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Brief 69-10584

NASA TECH BRIEF

Millimeter-Wave Atmospheric Loss Prediction Method

Date, 1966	Time, pm (local)	Atmospheric loss at zenith db.	Ground temperature, °F	Ground humidity, %
February 9	4:00	0.50	54	49
May 29	10:00	0.41	56	77
June 14	9:00	0.80	79	53
June 23	5:00	0.62	81	51
June 25	6:30	0.78	76	61
June 26	9:30	0.49	64	80
June 27	9:00	0.36	—	—
July 6	3:00	0.76	64	61
July 8	5:30	0.78	90	29
July 10	5:30	0.71	90	20

Tabulation of the 90-GHz measured atmospheric loss at zenith and other parameters

The novelty of this innovation lies in establishing the relationship between the water vapor content of the atmosphere and the atmospheric attenuation by taking temperature and humidity measurements at the ground level in lieu of weather balloon measurements.

The problem:

To provide a method of predicting the attenuation to millimeter wave propagation resulting from an atmospheric loss due to water content and, conversely, knowing the atmospheric loss from a series of measurements on relatively clear days from measurement of a radio source, to provide a means for measuring the water vapor density by the variation in atmospheric loss.

The solution:

The problem is solved by relating the atmospheric attenuation to the ground temperature and humidity after a series of measurements to determine the relationship and to obtain a reference from which changes in temperature and humidity will produce a corresponding atmospheric loss figure. A computer program is generated to compute the atmospheric loss due to water content, given the measured loss and ground temperature and humidity.

Notes:

1. This measurement technique should also be of interest in the communications industry for use in satellite systems.

(continued overleaf)

2. No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer
NASA Pasadena Office
4800 Oak Grove Drive
Pasadena, California 91103
Reference: B69-10584

Patent status:

No patent action is contemplated by NASA.

Source: Charles T. Stelzried of
Caltech/JPL
under contract to
NASA Pasadena Office
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