8	99.9	10.30	3	999
109259	999	999	-34.3	99.9	7.74	3	999

NNNN

ATTACHMENT 4

DISK FILE OUTPUT

TEST NBR 06308 T-0 6000

RAWINSONDE MSS/MSS
CAPE CANAVERAL AFS, FLORIDA
1647Z 20 MAY 1936
ASCENT NBR 0433

ALTITUDE GEOMFT	DIR DEG	SPEED KTS	TEMP DEG C	DPT DEG C	PRESS MBS	RH PCT	AB HUM G/M3	DENSITY G/M3	IR N	VS KTS	SHR /SEC	VPR MBS	PW MM
15	150	8	25.8	20.7	1014.60	69	17.62	1157.68	364	573	.000	24.39	0
1000	206	14	24.7	21.1	930.79	80	18.24	1135.99	361	575	.020	25.07	5
2000	225	19	24.8	15.3	947.45	57	13.07	1099.69	322	575	.012	17.98	10
3000	232	23	23.6	12.3	915.14	51	10.84	1067.75	302	574	.008	14.84	14
4000	234	26	20.9	10.9	883.71	53	9.60	1040.99	289	570	.005	13.04	17
5000	233	26	17.9	9.5	853.07	58	8.84	1015.67	230	567	.001	11.87	19
6000	224	24	15.9	7.9	823.20	59	7.99	987.43	269	564	.007	10.65	22
7000	211	23	13.2	5.9	794.14	61	7.03	961.95	258	561	.009	9.29	24
8000	208	22	10.7	5.7	765.87	71	7.01	935.60	252	558	.003	9.18	26
9000	218	18	9.1	3.3	738.41	67	5.93	907.67	239	553	.009	7.73	28
10000	233	15	8.1	1.3	711.79	62	5.18	878.47	228	555	.009	6.73	30
11000	247	15	5.3	1.1	685.95	75	5.16	855.16	223	552	.003	6.63	31
12000	269	21	3.3	-1.7	660.84	70	4.25	830.20	212	549	.016	5.43	33
13000	265	21	2.9	-10.9	636.55	35	2.10	802.06	192	548	.003	2.67	34
14000	260	21	.6	-17.3	613.00	25	1.25	779.23	182	545	.003	1.58	34
15000	258	21	-2.0	-17.2	590.11	30	1.26	757.51	177	542	.001	1.58	34
16000	259	18	-5.2	-18.4	567.84	34	1.16	737.57	172	538	.004	1.43	35
17000	257	14	-7.7	-22.0	546.18	31	.87	716.26	165	535	.007	1.07	35
18000	246	12	-9.5	-25.5	525.20	26	.63	693.49	159	533	.006	.77	35
19000	236	11	-11.2	-24.9	504.89	31	.67	670.95	154	531	.003	.81	36
20000	238	15	-13.3	-22.7	485.23	45	.82	649.94	150	529	.005	.99	36
21000	248	19	-14.8	-28.7	466.19	29	.49	629.39	143	527	.009	.57	36
22000	249	23	-15.9	-33.6	447.78	22	.30	608.52	138	524	.007	.36	36
23000	251	28	-19.3	-31.7	429.94	32	.36	589.91	134	521	.007	.43	36
24000	254	32	-22.1	-30.1	412.66	48	.43	572.46	131	518	.009	.50	36
25000	244	38	-23.9	-26.9	395.91	76	.59	552.90	127	515	.015	.67	36
26000	240	37	-25.5	-28.1	379.74	78	.52	533.86	123	514	.005	.60	37
27000	233	32	-27.6	-30.1	364.12	79	.44	516.25	118	511	.011	.50	37
28000	227	27	-29.9	-32.5	349.01	78	.35	499.63	114	508	.010	.40	37
29000	220	24	-32.5	-35.5	334.39	74	.25	483.94	110	505	.006	.29	37
30000	219	25	-35.0	-38.3	320.22	72	.20	468.33	106	502	.002	.22	37
31000	222	30	-37.4	-41.7	306.53	64	.14	452.97	102	499	.007	.15	37
32000	224	36	-39.9	-44.4	293.29	62	.11	437.93	98	495	.011	.12	37
33000	226	42	-42.3	-47.0	280.49	60	.08	423.27	95	492	.011	.09	37
34000	228	47	-44.7	-49.4	268.11	59	.06	408.82	92	489	.009	.07	37
35000	231	55	-47.3	-52.2	256.16	57	.05	395.17	88	485	.014	.05	37
36000	234	60	-50.1	-55.1	244.60	55	.03	381.99	85	482	.011	.03	37
37000	237	62	-53.0	-58.2	233.43	53	.02	369.44	82	478	.006	.02	37
38000	240	65	-55.6	-60.9	222.54	51	.02	356.58	80	475	.007	.02	37
39000	244	69	-57.6	-63.1	212.25	49	.01	343.08	77	472	.011	.01	37
40000	248	73	-59.4	99.9	202.25	999	99.99	329.68	73	470	.011	.01	999
41000	251	76	-61.4	99.9	192.65	999	99.99	316.88	71	467	.007	.00	999
42000	254	79	-62.7	99.9	183.43	999	99.99	303.65	68	465	.009	.00	999
43000	258	81	-63.8	99.9	174.61	999	99.99	290.53	65	464	.010	.00	999
44000	262	82	-64.8	99.9	166.17	999	99.99	277.80	62	463	.010	.00	999

RSRC 2

ALTITUDE GEOMFT	DIR DEG	SPEED KTS	TEMP DEG C	DPT DEG C	PRESS MBS	RH PCT	AB HUM G/M3	DENSITY G/M3	IR W	VS KTS	SHR /SEC	VPR MBS	PW MM
45000	265	82	-54.7	99.9	158.12	999	99.99	254.25	59	563	.005	.00	999
46000	266	80	-53.0	99.9	150.49	999	99.99	249.54	56	565	.005	.00	999
47000	268	71	-51.6	99.9	143.29	999	99.99	235.99	53	567	.015	.00	999
48000	270	57	-51.4	99.9	135.45	999	99.99	224.50	50	567	.024	.00	999
49000	270	44	-50.3	99.9	129.97	999	99.99	212.75	47	569	.022	.00	999
50000	265	34	-59.3	99.9	123.81	999	99.99	201.71	45	570	.019	.00	999
51000	253	26	-61.1	99.9	117.94	999	99.99	193.77	43	568	.015	.00	999
52000	239	23	-63.6	99.9	112.30	999	99.99	185.53	42	564	.012	.00	999
53000	230	21	-65.5	99.9	106.85	999	99.99	180.10	40	562	.007	.00	999
54000	226	21	-69.3	99.9	101.62	999	99.99	172.85	39	558	.003	.00	999
55000	227	21	-69.5	99.9	96.51	999	99.99	164.50	37	558	.001	.00	999
56000	233	19	-69.7	99.9	91.85	999	99.99	156.49	35	557	.005	.00	999
57000	236	17	-69.2	99.9	87.33	999	99.99	149.45	33	559	.003	.00	999
58000	235	15	-67.2	99.9	83.05	999	99.99	140.51	31	559	.003	.00	999
59000	226	13	-65.2	99.9	78.99	999	99.99	132.95	30	561	.005	.00	999
60000	206	10	-65.7	99.9	75.15	999	99.99	126.13	28	561	.008	.00	999
61000	186	10	-65.2	99.9	71.50	999	99.99	119.77	27	562	.005	.00	999
62000	178	10	-65.0	99.9	68.04	999	99.99	113.98	25	562	.002	.00	999
63000	179	11	-64.0	99.9	64.75	999	99.99	107.85	24	564	.001	.00	999
64000	180	10	-61.1	99.9	61.66	999	99.99	101.31	23	563	.001	.00	999
65000	173	9	-59.2	99.9	58.74	999	99.99	95.64	21	570	.002	.00	999
66000	164	10	-57.3	99.9	55.98	999	99.99	90.37	20	573	.003	.00	999
67000	160	10	-57.7	99.9	53.38	999	99.99	86.28	19	572	.001	.00	999
68000	157	9	-59.4	99.9	50.87	999	99.99	82.53	18	571	.002	.00	999
69000	148	7	-57.7	99.9	48.48	999	99.99	78.33	17	572	.005	.00	999
70000	120	4	-56.6	99.9	46.22	999	99.99	74.35	17	574	.005	.00	999
71000	89	5	-55.1	99.9	44.07	999	99.99	70.73	16	574	.005	.00	999
72000	84	8	-55.6	99.9	42.03	999	99.99	67.30	15	575	.004	.00	999
73000	86	10	-55.2	99.9	40.08	999	99.99	64.07	14	575	.004	.00	999
74000	88	11	-55.6	99.9	38.22	999	99.99	61.48	14	574	.001	.00	999
75000	89	11	-55.2	99.9	36.45	999	99.99	58.52	13	574	.001	.00	999
76000	91	12	-55.1	99.9	34.75	999	99.99	55.54	12	576	.002	.00	999
77000	96	13	-54.0	99.9	33.15	999	99.99	52.70	12	577	.003	.00	999
78000	104	14	-53.5	99.9	31.63	999	99.99	50.17	11	578	.003	.00	999
79000	112	14	-53.1	99.9	30.18	999	99.99	47.78	11	578	.003	.00	999
80000	117	13	-52.3	99.9	28.80	999	99.99	45.43	10	579	.002	.00	999
81000	118	12	-51.3	99.9	27.49	999	99.99	43.17	10	581	.002	.00	999
82000	116	11	-51.0	99.9	26.24	999	99.99	41.15	9	581	.002	.00	999
83000	111	11	-50.9	99.9	25.05	999	99.99	39.27	9	581	.002	.00	999
84000	104	11	-50.2	99.9	23.92	999	99.99	37.33	9	582	.002	.00	999
85000	98	11	-49.9	99.9	22.84	999	99.99	35.49	8	584	.002	.00	999
86000	94	12	-49.2	99.9	21.82	999	99.99	33.79	8	585	.001	.00	999
87000	97	11	-47.9	99.9	20.84	999	99.99	32.23	7	585	.001	.00	999
88000	102	11	-47.5	99.9	19.91	999	99.99	30.75	7	585	.002	.00	999
89000	108	12	-46.9	99.9	19.02	999	99.99	29.29	7	585	.002	.00	999
90000	113	12	-46.6	99.9	18.18	999	99.99	27.95	6	587	.001	.00	999
91000	110	13	-45.1	99.9	17.37	999	99.99	26.65	6	587	.001	.00	999
92000	110	14	-45.2	99.9	16.59	999	99.99	25.37	6	588	.002	.00	999
93000	114	14	-45.1	99.9	15.87	999	99.99	24.24	5	589	.002	.00	999
94000	122	13	-44.8	99.9	15.17	999	99.99	23.11	5	589	.003	.00	999
95000	134	12	-44.4	99.9	14.50	999	99.99	22.27	5	590	.005	.00	999
96000	144	11	-44.1	99.9	13.86	999	99.99	21.08	5	590	.004	.00	999
97000	150	10	-42.5	99.9	13.25	999	99.99	20.02	4	592	.002	.00	999
98000	149	9	-39.6	99.9	12.68	999	99.99	18.91	4	595	.002	.00	999
99000	139	9	-33.5	99.9	12.13	999	99.99	18.01	4	597	.003	.00	999
100000	132	10	-33.2	99.9	11.51	999	99.99	17.22	4	597	.002	.00	999

ALTITUDE GEOMFT	DIR DEG	SPEED KTS	TEMP DEG C	DPT DEG C	PRESS MBS	RH PCT	AB HUM G/M3	DENSITY G/M3	IR N	VS KTS	SHR /SEC	VPR MBS	PW MM
101000	130	10	-39.3	99.9	11.11	999	99.99	16.56	4	596	.001	.00	999
102000	135	10	-40.2	99.9	10.53	999	99.99	15.90	4	595	.002	.00	999
103000	140	10	-40.6	99.9	10.17	999	99.99	15.24	3	594	.001	.00	999
104000	139	9	-40.1	99.9	9.73	999	99.99	14.55	3	595	.001	.00	999
105000	128	8	-39.3	99.9	9.31	999	99.99	13.88	3	595	.003	.00	999
106000	108	8	-38.3	99.9	8.91	999	99.99	13.22	3	597	.005	.00	999
107000	98	9	-37.5	99.9	8.53	999	99.99	12.61	3	593	.003	.00	999
108000	999	999	-36.4	99.9	8.17	999	99.99	12.02	3	600	.999	.00	999
109000	999	999	-34.7	99.9	7.82	999	99.99	11.43	3	602	.999	.00	999

TERMINATION 108535 GEOMFT 33091 GEOPM 7.7 MBS.

TROPOPAUSE 43755 GEOMFT 168.20 MB -64.7 C 99.9 C 63 N

RSRC 2

MANDATORY LEVELS

ALTITUDE GEOPFT	DIR DEG	SPEED KTS	TEMP DEG C	DEW PT DEG C	PRESS MBS	RH PCT
436	183	10	25.8	21.1	1000	76
1919	224	18	24.9	16.0	950	58
3473	234	24	22.3	11.8	900	51
5093	232	26	17.7	9.4	850	58
6784	213	23	13.7	6.1	800	60
8559	212	20	9.7	4.7	750	71
10433	240	15	5.9	1.3	700	68
12417	268	23	3.7	-6.5	650	49
14533	259	21	-.8	-17.1	600	28
16784	258	15	-7.3	-21.1	550	32
19201	234	12	-11.5	-24.2	500	34
21824	249	23	-15.6	-33.9	450	21
24688	244	38	-23.5	-26.7	400	75
27856	227	27	-29.7	-32.3	350	78
31395	223	33	-38.6	-43.0	300	63
35418	233	59	-48.7	-53.7	250	55
40096	249	74	-59.9	99.9	200	999
42805	258	81	-63.7	99.9	175	999
45899	266	80	-62.8	99.9	150	999
49613	267	35	-59.0	99.9	125	999
54100	226	21	-58.7	99.9	100	999
58497	230	13	-56.3	99.9	80	999
61160	183	10	-65.1	99.9	70	999
64269	177	9	-59.8	99.9	60	999
68935	154	8	-58.2	99.9	50	999
72683	86	10	-55.3	99.9	40	999
78718	113	14	-53.1	99.9	30	999
82599	111	11	-50.9	99.9	25	999
87407	101	11	-47.6	99.9	20	999
93686	124	13	-44.7	99.9	15	999
102733	139	10	-40.4	99.9	10	999

SIGNIFICANT LEVELS

ALTITUDE GEOMFT	DIR DEG	SPEED KTS	TEMP DEG C	DPT DEG C	PRESS MBS	IR N	RH PCT
16	150	8	25.8	20.7	1014.60	364	69
909	204	14	24.7	21.5	933.89	365	83
1774	223	18	24.9	16.5	954.89	328	60
2602	231	22	24.7	13.7	927.91	303	50
4953	233	26	18.0	9.6	854.51	280	58
8217	208	22	10.2	5.9	759.85	251	74
9901	231	15	8.4	1.3	714.41	229	61
11503	251	15	3.8	.9	673.25	220	81
11635	269	20	3.3	.9	659.92	220	84
12172	269	21	3.3	-3.0	656.59	208	63
12307	270	24	3.6	-4.7	653.29	204	54
12571	266	22	3.7	-8.2	646.88	197	41
13107	264	21	2.7	-11.6	634.00	191	34
13939	260	21	.8	-17.3	614.41	182	24
16379	260	17	-6.4	-19.1	559.59	170	36
18334	241	11	-10.0	-26.6	518.35	157	24
19678	235	14	-12.8	-22.5	491.50	152	44
20667	241	17	-14.6	-24.4	472.46	147	43
20945	248	19	-14.7	-28.4	457.22	144	30
21834	249	23	-15.5	-34.0	450.81	138	20
23637	252	29	-21.3	-32.3	418.88	131	36
23979	254	32	-22.1	-30.3	413.01	131	47
24326	249	37	-22.7	-27.0	407.14	130	67
27478	230	29	-28.6	-31.0	356.94	116	80
37663	239	63	-54.9	-60.1	226.25	81	52
40518	249	75	-60.5	99.9	197.32	72	999
42616	257	80	-63.3	99.9	177.95	66	999
43755	261	82	-64.7	99.9	168.20	63	999
44554	264	83	-54.9	99.9	161.56	60	999
46495	267	78	-61.4	99.9	146.87	54	999
49819	267	35	-59.0	99.9	124.90	45	999
54185	225	21	-68.7	99.9	100.67	38	999
55230	227	21	-69.5	99.9	95.50	36	999
60757	188	10	-65.2	99.9	72.37	27	999
63086	180	11	-63.9	99.9	64.48	24	999
64301	180	10	-60.2	99.9	60.76	22	999
66354	162	10	-56.6	99.9	55.04	20	999
67619	159	10	-58.7	99.9	51.31	19	999
72924	86	10	-55.1	99.9	40.23	14	999
74102	88	11	-56.7	99.9	38.04	14	999
93504	116	14	-45.1	99.9	15.51	5	999
96523	151	11	-43.9	99.9	13.54	5	999
97943	149	9	-39.7	99.9	12.71	4	999
99604	133	9	-37.8	99.9	11.81	4	999
102716	140	10	-40.8	99.9	10.30	3	999
109259	999	999	-34.3	99.9	7.74	3	999

ATTACHMENT 5

PROGRAM LISTING

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PROGRAM RSRC        73/757  OPT=2,ROUND= A/ S/ M/-L,-DS      FTN 5.1+642        87/05/18. 13.37.10        PAGE    1
DC=-LONG/-OT,ARG=- OMMON/-FIXED,CS= USER/-FIXED,TB=-TL/-SB/-SL/ FP/-IL/-PMT/-ST,-AL,PI=5000
FTN5,I=RSRC2,P=0,L=RSRC,LO.

      PROGRAM RSRC(INPUT,OUTPUT,TAPE1,TAPE2,TAPE3,TAPE5=INPUT,
     C TAPE7=OUTPUT,TAPE40,TAPE60,TAPE61,TAPE22)
C---------
      COMMON/A/ABSH,DALT,DEN,DLOG(6),GG(6),GRAT,HA,
     C HGT,HH(6),HS,HV,IELE,IP,ISL(6),ITHK,
     C ITYPE,NWDD(2),NWWD(2),P,PLOG(6),PR(6),
     C RA,RAD,RFI(6),RH,RI,SF,SFC,SHR,SIGLH,
     C T,TD,TDEW(6),TP(6),
     C UABS(6),UU(6),VS,VSN(6),VX(6),VX1,VXHP,VY(6),VY1,VYHP,WC,
     C XINE,NNA(4),XX(6),YY(6),Z,ZZ(6),KSW1,KSW2,KSW3,
     C KSW4,KSW5,KSW6,EE(6),PWA(6),E,PW
      COMMON/IHEAD/IHEAD1(11),IHEAD2(11)
      COMMON/NIG/IDAY
      DIMENSION PTBEG(10),PTEND(15)
      DATA PTBEG/10*O"7657"/
      DATA PTEND/3*O"7652",2*O"1616",10*O"7657"/
C---------
C        KSW1 = 0      WIND SPEED IN KTS OR MPS
C             = 1      WIND SPEED IN FPS
C        KSW2          NOT USED
C        KSW3 = 0      INTERPOLATED OUTPUT
C             = 1      UNINTERPOLATED OUTPUT
C        KSW4          NOT USED
C        KSW5 = 0      MICROWAVE IR OUTPUT
C             = 1      OPTICAL IR OUTPUT
C        KSW6 = 0      SHEAR OUTPUT IN /SEC
C             = 2      SHEAR OUTPUT IN /KTS
C          IP = 0      FEET OUTPUT
C             = 1      METERS OUTPUT
C             = 2      BLAST OUTPUT
C          IO = 0      LAG CORRECTION FOR TEMP AND HUMIDITY
C             = 2      NO LAG CORRECTION FOR TEMP AND HUMIDITY
C        ISIG = 0      STANDARD SIGNIFICANT CRITERIA
C             = 1      SPECIAL SIGNIFICANT CRITERIA
C---------
C      TAPE1  = DISK FILE OUTPUT
C      TAPE2  = SCRATCH FILE
C      TAPE3  = INPUT FILE
C      TAPE6  = TERMINAL INPUT
C      TAPE7  = CRT OUTPUT
C      TAPE40 = TELETYPE OUTPUT
C      TAPE60 = ID NAME FILE
C      TAPE61 = PRINTER OUTPUT
C      TAPE22 = RCA--ID & ENDRUN
C---------
      DATA NAME/"RSRC2      "/
      CALL ID(NAME)
C---------
      REWIND 60
      REWIND 61
      DALT=1000.
      IP=IO=KSW1=KSW2=KSW3=KSW4=KSW5=KSW6=ISIG=0
      IDAY=1
200   WRITE(7,6)
      READ(6,7) I
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      IF (I.NE.R"Y".AND.I.NE.R"N") GOTO 200
      IF (I.EQ.R"Y") GOTO 300
  205 WRITE(7,1)
      READ(5,7) I
      IF (I.NE.R"Y".AND.I.NE.R"N") GOTO 205
      IF (I.EQ.R"N") GOTO 210
      IP=2
      KSW3=1
      GOTO 260
  210 WRITE(7,9)
      READ(5,7) I
      IF (I.NE.R"Y".AND.I.NE.R"N") GOTO 210
      IF (I.EQ.R"N") KSW3=1
      IF (I.EQ.R"N") GOTO 230
      WRITE(7,10)
      READ(5,11) DALT
  230 WRITE(7,13)
      READ(5,7) I
      IF (I.NE.R"F".AND.I.NE.R"M") GOTO 230
      IF (I.EQ.R"M") IP=1
      IF (I.EQ.R"M") GOTO 250
  240 WRITE(7,15)
      READ(5,7) I
      IF (I.NE.R"Y".AND.I.NE.R"N") GOTO 240
      IF (I.EQ.R"Y") KSW1=1
  250 WRITE(7,16)
      READ(5,7) I
      IF (I.NE.R"Y".AND.I.NE.R"N") GOTO 250
      IF (I.EQ.R"Y") KSW5=1
  260 WRITE(7,17)
      READ(5,7) I
      IF (I.NE.R"Y".AND.I.NE.R"N") GOTO 260
      IF (I.EQ.R"N") IDAY=0
  270 WRITE(7,18)
      READ(5,7) I
      IF (I.NE.R"Y".AND.I.NE.R"N") GOTO 270
      IF (I.EQ.R"N") ID=2
      IF (IP.EQ.2) GOTO 300
  280 WRITE(7,19)
      READ(5,7) I
      IF (I.NE.R"Y".AND.I.NE.R"N") GOTO 280
      IF (I.EQ.R"Y") KSW6=2
  290 WRITE(7,20)
      READ(5,7) I
      IF (I.NE.R"1".AND.I.NE.R"2") GOTO 290
      IF (I.EQ.R"2") ISIG=1
  300 CONTINUE
C---------
      IF (KSW5.NE.1) WRITE(40,21) PTEEG
      IF (IP.NE.0) GOTO 110
C---------FEET
      RA = 22902983.317
      SFC=1.68395
      SF=1.2
      RV=221.255
      WC=.592085
      IF (KSW1.EQ.1) WC=1.0
```

```
      GOTO 130
C---------METERS
110   RA=6371229.315
      SFC=.514792
      SF=.3048
      HV=67.442
      WC=1.0
130   RAD=57.29578
      XINE=999999999.
      NNA(1)=R" GEO"
      NNA(2)=R"MFT "
      NNA(3)=R"  GE"
      NNA(4)=R"QMM "
      NWDD(1)=R"KTS "
      NWDD(2)=R"MPS "
      NWWD(1)=R"KTS "
      NWWD(2)=R"MPS "
C---------
      CALL TITLE(TRKHGT)
      CALL COMPUT(TRKHGT,IO)
      CALL HED(IP,KSW1,KSW5,KSW6)
      CALL TABDAT
      CALL MAND(KSW1,KSW5,IP,XINE,WC,ITERM)
      CALL SIG(SIGLH,ITERM,ISIG,WC,KSW1,KSW5,IP)
      IF (KSW5.NE.1) WRITE(40,22) PTEND
      ENDFILE 1
      ENDFILE 7
      ENDFILE 40
      ENDFILE 61
C---------
      CALL ENDRUN
      STOP
C---------
6     FORMAT("USER DEFAULT OPTIONS--YES/NO ?"/
     C       "INTERPOLATED OUTPUT"/
     C       "1000 FOOT INCREMENT"/
     C       "OUTPUT IN FEET"/
     C       "SPEED IN KNOTS"/
     C       "MICROWAVE IR"/
     C       "DAYLIGHT RUN"/
     C       "MOTHER CORRECTION"/
     C       "SHEAR--/SEC"/
     C       "SIGNIFICANT CRITERIA"/
     C          STANDARD  1 DEG C/10% RH")
1     FORMAT("BLAST DATA REQUIRED--YES/NO ?")
7     FORMAT(R1)
9     FORMAT("INTERPOLATED OUTPUT--YES/NO ?")
12    FORMAT("ALTITUDE INCREMENT"/"  XXXX")
11    FORMAT(F4.0)
13    FORMAT("OUTPUT UNITS--FEET/METERS ?")
15    FORMAT("WIND SPEED IN FPS--YES/NO ?")
16    FORMAT("OPTICAL IR OUTPUT--YES/NO ?")
17    FORMAT("DAYLIGHT RUN--YES/NO ?")
18    FORMAT("MOTHER CORRECTION--YES/NO ?")
19    FORMAT("SHEAR OUTPUT IN KTS--YES/NO ?")
22    FORMAT("SIGNIFICANT CRITERIA:"/
     C       "  (1) STANDARD  1 DEG C/10% RH"/
```

```
C        "  (2) SPECIAL 2.5 DEG C/ 5% RH")
21    FORMAT(10R2//)
22    FORMAT(/15R2)
C---------
      END
```

--VARIABLE MAP--(LO=A/R)

A=ARGLIST, C=CTRL OF LO, I=DATA INIT.
R=READ, S=STORE, U=I/O UNIT, W=WRITE

-NAME-	ADDRESS	--BLOCK-----	PROPERTIES--------	TYPE---------	SIZE---	REFERENCES-								
ABSH	0B	/A/		REAL		4								
DALT	1B	/A/		REAL		4	51/S	71/R						
DEN	2B	/A/		REAL		4								
DLOG	3B	/A/		REAL	6	4								
E	237B	/A/		REAL		4								
EE	223B	/A/		REAL	6	4								
GG	11B	/A/		REAL	6	4								
GRAT	17B	/A/		REAL		4								
HA	20B	/A/		REAL		4								
HGT	21B	/A/		REAL		4								
HH	22B	/A/		REAL	6	4								
HS	30B	/A/		REAL		4								
HV	31B	/A/		REAL		4	110/S	118/S						
I	446B			INTEGER		55/R	56	56	57	59/R	60	60	61	66/R
						67	67	68	69	73/R	74	74	75	76
						78/R	79	79	80	82/R	83	83	84	85/R
						87	87	88	90/R	91	91	92	95/R	96
						96	97	99/R	100	100	101			
IDAY	0B	/NIG/		INTEGER		13	53/S	88/S						
IELE	32B	/A/		INTEGER		4								
IHEAD1	0B	/IHEAD/		INTEGER	11	12								
IHEAD2	13B	/IHEAD/		INTEGER	11	12								
IO	445B			INTEGER		52/S	92/S	132/A						
IP	33B	/A/		INTEGER		4	52/S	62/S	75/S	93	105	133/A	135/A	136/A
ISIG	444B			INTEGER		52/S	121/S	136/A						
ISL	34B	/A/		INTEGER	6	4								
ITERM	450B			INTEGER		135/A	136/A							
ITHK	42B	/A/		INTEGER		4								
ITYPE	43B	/A/		INTEGER		4								
KSW1	215B	/A/		INTEGER		4	52/S	80/S	112	133/A	135/A	136/A		
KSW2	216B	/A/		INTEGER		4	52/S							
KSW3	217B	/A/		INTEGER		4	52/S	63/S	88/S					
KSW4	220B	/A/		INTEGER		4	52/S							
KSW5	221B	/A/		INTEGER		4	52/S	84/S	104	133/A	135/A	136/A	137	
KSW6	222B	/A/		INTEGER		4	52/S	97/S	133/A					
NAME	443B			INTEGER		45/I	47/A							
NNA	165B	/A/		INTEGER	4	4	122/S	123/S	124/S	125/S				
NWDD	44B	/A/		INTEGER	2	4	126/S	127/S						
NWWD	45B	/A/		INTEGER	2	4	128/S	129/S						
P	50B	/A/		REAL		4								
PLOG	51B	/A/		REAL	6	4								
PR	57B	/A/		REAL	6	4								
PTBEG	412B			REAL	15	14	15/I	134/W						
PTEND	424B			REAL	15	14	15/I	137/W						
P.	242B	/A/		REAL		4								
PWA	231B	/A/		REAL	6	4								
RA	65B	/A/		REAL		4	107/S	115/S						

RSRC 2

```
-NAME---ADDRESS --BLOCK-----PROPERTIES-- ----TYPE---------SIZE---REFERENCES-

 RAD        33B  /A/                        REAL                 1    173/S
 REI        67B  /A/                        REAL          6      1
 RH         75B  /A/                        REAL                 1
 RI         76B  /A/                        REAL                 1
 SF         77B  /A/                        REAL                 1    179/S  117/S
 SFC       103B  /A/                        REAL                 1    175/S  113/S
 SHR       101B  /A/                        REAL                 1
 SIGLH     102B  /A/                        REAL                 1    136/A
 T         103B  /A/                        REAL                 1
 TD        104B  /A/                        REAL                 1
 TDEW      105B  /A/                        REAL          6      1
 TP        113B  /A/                        REAL          6      1
 TRKHGT    447B                             REAL               131/A  132/A
 UABS      121B  /A/                        REAL          6      1
 UU        127B  /A/                        REAL          6      1
 VS        135B  /A/                        REAL                 1
 VSN       136B  /A/                        REAL          6      1
 VX        144B  /A/                        REAL          6      1
 VXHP      153B  /A/                        REAL                 1
 VX1       152B  /A/                        REAL                 1
 VY        154B  /A/                        REAL          6      1
 VYHP      163B  /A/                        REAL                 1
 VY1       162B  /A/                        REAL                 1
 WC        164B  /A/                        REAL                 1    111/S  112/S  113/S  135/A  136/A
 XINE      165B  /A/                        REAL                 1    121/S  135/A
 XX        172B  /A/                        REAL          6      1
 YY        200B  /A/                        REAL          6      1
 Z         206B  /A/                        REAL                 1
 ZZ        207B  /A/                        REAL          6      1


--PROCEDURES--(LO=A/R)                                              D=DEF LINE OF STMT FUNC
 -NAME----TYPE------ARGS----CLASS-----REFERENCES-                   A=ACTUAL ARGUMENT

 COMPUT              2    SUBROUTINE  132
 ENDRUN              2    SUBROUTINE  143
 HED                 4    SUBROUTINE  133
 ID                  1    SUBROUTINE   47
 MAND                6    SUBROUTINE  135
 SIG                 7    SUBROUTINE  133
 TABDAT              0    SUBROUTINE  134
 TITLE               1    SUBROUTINE  131


--STATEMENT LABELS--(LO=A/R)                                        A=ASSIGN STMT, D=DO STMT.
 -LABEL--ADDRESS---PROPERTIES-----DEF--REFERENCES-                  R=READ, W=WRITE, L=LABEL

     1      70B   FORMAT        157     53/W  157/L
     6      37B   FORMAT        146     54/W  146/L
     7      75B   FORMAT        153     55/R   59/R   66/R   72/R   78/R   82/R   86/R   92/R   95/R   99/R  153/L
     9      77B   FORMAT        159     65/W  159/L
    10     104B   FORMAT        160     70/W  160/L
    11     111B   FORMAT        161     71/R  161/L
    13     113B   FORMAT        162     72/W  162/L
    15     126B   FORMAT        163     77/W  163/L
    16     125B   FORMAT        164     81/W  164/L
    17     132B   FORMAT        165     85/W  165/L
```

```
          PROGRAM RSRC        73/762  OPT=0,ROUND= A/ S/ M/-D,-DS     FTN 5.1+512        87/05/15. 13.37.10        PAGE    6
 -LABEL--ADDRESS---PROPERTIES-----DEF--REFERENCES-

    13      136B    FORMAT          166     89/W   166/L
    19      143B    FORMAT          167     94/W   167/L
    20      150B    FORMAT          168     98/W   168/L
    21      163B    FORMAT          171    104/W   171/L
    22      165B    FORMAT          172    137/W   172/L
   110        0B                    115    105     115/L
   130        0B                    120    113     120/L
   200        0B                     54     54/L    56
   205        0B                     58     58/L    60
   210        0B                     65     61      65/L    67
   230        0B                     72     69      72/L    74
   240        0B                     77     77/L    79
   250        0B                     81     76      81/L    83
   260        0B                     85     84      85/L    87
   270        0B                     89     89/L    91
   280        0B                     94     94/L    96
   290        0B                     98     98/L   100
   300        0B                    102     57      93     102/L

--ENTRY POINTS--(LO=A/R)                                                                  D=DEFINITION, R=RETURN
 -NAME---ADDRESS--ARGS------REFERENCES-

  RSRC        0B      0          1/D

--I/O UNITS--(LO=A/R)                                                                     R=READ, W=WRITE
 -NAME--- PROPERTIES-------------REFERENCES-

  TAPE1                            138
  TAPE40  FMT/SEQ                  104/W  137/W  140
  TAPE5   FMT/SEQ                   55/R   59/R   66/R   71/R   73/R   78/R   82/R   86/R   90/R   95/R   99/R
  TAPE60                            49
  TAPE61                            50    141
  TAPE7   FMT/SEQ                   54/W   58/W   65/W   70/W   72/W   77/W   81/W   85/W   89/W   94/W   98/W  139

--STATISTICS--

  PROGRAM-UNIT LENGTH            451B =  297
  CM LABELLED COMMON LENGTH      270B =  184
  CM STORAGE USED              54520B =  27200
  COMPILE TIME                 0.413 SECONDS
```

```
  FUNCTION WDIRF      73/750  OPT=0,ROUND= A/ S/ M/-D,-DS      FTN 5.1+642        87/05/15. 13.37.10        PAGE     1
DO=-LONG/-OT,ARG=-COMMON/-FIXED,CS= USER/-FIXED,DS=-TS/-SE/-SL/ EP/-IL/-PMD/-ST,-AL,PL=5700
FTN5,I=RSRC2,B=0,L=RSRC,LO.

                 FUNCTION WDIRF(X,Y)
           C------
                 IF(X.LE.998)GO TO 100
                 WDIRF=999.0
                 RETURN
           C------
             100 IF(X.NE.0.)GO TO 110
                 IF(Y.GE.0.)WDIRF = 360.
                 IF(Y.LT.0.)WDIRF = 180.
                 RETURN
           C------
             110 D= ATAN(Y/X)*57.29578
                 IF(X.GT.0.)WDIRF=90.-D
                 IF(X.LT.0.)WDIRF = 270.-D
                 IF(WDIRF.LT.0.5)WDIRF=360.
                 RETURN
           C------
                 ENTRY WSPDF
           C------
                 IF(X.LE.998.)GO TO 120
                 WSPDF =999.0
                 RETURN
           C------
             120 WSPDF=SQRT(X*X+Y*Y)
                 RETURN
                 END

--VARIABLE MAP--(LO=A/R)                                                                  A=ARGLIST, C=CTRL OF DO, I=DATA INIT,
 -NAME---ADDRESS --BLOCK-----PROPERTIES-------TYPE---------SIZE---REFERENCES-             R=READ, S=STORE, U=I/O UNIT, W=WRITE

  D          25B                              REAL                  12/S   13     14
  WDIRF      23B                              REAL                   4/S    8/S    9/S   13/S   14/S   15     15/S
  WSPDF      23B                              REAL                  21/S   24/S
  X           1   DUMMY-ARG                   REAL                   1      3      7     12/A   13     14     20     24/A   24/A
  Y           2   DUMMY-ARG                   REAL                   1      8      9     12/A   24/A   24/A

--PROCEDURES--(LO=A/R)                                                                    D=DEF LINE OF STMT FUNC
 -NAME----TYPE------ARGS----CLASS-----REFERENCES-                                         A=ACTUAL ARGUMENT

  ATAN    GENERIC      1    INTRINSIC    12
  SQRT    GENERIC      1    INTRINSIC    24

--STATEMENT LABELS--(LO=A/R)                                                              A=ASSIGN STMT, D=DO STMT,
 -LABEL--ADDRESS---PROPERTIES-----DEF--REFERENCES-                                        R=READ, W=WRITE, L=LABEL

    100       0B                     7      3      7/L
    110       0B                    12      7     12/L
    120       0B                    24     20     24/L
```

```
          FUNCTION WDIRF      73/762  OPT=2,ROUND= A/ S/ M/-D,-DS     FTN 5.1+642        87/08/15. 13.37.12        PAGE    2

--ENTRY POINTS--(LO=A/R)                                                                  S:DEFINITION, R=RETURN
 -NAME---ADDRESS--ARGS------REFERENCES-

  WDIRF       0B     2          1/D    5/R   10/R   15/R   22/R   25/R
  WSPDF       03     2         18/D

--STATISTICS--

  PROGRAM-UNIT LENGTH              31B =  25
  CM STORAGE USED               62600B =  25984
  COMPILE TIME                  0.059 SECONDS
```

```
SUBROUTINE WIND        73/762  OPT=0,ROUND= A/ S/ M/-D,-DS      FTN 5.1+312          87/06/15. 13.37.12        PAGE     1
DO=-LONG/-OT,ARG=-COMMON/-FIXED,CS= USER/-FIXED,DB=-TB/-SB/-SL/ FR/-IL/-RND/-ST,-AL,PL=5000
FTN5,I=RSRC2,R=0,L=RSRC,LO.

                  SUBROUTINE WIND(GG,VX,VY,XINE,XX,YY)
            C---------
                  DIMENSION GG(6),VX(6),VY(6),XX(6),YY(6)
                  DATA WDSW/0.0/
            C---------
                  IF ((GG(2)-GG(1)).GT.0.5) GOTO 40
                  IF (WDSW.EQ.-1.) GOTO 120
                  WDSW=-1.
                  GO TO 50
               40 WDSW=0.0
             50   IF (XX(1).NE.XINE.AND.XX(2).NE.XINE.AND.XX(3).NE.XINE) GOTO 90
                  VX(2)=VY(2)=XINE
                  GO TO 100
               90 VX(2)=(XX(1)-XX(3))/((GG(3)-GG(1))*60.)
                  VY(2)=(YY(1)-YY(3))/((GG(3)-GG(1))*60.)
            100   IF (WDSW.EQ.0.) RETURN
            C---------
            120   IF (XX(1).NE.XINE.AND.XX(3).NE.XINE.AND.XX(5).NE.XINE) GOTO 160
                  VX(3)=VY(3)=XINE
                  RETURN
             160 VX(3)=(XX(1)-XX(5))/((GG(5)-GG(1))*60.)
                  VY(3)=(YY(1)-YY(5))/((GG(5)-GG(1))*60.)
                  RETURN
                  END
```

```
--VARIABLE MAP--(LO=A/R)                                                                    A=ARGLIST, C=CTRL OF DO, I=DATA INIT,
 -NAME---ADDRESS --BLOCK-----PROPERTIES-------TYPE---------SIZE---REFERENCES-                R=READ, S=STORE, U=I/O UNIT, W=WRITE

  GG          1   DUMMY-ARG                  REAL          6      1      3      6      6     14     14     15     15     21
                                                                 21     22     22
  VX          2   DUMMY-ARG                  REAL          6      1      3     12/S   14/S   19/S   21/S
  VY          3   DUMMY-ARG                  REAL          6      1      3     12/S   15/S   19/S   22/S
  WDSW       22B                             REAL                 4/I    7      8/S   10/S   16
  XINE        4   DUMMY-ARG                  REAL                 1     11     11     11     12     18     18     18     19
  XX          5   DUMMY-ARG                  REAL          6      1      3     11     11     11     14     14     18     18
                                                                 18     21     21
  YY          6   DUMMY-ARG                  REAL          6      1      3     15     15     22     22
```

```
--STATEMENT LABELS--(LO=A/R)                                                                A=ASSIGN STMT, D=DO STMT,
 -LABEL--ADDRESS---PROPERTIES-----DEF--REFERENCES-                                           R=READ, W=WRITE, L=LABEL

    40       0B                    10      3     10/L
    50       0B                    11      9     11/L
    90       0B                    14     11     14/L
   100       0B                    15     13     15/L
   120       0B                    18      7     18/L
   160       0B                    21     18     21/I
```

```
        SUBROUTINE WIND        73/760  OPT=0,ROUND= A/ S/ M/-D,-DS     FTN 5.1+642        87/06/16. 13.37.10        PAGE     2

--ENTRY POINTS--(LC=A/R)                                                                  D=DEFINITION, R=RETURN
 -NAME---ADDRESS--ARGS------REFERENCES-

  WIND        0B      5          1/D    16/R    20/R    23/R


--STATISTICS--

  PROGRAM-UNIT LENGTH              26B =  22
  CM STORAGE USED                62500B =  25984
  COMPILE TIME                   0.087 SECONDS
```

```
SUBROUTINE TSIGN      73/762  OPT=2,ROUND= A/ S/ 1/-D,-DS     FTN 5.1+642        87/05/18. 13.37.12        PAGE     1
DO=-LONG/-OT,ARG=-COMMON/-FIXED,CS= USER/-FIXED,DB=-TB/-SE/-SL/ EF/-ID/-PMD/-ST,-AL,PL=5000
FTN5,I=RSRC2,B=2,L=RSRC,LO.

      1                 SUBROUTINE TSIGN(I,K)
      2                 IF (I.GE.0) THEN
1     3                 II=I/10
1     4                 K=(I-II*10)+O"33"
1     5                 I=II
1     6                 ELSE
1     7                 II=I/10
1     8                 K=(I-II*10)*(-1)
1     9                 I=-II
1    10                 IF (K.EQ.0) K=O"66"
1    11                 IF (K.NE.O"66") K=K+O"11"
1    12                 END IF
     13                 RETURN
     14                 END

--VARIABLE MAP--(LO=A/R)                                                                  A=ARGLIST, C=CTRL OF DO, I=DATA INIT,
 -NAME---ADDRESS --BLOCK-----PROPERTIES-------TYPE---------SIZE---REFERENCES-             R=READ, S=STORE, U=I/O UNIT, W=WRITE

  I            1   DUMMY-ARG                  INTEGER                1      2      3      4      5/S    7      8      9/S
  II          16B                             INTEGER                3/S    4      5      7/S    8      9
  K            2   DUMMY-ARG                  INTEGER                1      4/S    8/S    10     10/S   11     11     11/S

--ENTRY POINTS--(LO=A/R)                                                                  D=DEFINITION, R=RETURN
 -NAME---ADDRESS--ARGS------REFERENCES-

  TSIGN       0B     2          1/D   13/R

--STATISTICS--

  PROGRAM-UNIT LENGTH              22B =  18
  CM STORAGE USED                62600B =  25984
  COMPILE TIME                   0.037 SECONDS
```

```
SUBROUTINE FORM        73/762  OPT=2,ROUND= A/ S/ M/-E,-DS      FTN 5.1+642          87/05/15. 13.37.1.        PAGE    1
DD=-LONG/-DI,ARG=-COMMON/-FIXED,CS= USER/-FIXED,DB=-TB/-SB/-SL/ FP/-ID/-PMD/-ST,-AL,PL=5000
FTN5,I=RSRC2,R=2,L=RSRC,LO.

      SUBROUTINE FORM
C---------
      COMMON/A/ABSH,DALT,DEN,DLOG(6),GG(6),GRAT,HA,
     C HGT,HH(6),HS,HV,IELE,IP,ISL(6),ITHK,
     C ITYPE,NWDD(2),NWWC(2),P,PLOG(6),PR(6),
     C RA,RAD,RFI(6),RH,RI,SF,SFC,SHR,SIGLH,
     C T,TD,TDEW(6),TP(6),
     C UABS(6),UU(6),VS,VSN(6),VX(6),VX1,VXHP,VY(6),VY1,VYHP,WC,
     C XINE,NNA(4),XX(6),YY(6),Z,ZZ(6),KSW1,KSW2,KSW3,
     C KSW4,KSW5,KSW6,EE(6),PWA(6),E,PW
      COMMON/IHEAD/IHEAD1(11),IHEAD2(11)
      DATA TEP/0.0/
      DATA IPAGE/11/
C---------
      IF (IPAGE.GE.56) THEN
      IPAGE=0
      WRITE(61,'(1H1,/,11A10)') (IHEAD1(I),I=1,11)
      WRITE(61,'(11A10,/)') (IHEAD2(I),I=1,11)
      ENDIF
C---------
      THR=999.9
      IF (SHR.NE.0.0.AND.SHR.NE.0.999) THR=SHR*592.035
      IF (KSW1.EQ.1.OR.IP.GE.1) VS=VS*SFC
C---------
      IF (DALT.EQ.1000..AND.KSW1.EQ.0.AND.KSW5.EQ.2) THEN
      WRITE(61,200) NINT(Z),NINT(VX1),NINT(VY1),T,TD,P,NINT(RH),
     C ABSH,DEN,NINT(RI),NINT(VS),THR,E,NINT(PW)
      IPAGE=IPAGE+1
      ELSE IF (IP.LE.1) THEN
      WRITE(61,100) NINT(Z),NINT(VX1),NINT(VY1),T,TD,P,NINT(RH),
     C ABSH,DEN,NINT(RI),NINT(VS),SHR,E,NINT(PW)
      IPAGE=IPAGE+1
      ELSE
      IF (VX1.GT.999.) VY1=99.9
      WRITE(61,102) NINT(Z),NINT(VX1),VY1,T,TD,P,NINT(RH),ABSH,DEN,
     C NINT(RI),VS,SHR,E,NINT(PW)
      IPAGE=IPAGE+1
      ENDIF
      IF (IP.NE.0.OR.DALT.NE.1000.) GOTO 70
C---------CHECK LAPSE RATE
      TLAP=TEP-T
      TEP=T
      IF (TEP.EQ.-TLAP) GOTO 3
      IF (TLAP.LT.3.3.AND.TLAP.GT.-5.) GOTO 3
      WRITE(7,1) P
C---------CHECK SHEAR
3     IF (SHR.GE..999.OR.SHR.LT..227) GOTO 70
      WRITE(7,2) P
70    IP=P*100.+.5
      IB=ABSH*100.+.5
      LS=DEN*100.+.5
      JT = NINT(T*10.)
      ID = NINT(TD*10.)
      CALL TSIGN(JT,IT1)
      CALL TSIGN(ID,ID1)
```

```
56                IF(IP.GT.1) GO TO 73
57                IF(DALT.NE.10000..AND.IP.EQ.0) GO TO 71
58                IF(KSW5.NE.2) GO TO 71
59          C---------SHEAR IN KTS
60                WRITE(1,230) NINT(Z),NINT(VX1),NINT(VY1),JT,IT1,ID,ID1,
61               C LP,NINT(RH),IB,LS,NINT(RI),NINT(VS),SHR,E,NINT(PW)
62                IF (KSW5.NE.1)
63               C WRITE(40,510) NINT(Z),NINT(VX1),NINT(VY1),T,TD,P,NINT(RH),
64               C ABSH,DEN,NINT(RI),NINT(VS),SHR,E,NINT(PW)
65                RETURN
66          C---------
67          71    WRITE(1,130) NINT(Z),NINT(VX1),NINT(VY1),JT,IT1,ID,ID1,
68               C LP,NINT(RH),IB,LS,NINT(RI),NINT(VS),SHR,E,NINT(PW)
69                IF (KSW5.NE.1)
70               C WRITE(40,510) NINT(Z),NINT(VX1),NINT(VY1),T,TD,P,NINT(RH),
71               C ABSH,DEN,NINT(RI),NINT(VS),SHR,E,NINT(PW)
72                RETURN
73          C---------BLAST DATA
74          73    IF(VX1.GT.998.) VY1=99.9
75                WRITE(1,131) NINT(Z),NINT(VX1),VY1,JT,IT1,ID,ID1,LP,
76               C NINT(RH),IB,LS,NINT(RI),VS,SHR,E,NINT(PW)
77                RETURN
78          C---------
79          1     FORMAT("TEMPERATURE AT",F10.2," MBS ")
80          2     FORMAT("WIND SHEAR AT",F10.2," MBS ")
81          100   FORMAT(1H ,I7,4X,I3,3X,I3,2X,F6.1,3X,F6.1,4X,F7.2,4X,I3,
82               C 4X,F5.2,3X,F7.2,4X,I3,3X,I4,2X,F5.3,3X,F5.2,3X,I3)
83          102   FORMAT(1H ,I7,4X,I3,3X,F4.1,1X,F6.1,3X,F6.1,4X,F7.2,1X,I3,
84               C 4X,F5.2,3X,F7.2,4X,I3,3X,F5.1,1X,F5.3,3X,F5.2,3X,I3)
85          130   FORMAT(I6.6,3X,I3.3,2X,I3.3,2X,I3.2,R1,4X,I3.2,R1,4X,I6.6,1X,
86               C I3.3,3X,I4.4,1X,I6.6,I3.3,I4.4,F5.3,F5.2,I3)
87          131   FORMAT(I6.6,3X,I3.3,2X,F4.1,1X,I3.2,R1,4X,I3.2,R1,4X,I6.6,1X,
88               C I3.3,3X,I4.4,1X,I6.6,I3.3,F5.1,F5.3,F5.2,I3)
89          200   FORMAT(1H ,I7,4X,I3,3X,I3,3X,F5.1,4X,F5.1,4X,F7.2,4X,I3,4X,
90               +F5.2,3X,F7.2,4X,I3,3X,I4,2X,F5.1,3X,F5.2,3X,I3)
91          230   FORMAT(I6.6,3X,I3.3,2X,I3.3,2X,I3.2,R1,4X,I3.2,R1,4X,I6.6,1X,I3.3
92               +,3X,I4.4,1X,I6.6,I3.3,I4.4,F5.1,F5.2,I3)
93          510   FORMAT(I3,2I4,2F5.1,F7.1,I4,F5.2,F7.1,2I4,F5.3,F5.2,I3)
94          C---------
95                END
```

```
--VARIABLE MAP--(LO=A/R)                                                    A=ARGLIST, C=CTRL OF DO, I=DATA INIT,
 -NAME---ADDRESS --BLOCK-----PROPERTIES-------TYPE---------SIZE---REFERENCES-                R=READ, S=STORE, U=I/O UNIT, W=WRITE

  ABSH        0B  /A/                        REAL                  3     25/W   32/W   75/W   53     62/W   69/W
  DALT        1B  /A/                        REAL                  3     25     39     57
  DEN         2B  /A/                        REAL                  3     25/W   32/W   35/W   51     62/W   69/W
  DLOG        3B  /A/                        REAL          6       3
  E         237B  /A/                        REAL                  3     25/W   30/W   35/W   50/W   62/W   67/W   69/W   75/W
  EE        223B  /A/                        REAL          6       3
  GG         11B  /A/                        REAL          6       3
  GRAT       17B  /A/                        REAL                  3
  HA         22B  /A/                        REAL                  3
  HGT        21B  /A/                        REAL                  3
  HH         22B  /A/                        REAL          6       3
  HS         33B  /A/                        REAL                  3
```

-NAME---	ADDRESS	--BLOCK-----	PROPERTIES---	----TYPE----------	SIZE---	REFERENCES-								
HV	31B	/A/		REAL		3								
I	433B			INTEGER		17	19							
IB	437B			INTEGER		53/S	60/W	67/W	75/W					
ID	442B			INTEGER		53/S	55/A	62/W	67/W	75/W				
ID1	444B			INTEGER		55/A	60/W	67/W	75/W					
IELB	32B	/A/		INTEGER		3								
IHEAD1	8B	/IHEAD/		INTEGER	11	11	17/W							
IHEAD2	13B	/IHEAD/		INTEGER	11	11	14/W							
IP	33B	/P/		INTEGER		3	23	29	39	56	57			
IPAGE	432B			INTEGER		13/I	15	15/S	29	29/S	32	32/S	37	37/S
ISL	34B	/A/		INTEGER	6	3								
ITHK	42B	/A/		INTEGER		3								
ITYPE	43B	/A/		INTEGER		3								
IT1	443B			INTEGER		54/A	60/W	67/W	75/W					
JT	441B			INTEGER		52/S	54/A	60/W	67/W	75/W				
KSW1	215B	/A/		INTEGER		3	23	25						
KSW2	216B	/A/		INTEGER		3								
KSW3	217B	/A/		INTEGER		3								
KSW4	220B	/A/		INTEGER		3								
KSW5	221B	/A/		INTEGER		3	62	69						
KSW6	222B	/A/		INTEGER		3	25	58						
LP	436B			INTEGER		49/S	60/W	67/W	75/W					
LS	440B			INTEGER		51/S	60/W	67/W	75/W					
NNA	165B	/A/		INTEGER	4	3								
NWDD	44B	/A/		INTEGER	2	3								
NWWD	45B	/A/		INTEGER	2	3								
P	50B	/A/		REAL		3	25/W	30/W	35/W	45/W	46/W	49	52/W	59/W
PLOG	51B	/A/		REAL	5	3								
PR	57B	/A/		REAL	6	3								
PW	240B	/A/		REAL		3	25/A	30/A	35/A	50/A	52/A	57/A	59/A	75/A
PWA	231B	/A/		REAL	5	3								
RA	65B	/A/		REAL		3								
RAD	66B	/A/		REAL		3								
RFI	67B	/A/		REAL	6	3								
RH	75B	/A/		REAL		3	25/A	30/A	35/A	50/A	52/A	57/A	59/A	75/A
RI	76B	/A/		REAL		3	25/A	30/A	35/A	50/A	52/A	57/A	59/A	75/A
SF	77B	/A/		REAL		3								
SFC	100B	/A/		REAL		3	23							
SHR	101B	/A/		REAL		3	22	22	22	70/W	35/W	47	17	57/W
						59/W	75/W							
SIGLH	122B	/A/		REAL		3								
T	123B	/A/		REAL		3	26/W	32/W	35/W	41	42	52/A	52/W	59/W
TD	104B	/A/		REAL		3	25/W	30/W	35/W	53/A	52/W	59/W		
TDEW	125B	/A/		REAL	6	3								
TEP	431B			REAL		12/I	41	42/S	43					
TER	434B			REAL		21/S	22/S	25/W	50/W	52/W				
TLAP	435B			REAL		41/S	43	44	44					
TP	113B	/A/		REAL	5	3								
UABS	121B	/A/		REAL	5	3								
UU	127B	/A/		REAL	6	3								
VS	135B	/A/		REAL		3	23	23/S	25/A	30/A	35/W	50/A	52/A	57/A
						59/A	75/W							
VSH	136B	/A/		REAL	5	3								
VX	144B	/A/		REAL	5	3								
VXHP	153B	/A/		REAL		3								
VX1	152B	/A/		REAL		3	25/A	32/A	31	35/A	52/A	52/A	37/A	59/A
						71	75/A							

RSRC 2

```
      SUBROUTINE FORM        73/760  OPT=0,ROUND= A/ S/ M/-D,-DF      FTN 5.1+642          87/05/16. 13.37.10        PAGE      4
 -NAME---ADDRESS --BLOCK-----PROPERTIES-------TYPE---------SIZE---REFERENCES-

  VY          154B  /A/                          REAL            6       3
  VYHP        163B  /A/                          REAL                    3
  VY1         162B  /A/                          REAL                    3      26/A    30/A    31/S    35/W    60/A    62/A    67/A    69/A
                                                                        74/S    75/W
  WC          164B  /A/                          REAL                    3
  XINE        165B  /A/                          REAL                    3
  XX          172B  /A/                          REAL            6       3
  YY          200B  /A/                          REAL            6       3
  Z           205B  /A/                          REAL                    3      26/A    30/A    35/A    60/A    62/A    67/A    69/A    75/A
  ZZ          207B  /A/                          REAL            6       3

--PROCEDURES--(LO=A/R)                                                                    D=DEF LINE OF STMT FUNC
 -NAME----TYPE------ARGS----CLASS-----REFERENCES-                                         A=ACTUAL ARGUMENT

  NINT    GENERIC      1    INTRINSIC    26/W    26/W    26/W    26/W    26/W    26/W    26/W    30/W    30/W    30/W    30/W    30/W    30/W
                                         30/W    35/W    35/W    35/W    35/W    35/W    52      53      60/W    60/W    60/W    62/W    62/W
                                         60/W    60/W    62/W    62/W    62/W    62/W    62/W    62/W    62/W    67/W    67/W    67/W    67/W
                                         67/W    67/W    67/W    69/W    69/W    69/W    69/W    69/W    69/W    69/W    75/W    75/W    75/W
                                         75/W    75/W
  TSIGN                2    SUBROUTINE   54      55

--STATEMENT LABELS--(LO=A/R)                                                              A=ASSIGN STMT, D=DO STMT,
 -LABEL--ADDRESS---PROPERTIES-----DEF--REFERENCES-                                        R=READ, W=WRITE, L=LABEL

     1      25B   FORMAT          79      45/W    79/L
     2      32B   FORMAT          80      48/W    80/L
     3       0B                   47      43      44      47/L
    70       0B                   49      39      47      49/L
    71       0B                   67      57      58      67/L
    73       0B                   74      56      74/L
   100      37B   FORMAT          81      30/W    81/L
   102      52B   FORMAT          83      35/W    83/L
   130      66B   FORMAT          85      67/W    85/L
   131     101B   FORMAT          87      75/W    87/L
   200     114B   FORMAT          89      26/W    89/L
   230     127B   FORMAT          91      60/W    91/L
   510     142B   FORMAT          93      62/W    69/W    93/L

--ENTRY POINTS--(LO=A/R)                                                                  D=DEFINITION, R=RETURN
 -NAME---ADDRESS--ARGS------REFERENCES-

  FORM        0B     0          1/D    65/R    72/R    77/R

--I/O UNITS--(LO=A/R)                                                                     R=READ, W=WRITE
 -NAME--- PROPERTIES-------------REFERENCES-

  TAPE1    FMT/SEQ                 60/W    67/W    75/W
  TAPE40   FMT/SEQ                 62/W    69/W
  TAPE61   FMT/SEQ                 17/W    18/W    26/W    30/W    35/W
  TAPE7    FMT/SEQ                 45/W    48/W
```

```
--STATISTICS--

  PROGRAM-UNIT LENGTH            445B =  293
  CM LABELLED COMMON LENGTH      267B =  183
  CM STORAGE USED              54500B =  27008
  COMPILE TIME                 0.411 SECONDS
```

```
SUBROUTINE TRHC        73/762  OPT=0,ROUND= A/ S/ M/-T,-DS      FTN 5.1+642          87/05/18. 13.37.12        PAGE     1
DO=-LONG/-OT,ARG=-COMMON/-FIXED,CS= USER/-FIXED,DB=-TB/-SB/-SL/ FR/-IL/-PMD/-ST,-AL,PL=5000
FTN5,I=RSRC2,B=0,L=RSRC,LO.

                SUBROUTINE TRHC(DEN,G,GP,TC,TCP,T,TP,RC,R,ISW62,P,IELE,ITYPE)
                COMMON/NIG/IDAY
                REAL LAMDA,LR
                DATA ICHK/0/
                IF (ICHK.EQ.0) TSP=T
                ICHK=1
          C---------INTERMEDIATE VARIABLES
                RHO=(10.**DEN)/1000.
                DG=(G-GP)*60.
                V=6.0
                LAMDA=9.8*((RHO*V)**(-0.43))
                EX=EXP(-DG/LAMDA)
          C---------CORRECTED TEMPERATURE
                TC=TCP+DG*((T-TCP*(1-EX)-TP*EX)/(DG-LAMDA*(1-EX)))
                IF (IELE.EQ.4) TC=T
          C---------RELATIVE HUMIDITY SECTION
                IF (ISW60.EQ.1) RETURN
                LR=(T-TCP*(1-EX)-TP*EX)/(DG-LAMDA*(1-EX))
                LAMDA=52.0*((RHO*V)**(-0.71))
                EX=EXP(-DG/LAMDA)
                TS=(TCP-LAMDA*LR)*(1-EX)+LR*DG+TSP*EX
                DELTIN=0.0
                IF (IDAY.EQ.0.AND.ITYPE.EQ.4) DELTIN=-0.0659*P**0.5+2.464
                TSD=TS+DELTIN
                COR=(EXP((17.269*TSD)/(TSD+237.3))/EXP((17.269*TC)/(TC+237.3)))
                RC=COR*R
                TSP=TS
                RETURN
                END

--VARIABLE MAP--(LO=A/R)                                                    A=ARGLIST, C=CTRL OF DO, I=DATA INIT,
 -NAME---ADDRESS --BLOCK-----PROPERTIES-------TYPE---------SIZE---REFERENCES-          R=READ, S=STORE, U=I/O UNIT, *=*RITE

  COR        51B                          REAL                 25/S   25
  DELTIN     47B                          REAL                 22/S   23/S   24
  DEN         1   DUMMY-ARG               REAL                  1      5
  DG         43B                          REAL                  9/S   12/A   14     14     18     20/A   21
  EX         45B                          REAL                 12/S   14     14     14     18     15     18     20/S   21
                                                               21
  G           2   DUMMY-ARG               REAL                  1      9
  GP          3   DUMMY-ARG               REAL                  1      9
  ICHK       40B                          INTEGER               4/I    5      5/S
  IDAY        0B  /NIG/                   INTEGER               2     23
  IELE       12   DUMMY-ARG               INTEGER               1     15
  ISW60      10   DUMMY-ARG               INTEGER               1     17
  ITYPE      13   DUMMY-ARG               INTEGER               1     23
  LAMDA      35B                          REAL                  3     11/S   12/A   11     18     19/S   20/A   21
  LR         37B                          REAL                  3     18/S   21     21
  P          11   DUMMY-ARG               REAL                  1     23
  R           9   DUMMY-ARG               REAL                  1     25
  RC          3   DUMMY-ARG               REAL                  1     25/S
  RHO        42B                          REAL                  3/S   11     19
  T           5   DUMMY-ARG               REAL                  1      5     14     15     18
  TC          4   DUMMY-ARG               REAL                  1     14/S   15/S   25     25
```

```
        SUBROUTINE TRHC        73/762  OPT=0,ROUND= A/ S/ M/-D,-DS     FTN 5.1+548        87/05/15. 13.37.10        PAGE      2
 -NAME---ADDRESS --BLOCK-----PROPERTIES-------TYPE---------SIZE---REFERENCES-

  TCP          5   DUMMY-ARG                  REAL                  1     14     14     18     21
  TP           7   DUMMY-ARG                  REAL                  1     14     18
  TC          43B                             REAL                21/S   24     27
  TSD         52B                             REAL                24/S   25     25
  TSP         41B                             REAL                 5/S   21     27/S
  V           44B                             REAL                10/S   11     19

--PROCEDURES--(LO=A/R)                                                                  D=DEF LINE OF STMT FUNC
 -NAME----TYPE------ARGS----CLASS-----REFERENCES-                                       A=ACTUAL ARGUMENT

  EXP     GENERIC      1    INTRINSIC    12     20     25     25

--ENTRY POINTS--(LO=A/R)                                                                D=DEFINITION, R=RETURN
 -NAME---ADDRESS--ARGS------REFERENCES-

  TRHC        2B    13          1/D   17/R   25/R

--STATISTICS--

  PROGRAM-UNIT LENGTH              55B =  45
  CM LABELLED COMMON LENGTH         1B =  1
  CM STORAGE USED                 52500B =  25934
  COMPILE TIME                    0.116 SECONDS
```

```
1          SUBROUTINE COMPUT(TRKSGT,IO)
2     C---------
3          COMMON/A/ABSH,DALT,DEN,DLOG(6),GG(6),GRAT,HA,
4        C HGT,HH(6),HS,HV,IELE,IP,ISL(6),ITRK,
5        C ITYPE,NWDD(2),NWWD(2),P,PLOG(6),PR(6),
6        C RA,RAD,RFI(6),RH,RI,SF,SFC,SHR,SIGLH,
7        C T,TD,TDEW(6),TP(6),
8        C UABS(6),UU(6),VS,VSH(6),VX(6),VX1,VXHP,VY(6),VY1,VYHP,WC,
9        C XINF,YNA(4),XX(6),YY(6),Z,ZZ(6),KSW1,KSW2,KSW3,
10       C KSW4,KSW5,KSW6,RE(6),PWA(6),E,PW
11    C---------
12         SMOOF(XA,XB,XC,GA,GB,GC) =
13       C ((((XC-XA)*(2.*(GB-GA)))/(GC-GA))+(2.*XA)+XB)/3.
14    C---------
15         RX=22902983.317
16         ISW60=KI=0
17         GP=TS=PW=0.0
18    C---------
19    10   READ(3,1) G,RNG,EL,AZ,DF,DT,IS,ITRK
20         IF (G.EQ.999.) GOTO 590
21         RNG=RNG/0.3048
22         AZ=AZ/RAD
23         EL=EL/RAD
24         G=G/50.
25    C---------
26         TC=DT
27         IF (TC.LE.-37.5) IO=2
28         RC=DF
29    C---------CORRECT TEMPERATURE AND RELATIVE HUMIDITY FOR SENSOR LAG
30         IF (IO.NE.2.AND.G.NE.0.0)
31       C CALL TRHC(DEN,G,GP,TC,TS,DT,TP1,RC,DF,ISW60,P,IELE,ITYPE)
32         T=TC
33         TK=T+273.15
34         IF (ISW60.NE.0) GOTO 220
35         IF (T.GE.(-50.)) GOTO 100
36         ISW60=1
37         GOTO 220
38    100  IF (DF.EQ.999.0) GOTO 220
39         RH=RC
40         IF (RH.GE.100.) RH=100.
41         IF (RH.LT.1.) RH=1.
42         GOTO 320
43    220  RH=999.
44         TV=TK
45         TD=99.9
46         ABSH=99.99
47         E=0.
48         PW=999.
49         IF (G.EQ.0.0) GOTO 370
50    C---------CORRECT ELEVATION FOR R/I
51    242  IF (EL.EQ.0.) GOTO 10
52         ELC=(COS(EL)/SIN(EL))*((RI-RIS)*.000221)+EL
53    C---------HEIGHT
54         Z=(SQRT(REAS*REAS+RNG*RNG+2.2*REAS*RNG*SIN(ELC))-RX)*SF
55         IF (Z.LE.ZP) GOTO 10
```

```
      HGT=((RA*Z)/(RA+Z))*GRAT
C---------PRESSURE & VIRTUAL TEMPERATURE
      PRLG=PPRLG-((HGT-HGTP)/(HV*((TK+TVP)/2)))
      P=10.**PRLG
      IF (RH.EQ.999.) GOTO 290
      TV=TK/(1.-.379*E/P)
      PRLG=PPRLG-((HGT-HGTP)/(HV*((TV+TVP)/2)))
      P=10.**PRLG
      TV=TK/(1.-.379*E/P)
C---------PRECIPITABLE WATER
      PW = PW+((G./983.616)*(WP+W)*(PP-P))
      IF (E.LT.0.001) PW=999.
C---------CORRECT EL FOR EARTH CURVE
290   EC=ELC+((Z*(COS(ELC)/SIN(ELC)))/(2.2*RA))
C---------X AND Y
      X=RNG*COS(EC)*SIN(AZ)*SF
      Y=RNG*COS(EC)*COS(AZ)*SF
      GO TO 372
C---------VAPOR PRESSURE
320   E = RH*.0611*10.**((7.5*T)/(237.3+T))
      ELOG=ALOG10(E)
C---------MIXING RATIO
      W = 622.*(E/(P-E))
C---------DEW POINT
      TD=((237.3*ELOG)-186.527)/(8.286-ELOG)
C---------ABSOLUTE HUMIDITY
      ABSH=216.7*(E/TK)
      IF (G.NE.0.0) GOTO 240
C---------VIRTUAL TEMP
      TV = TK/(1.-.379*E/P)
C---------DENSITY
370   DEN=ALOG10(348.38*P/TV)
C---------VELOCITY OF SOUND
      VS=(SQRT(1.4023*((P*10.**5.)/(10.**DEN))))*1.94254
C---------REFRACTIVE INDEX
      RI = (77.6*P-5.5*E+374338.*E/TK)/TK
      IF (KSW5.EQ.1) RI=(((77.6*P)/TK)+((.584*P)/(TK*.3135))-.08*E)+.5
      IF (G.NE.0.2) GOTO 520
C--------- SET INITIAL VALUES
      PRLG=ALOG10(P)
      HGT=HGTP+HA
      RIG=RI
      REAS = RX+(HA+TRKHGT)
      X=RNG*SIN(AZ)*SF
      Y=RNG*COS(AZ)*SF
C---------DECREMENT WORKING BVARIABLES
522   TVP=TV
      TP1=DT
      TS=T
      PP=P
      PPRLG=PRLG
      GP=G
      ZP=Z
      HGTP=HGT
      WP=W
      KI=KI+1
      TD(KI)=G
```

```
      XX(KI)=X
      YY(KI)=Y
      ZZ(KI)=Z
      HH(KI)=HGT
      PR(KI)=P
      PLOG(KI)=PRLG
      TP(KI)=T
      TDEW(KI)=TD
      UU(KI)=RH
      UABS(KI)=ABSH
      DLOG(KI)=DEN
      VSN(KI)=VS
      RFI(KI)=RI
      IF (KSW5.EQ.1) RFI(KI)=ORI
      EE(KI)=E
      PWA(KI)=PW
      ISL(KI)=IS
      IF (KI.NE.3) GOTO 10
C---------WRITE DATA OF LOWEST POINT ON TAPE 2
      WRITE(2) GG(1),XX(1),YY(1),ZZ(1),HH(1),PR(1),PLOG(1),TP(1),
     C TDEW(1),UU(1),UABS(1),DLOG(1),VSN(1),RFI(1),ISL(1),EE(1),PWA(1)
C---------SMOOTH X AND Y
      XX(2)=SMOOF(XX(1),XX(2),XX(3),GG(1),GG(2),GG(3))
      YY(2)=SMOOF(YY(1),YY(2),YY(3),GG(1),GG(2),GG(3))
C---------DECREMENT STORED VALUES
      DO 580 I=1,2
      GG(I)=GG(I+1)
      XX(I)=XX(I+1)
      YY(I)=YY(I+1)
      ZZ(I)=ZZ(I+1)
      HH(I)=HH(I+1)
      PR(I)=PR(I+1)
      PLOG(I)=PLOG(I+1)
      TP(I)=TP(I+1)
      TDEW(I)=TDEW(I+1)
      UU(I)=UU(I+1)
      UABS(I)=UABS(I+1)
      DLOG(I)=DLOG(I+1)
      VSN(I)=VSN(I+1)
      RFI(I)=RFI(I+1)
      EE(I)=EE(I+1)
      PWA(I)=PWA(I+1)
580   ISL(I)=ISL(I+1)
      KI=2
      GOTO 10
C---------
590   WRITE(2) GG(1),XX(1),YY(1),ZZ(1),HH(1),PR(1),PLOG(1),TP(1),
     C TDEW(1),UU(1),UABS(1),DLOG(1),VSN(1),RFI(1),ISL(1),EE(1),PWA(1)
      WRITE(2) GG(2),XX(2),YY(2),ZZ(2),HH(2),PR(2),PLOG(2),TP(2),
     C TDEW(2),UU(2),UABS(2),DLOG(2),VSN(2),RFI(2),ISL(2),EE(2),PWA(2)
C---------
      ENDFILE 2
      REWIND 2
      RETURN
C---------
1     FORMAT(F4.2,F7.2,F5.2,F5.2,F5.1,F7.1,I2,I5,I4)
C---------
```

```
170                 END

--VARIABLE MAP--(LO=A/R)                                                    A=ARGLIST, C=CTRL OF DO, I=DATA INIT,
 -NAME---ADDRESS --BLOCK-----PROPERTIES-- ----TYPE---------SIZE---REFERENCES-                R=READ, S=STORE, U=I/O UNIT, W=WRITE

 ABSH        3B  /A/                      REAL                 3    15/S   32/S  112
 AZ        213B                           REAL                19/R  22     22/S   71/A   72/A   99/A  100/A
 DALT        1B  /A/                      REAL                 3
 DEN         2B  /A/                      REAL                 3    30/A   87/S   89    123
 DF        211B                           REAL                19/R  28     30/A   38
 DLOG        3B  /A/                      REAL          5      3   123/S  132/W  150   150/S  159/W  161/W
 DT        212B                           REAL                19/R  25     30/A  103
 E         237B  /A/                      REAL                 3    47/S   51     64    67     75/S   76/A   78    78
                                                               82    85     91     91    92    127
 EC        234B                           REAL                59/S  71/A   72/A
 EE        223B  /A/                      REAL          5      3   127/S  132/W  153   153/S  159/W  161/W
 EL        207B                           REAL                19/R  23     23/S   51    52/A   52/A   52
 ELC       222B                           REAL                52/S  54/A   69     69/A   69/A
 ELOG      237B                           REAL                75/S  80     82
 G         205B                           REAL                19/R  20     24     24/S   30     30/A   49    83    93
                                                              107   112
 GA        NONE   STF-DARG                REAL                12
 GB        NONE   STF-DARG                REAL                12
 GC        NONE   STF-DARG                REAL                12
 GG         11B  /A/                      REAL          5      3   112/S  132/W  135   135    135    136   136   136
                                                              139   139/S  159/W  161/W
 GP        204B                           REAL                17/S  30/A  107/S
 GRAT       17B  /A/                      REAL                 3    56
 HA         20B  /A/                      REAL                 3    95     98
 HGT        21B  /A/                      REAL                 3    56/S   58     62    96/S  109   116
 HGTP      225B                           REAL                58    62     96/S  109/S
 HH         22B  /A/                      REAL          5      3   115/S  132/W  143   143/S  159/W  161/W
 HS         30B  /A/                      REAL                 3
 HV         31B  /A/                      REAL                 3    58     62
 I         241B                           INTEGER             138/C  139    139    140   140    141    141   142   142
                                                              143   143    144    144   145    145    146   146   147
                                                              147   148    148    149   149    150    150   151   151
                                                              152   152    153    153   154    154    155   155
 IELE       32B  /A/                      INTEGER              3    30/A
 IO          2   DUMMY-ARG                INTEGER              1    27/S   32
 IP         33B  /A/                      INTEGER              3
 IS        213B                           INTEGER             19/R  129
 ISL        34B  /A/                      INTEGER       5      3   129/S  132/W  155   155/S  159/W  161/W
 ISW60     202B                           INTEGER             16/S  30/A   34     35/S
 ITHK       42B  /A/                      INTEGER              3    19/R
 ITYPE      43B  /A/                      INTEGER              3    30/A
 KI        231B                           INTEGER             16/S  111    111/S  112   113    114    115   116   117
                                                              118   119    120    121   122    123    124   125   126
                                                              127   128    129    130   155/S
 KSW1      215B  /A/                      INTEGER              3
 KSW2      216B  /A/                      INTEGER              3
 KSW3      217B  /A/                      INTEGER              3
 KSW4      220B  /A/                      INTEGER              3
 KSW5      221B  /A/                      INTEGER              3    92    125
 KSW6      222B  /A/                      INTEGER              3
 NMA       165B  /A/                      INTEGER       4      7
```

RSRC 2

-NAME---	ADDRESS	--BLOCK-----	PROPERTIES-------TYPE---------SIZE---REFERENCES-										
NWDD	41B	/A/	INTEGER	2	3								
NWWD	43B	/A/	INTEGER	2	3								
ORI	243B		REAL		92/S	123							
P	53B	/A/	REAL		3	30/A	59/S	61	63/S	64	66	73	85
					87/A	89	91	92	92	95/A	105	117	
PLOG	51B	/A/	REAL	5	3	113/S	132/W	145	145/S	159/W	151/W		
PP	233B		REAL		65	125/S							
PPRLG	225B		REAL		58	62	106/S						
PR	57B	/A/	REAL	5	3	117/S	132/W	144	144/S	159/W	151/W		
PRLG	230B		REAL		58/S	59	62/S	63	95/S	106	118		
PW	243B	/A/	REAL		3	17/S	43/S	55	56/S	57/S	129		
PWA	231B	/A/	REAL	5	3	123/S	132/W	154	154/S	159/W	151/W		
RA	65B	/A/	REAL		3	56	58	59					
RAD	55B	/A/	REAL		3	22	23						
RC	215B		REAL		23/S	30/A	39						
REAS	223B		REAL		54/A	54/A	54/A	93/S					
RFI	67B	/A/	REAL	5	3	125/S	125/S	132/W	152	152/S	159/W	151/W	
RH	75B	/A/	REAL		3	39/S	40	40/S	41	41/S	43/S	50	75
					121								
RI	76B	/A/	REAL		3	52	91/S	97	125				
RIS	221B		REAL		52	97/S							
RNG	206B		REAL		19/R	21	21/S	54/A	54/A	54/A	71	72	99
					100								
RX	200B		REAL		15/S	54	93						
SF	77B	/A/	REAL		3	54	71	72	99	100			
SFC	100B	/A/	REAL		3								
SHR	101B	/A/	REAL		3								
SIGLH	102B	/A/	REAL		3								
T	103B	/A/	REAL		3	32/S	33	35	75	75	104	119	
TC	214B		REAL		25/S	27	30/A	32					
TD	104B	/A/	REAL		3	45/S	87/S	120					
TDEW	105B	/A/	REAL	5	3	120/S	132/W	147	147/S	159/W	151/W		
TK	217B		REAL		33/S	44	53	61	64	82	85	91	91
					92	92							
TP	113B	/A/	REAL	5	3	113/S	132/W	145	146/S	159/W	151/W		
TP1	216B		REAL		30/A	103/S							
TRKHGT	1	DUMMY-ARG	REAL		1	93							
TS	203B		REAL		17/S	30/A	104/S						
TV	222B		REAL		44/S	61/S	62	64/S	85/S	87/A	102		
TVP	227B		REAL		58	62	102/S						
UABS	121B	/A/	REAL	5	3	122/S	132/W	149	149/S	159/W	151/W		
JU	127B	/A/	REAL	5	3	121/S	132/W	148	148/S	159/W	151/W		
VS	135B	/A/	REAL		3	89/S	124						
VSN	136B	/A/	REAL	5	3	124/S	132/W	151	151/S	159/W	151/W		
VX	144B	/A/	REAL	5	3								
VXHP	153B	/A/	REAL		3								
VX1	152B	/A/	REAL		3								
VY	154B	/A/	REAL	5	3								
VYHP	163B	/A/	REAL		3								
VY1	162B	/A/	REAL		3								
W	232B		REAL		35	73/S	110						
WC	164B	/A/	REAL		3								
WP	231B		REAL		53	110/S							
X	235B		REAL		71/S	99/S	113						
XA	NONE	STF-DARG	REAL		12								
XB	NONE	STF-DARG	REAL		12								
XC	NONE	STF-DARG	REAL		12								

RSRC 2

```
        SUBROUTINE COMPUT      73/752  OPT=2,ROUND= A/ S/ M/-D,-LS      FTN 5.1+642          87/06/15. 13.37.12        PAGE     5
 -NAME---ADDRESS --BLOCK-----PROPERTIES-------TYPE---------SIZE---REFERENCES-

  XINE       155B  /A/                          REAL                  3
  XX         172B  /A/                          REAL            6     3    113/S  132/W  135    135    135    135/S  140    142/S
                                                                     159/W  161/W
  Y          236B                               REAL                 72/S  122/S  114
  YY         230B  /A/                          REAL            6     3    114/S  132/W  135    135    135    135/S  141    141/S
                                                                     159/W  161/W
  Z          236B  /A/                          REAL                  3     54/S   55     55     53     59    148    115
  ZP         224B                               REAL                 55    128/S
  ZZ         227B  /A/                          REAL            6     3    115/S  132/W  142    142/S  159/W  161/W

--PROCEDURES--(LO=A/R)                                                                    D=DEF LINE OF STMT FUNC
 -NAME----TYPE------ARGS----CLASS-----REFERENCES-                                         R=ACTUAL ARGUMENT

  ALOG10  REAL          1    INTRINSIC    76     87     95
  COS     GENERIC       1    INTRINSIC    52     69     71     72     72    100
  SIN     GENERIC       1    INTRINSIC    52     54/A   69     71     99
  SMOOF   REAL          6    STAT FUNC    12/D  135    136
  SQRT    GENERIC       1    INTRINSIC    54     89
  TRHC                 13    SUBROUTINE   30

--STATEMENT LABELS--(LO=A/R)                                                              A=ASSIGN STMT, D=DO STMT,
 -LABEL--ADDRESS---PROPERTIES-----DEF--REFERENCES-                                        R=READ, W=WRITE, L=LABEL

     1      54B   FORMAT          168     19/R  158/L
    10       0B                    19     19/L   51     55    130    157
   100       0B                    38     35     38/L
   220       0B                    43     34     37     38     43/L
   240       0B                    51     51/L   83
   290       0B                    69     60     69/L
   320       0B                    75     42     75/L
   370       0B                    87     49     73     87/L
   500       0B                   102     93    122/L
   590   INACTIVE DO-TERM         155    133/D  155/L
   590       3B                   159     22    159/L

--ENTRY POINTS--(LO=A/R)                                                                  D=DEFINITION, R=RETURN
 -NAME---ADDRESS--ARGS------REFERENCES-

  COMPUT      3B     2          1/D  155/R

--I/O UNITS--(LO=A/R)                                                                     R=READ, W=WRITE
 -NAME--- PROPERTIES-------------REFERENCES-

  TAPE2   BIN/SEQ                 132/W  159/W  131/W  154    155
  TAPE3   FMT/SEQ                  19/R
```

RSRC 2

```
--STATISTICS--

  PROGRAM-UNIT LENGTH            2438 =  155
  CM LABELLED COMMON LENGTH      241B =  161
  CM STORAGE USED              34602P =  27003
  COMPILE TIME                 0.533 SECONDS
```

```
SUBROUTINE TITLE      73/762  OPT=2,ROUND= A/ S/ M/-D,-DS     FTN 5.1+642        87/06/16. 13.37.10        PAGE     1
DO=-LONG/-OT,ARG=-COMMON/-FIXED,CS= USER/-FIXED,DE=-TR/-SE/-SL/ ER/-ID/-PMD/-ST, AL,PL=5000
FTN5,I=RSRC2,B=7,L=RSRC,LO.

      SUBROUTINE TITLE(TRKHGT)
C---------
      COMMON/A/ARSH,DALT,DEN,DLOG(6),GG(6),GRAT,HA,
     C HGT,HH(6),HS,HV,IELE,IP,ISL(6),ITHK,
     C ITYPE,NWDD(2),NWWD(2),P,PLOG(6),PR(6),
     C RA,RAL,RFI(6),RH,RI,SF,SFC,SHR,SIGLH,
     C T,TD,TDEW(6),TP(6),
     C UABS(6),UU(6),VS,VSN(6),VX(6),VX1,VXHP,VY(6),VY1,VYHP,WC,
     C XINE,NNA(4),XX(6),YY(6),Z,ZZ(6),KSW1,KSW2,KSW3,
     C KSW4,KSW5,KSW6,EE(6),PWA(6),E,PW
      INTEGER WID(2),XID(8,4),MTH(12),IZ(4),TIME
      DIMENSION GRATE(4),TEMPS(8),TEST(7)
      REAL LAT
C---------
      DATA WID/" MSS/MSS  "," MSS/J031 "/
      DATA GRATE/0.9985630638,0.9978238080,0.9974695597,0.9999999999/
      DATA MTH/R"JAN ",R"FEB ",R"MAR ",R"APR ",R"MAY ",R"JUN ",
     C         R"JUL ",R"AUG ",R"SEP ",R"OCT ",R"NOV ",R"DEC "/
      DATA IZ/1,9,12,99/
      DATA XID/
     C R"CAPE",R" CAN",R"AVER",R"AL A",R"FS, ",R"FLOR",R"IDA ",R"    ",
     C R"ANTI",R"GUA ",R"AAFB",R", WE",R"ST I",R"NDIE",R"S   ",R"    ",
     C R"ASCE",R"NSIO",R"N AA",R"FB, ",R"SAO ",R"    ",R"    ",R"    ",
     C R"STAT",R"ION ",R"    ",R"    ",R"    ",R"    ",R"    ",R"    "/
C---------
      READ(3,230) (TEST(I),I=1,7)
      READ(3,220) (TEMPS(I),I=1,8)
      DECODE(25,240,TEMPS(1)) IDX,MON,IDA,IYR,TIME,ASC,LAT
      IF (IDX.NE.99) GOTO 40
      READ(3,235) (XID(I,4),I=3,8)
40    DO 50 I=1,4
50    IF (IDX.EQ.IZ(I)) GOTO 70
70    IF (I.LE.3) GRAT=GRATE(I)
      IF (I.GE.4)
     C GRAT = 1-(0.0026373*COS(2*LAT/RAD))
     C         +(0.0000059*(COS(2*LAT/RAD))**2)
C---------
      READ(3,220) ITYPE,IELE,HA,DIR,SPD,TRKHGT,P
      IF (DIR.EQ.0.0) DIR=360.
      HA=HA*SF
      TRKHGT=TRKHGT*SF
      Z=HA
      HGT=((RA*HA)/(RA+HA))*GRAT
      VX(1)=SFC*SPD*SIN(DIR/RAD)
      VY(1)=SFC*SPD*COS(DIR/RAD)
      VXHP=VX(1)
      VYHP=VY(1)
      VX1=DIR
      VY1=SPD*SFC*WC
C---------
      IF (IELE.EQ.4) L=1
      IF (IELE.EQ.5) L=2
C---------
      WRITE(1,262) (TEST(J),J=1,7),XID(L)
      WRITE(1,290) (XID(J,I),J=1,8)
```

```
                WRITE(1,320) TIME,IDA,MTH(MON),IYR,ASC
                WRITE(61,250) (TEST(J),J=1,7),WID(L)
                WRITE(61,270) (XID(J,I),J=1,8)
                WRITE(61,310) TIME,IDA,MTH(MON),IYR,ASC
                IF (KSW5.NE.1) THEN
1               WRITE(40,1) (TEST(J),J=1,7),WID(L)
1               WRITE(40,2) (XID(J,I),J=1,8)
1               WRITE(40,3) TIME,IDA,MTH(MON),IYR,ASC
1               ENDIF
                RETURN
          C---------
          1     FORMAT("TEST NBR ",7A10/"RAWINSONDE",R10)
          2     FORMAT(8R4)
          3     FORMAT(A4,"Z  ",I2,1X,R4,"19",I2/"ASCENT NBR   ",A4)
          200   FORMAT(2I1,2F4.0,2F3.0,F7.2)
          220   FORMAT(8A10)
          230   FORMAT(7A10)
          235   FORMAT(6R4)
          240   FORMAT(4(I2,1X),2(A4,1X),F3.1)
          250   FORMAT("1",/," TEST NBR ",7A10,//," RAWINSONDE",R10)
          260   FORMAT(5X,"01",72X,"-",/,"TEST NBR ",7A10,"9",/
               C "RAWINSONDE",R10,59X,"9")
          270   FORMAT("  ",8R4)
          290   FORMAT(8R4,47X,"9")
          310   FORMAT(" ",A4,"Z  ",I2,1X,R4,"19",I2,/," ASCENT NBR   ",A4,//)
          320   FORMAT(A4,"Z  ",I2,1X,R4,"19",I2,61X,"9",/,"ASCENT NBR   ",A4,
               C 62X,"9")
          C---------
                END
```

```
--VARIABLE MAP--(LO=A/R)                                                    A=ARGLIST, C=CTRL OF DO, I=DATA INIT,
 -NAME---ADDRESS --BLOCK-----PROPERTIES-------TYPE---------SIZE---REFERENCES-          R=READ, S=STORE, U=I/O UNIT, W=WRITE

 ABSH        0B  /A/                          REAL                  3
 ASC       371B                               REAL                 23/W   56/W   59/W   63/W
 DALT        1B  /A/                          REAL                  3
 DEN         2B  /A/                          REAL                  3
 DIR       373B                               REAL                 33/R   39     39/S   44/A   45/A   48
 DLOG        3B  /A/                          REAL          6       3
 E         237B  /A/                          REAL                  3
 EE        223B  /A/                          REAL          6       3
 GG         11B  /A/                          REAL          6       3
 GRAT       17B  /A/                          REAL                  3     33/S   34/S   43
 GRATE     340B                               REAL          4      12     16/I   33
 HA         20B  /A/                          REAL                  3     38/R   40     40/S   42     43     43
 HGT        21B  /A/                          REAL                  3     43/S
 HH         22B  /A/                          REAL          6       3
 HS         30B  /A/                          REAL                  3
 HV         31B  /A/                          REAL                  3
 I         364B                               INTEGER              25     27     30     30     31/C   32     33     33     34
                                                                   55     55     58     58     62     62
 IDA       367B                               INTEGER              23/W   56/W   59/W   63/W
 IDX       365B                               INTEGER              23/W   29     32
 IELE       32B  /A/                          INTEGER               3     38/R   51     52
 IP         33B  /A/                          INTEGER               3
 ISL        34B  /A/                          INTEGER       6       3
```

-NAME---	ADDRESS	--BLOCK-----	PROPERTIES--------	TYPE---------	SIZE---	REFERENCES-								
ITHK	42B	/A/		INTEGER		3								
ITYPE	43B	/A/		INTEGER		3	34/R							
IYR	372B			INTEGER		23/W	53/W	59/W	63/W					
IZ	333B			INTEGER	4	11	19/I	33						
J	376B			INTEGER		54	55	56	57	58	58	61	62	62
KSW1	215B	/A/		INTEGER		3								
KSW2	216B	/A/		INTEGER		3								
KSW3	217B	/A/		INTEGER		3								
KSW4	220B	/A/		INTEGER		3								
KSW5	221B	/A/		INTEGER		3	52							
KSW6	222B	/A/		INTEGER		3								
L	375B			INTEGER		51/S	52/S	54	57	61				
LAT	363B			REAL		13	25/W	34/A	34/A					
MON	366B			INTEGER		23/W	56	59	63					
MTH	317B			INTEGER	12	11	17/I	59/W	59/W	63/W				
NNA	165B	/A/		INTEGER	4	3								
NWDD	44B	/A/		INTEGER	2	3								
NWWD	45B	/A/		INTEGER	2	3								
P	50B	/A/		REAL		3	33/R							
PLOG	51B	/A/		REAL	6	3								
PR	57B	/A/		REAL	6	3								
PW	243B	/A/		REAL		3								
PWA	231B	/A/		REAL	6	3								
RA	65B	/A/		REAL		3	43	43						
RAD	66B	/A/		REAL		3	34/A	34/A	44/A	45/A				
RFI	67B	/A/		REAL	6	3								
RH	75B	/A/		REAL		3								
RI	76B	/A/		REAL		3								
SF	77B	/A/		REAL		3	40	41						
SFC	100B	/A/		REAL		3	44	45	49					
SHR	101B	/A/		REAL		3								
SIGLH	102B	/A/		REAL		3								
SPD	374B			REAL		33/R	44	45	49					
T	103B	/A/		REAL		3								
TD	104B	/A/		REAL		3								
TDEW	105B	/A/		REAL	6	3								
TEMPS	344B			REAL	6	12	27/R	23/W						
TEST	354B			REAL	7	12	25/R	54/W	57/W	61/W				
TIME	337B			INTEGER		11	23/W	55/W	59/W	63/W				
TP	113B	/A/		REAL	6	3								
TRSHGT	1	DUMMY-ARG		REAL		1	38/R	41	41/S					
UABS	121B	/A/		REAL	5	3								
UU	127B	/A/		REAL	5	3								
VS	135B	/A/		REAL		3								
VSV	136B	/A/		REAL	6	3								
VX	144B	/A/		REAL	6	3	44/S	45						
VXHP	153B	/A/		REAL		3	45/S							
VX1	152B	/A/		REAL		3	43/S							
VY	154B	/A/		REAL	6	3	45/S	47						
VYHP	163B	/A/		REAL		3	47/S							
VY1	162B	/A/		REAL		3	49/S							
WC	164B	/A/		REAL		3	49							
WIB	265B			INTEGER	2	11	15/I	54/W	57/W	61/W				
WIP	257B			INTEGER	32	11	22/I	38/R	55/W	58/W	62/W			
XINE	166B	/A/		REAL		3								
XX	172B	/A/		REAL	6	3								
YY	273B	/A/		REAL	6	3								

```
SUBROUTINE HED        77/763  OPT=0,ROUND= A/ M/ N/-D,-DC      FTN 5.1+642        87/05/18. 13.37.16        PAGE      1
DO=-LONG/-OT,ARG=-COMMON/-FIXED,CS= USER/-FIXED,DB=-TB/-SB/-SL/ ER/-ID/-PMD/-ST,-AL,PL=5000
FTN5,I=RSRC2,B=0,L=RSRC,LO.

                  SUBROUTINE HED(IP,KSW1,KSW5,KSW6)
            C---------
                  COMMON/IHEAD/IHEAD1(11),IHEAD2(11)
            C---------INITIALIZE OUTPUT VARIABLES
                  IALT=6HGEOMFT
                  ISPD=3HKTS
                  IR=3H N
                  ISHR=4H/SEC
                  IF (KSW1.EQ.1) ISPD=3HFPS
                  IF (KSW5.EQ.1) IR=3HOPT
                  IF (KSW6.EQ.2) ISHR=4H/KTS
                  IF (IP.NE.0) THEN
1                 IALT=6HGEOMM
1                 ISPD=3HMPS
1                 ENDIF
1           C---------PRINTER FILE
                  WRITE(61,1)
                  ENCODE(110,1,IHEAD1(1))
                  WRITE(61,2) IALT,ISPD,IR,ISPD,ISHR
                  ENCODE(110,2,IHEAD2(1)) IALT,ISPD,IR,ISPD,ISHR
            C---------DISK FILE
                  WRITE(1,3) IALT,ISPD
            C---------TELETYPE FILE
                  IF (KSW5.EQ.0) THEN
1                 IF (IP.EQ.1) IALT=6H GEOMM
1                 WRITE(40,4)
1                 WRITE(40,5) IALT,ISPD,IR,ISPD,ISHR
1                 ENDIF
                  RETURN
            C---------FORMATS
            1     FORMAT(" ALTITUDE   DIR  SPEED   TEMP     DPT      PRESS      RH",
                C "    AB HUM   DENSITY    IR      VS    SHR    VPR     PW")
            2     FORMAT(2X,A6,10H    DEG    ,A3,17H   DEG C    DEG C,6X,3HMBS,6X,
                C 11HPCT    G/M3,6X,4HG/M3,5X,A3,4X,A3,3X,A4,4X,10HMBS     MM/)
            3     FORMAT(A6,"    DIR    ",A3,"   TEMP     DPT    PRESS   RH AB HUM",
                C   DEN   IR VS  SHR  VPR  PW 9")
            4     FORMAT(/"  ALT  DIR SPD  TEMP  DPT   PRESS  RH ABHUM DENSITY",
                C "  IR  VS  SHR  VPR  PW")
            5     FORMAT(A6," DEG ",A3," DEG C DEG C   MBS  PCT  G/M3   G/M3  ",
                C A3,A3,1X,A4,"  MBS  MM"/)
            C---------
                  END
```

```
--VARIABLE MAP--(LO=A/R)                                                                  A=ARGLIST, C=CTRL OF DO, I=DATA INIT,
 -NAME---ADDRESS --BLOCK-----PROPERTIES-------TYPE---------SIZE---REFERENCES-              R=READ, S=STORE, U=I/O UNIT, W=WRITE

  IALT       174B                          INTEGER                 5/S   13/S   19/W   20/R   22/W   25/S   27/W
  IHEAD1       0B  /IHEAD/                 INTEGER        11       3     18/R
  IHEAD2      13B  /IHEAD/                 INTEGER        11       3     20/R
  IP           1   DUMMY-ARG               INTEGER                 1     12     25
  IR         176B                          INTEGER                 7/S   10/S   19/W   20/R   27/W
  ISHR       177B                          INTEGER                 8/S   11/S   19/W   20/R   27/W
  ISPD       175B                          INTEGER                 6/S    9/S   14/S   19/W   19/W   20/R   20/R   22/W   27/W
                                                                  27/W
```

```
        SUBROUTINE TITLE      73/762  OPT=2,ROUND= A/ S/ M/-D,-DS     FTN 5.1+842        87/05/15. 12.37.12        PAGE     4
 -NAME---ADDRESS --BLOCK-----PROPERTIES-------TYPE---------SIZE---REFERENCES-

  Z          226B  /A/                          REAL                  3      42/S
  ZZ         227B  /A/                          REAL            6     3

--PROCEDURES--(LO=A/R)                                                                  D=DEF LINE OF STMT FUNC
 -NAME----TYPE------ARGS----CLASS-----REFERENCES-                                       A=ACTUAL ARGUMENT

  COS     GENERIC      1    INTRINSIC    34     34     45
  SIN     GENERIC      1    INTRINSIC    44

--STATEMENT LABELS--(LO=A/R)                                                            A=ASSIGN STMT, D=DO STMT,
 -LABEL--ADDRESS---PROPERTIES-----DEF--REFERENCES-                                      R=READ, W=WRITE, L=LABEL

     1       13B   FORMAT          67     61/W   67/L
     2       20B   FORMAT          68     62/W   68/L
     3       22B   FORMAT          69     63/W   69/L
    40        0B                   31     29     31/L
    50   INACTIVE DO-TERM          32     31/D   32/L
    70        0B                   33     32     33/L
   200       30B   FORMAT          70     38/R   70/L
   220       34B   FORMAT          71     27/R   71/L
   230       36B   FORMAT          72     25/R   72/L
   235       40B   FORMAT          73     30/R   73/L
   240       42B   FORMAT          74     28/W   74/L
   250       46B   FORMAT          75     57/W   75/L
   260       54B   FORMAT          76     54/W   76/L
   270       64B   FORMAT          78     53/W   78/L
   290       66B   FORMAT          79     55/W   79/L
   310       71B   FORMAT          80     59/W   80/L
   320      100B   FORMAT          81     56/W   81/L

--ENTRY POINTS--(LO=A/R)                                                                D=DEFINITION, R=RETURN
 -NAME---ADDRESS--ARGS------REFERENCES-

  TITLE       2B     1          1/D   65/R

--I/O UNITS--(LO=A/R)                                                                   R=READ, W=WRITE
 -NAME--- PROPERTIES-------------REFERENCES-

  TAPE1   FMT/SEQ                  54/W   55/W   56/W
  TAPE3   FMT/SEQ                  26/R   27/R   30/R   38/R
  TAPE40  FMT/SEQ                  61/W   62/W   63/W
  TAPE61  FMT/SEQ                  57/W   58/W   59/W

--STATISTICS--

  PROGRAM-UNIT LENGTH            4[illegible] =  253
  CM LABELLED COMMON LENGTH      [illegible] =  151
  CM STORAGE USED              [illegible] =  27[illegible]
  COMPILE TIME                 0.339 SECONDS
```

```
      SUBROUTINE HED        73/760  OPT=0,ROUND= A/ S/ M/-D,-DS     FTN 5.1+542        87/06/16. 13.37.12        PAGE    2
 -NAME---ADDRESS --BLOCK-----PROPERTIES-------TYPE---------SIZE---REFERENCES-

  KSW1          2   DUMMY-ARG                  INTEGER                 1      9
  KSW5          3   DUMMY-ARG                  INTEGER                 1     10     24
  KSW6          4   DUMMY-ARG                  INTEGER                 1     11

--STATEMENT LABELS--(LO=A/R)                                                          A=ASSIGN STMT, D=DO STMT,
 -LABEL--ADDRESS---PROPERTIES-----DEF--REFERENCES-                                    R=READ, W=WRITE, L=LABEL

     1       17B   FORMAT          31     17/W   18/R   31/L
     2       34B   FORMAT          33     19/W   20/R   33/L
     3       51B   FORMAT          35     22/W   35/L
     4       63B   FORMAT          37     26/W   37/L
     5       75B   FORMAT          39     27/W   39/L

--ENTRY POINTS--(LO=A/R)                                                              D=DEFINITION, R=RETURN
 -NAME---ADDRESS--ARGS------REFERENCES-

  HED         0B     4          1/D   29/R

--I/O UNITS--(LO=A/R)                                                                 R=READ, W=WRITE
 -NAME--- PROPERTIES-------------REFERENCES-

  TAPE1   FMT/SEQ                  22/W
  TAPE40  FMT/SEQ                  26/W   27/W
  TAPE61  FMT/SEQ                  17/W   19/W

--STATISTICS--

  PROGRAM-UNIT LENGTH            203B =  131
  CM LABELLED COMMON LENGTH       26B =  22
  CM STORAGE USED              62600B =  25984
  COMPILE TIME                 0.095 SECONDS
```

```
SUBROUTINE TABDAT      73/762  OPT=0,ROUND= A/ S/ M/-D,-DS      FTN 5.1+642          87/05/15. 13.37.12        PAGE     1
DO=-LONG/-OT,ARG=-COMMON/-FIXED,CS= USER/-FIXED,DB=-TB/-SB/-SL/ ER/-ID/-PMD/-ST,-AL,PL=5000
FTN5,I=RSRC2,B=0,L=RSRC,LO.
```

```
      SUBROUTINE TABDAT
C---------
      COMMON/A/ABSH,DALT,DEN,DLOG(6),GG(6),GHAT,HA,
     C HGT,HH(6),HS,HV,IELE,IP,ISL(6),ITHK,
     C ITYPE,NWDD(2),NWWD(2),P,PLOG(6),PR(6),
     C RA,RAD,RFI(6),RH,RI,SF,SFC,SHR,SIGLH,
     C T,TD,TDEW(6),TP(6),
     C UABS(6),UU(6),VS,VSN(6),VX(6),VX1,VXHP,VY(6),VY1,VYHP,WC,
     C XINE,NNA(4),XX(6),YY(6),Z,ZZ(6),KSW1,KSW2,KSW3,
     C KSW4,KSW5,KSW6,EE(6),PWA(6),E,PW
      COMMON/SIG/VXA(720),VYA(720)
C---------
      DO 100 I=1,720
100   VXA(I)=VYA(I)=XINE
      K=2
      IDSW=INX=ITERM=0
      DHT=RBA=DBA=HBA=PBA=TBA=BASESW=TROPSW=7.
      SIGLH=SIGLP=SIGLT=SIGLD=SIGLI=0.0
C---------READ FIRST SIX POINTS
      DO 120 I=1,6
      READ(2)GG(I),XX(I),YY(I),ZZ(I),HH(I),PR(I),PLOG(I),TP(I),TDEW(I),
     C UU(I),UABS(I),DLOG(I),VSN(I),RFI(I),ISL(I),EE(I),PWA(I)
      IF (I.NE.1) GOTO 120
      DEN=10.**DLOG(I)
      Z=ZZ(I)
      T=TP(I)
      TD=TDEW(I)
      P=PR(I)
      RH=UU(I)
      ABSH=UABS(I)
      VS=VSN(I)
      RI=RFI(I)
      E=EE(I)
      PW=PWA(I)
      CALL FORM
120   CONTINUE
C---------COMPUTE VX & VY
130   CALL WIND(GG,VX,VY,XINE,XX,YY)
C---------TROPOPAUSE SELECTION
C---------CHECK IF TROPOPAUSE SELECTED
      IF (TROPSW.EQ.1.) GOTO 250
      IF (PR(I).GT.500.) GOTO 250
      IF (BASESW.EQ.1.) GOTO 220
C---------SET BASE LEVEL
      BASESW=1.
      IF (IP.EQ.2) THEN
1     CN1=.0025095
1     CN2=5562.
1     ELSE
1     CN1=.002
1     CN2=2700.
1     ENDIF
210   HBA=ZZ(I)
      PBA=PR(I)
      TBA=TP(I)
```

```
      DBA=TDEW(I)
      RBA=RFI(I)
      GO TO 250
C---------DELTA HEIGHT
220   DHT=ZZ(I)-HBA
      IF (DHT.GE.CN2) GOTO 242
C---------CALCULATE PROBABLE TEMP AND CHECK
C---------FOR NEW BASELEVEL
      IF (TBA-(CN1*DHT)-TP(I))250,250,210
C---------SET TROPOPAUSE
240   TROPSW=1.
      SIGLH=HBA
      SIGLP=PBA
      SIGLT=TBA
      SIGLD=DBA
      SIGLI=RBA
C---------
250   CALL INTERP
C---------
C---------DECREMENT STORAGE VALUES
      K=K+1
      VXA(K)=VX(1)
      VYA(K)=VY(1)
      DO 290 I=1,5
      GG(I)=GG(I+1)
      XX(I)=XX(I+1)
      YY(I)=YY(I+1)
      ZZ(I)=ZZ(I+1)
      VX(I)=VX(I+1)
      VY(I)=VY(I+1)
      HH(I)=HH(I+1)
      PR(I)=PR(I+1)
      PLOG(I)=PLOG(I+1)
      TP(I)=TP(I+1)
      TDEW(I)=TDEW(I+1)
      UU(I)=UU(I+1)
      UABS(I)=UABS(I+1)
      DLOG(I)=DLOG(I+1)
      VSN(I)=VSN(I+1)
      RFI(I)=RFI(I+1)
      ISL(I)=ISL(I+1)
      EE(I)=EE(I+1)
290   PWA(I)=PWA(I+1)
      IF (ITERM.EQ.1) GOTO 370
C---------READ MORE DATA
      READ(2,END=312)GG(6),XX(6),YY(6),ZZ(6),HH(6),PR(6),PLOG(6),TP(6),
     +TDEW(6),UU(6),UABS(6),DLOG(6),VSN(6),RFI(6),ISL(6),EE(6),PWA(6)
      GOTO 130
312   ITERM=1
370   IF (INX.GT.0) GOTO 112
C---------SET WIND DATA MISS
      TP(6)=VY(6)=VX(6)=VY(5)=VX(5)=YY(5)=XX(5)=XINE
      IDSW=1
      IF ((GG(5)-GG(4)).GT.0.5) GOTO 400
      VY(4)=VX(4)=XINE
      IDSW=-1
400   INX=1
```

```
      GOTO 130
C---------TEST END SWITCH
417   IF (IDSW.LT.0) GOTO 430
      IDSW=IDSW-1
      GOTO 130
430   IF (TP(2).NE.XINE) GOTO 250
      J=1
      IF (IP.NE.0) J=3
      IF (KSW1.NE.1) GOTO 490
      NWDD(2)=R"FPS "
      NWWD(2)=R"FPS "
490   IF (IP.EQ.0) THEN
      XHGT=HGT
      ZHGT=HGT*.3048
      ELSE
      XHGT=HGT/.3048
      ZHGT=HGT
      ENDIF
C---------
      WRITE(61,620) NINT(XHGT),NINT(ZHGT),PR(1)
      WRITE(1,650)  NINT(XHGT),NINT(ZHGT),PR(1),ITHK
      IF (KSW5.NE.1)
     C WRITE(40,651)NINT(XHGT),NINT(ZHGT),PR(1)
C---------
      IF (P.GT.200.) SIGLH=SIGLP=SIGLT=SIGLD=SIGLI=0.0
      IF (KSW5.EQ.1) THEN
      WRITE(61,630) NINT(SIGLH),NNA(J),NNA(J+1),SIGLP,SIGLT,SIGLD,
     C NINT(SIGLI)
      WRITE(1,670)  NINT(SIGLH),NNA(J),NNA(J+1),SIGLP,SIGLT,SIGLD,
     C NINT(SIGLI)
      ELSE
      WRITE(61,640) NINT(SIGLH),NNA(J),NNA(J+1),SIGLP,SIGLT,SIGLD,
     C NINT(SIGLI)
      WRITE(1,660)  NINT(SIGLH),NNA(J),NNA(J+1),SIGLP,SIGLT,SIGLD,
     C NINT(SIGLI)
      WRITE(40,661) NINT(SIGLH),NNA(J),NNA(J+1),SIGLP,SIGLT,SIGLD,
     C NINT(SIGLI)
      ENDIF
C---------
      REWIND 2
      RETURN
C---------
620   FORMAT("0TERMINATION ",I7," GEOPFT ",I6," GEOPM ",F5.1," MBS."/)
630   FORMAT(" TROPOPAUSE ",I7,2R4,F7.2," MB ",F5.1," C ",F5.1," C ",
     C I4," OPT")
640   FORMAT(" TROPOPAUSE ",I7,2R4,F7.2," MB ",F5.1," C ",F5.1," C ",
     C I4," N")
650   FORMAT("TERMINATION",5X,I7," GEOPFT ",I6," GEOPM ",F5.1,
     C " MBS",17X,"-   ",I4.4,"9")
651   FORMAT("TERMINATION",5X,I7," GEOPFT ",I6," GEOPM ",F5.1," MBS")
660   FORMAT("TROPOPAUSE ",I7,2R4,F7.2," MB ",F5.1," C ",F5.1," C ",
     C I4,"N ",12X,"9")
661   FORMAT("TROPOPAUSE ",I7,2R4,F7.2," MB ",F5.1," C ",F5.1," C ",
     C I4,"N ")
670   FORMAT("TROPOPAUSE ",I7,2R4,F7.2," MB ",F5.1," C ",F5.1," C ",
     C I4," OPT ",13X,"9")
C---------
```

RSRC 2

```
 170                END

--VARIABLE MAP--(LO=A/P)                                                    A=ARGLIST, C=CTRL OF DO, I=DATA INIT,
 -NAME---ADDRESS --BLOCK-----PROPERTIES-------TYPE---------SIZE---REFERENCES-                R=READ, S=STORE, U=I/O UNIT, W=WRITE

 ABSH        2B  /A/                  REAL                 3     42/S
 BASESW    335B                       REAL                17/S   43     45/S
 CN1       351B                       REAL                47/S   50/S   54
 CN2       352B                       REAL                48/S   51/S   61
 DALT        1B  /A/                  REAL                 3
 DBA       341B                       REAL                17/S   53/S   70
 DEN         2B  /A/                  REAL                 3     24/S
 DHT       343B                       REAL                17/S   60/S   61     64
 DLOG        3B  /A/                  REAL          6      3     21/R   24     93     93/S  101/R
 E         237B  /A/                  REAL                 3     33/S
 EE        223B  /A/                  REAL          6      3     21/R   33     97     97/S  101/R
 GG         11B  /A/                  REAL          6      3     21/R   38/A   80     80/S  101/R  109    129
 GRAT       17B  /A/                  REAL                 3
 HA         20B  /A/                  REAL                 3
 HBA       340B                       REAL                17/S   53/S   60     67
 HGT        21B  /A/                  REAL                 3    125    126    128    129
 HH         22B  /A/                  REAL          6      3     21/R   85     85/S  101/R
 HS         30B  /A/                  REAL                 3
 HV         31B  /A/                  REAL                 3
 I         326B                       INTEGER             13/C   14     14     20/C   21     21     21     21     21
                                                          21     21     21     21     21     21     21     21     21
                                                          21     21     21     23     24     25     26     27     28
                                                          29     30     31     32     33     34     42     53     54
                                                          55     56     57     60     64     79/C   80     80     81
                                                          81     82     82     83     83     84     84     85     85
                                                          85     86     87     87     88     88     89     89     90
                                                          90     91     91     92     92     93     93     94     94
                                                          95     95     96     96     97     97     98     98
 IDSW      333B                       INTEGER             16/S  108/S  111/S  115    116    116/S
 IELE       32B  /A/                  INTEGER              3
 INX       332B                       INTEGER             16/S  105    112/S
 IP         33B  /A/                  INTEGER              3     46    122    124
 ISL        34B  /A/                  INTEGER       6      3     21/R   96     96/S  101/R
 ITERM     331B                       INTEGER             16/S   99    104/S
 ITHK       42B  /A/                  INTEGER              3    133/W
 ITYPE      43B  /A/                  INTEGER              3
 J         354B                       INTEGER            119/S  120/S  139    139    141    141    144    144    145
                                                         145    148    148
 K         330B                       INTEGER             15/S   76     76/S   77     78
 KSW1      215B  /A/                  INTEGER              3    121
 KSW2      216B  /A/                  INTEGER              3
 KSW3      217B  /A/                  INTEGER              3
 KSW4      220B  /A/                  INTEGER              3
 KSW5      221B  /A/                  INTEGER              3    134    138
 KSW6      222B  /A/                  INTEGER              3
 NNA       166B  /A/                  INTEGER       4      3    139/W  139/W  141/W  141/W  144/W  144/W  145/W  145/W
                                                         148/W  148/W
 NWDD       44B  /A/                  INTEGER       2      3    122/S
 NWWD       45B  /A/                  INTEGER       2      3    123/S
 P          52B  /A/                  REAL                 3     28/S  137
 PBA       337B                       REAL                17/S   54/S   58
```

RSRC 2

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      SUBROUTINE TABDAT      77/763  OPT=0,ROUND= A/ S/ M/-D,-DS      FTN 5.1+542          87/05/15. 13.37.10          PAGE    5
 -NAME---ADDRESS --BLOCK-----PROPERTIES-------TYPE---------SIZE---REFERENCES-

 PLOG        515  /A/                          REAL            5      3     21/R   88     88/S  101/R
 PR          57B  /A/                          REAL            6      3     21/R   23     42     51     87     87/S  101/R  136/W
                                                                    133/W  134/W
 PW         240B  /A/                          REAL                   3     34/S
 PWA        231B  /A/                          REAL            6      3     21/R   74     98     98/S  101/R
 RA          65B  /A/                          REAL                   3
 RAD         55B  /A/                          REAL                   3
 RBA        342B                               REAL                  17/S   57/S   71
 RFI         57B  /A/                          REAL            5      3     21/R   32     37     95     95/S  101/R
 RH          75B  /A/                          REAL                   3     29/S
 RI          76B  /A/                          REAL                   3     32/S
 SF          77B  /A/                          REAL                   3
 SFC        100B  /A/                          REAL                   3
 SHR        101B  /A/                          REAL                   3
 SIGLD      345B                               REAL                  13/S   70/S  137/S  139/W  141/W  144/W  146/W  148/W
 SIGLH      132B  /A/                          REAL                   3     13/S   67/S  137/S  139/A  141/A  144/A  146/A  148/A
 SIGLI      344B                               REAL                  13/S   71/S  137/S  139/A  141/A  144/A  146/A  148/A
 SIGLP      347B                               REAL                  13/S   65/S  137/S  139/W  141/W  144/W  146/W  148/W
 SIGLT      346B                               REAL                  13/S   69/S  137/S  139/W  141/W  144/W  146/W  148/W
 T          103B  /A/                          REAL                   3     25/S
 TBA        336B                               REAL                  17/S   55/S   54     39
 TD         104B  /A/                          REAL                   3     27/S
 TDEW       105B  /A/                          REAL            6      3     21/R   27     55     90     90/S  101/R
 TP         113B  /A/                          REAL            6      3     21/R   25     55     54     39     39/S  101/R  107/S
                                                                    113
 TROPSW     334B                               REAL                  17/S   41     65/S
 UABS       121B  /A/                          REAL            6      3     21/R   32     92     92/S  101/R
 UU         127B  /A/                          REAL            6      3     21/R   29     91     91/S  101/R
 VS         135B  /A/                          REAL                   3     31/S
 VSN        136B  /A/                          REAL            6      3     21/R   31     94     94/S  101/R
 VX         144B  /A/                          REAL            6      3     38/A   77     84     84/S  107/S  107/S  110/S
 VXA          2B  /SIG/                        REAL          720     11     14/S   77/S
 VXHP       153B  /A/                          REAL                   3
 VX1        152B  /A/                          REAL                   3
 VY         154B  /A/                          REAL            6      3     38/A   75     85     85/S  107/S  107/S  110/S
 VYA       1323B  /SIG/                        REAL          720     11     14/S   75/S
 VYHP       163B  /A/                          REAL                   3
 VY1        162B  /A/                          REAL                   3
 WC         164B  /A/                          REAL                   3
 XHGT       355B                               REAL                 125/S  128/S  132/A  133/A  134/A
 XINE       165B  /A/                          REAL                   3     14     38/A  107    112    118
 XX         172B  /A/                          REAL            6      3     21/R   38/A   91     91/S  101/R  107/S
 YY         200B  /A/                          REAL            6      3     21/R   38/A   92     92/S  101/R  107/S
 Z          206B  /A/                          REAL                   3     25/S
 ZHGT       356B                               REAL                 123/S  129/S  132/A  133/A  134/A
 ZZ         207B  /A/                          REAL            6      3     21/R   25     53     52     52     83/S  101/R

--PROCEDURES--(LO=A/R)                                                                    D=DEF LINE OF STMT FUNC
 -NAME----TYPE------ARGS----CLASS-----REFERENCES-                                         A=ACTUAL ARGUMENT

 FORM                 2    SUBROUTINE   35
 INTERP               2    SUBROUTINE   73
 NINT    GENERIC      1    INTRINSIC   132/W  132/W  133/W  133/W  134/W  134/W  139/W  139/W  141/W  141/W  144/W  144/W  148/W
                                       146/W  149/W  149/W
 WIND                 5    SUBROUTINE   35
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      SUBROUTINE TABDAT     73/760  OPT=0,ROUND= A/ S/ M/-D,-DS     FTN 5.1+542        87/06/15. 15.37.12        PAGE     5

--STATEMENT LABELS--(LO=A/R)                                                                  A=ASSIGN STMT, D=DO STMT,
 -LABEL--ADDRESS---PROPERTIES-----DEF--REFERENCES-                                            R=READ, W=WRITE, L=LABEL

   100   INACTIVE DO-TERM        14     13/D   14/L
   120       0B   DO-TERM        32     22/D   23     33/L
   130       0B                  38     33/L  103    113    117
   210       0B                  53     53/L   54
   220       0B                  67     43     60/L
   240       0B                  66     61     66/L
   250       0B                  73     41     42     53     64     64     73/L  118
   290   INACTIVE DO-TERM        98     79/D   98/L
   310       0B                 104    101    104/L
   370       0B                 105     99    105/L
   400       0B                 112    109    112/L
   410       0B                 115    105    115/L
   430       0B                 118    115    118/L
   490       0B                 124    121    124/L
   620      20B   FORMAT        155    132/W  155/L
   630      27B   FORMAT        156    139/W  156/L
   640      37B   FORMAT        158    144/W  158/L
   650      47B   FORMAT        160    133/W  160/L
   651      60B   FORMAT        162    134/W  162/L
   660      67B   FORMAT        163    146/W  163/L
   661     100B   FORMAT        165    148/W  165/L
   670     110B   FORMAT        167    141/W  167/L

--ENTRY POINTS--(LO=A/R)                                                                      D=DEFINITION, R=RETURN
 -NAME---ADDRESS--ARGS------REFERENCES-

  TABDAT      0B     0          1/D  153/R

--I/O UNITS--(LO=A/R)                                                                         R=READ, W=WRITE
 -NAME--- PROPERTIES-------------REFERENCES-

  TAPE1   FMT/SEQ                 133/W  141/W  146/W
  TAPE2   BIN/SEQ                  21/R  101/R  152
  TAPE40  FMT/SEQ                 134/W  148/W
  TAPE61  FMT/SEQ                 132/W  139/W  144/W

--STATISTICS--

  PROGRAM-UNIT LENGTH            357B =  239
  CM LABELLED COMMON LENGTH     3101B =  1601
  CM STORAGE USED              64600B =  27008
  COMPILE TIME                 0.528 SECONDS
```

```
SUBROUTINE INTERP      73/76Z  OPT=0,ROUND- A/ S/ M/-D,-DS      FTN 5.1+642          87/05/16. 13.37.10        PAGE     1
DO=-LONG/-OT,ARG=-COMMON/-FIXED,CS= USER/-FIXED,DB=-TB/-SB/-SL/ ER/-ID/-PMD/-ST,-AL,PL=5000
FTN5,I=RSRC2,B=0,L=RSRC,LO.

      SUBROUTINE INTERP
C---------
      COMMON/A/ABSH,DALT,DEN,DLOG(5),GG(6),GRAT,HA,
     C HGT,HH(6),HS,HV,IELE,IP,ISL(6),ITHK,
     C ITYPE,NWDD(2),NWWD(2),P,PLOG(6),PR(6),
     C RA,RAD,RFI(6),RH,RI,SF,SFC,SHR,SIGLH,
     C T,TD,TDEW(6),TP(6),
     C UABS(6),UU(6),VS,VSN(6),VX(6),VX1,VXHP,VY(6),VY1,VYHP,WC,
     C XINE,NNA(4),XX(6),YY(6),Z,ZZ(6),KSW1,KSW2,KSW3,
     C KSW4,KSW5,KSW6,EE(6),PWA(6),E,PW
C---------
      IF(KSW3.EQ.1) GO TO 200
   10 IF (HS.LT.ZZ(1)) GOTO 150
      IF (HS.GT.ZZ(2)) RETURN
      Z=HS
      RAT=(ZZ(2)-HS)/(ZZ(2)-ZZ(1))
      P=10.**((RAT*(PLOG(1)-PLOG(2)))+PLOG(2))
      T=(RAT*(TP(1)-TP(2)))+TP(2)
      E=(RAT*(EE(1)-EE(2)))+EE(2)
      PW=(RAT*(PWA(1)-PWA(2)))+PWA(2)
      IF (PWA(2).EQ.999.) PW=999.
      DEN=10.**((RAT*(DLOG(1)-DLOG(2)))+DLOG(2))
      VS=(RAT*(VSN(1)-VSN(2)))+VSN(2)
      RI=(RAT*(RFI(1)-RFI(2)))+RFI(2)
      IF (UU(1).EQ.999..OR.UU(2).EQ.999.) GOTO 130
      TD=RAT*(TDEW(1)-TDEW(2))+TDEW(2)
      RH=RAT*(UU(1)-UU(2))+UU(2)
      ABSH=(RAT*(UABS(1)-UABS(2)))+UABS(2)
   60 IF (VX(1).EQ.XINE.OR.VX(2).EQ.XINE) GOTO 170
      VXH=(RAT*(VX(1)-VX(2)))+VX(2)
      VYH=(RAT*(VY(1)-VY(2)))+VY(2)
   90 IF (VXHP.EQ.XINE) GOTO 190
      AVX=VXH-VXHP
      AVY=VYH-VYHP
      SHR=WSPDF(AVX,AVY)/DALT
  110 VXHP=VXH
      VYHP=VYH
      VX1=WDIRF(VXH,VYH)
      VY1=WSPDF(VXH,VYH)*WC
C---------
  140 CALL FORM
C---------
  150 HS=HS+DALT
      IF (KSW3.EQ.1) RETURN
      GOTO 10
  170 SHR=.999
      VX1=999.
      VY1=999.
      VXHP=XINE
      GO TO 140
  180 RH=999.
      TD=99.9
      ABSH=99.99
      GO TO 60
  190 SHR=.999
```

```
56                  GO TO 110
57            C
58              200 Z=ZZ(2)
59                  P=10.**PLOG(2)
60                  T=TP(2)
61                  DEN=10.**DLOG(2)
62                  VS=VSN(2)
63                  RI=RFI(2)
64                  TD=TDEW(2)
65                  RH=UU(2)
66                  ABSH=UABS(2)
67                  VXE=VX(2)
68                  VYH=VY(2)
69                  E=PE(2)
70                  PW=PWA(2)
71                  DALT=ZZ(2)-ZZ(1)
72                  IF (VXH-XINE)90,170,90
73                  END
```

```
--VARIABLE MAP--(LO=A/R)                                                    A=ARGLIST, C=CTRL OF DO, I=DATA INIT,
 -NAME---ADDRESS --BLOCK-----PROPERTIES-------TYPE---------SIZE---REFERENCES-                R=READ, S=STORE, U=I/O UNIT, W=WRITE
```

NAME	ADDRESS	BLOCK	PROPERTIES	TYPE	SIZE	REFERENCES					
ABSH	70B	/A/		REAL		3	28/S	53/S	65/S		
AVX	34B			REAL		33/S	35/A				
AVY	35B			REAL		34/S	35/A				
DALT	1B	/A/		REAL		3	35	43	71/S		
DEN	2B	/A/		REAL		3	22/S	51/S			
DLOG	3B	/A/		REAL	6	3	22	22	22	51	
E	237B	/A/		REAL		3	19/S	69/S			
EE	223B	/A/		REAL	6	3	19	19	19	69	
GG	11B	/A/		REAL	6	3					
GRAT	17B	/A/		REAL		3					
HA	23B	/A/		REAL		3					
HGT	21B	/A/		REAL		3					
HH	22B	/A/		REAL	6	3					
HS	30B	/A/		REAL		3	13	14	15	16	43	43/S
HV	31B	/A/		REAL		3					
IELE	32B	/A/		INTEGER		3					
IP	33B	/A/		INTEGER		3					
ISL	34B	/A/		INTEGER	5	3					
ITHK	42B	/A/		INTEGER		3					
ITYPE	43B	/A/		INTEGER		3					
KSW1	215B	/A/		INTEGER		3					
KSW2	216B	/A/		INTEGER		3					
KSW3	217B	/A/		INTEGER		3	12	44			
KSW4	220B	/A/		INTEGER		3					
KSW5	221B	/A/		INTEGER		3					
KSW6	222B	/A/		INTEGER		3					
NNA	155B	/A/		INTEGER	1	3					
NWDD	44B	/A/		INTEGER	2	3					
NWWD	46B	/A/		INTEGER	2	3					
P	50B	/A/		REAL		3	17/S	59/S			
PLOG	51B	/A/		REAL	6	3	17	17	17	59	
PR	52B	/A/		REAL	6	3					
PW	243B	/A/		REAL		3	20/S	21/S	70/S		
PWA	231B	/A/		REAL	3	3	20	20	23	21	70

RSRC 2

```
      SUBROUTINE INTERP     73/782  OPT=2,ROUND= A/ S/ M/-D,-DS     FTN 5.1+642        87/05/16. 12.37.10        PAGE     3
 -NAME---ADDRESS --BLOCK-----PROPERTIES-------TYPE---------SIZE---REFERENCES-

  RA          65B  /A/                          REAL                  3
  RAD         66B  /A/                          REAL                  3
  RAT         31B                               REAL                 15/S   17     18     19     20     22     23     24     25
                                                                     27     29     32     31
  RFI         67B  /A/                          REAL          6       3     21     24     24     63
  RH          75B  /A/                          REAL                  3     27/S   51/S   65/S
  RI          73B  /A/                          REAL                  3     21/S   63/S
  SF          77B  /A/                          REAL                  3
  SFC        102B  /A/                          REAL                  3
  SHR        101B  /A/                          REAL                  3     35/S   48/S   55/S
  SIGLH      102B  /A/                          REAL                  3
  T          103B  /A/                          REAL                  3     19/S   50/S
  TD         104B  /A/                          REAL                  3     25/S   52/S   54/S
  TDEW       105B  /A/                          REAL          6       3     25     25     25     54
  TP         113B  /A/                          REAL          6       3     19     19     18     52
  UABS       121B  /A/                          REAL          6       3     28     28     28     56
  UU         127B  /A/                          REAL          6       3     25     25     27     27     27     55
  VS         135B  /A/                          REAL                  3     23/S   62/S
  VSN        136B  /A/                          REAL          6       3     23     23     23     52
  VX         144B  /A/                          REAL          6       3     29     29     30     30     30     57
  VXH         32B                               REAL                 30/S   33     35     38/A   39/A   57/S   72
  VXHP       153B  /A/                          REAL                  3     32     33     35/S   49/S
  VX1        152B  /A/                          REAL                  3     38/S   47/S
  VY         154B  /A/                          REAL          6       3     31     31     31     68
  VYH         33B                               REAL                 31/S   34     37     38/A   39/A   58/S
  VYHP       163B  /A/                          REAL                  3     34     37/S
  VY1        162B  /A/                          REAL                  3     39/S   49/S
  WC         164B  /A/                          REAL                  3     39
  XINE       165B  /A/                          REAL                  3     29     29     32     49     72
  XX         172B  /A/                          REAL          6       3
  YY         200B  /A/                          REAL          6       3
  Z          206B  /A/                          REAL                  3     15/S   53/S
  ZZ         207B  /A/                          REAL          6       3     13     14     15     16     16     58     71     71

--PROCEDURES--(LO=A/R)                                                                  D=DEF LINE OF STMT FUNC
 -NAME----TYPE------ARGS----CLASS-----REFERENCES-                                       A=ACTUAL ARGUMENT

  FORM                  0    SUBROUTINE   41
  WDIRF    REAL         2    FUNCTION     38
  WSPDF    REAL         2    FUNCTION     35     39

--STATEMENT LABELS--(LO=A/R)                                                            A=ASSIGN STMT, D=DO STMT,
 -LABEL--ADDRESS---PROPERTIES-----DEF--REFERENCES-                                      R=READ, W=WRITE, L=LABEL

    10       0B                    13     13/L   45
    50       2B                    29     29/L   54
    90       3B                    32     32/L   72     72
   110       0B                    35     35/L   55
   140       3B                    41     41/L   52
   150       0B                    43     13     43/L
   170       0B                    45     29     45/L   72
   180       0B                    51     25     51/L
   190       2B                    55     32     55/L
   200       2B                    58     12     58/L
```

```
SUBROUTINE INTERP     73/753  OPT=0,ROUND= A/ S/ M/-D,-DS     FTN 5.1+642        87/06/16. 13.37.12        PAGE    4

--ENTRY POINTS--(LO=A/R)                                                                  D=DEFINITION, R=RETURN
 -NAME---ADDRESS--ARGS------REFERENCES-

  INTERP      0B      0          1/D    14/R    44/R

--STATISTICS--

  PROGRAM-UNIT LENGTH                 36B =  30
  CM LABELLED COMMON LENGTH          241B =  161
  CM STORAGE USED                  54300B =  27000
  COMPILE TIME                     0.237 SECONDS
```

```
SUBROUTINE MAND        73/750  OPT=0,ROUND= A/ B/ M/-D,-DS      FTN 5.1+642        87/08/15. 13.37.12        PAGE    1
DO=-LONG/-OT,ARG=-COMMON/-FIXED,CS= USER/-FIXED,DB=-TL/-EB/-SL/ ER/-TL/-PMD/-ST,-AL,PL=5000
FTN5,I=RSRC2,B=0,L=RSRC,LO.

      SUBROUTINE MAND(KSW1,KSW5,IP,XINE,WC,ITERM)
C---------
      COMMON/MAND/G(720),Z(720),H(720),P(720),PLOG(720),
     C T(720),TD(720),HUM(720),RFI(720),SL(720)
      COMMON/SIG/VXA(720),VYA(720)
      INTEGER SL
      DIMENSION PMAN(40)
      DATA PMAN/1000.,950.,900.,850.,800.,750.,700.,650.,600.,550.,500.,
     C 450.,400.,350.,300.,250.,200.,175.,150.,125.,100.,80.,70.,
     C 60.,50.,40.,30.,25.,20.,15.,10.,7.,5.,4.,3.,2.,1.,0.,0.,0./
C---------
      NH=6HGEOPFT
      IF (IP.EQ.1) NH=6H GEOPM
      NS=3HKTS
      IF (KSW1.EQ.1) NS=3HFPS
      IF (IP.EQ.1) NS=3HMPS
      MH=6HGEOPFT
      IF (IP.EQ.1) MH=6HGEOPM
      WRITE(61,1)
      WRITE(61,2) NH,NS
      IF (KSW5.NE.1) WRITE(40,4) NH,NS
      WRITE(1,5) MH,NS
C---------
      DO 100 I=1,720
100   READ(2,END=110) G(I),X,Y,Z(I),H(I),P(I),PLOG(I),T(I),TD(I),
     C HUM(I),UABS,DLOG,VSN,RFI(I),SL(I),EE,PWA
110   ITERM=I-1
C---------
      NM=1
      DO 130 I=1,ITERM-1
120   IF (P(I+1).GT.PMAN(NM)) GOTO 130
      IF (P(I).GE.PMAN(NM)) THEN
      RAT=(PLOG(I)-ALOG10(PMAN(NM)))/(PLOG(I)-PLOG(I+1))
      HOUT=(RAT*(H(I+1)-H(I)))+H(I)
      DOUT=SOUT=999.
      IF (VXA(I).NE.XINE.AND.VYA(I+1).NE.XINE) THEN
      XX=(RAT*(VXA(I+1)-VXA(I)))+VXA(I)
      YY=(RAT*(VYA(I+1)-VYA(I)))+VYA(I)
      DOUT=WDIRF(XX,YY)
      SOUT=WSPDF(XX,YY)*WC
      ENDIF
      TOUT=(RAT*(T(I+1)-T(I)))+T(I)
      TDOUT=99.9
      HUMOUT=999.
      IF (HUM(I).NE.999..AND.HUM(I+1).NE.999.) THEN
      TDOUT=(RAT*(TD(I+1)-TD(I)))+TD(I)
      HUMOUT=(RAT*(HUM(I+1)-HUM(I)))+HUM(I)
      ENDIF
      WRITE(61,3) NINT(HOUT),NINT(DOUT),NINT(SOUT),TOUT,TDOUT,
     C NINT(PMAN(NM)),NINT(HUMOUT)
      IF (KSW5.NE.1)
     C WRITE(40,6) NINT(HOUT),NINT(DOUT),NINT(SOUT),TOUT,TDOUT,
     C PMAN(NM),NINT(HUMOUT)
      LP=PMAN(NM)*10.
      JT=NINT(TOUT*10.)
```

```
1                 ID=MINT(TDOUT*10.)
1                 CALL TSIGN(JT,IT1)
1                 CALL TSIGN(ID,ID1)
1                 WRITE(1,7) NINT(HOUT),NINT(DOUT),NINT(SOUT),JT,IT1,IP,ID1,LP,
1                C NINT(HUMOUT)
1                 NM=NM+1
1                 ELSE
1                 NM=NM+1
1                 GOTO 122
1                 ENDIF
            132   CONTINUE
                  RETURN
            C---------
            1     FORMAT(1H1,23X,"MANDATORY LEVELS"//
                 C " ALTITUDE   DIR  SPEED   TEMP   DEW PT     PRESS      RH")
            2     FORMAT(2X,A6,4X,"DEG",3X,A3,3X,"DEG C   DEG C",7X,"MBS",6X,"PCT"/)
            3     FORMAT(1X,I7,4X,I3,3X,I3,3X,F5.1,4X,F5.1,6X,I4,5X,I3)
            4     FORMAT("MANDATORY LEVELS"/A6," DIR ",A3,
                 C "  TEMP   DPT PRESS   RH"/)
            5     FORMAT(30X,"MANDATORY LEVELS",30X,"-  9"/
                 C A6,3X,"DIR",2X,A3,"  TEMP     DPT    PRESS   RH",T80,"9")
            6     FORMAT(I6,2I4,2F6.1,F7.1,I4)
            7     FORMAT(I6.6,I6.3,I5.3,I5.2,R1,I7.2,R1,I9.5,I5.3,33X,"1")
            C---------
                  END
```

```
--VARIABLE MAP--(LO=A/R)                                                    A=ARGLIST, C=CTRL OF DO, I=DATA INIT,
 -NAME---ADDRESS --BLOCK-----PROPERTIES-------TYPE---------SIZE---REFERENCES-                R=READ, S=STORE, U=I/O UNIT, W=WRITE

 DLOG       320B            *S*              REAL                  25/R
 DOUT       331B                             REAL                  35/S   39/S   49/A   51/A   59/A
 EE         322B            *S*              REAL                  25/R
 G            2B  /MAND/                     REAL        720        3     25/R
 H         2540B  /MAND/                     REAL        720        3     25/R   34     34     34
 HOUT       327B                             REAL                  34/S   49/A   51/A   59/A
 HUM      11662B  /MAND/                     REAL        720        3     25/R   45     45     47     47     47
 HUMOUT     336B                             REAL                  44/S   47/S   49/A   51/A   59/A
 I          313B                             INTEGER               24/C   25     25     25     25     25     25     25     25
                                                                    25     25     27     30/C   31     32     33     33     33
                                                                    34     34     34     35     36     37     37     37     38
                                                                    38     38     42     42     42     45     45     45     45
                                                                    45     47     47     47
 ID         341B                             INTEGER               55/S   58/A   59/W
 ID1        343B                             INTEGER               58/A   59/W
 IP           3   DUMMY-ARG                  INTEGER                1     13     15     18
 ITERM        6   DUMMY-ARG                  INTEGER                1     27/S   32/C
 IT1        342B                             INTEGER               57/A   59/W
 JT         340B                             INTEGER               55/S   57/A   59/W
 KSW1         1   DUMMY-ARG                  INTEGER                1     15
 KSW5         2   DUMMY-ARG                  INTEGER                1     21     51
 LP         337B                             INTEGER               54/S   59/W
 MH         312B                             INTEGER               17/S   19/S   22/W
 NH         313B                             INTEGER               12/S   13/S   22/W   21/W
 NM         324B                             INTEGER               29/S   31     32     33     49     51     54     61     61/S
                                                                    53     33/S
 NS         311B                             INTEGER               14/S   15/S   15/S   22/W   21/W   22/W
```

RSRC 2

```
        SUBROUTINE MAND        75/75)  OPT=3,ROUND= A/ S/ X/-D,-DC      FTN 5.1+612          87/09/18. 13.37.12          PAGE      5
 -NAME---ADDRESS --BLOCK-----PROPERTIES-------TYPE---------SIZE---REFERENCES-

  P          41625  /MAND/                    REAL          722      3      25/R    31      32
  PLOT      552CB   /MAND/                    REAL          722      3      25/R    33      33      33
  PMAN       243B                             REAL           43      7      2/I     31      32      33/A    49/A    51/A    54
  PWA        327B            *S*              REAL                  25/R
  RAT        326B                             REAL                  33/S    34      37      33      42      46      47
  RFI       13233B  /MAND/                    REAL          722      3      25/R
  SL        145235  /MAND/                    INTEGER       723      3       5      25/R
  SOUT       333B                             REAL                  75/S    42/S    49/A    51/A    [illegible]/A
  T         7323B   /MAND/                    REAL          722      3      25/R    42      42      42
  TD        1734B   /MAND/                    REAL          723      3      25/R    46      46      46
  TDOUT      335B                             REAL                  43/S    49/S    49/A    51/A    53/A
  TOUT       334B                             REAL                  42/S    49/A    51/A    53/A
  UABS       317B            *S*              REAL                  25/R
  VSN        321B            *S*              REAL                  25/R
  VXA         35   /SIG/                      REAL          722      5      36      38      37      37      37
  VYA       1323B  /SIG/                      REAL          722      5      38      38      38
  WC          5    DUMMY-ARG                  REAL                   1      42
  X          315B            *S*              REAL                  25/R
  XINE        4    DUMMY-ARG                  REAL                   1      38      35
  XX         332B                             REAL                  37/S    39/A    42/A
  Y          316B            *S*              REAL                  25/R
  YY         333B                             REAL                  38/S    39/A    42/A
  Z         1323B  /MAND/                     REAL          722      3      25/R

--PROCEDURES--(LO=A/R)                                                          D=DEF LINE OF STMT FUNC
 -NAME----TYPE------ARGS----CLASS-----REFERENCES-                               A=ACTUAL ARGUMENT

  ALOG10   REAL        1    INTRINSIC    33
  MINT     GENERIC     1    INTRINSIC    49/W    49/W    49/W    49/W    49/W    51/W    51/W    51/W    51/W    55      56      59/W    59/W
                                         59/W    59/W
  ISIGN                2    SUBROUTINE   57      58
  WDIRF    REAL        2    FUNCTION     38
  WSPDF    REAL        2    FUNCTION     42

--STATEMENT LABELS--(LO=A/R)                                                    A=ASSIGN STMT, D=DO STMT,
 -LABEL--ADDRESS---PROPERTIES-----DEF--REFERENCES-                              R=READ, W=WRITE, L=LABEL

     1       13B   FORMAT          59     10/W    59/L
     2       30B   FORMAT          71     22/W    71/L
     3       40B   FORMAT          72     49/W    72/L
     4       45B   FORMAT          73     21/W    73/L
     5       56B   FORMAT          75     22/W    75/L
     6       71B   FORMAT          77     51/W    77/L
     7       73B   FORMAT          78     53/W    78/L
   102   INACTIVE  DO-TERM         25     25/D    25/L
   112       25                    27     25      27/L
   122       22                    31     31/L    54
   138       25    DO-TERM         35     38/D    31      35/L
```

```
--ENTRY POINTS--(LO=A/R)                                          D=DEFINITION, R=RETURN
 -NAME---ADDRESS--ARGS------REFERENCES-

  MAND        0B     3          1/D   67/R


--I/O UNITS--(LO=A/R)                                             R=READ, W=WRITE
 -NAME--- PROPERTIES-------------REFERENCES-

  TAPE1    FMT/SEQ                  22/W   59/W
  TAPE2    BIN/SEQ                  25/R
  TAPE40   FMT/SEQ                  21/W   51/W
  TAPE51   FMT/SEQ                  19/W   20/W   49/W


--STATISTICS--

  PROGRAM-UNIT LENGTH            347B =  231
  CM LABELLED COMMON LENGTH    20700B =  8640
  CM STORAGE USED              64600B =  27003
  COMPILE TIME                 0.320 SECONDS
```

```
      SUBROUTINE SIG(SIGLH,ITERM,ISIG,KC,KSW1,KSW5,IP)
C---------
      COMMON/MAND/G(720),Z(720),H(720),P(720),PLOG(720),
     C T(720),TD(720),HUM(720),RFI(720),SL(720)
      COMMON/SIG/VXA(720),VYA(720)
      INTEGER SL
C---------
      TKEPT=0.0
      SL(1)=9
      SL(ITERM)=9
C---------SIGNIFICANT TEMPERATURES & TROPOPAUSE
      SIGTIM=G(1)
      SIGTMP=T(1)
      TMAX=TMIN=T(1)
      KMIN=KMAX=1
      K40=1
      J=2
      DO 100 I=2,ITERM-1
      IF (SIGLH.EQ.Z(I)) SL(I)=9
      IF (T(I).LT.TMIN) THEN
      TMIN=T(I)
      KMIN=I
      ENDIF
      IF (T(I).GT.TMAX) THEN
      TMAX=T(I)
      KMAX=I
      ENDIF
      TMPCON=1.0
      IF (P(I).GT.700.,AND.ISIG.EQ.1) TMPCON=0.5
      IF (P(I).LT.300.) TMPCON=2.0
      DO 105 K=J,I
      TSIG=ABS(T(K)-(SIGTMP+((G(K)-SIGTIM)*(T(I+1)-SIGTMP)/
     C     (G(I+1)-SIGTIM))))-TMPCON
      IF (T(K).GE.-40.0.AND.T(K).LE.-37.0) THEN
      TTEMP=(TSIG+TMPCON)/TMPCON
      IF (TTEMP.GT.TKEPT) THEN
      TKEPT=TTEMP
      K40=K
      ENDIF
      ENDIF
      IF (TSIG.LT.0.0) GOTO 105
      SL(K)=9
      SIGTMP=T(K)
      SIGTIM=G(K)
      J=K+1
      GOTO 100
105   CONTINUE
102   CONTINUE
      SL(K40)=9
      SL(KMIN)=9
      SL(KMAX)=9
C---------SIGNIFICANT HUMIDITIES
      SIGTIM=G(1)
      SIGHUM=HUM(1)
      HMAX=HMIN=HUM(1)
```

```
      JMIN=JMAX=1
      J=0
      DO 117 I=2,ITERM-1
      IF (HUM(I).EQ.999..OR.HUM(I+1).EQ.999.) GOTO 117
      IF (HUM(I).LT.HMIN) THEN
1     HMIN=HUM(I)
1     JMIN=I
1     ENDIF
      IF (HUM(I).GT.HMAX) THEN
1     HMAX=HUM(I)
1     JMAX=I
1     ENDIF
      RHCON=10.0
      IF (P(I).GT.700..AND.ISIG.EQ.1) RHCON=5.0
      DO 115 K=J,I
      HSIG=ABS(HUM(K)-(SIGHUM+((G(K)-SIGTIM)*(HUM(I+1)-SIGHUM)/
     C     (G(I+1)-SIGTIM))))-RHCON
      IF (HSIG.LT.0.0) GOTO 115
      SL(K)=9
      SIGHUM=HUM(K)
      SIGTIM=G(K)
      J=K+1
      GOTO 110
115   CONTINUE
110   CONTINUE
      SL(JMIN)=9
      SL(JMAX)=9
C---------MAXIMUM WINDS
      WMAXL=WMAXU=0.0
      IWMAXL=IWMAXU=0
      DO 120 I=1,ITERM
      IF (VXA(I).GE.998.) GOTO 120
      SPD=WSPDF(VXA(I),VYA(I))*WC
      IF (WMAXL.LT.SPD.AND.P(I).GE.100.) THEN
1     WMAXL=SPD
1     IWMAXL=I
1     ENDIF
      IF (WMAXU.LT.SPD.AND.P(I).LT.100.) THEN
1     WMAXU=SPD
1     IWMAXU=I
1     ENDIF
120   CONTINUE
      SL(IWMAXL)=9
      IF (IWMAXU.GT.0) SL(IWMAXU)=9
C---------OUTPUT SIGNIFICANT DATA
      NH=6HGEOMFT
      IF (IP.EQ.1) NH=6H GEOMM
      NS=3HKTS
      IF (KSW1.EQ.1) NS=3HFPS
      IF (IP.EQ.1) NS=3HMPS
      MH=6HGEOMFT
      IF (IP.EQ.1) MH=6HGEOMM
      IRN=3H N
      IF (KSW5.EQ.1) IRN=3HOPT
      WRITE(61,1)
      WRITE(61,2) NH,NS,IRN
      IF (KSW5.NE.1) WRITE(40,4) NH,NS
```

```
SUBROUTINE SIG        73/767  OPT=2,ROUND= A/ S/ M/-D,-DB     FTN 5.1+642        87/05/16. 13.37.12        PAGE    3

                  WRITE(1,5) MH,MS
                  DO 130 I=1,ITERM
                  IF (SL(I).NE.9) GOTO 130
                  DIR=WDIRF(VXA(I),VYA(I))
                  SPD=WSPDF(VXA(I),VYA(I))*WC
                  IF (VXA(I).GE.998.) SPD=999.
                  WRITE(61,3) NINT(Z(I)),NINT(DIR),NINT(SPD),T(I),TD(I),P(I),
                 C NINT(RFI(I)),NINT(HUM(I))
                  IF (KSW5.NE.1)
                 C WRITE(43,6) NINT(Z(I)),NINT(DIR),NINT(SPD),T(I),TD(I),P(I),
                 C NINT(RFI(I)),NINT(HUM(I))
                  LP=P(I)*100.
                  JT=NINT(T(I)*10.)
                  JD=NINT(TD(I)*10.)
                  CALL TSIGN(JT,JT1)
                  CALL TSIGN(JD,JD1)
                  WRITE(1,7) NINT(Z(I)),NINT(DIR),NINT(SPD),JT,JT1,JD,JD1,LP,
                 C NINT(RFI(I)),NINT(HUM(I))
            130   CONTINUE
                  RETURN
            C---------
            1     FORMAT("1",25X,"SIGNIFICANT LEVELS"//
                 C " ALTITUDE   DIR  SPEED   TEMP    DPT",6X,"PRESS",6X,"IR",5X,
                 C "RH")
            2     FORMAT(2X,A6,4X,"DEG",3X,A3,3X,"DEG C    DEG C",6X,"MBS",6X,A3,3X,
                 C "PCT"/)
            3     FORMAT(1X,2I7,I6,F8.1,F9.1,F11.2,I7,I6)
            4     FORMAT("SIGNIFICANT LEVELS"/
                 C A6," DIR ",A3,"  TEMP   DPT PRESS    IR  RH"/)
            5     FORMAT(30X,"SIGNIFICANT LEVELS",27X,"-   9"/
                 C A6,3X,"DIR",2X,A3,"  TEMP     DPT     PRESS   IR  RH",T30,"9")
            6     FORMAT(I6,2I4,2F6.1,F8.2,2I4)
            7     FORMAT(I6.6,I6.3,I5.3,I5.2,R1,I7.2,R1,I10.6,I5.3,I4.3,T73,"!")
            C---------
                  END

--VARIABLE MAP--(LO=A/R)                                                    A=ARGLIST, C=CTRL OF DO, I=DATA INIT,
 -NAME---ADDRESS --BLOCK-----PROPERTIES-------TYPE---------SIZE---REFERENCES-                R=READ, S=STORE, U=I/O UNIT, W=WRITE

 DIR        321B                          REAL                  116/S  119/A  121/A  129/A
 G            0B  /MAND/                  REAL          720       3     12     32     32     44     53     71     71     75
 H         2640B  /MAND/                  REAL          720       3
 HMAX       257B                          REAL                   55/S   64     65/S
 HMIN       256B                          REAL                   55/S   60     61/S
 HSIG       255B                          REAL                   71/S   73
 HUM      11660B  /MAND/                  REAL          720       3     54     55     59     59     60     61     64     65
                                                                 71/A   71     75    119/A  121/A  129/A
 I          246B                          INTEGER                13/C   19     19     20     21     22     24     25     26
                                                                 29     30     31/C   32     32     58/C   59     59     62
                                                                 61     62     64     65     65     69     70/C   71     71
                                                                 85/C   87     88     88     89     91     93     95    114/C
                                                                115    116    118    117    117    118    119    119    119
                                                                119    119    119    121    121    121    121    121    121
                                                                124    125    125    129    129    129
 IP           7  DUMMY-ARG                INTEGER                 1    172    175    147
 IRN        277B                          INTEGER               123/S  129/C  111/W
```

-NAME---	ADDRESS	--BLOCK-----	PROPERTIES-------	TYPE---------	SIZE---	REFERENCES-								
ISIG	3	DUMMY-ARG		INTEGER		1	23	59						
ITERM	2	DUMMY-ARG		INTEGER		1	10	13/C	53/C	85/C	114/C			
IWMAXL	271B			INTEGER		85/S	91/S	99						
IWMAXU	270B			INTEGER		85/S	95/S	99	99					
J	245B			INTEGER		17/S	31/C	45/S	57/S	70/C	77/S			
JD	304B			INTEGER		126/S	128/A	129/W						
JD1	306B			INTEGER		128/A	129/W							
JMAX	260B			INTEGER		55/S	55/S	62						
JMIN	261B			INTEGER		55/S	62/S	91						
JT	303B			INTEGER		125/S	127/A	129/W						
JT1	305B			INTEGER		127/A	129/W							
K	251B			INTEGER		31/C	32	32	34	34	38	42	43	44
						45	70/C	71	71	74	75	76	77	
KMAX	242B			INTEGER		15/S	25/S	51						
KMIN	243B			INTEGER		15/S	22/S	52						
KSW1	5	DUMMY-ARG		INTEGER		1	104							
KSW5	6	DUMMY-ARG		INTEGER		1	109	112	121					
K40	244B			INTEGER		15/S	33/S	49						
LP	302B			INTEGER		124/S	129/W							
MH	276B			INTEGER		105/S	107/S	113/W						
NH	274B			INTEGER		101/S	102/S	111/W	112/W					
NS	275B			INTEGER		103/S	104/S	105/S	111/W	112/W	113/W			
P	4160B	/MAND/		REAL	720	3	29	30	69	89	93	119/W	121/W	124
PLOG	5500B	/MAND/		REAL	720	3								
RFI	13200B	/MAND/		REAL	720	3	119/A	121/A	129/A					
RHCON	263B			REAL		58/S	69/S	71						
SIGHUM	255B			REAL		54/S	71	71	75/S					
SIGLH	1	DUMMY-ARG		REAL		1	19							
SIGTIM	236B			REAL		12/S	32	32	44/S	53/S	71	71	75/S	
SIGTMP	237B			REAL		13/S	32	32	43/S					
SL	14520B	/MAND/		INTEGER	720	3	5	9/S	10/S	19/S	12/S	49/S	50/S	51/S
						74/S	81/S	82/S	93/S	99/S	115			
SPD	273B			REAL		88/S	89	90	93	94	117/S	118/S	119/A	121/A
						129/A								
T	7020B	/MAND/		REAL	720	3	13	14	20	21	24	25	32/A	32
						34	34	43	119/W	121/W	125/A			
TD	10340B	/MAND/		REAL	720	3	119/W	121/W	125/A					
TKEPT	235B			REAL		8/S	36	37/S						
TMAX	241B			REAL		14/S	24	25/S						
TMIN	240B			REAL		14/S	20	21/S						
TMPCON	250B			REAL		28/S	29/S	30/S	32	35	35			
TSIG	253B			REAL		32/S	35	41						
TTEMP	254B			REAL		35/S	36	37						
VXA	0B	/SIG/		REAL	720	5	87	98/A	115/A	117/A	118			
VYA	1320B	/SIG/		REAL	720	5	98/A	115/A	117/A					
WC	4	DUMMY-ARG		REAL		1	88	117						
WMAXL	267B			REAL		84/S	89	90/S						
WMAXU	266B			REAL		84/S	93	94/S						
Z	1320B	/MAND/		REAL	722	3	19	119/A	121/A	129/A				

RSRC 2

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SUBROUTINE SIG        73/727  OPT=2,ROUND= A/ S/ M/-I,-DS     FTN 5.1+642        07/03/15. 13.37.13        PAGE    5

--PROCEDURES--(LO=A/R)                                                                    D=DEF LINE OF STMT FUNC
 -NAME----TYPE------ARGS----CLASS-----REFERENCES-                                         A=ACTUAL ARGUMENT

  ABS     GENERIC      1    INTRINSIC    32     71
  NINT    GENERIC      1    INTRINSIC   119/W  119/W  119/W  119/W  119/W  121/W  121/W  121/W  121/W  121/W  125    125    129/W
                                         129/W  129/W  129/W  129/W
  TSIGN                2    SUBROUTINE  127    128
  WDIRF   REAL         2    FUNCTION    115
  WSPDF   REAL         2    FUNCTION     83    117

--STATEMENT LABELS--(LO=A/R)                                                              A=ASSIGN STMT, D=DO STMT,
 -LABEL--ADDRESS---PROPERTIES-----DEF--REFERENCES-                                        R=READ, W=WRITE, L=LABEL

      1      32B   FORMAT        134    110/W  134/L
      2      45B   FORMAT        137    111/W  137/L
      3      55B   FORMAT        139    119/W  139/L
      4      62B   FORMAT        140    112/W  140/L
      5      72B   FORMAT        142    113/W  142/L
      6     106B   FORMAT        144    121/W  144/L
      7     112B   FORMAT        145    129/W  145/L
    100       0B   DO-TERM        48     13/D   45     46/L
    105       0B   DO-TERM        47     31/D   41     47/L
    110       0B   DO-TERM        80     53/D   59     73     80/L
    115       0B   DO-TERM        79     70/D   73     79/L
    120       0B   DO-TERM        97     85/D   87     97/L
    130       0B   DO-TERM       131    114/D  115    131/L

--ENTRY POINTS--(LO=A/R)                                                                  D=DEFINITION, R=RETURN
 -NAME---ADDRESS--ARGS------REFERENCES-

  SIG         0B     7          1/D  132/R

--I/O UNITS--(LO=A/R)                                                                     R=READ, W=WRITE
 -NAME--- PROPERTIES-------------REFERENCES-

  TAPE1   FMT/SEQ                 113/W  129/W
  TAPE40  FMT/SEQ                 112/W  121/W
  TAPE51  FMT/SEQ                 110/W  111/W  119/W

--STATISTICS--

  PROGRAM-UNIT LENGTH            312B =  202
  CM LABELLED COMMON LENGTH    20700B =  8512
  CM STORAGE USED              54300B =  27003
  COMPILE TIME                 0.450 SECONDS
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RSRC 2