

# NASA TECH BRIEF

## *Marshall Space Flight Center*



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### **Four-Dimensional Worldwide Atmospheric Models: ANYPT and ANYRG**

#### **The problem:**

A system was needed to assist in the analysis of the distortion of information obtained from aircraft-mounted or spacecraft-mounted electromagnetic sensors. This distortion is caused by atmospheric parameters, mainly moisture.

#### **The solution:**

Two computer programs, ANYPT and ANYRG, were developed to read magnetic-tape data bases and to compute meteorological profiles for any position, time, and height (from zero to 25 km).

#### **How it's done:**

The data base utilized by ANYPT contains one file for each month of the year. Each of these files contains records representing atmospheric parameter values at 3,490 grid points over the globe. Each record contains the pressure means and variances, the temperature means and variances, the moisture means and variances, and the density means and variances, for any height from zero to 25 km at 1-km intervals. Using this global data set, ANYPT will generate for any month unique meteorological profiles consisting of tables of monthly means and variances for pressure, temperature, absolute humidity, and density, for any latitude, longitude, and level up to 25 km. Where data for a selected grid point is not available, ANYPT will take existing data and, using horizontal interpolation schemes, apply it to any location on the globe. In addition, ANYPT contains the option of curve fitting the profiles generated for any data point so that meteorological parameter

values may be extrapolated to any height in the range from zero to 25 km.

Program ANYRG accepts as input data curve-fit coefficients for each meteorological parameter averaged over each month and selected grid points within 45 homogeneous moisture regions defined across the globe. ANYRG then generates meteorological profiles at specific times and locations from the coefficients of the curve-fitted region data. The values produced are not unique for each latitude and longitude, for they are constant throughout a homogeneous moisture region. However, the execution efficiency of ANYRG, relative to ANYPT, recommends that ANYRG be used in those applications where lesser precision in generated profiles can be tolerated.

#### **Notes:**

1. These programs were written in FORTRAN V for the UNIVAC 1108 computer.
2. Inquiries concerning these programs should be directed to:

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