

Exhibit 1: " Particulars of Operation"

GeoPhone's VSAT terminals use a new type of spread spectrum modulation which is not accommodated by the normal emission and modulation designators listed in Section 2.201 of the FCC Rules. This attachment explains the new emission and modulation types used for transmission of low rate digital data, compressed digital voice data, or facsimile data between GeoPhone Terminals.

The VSAT terminals use GeoPhone's new multiple access technology called CAMA (Patent # 5557637). CAMA is a type of code assigned multiple access transmission system which maps a unique fixed spread spectrum code for each terminal into a fast frequency hopped spread spectrum waveform that is transmitted in a nominal 1.3MHz bandwidth sub-band of a standard commercial Geostationary Ku or C-Band Satellite transponder.

Each terminal in the GeoPhone network has a unique 16 digit code which assigns a sequence of sixteen frequencies (sixteen "chips") in a unique order of transmission within a selected transponder sub-band. This 16-chip sequence is used on each transmitted symbol, therefore it is a "very fast" frequency-hopping signal. The signal as transmitted is a **spread spectrum signal having uniform power spectral density over the selected subband** and having very well behaved spectral characteristics. Digital techniques are used to generate the waveforms that are transmitted by each terminal. The design provides that generation of the waveforms is done in such a way so to insure that each frequency chip starts and stops at peak voltage so that hopping rate artifacts do not appear in the transmitted spectrum. Partially orthogonal codes are used so that multiple users can operate in the same subband simultaneously.

Data Types Transferred:

- Compressed Digital Voice at 5.33 kbps
- Standard Commercial Facsimile at 4.8 kbps
- Digital Data at 4.8 kbps from/to customer equipment
- Standard Computer Modems at 4.8 kbps
- 800 bps terminal to terminal overhead channel

Maximum Data Transfer Rate per channel:

The **7.2 kbps data rate per channel** is the same for all data types but is processed differently for Voice or for Data / Fax to provide additional Forward Error Correction gain and BER performance for both Data and Fax. (27, 21) Reed-Solomon Forward Error Correction is applied to the combined 4.8 Kbps data/fax and 800 bps overhead channel (for packet framing, frequency/power control) for a total rate of **7.2 kbps per data/fax channel**. (27, 23) Reed-Solomon Forward Error Correction is applied to the combined 5.33 Kbps voice and 800 bps overhead channel (for packet framing, frequency/power control) for a total rate of **7.2 kbps per voice channel**.

Maximum Data Transfer Rate per Terminal:

The data from each channel is buffered into the transmitter at 7.2 kbps to accommodate up to four time division multiplexed channels which can be provided simultaneously from each terminal. The maximum transmit rate for the terminal would be four times the maximum channel data transfer rate of 7.2 kbps, or **28,800 bits per second**.

Modulation Characteristics (Complex):

The system uses 8 - Bit modulation such that the symbol rate = $28,800/8 = 3,600$ Symbols per second for all four channels or 900 Symbols per second per channel. Modulation is imparted onto the spread spectrum frequency hopped transmitted signal by adjusting the timing of the chips in the assigned sequence. By varying the leading chip in the transmitted sequence, a symbol having 8 bits is transmitted during each set of 16 chips transmitted between two terminals. In this way, no other modulation type, such as FSK or PSK is required to be added to the fast frequency hopped carrier.

*Do not routinely grant renewal.
Extensions of operating license should be
filed w/ I B per IB instructions
DJ*

Exhibit 2: Statement of Proposed Experiment

INTRODUCTION

GeoPhone Company, L.L.C. is developing a new type of low cost Very Small Aperture Terminal (VSAT) for use with existing and planned Geo-Stationary Satellites to provide low data rate voice, fax and data services for rural customers not currently served by public telephone infrastructure. Much of GeoPhone's projected markets are in developing countries, but certain private low rate data network applications that are available in the U.S. domestic market can also be served by this product. GeoPhone is developing this new VSAT terminal to provide services comparable to wired telephone infrastructure but at a very low competitive cost of \$1,500.00 to \$ 2,000.00 per telephone line.

STATEMENT OF THE PROPOSED EXPERIMENTS

GeoPhone Company, L.L.C. is requesting an experimental license to operate two (2) of its C-Band prototype GeoPhone VSAT terminals at GeoPhone facilities at N 38:59:37 , W 076:32:47 in Annapolis, Maryland. This site is fully coordinated (see attached Exhibit 4, Frequency Coordination Report). These terminals will be production prototypes of the GeoPhone VSAT terminal at C Band, manufactured by GeoPhone for use in communications of low data rate voice, facsimile and computer data at 5333 bps and 4,800 bits per second between the two GeoPhone terminals in a full mesh configuration. Each terminal will have four (4) telephony RJ-11 input ports capable of interface to a standard telephone handset, standard facsimile machines, selected two wire PABX or standard personal computer data modems.

More extensive Ku band tests have been conducted since April 1997 using the first of twelve planned terminals in GeoPhone's Experimental Ku Band network (WA2XBI). These tests have provided initial validation of the new signaling concept, modem performance, frequency and power control validation, RF hardware and initial network operation. Testing with this Ku-Band experimental network is continuing.

The current request for a C-Band license is required to complete development of GeoPhone's companion C-Band product line. Experimentation will be less extensive than for the Ku band network and will consist primarily of validating repeatability of system, software, and hardware performance results obtained at Ku band. Various over the air experiments will test voice, fax, and personal computer data transmission and the combination of all three types of transmissions simultaneously at C Band. Frequency and power calibration and control performance will also be verified. All transmissions will originate from and be received in the United States of America, all transmissions will be over existing, domestic, commercial satellites (Hughes Galaxy and GE Americom) and there will be **no services provided to the general public** as part of these experiments.

SPECIFIC OBJECTIVES OF THE EXPERIMENTS

The specific objectives of these experiments will be to verify and validate through careful measurement the following items:

1. The technical parameters of individual components, terminals, network, and terminal to terminal setup protocol's under realistic operating conditions using a Domestic, Commercial C Band Geo-Stationary Satellite.
2. The behavior of the network during extremes of weather and temperature.

3. The operation of active uplink power control systems including both Hardware and Software components
4. Network behavior with typical video and/or communications traffic on adjacent cross-polarized transponders at the same frequency or on adjacent co-polarized transponders of different frequency.
5. The achievable bit error rates, voice quality and data transfer quality for practical applications of the terminals in their intended markets.
6. The ability of the distributed network management software to detect and isolate remote terminal faults, and to reliably shut down terminals which are not within designated operational boundaries.
7. Behavior and operations of the distributed network management software system, the billing software system, the call handshake and terminal link management software system, and the administrative terminal automatic terminal diagnostic software management system.

CONTRIBUTION OF THE EXPERIMENT TO THE DEVELOPMENT OF THE RADIO ART

The GeoPhone terminals represent an entirely new type of radio communications system using typical geostationary communications satellites. In order to meet the increasing needs of rural markets for telephony, facsimile and low rate data services, particularly in developing countries or in economically depressed regions, GeoPhone uses new technologies that optimize the number of simultaneous conversations per transponder subband and allow for very low cost operations from multiple fixed locations. The experiments proposed by GeoPhone will validate and optimize the design of this new VSAT technology and will demonstrate the new and advanced features of system operations including:

- Use of advanced CAMA (Convolution Ambiguity Multiple Access) technology -- a type of CDMA technique that is asynchronous and has very high spectrum reuse capabilities.
- Development of an affordable very well behaved fast frequency hopping spread spectrum transmitter and receiver that is low enough in cost for use in rural telephony applications, thereby providing unique transponder frequency spectrum reuse capabilities.
- Use of a "hub-less" distributed network management system
- Use of advanced monolithic transmitter and receiver components
- Use of a completely software programmable transmitter and receiver system that can be reconfigured over the air through network wide broadcasts
- Deployment of a system that can have voice, data and facsimile transmissions in the same subband at the same time with high spectral reuse.

Exhibit 3: " 1.1307 Statement and Radiation Hazard Study"

It has been determined that an Environmental Impact Statement is not required for the site at 905 Commerce Rd. This is supported by the following data:

- a)
 - (1) 905 Commerce is not located in a designated Wilderness Area.
 - (2) 905 Commerce is not located in a designated Wildlife Preserve.
 - (3) No known endangered species are present and 905 Commerce is not in the designated Critical Areas. (Ref. 50 CFR, U.S. Fish and Wildlife Service, AA Co. Critical Area Map)
 - (4) 905 Commerce is not on, or under consideration for inclusion in the National Register of Historic Places (Ref. 36 CFR 60, 800 and Md. State).
 - (5) 905 Commerce is not a known or claimed Indian Religious Site.
 - (6) 905 Commerce is not located in a 100 Yr. Flood Plain (Ref. NEMA Flood Map 24008-0033C).
 - (7) 905 Commerce is not located in a wetland or Critical Area (Ref. AA Co. PCE)
 - (8) Anne Arundle Planning and Code Enforcement issued a approved Building Permit (#B02118402)
- b) The operation of the transmitters on the roof of 905 Commerce will not expose workers or the general public to levels of radiofrequency radiation in excess of the "Radio Frequency Protection Guides" recommended in "American National Standard Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz", ANSI/IEEE C95.1-1992). See appended "Radiation Hazard Study" .

Exhibit 4: " Frequency Coordination Report"

GeoPhone C-Band Earth Station at 905 Commerce Rd.



SATELLITE • MICROWAVE • LIGHTWAVE • RADIO • CABLE

MULTICOMM SCIENCES INTERNATIONAL, INC.

MARKET INFORMATION • FIELD SURVEYS • SYSTEM DESIGN
FEASIBILITY STUDIES • FREQUENCY COORDINATION • PROJECT MANAGEMENT

SINCE 1952

FREQUENCY COORDINATION REPORT

4 and 6 GHz TRANSMIT-RECEIVE EARTH STATION

GEOPHONE COMPANY LLC

ANNAPOLIS, MD

October 27, 1997

1. CONCLUSIONS

An Interference Study considering all existing, proposed and prior coordinated microwave facilities within the coordination contours of the proposed Earth Station demonstrates that this site will operate satisfactorily with the Common Carrier Microwave Environment as defined on the frequency coordination data sheet.

2. SUMMARY OF RESULTS

There were no potential great circle interference cases at 4 GHz. All of the potential great circle interference cases at 6 GHz were found to be acceptable on the basis that harmful interference will not likely result from the proposed operation, considering the criteria, the potential interference receive levels, and the total propagation losses.

There were no reported cases of rain scatter beam intersections.

3. SUPPLEMENTAL SHOWING

The Satellite Earth Station proposed in this Application was coordinated by Multicomm Sciences International, Inc., Frequency Coordinators Group, using computer techniques and in accordance with Parts 25 of the FCC Rules and Regulations.

4. FREQUENCY COORDINATION DATA

Frequency Coordination Data which is attached, contains the following:

- Technical Characteristics of Proposed Earth Station
- Horizon Antenna Gain Plot
- Discrimination Angle Plot
- Local Horizon Plot
- Satellite Elevation Plot
- 4 and 6 GHz Coordination Contour
- 4 and 6 GHz Rain Scatter

5. FREQUENCY COORDINATION STATEMENT (FCC Section 21.100 (d))

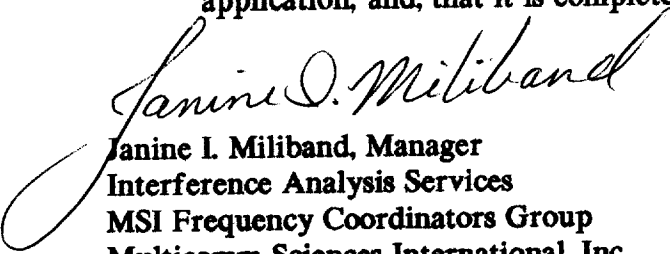
Holders of licenses, permittees, prior filed applicants or planners of 6 GHz transmitting stations were notified on September 17, 1997 of the proposed Earth Station technical details in accordance with Section 25.203 (c-2) of the FCC Rules and Regulations. Satisfactory coordination was achieved on the basis that harmful interference would not occur, or that sufficient terrestrial blocking exists.

AT&T
Ellis Thompson Corp
Wilm Cell Tele Co (Amcell/Cell One)
Intermedia Communications
Bell Atlantic Mobile Communications
Cellco Partnership _ CT, W-MA, W-NY
Cellco Partnership - MD, NJ, PA Region
Comcast Cable Communications (Mid-Atlan)

C-SW Cellular Partnership
Dobson Cellular of MD, Inc. dba Cell One
Hardy Cellular Telephone Co
Atlantic States Microwave Trans Co
Bell Atlantic - Pennsylvania
Bell Atlantic - Maryland
GTE North Inc Pennsylvania Operations
Harrisburg Cellular Telephone Co
Local Area Telecommunications
MCI Telecommunications
Overseas Telecommunications
Pennsylvania Cellular Telephone
Reading Cellular Telephone
Susquehanna Cellular Comm LP
Virginia Cellular LP
PBS Satellite Operations Center
Qwest Transmission
PECO Energy Co
Virginia Electric & Power Co
Winstar Locate
Wash/Balt Cellular LP
Washington DC SMSA LP
Micronet Communications
Microwave Planning
Comsearch

6. Certification of Person Responsible for Preparing Frequency Coordination Information Submitted in this Application

I hereby certify that I am the technically qualified person responsible for preparation of the frequency coordination information contained in this application; that I am familiar with Parts 21 and 25 of the Commission's Rules; that I have either prepared or reviewed the frequency coordination information submitted in this application; and, that it is complete and accurate to the best of my knowledge.


Janine I. Miliband, Manager
Interference Analysis Services
MSI Frequency Coordinators Group
Multicomm Sciences International, Inc.
October 27, 1997

SATELLITE EARTH STATION
FREQUENCY COORDINATION DATA
9/17/97

COMPANY NAME:	GeoPhone Company LLC		
EARTH STATION LOCATION:	Annapolis, MD		
LATITUDE(DMS):	38 59 37		
LONGITUDE(DMS):	76 32 47		
SITE GROUND ELEVATION(FT. AMSL):	85.0		
ANTENNA CENTER LINE(FT)	21.0		
ANTENNA TYPE:	Prodelin		
	1.8M Model 1194		
ANTENNA DIAMETER(METERS):	1.8		
4 GHZ ANTENNA GAIN(DBI):	35.5		
15 DB HALF BEAMWIDTH(DEG):	2.6		
6 GHZ ANTENNA GAIN(DBI):	39.5		
15 DB HALF BEAMWIDTH(DEG):	1.7		
OPERATING MODE:	T/R		
RECEIVE BAND(MHZ):	3700 - 4200		
TRANSMIT BAND(MHZ):	5925 - 6425		
EMISSION DESIGNATOR	1M30XXC	1M30XXD	1M30XXE
MODULATION:		DIGITAL	
MAX. AVAILABLE RF POWER(DBW/4KHZ):	-17.0		
(DBW/1MHZ):	7.0		
MAX. EIRP	(DBW/4KHZ):	22.5	
	(DBW/1MHZ):	46.5	
MAX. PERMISSIBLE INTERFERENCE POWER			
4 GHZ 20%(DBW)	-140.0		
4 GHZ 0.0100%(DBW)	-130.0		
6 GHZ 20%(DBW/4KHZ)	-154.0		
6 GHZ 0.0025%(DBW/4KHZ)	-131.0		
SATELLITE ARC (MIN/MAX)	74/104 DEG		
AZIMUTH	176.0/219.5 DEG		
ELEVATION	44.8/ 36.6 DEG		
RADIO CLIMATE	A		
RAIN ZONE	2		
MAXIMUM GREAT CIRCLE COORDINATION DISTANCE(KM)			
4 GHZ	174.0		
6 GHZ	102.0		
PRECIPITATION SCATTER CONTOUR RADIUS(KM)			
4 GHZ	101.0		
6 GHZ	100.0		
MULTICOMM SCIENCES INTERNATIONAL, INC.			
Denville, NJ 07834 (201)-627-7400			

Annapolis,MD

38 59 37

76 32 47

AZ DEG	DISC DEG	HOR DEGREES	ANG	4GHZ HOR GAIN	6GHZ HOR GAIN	4GHZ COORD KM	6GHZ COORD KM	RAIN 4 SCAT KM	RAIN 6 SCAT KM
5.	131.	.0		-10.0	-12.0	119.6	102.0	101.0	100.0
10.	134.	.0		-10.0	-12.0	119.0	102.0	101.0	100.0
15.	132.	.0		-10.0	-12.0	119.4	102.0	101.0	100.0
20.	130.	.0		-10.0	-12.0	119.8	102.0	101.0	100.0
25.	128.	.0		-10.0	-12.0	120.4	102.0	101.0	100.0
30.	126.	.0		-10.0	-12.0	121.0	102.0	101.0	100.0
35.	123.	.0		-10.0	-12.0	121.8	102.0	101.0	100.0
40.	121.	.0		-10.0	-12.0	122.6	102.0	101.0	100.0
45.	118.	.0		-10.0	-12.0	123.5	102.0	101.0	100.0
50.	115.	.0		-10.0	-12.0	124.5	102.0	101.0	100.0
55.	111.	.0		-10.0	-12.0	125.5	102.0	101.0	100.0
60.	108.	.0		-10.0	-12.0	126.6	102.0	101.0	100.0
65.	105.	.0		-10.0	-12.0	127.8	102.0	101.0	100.0
70.	101.	.0		-10.0	-12.0	129.1	102.0	101.0	100.0
75.	98.	.0		-10.0	-12.0	130.4	102.0	101.0	100.0
80.	94.	.0		-10.0	-12.0	131.8	102.0	101.0	100.0
85.	91.	.0		-10.0	-12.0	133.3	102.0	101.0	100.0
90.	87.	.0		-10.0	-12.0	134.9	102.0	101.0	100.0
95.	84.	.0		-10.0	-12.0	136.6	102.0	101.0	100.0
100.	80.	.0		-10.0	-12.0	138.3	102.0	101.0	100.0
105.	77.	.0		-10.0	-12.0	140.1	102.0	101.0	100.0
110.	73.	.0		-10.0	-12.0	142.0	102.0	101.0	100.0
115.	70.	.0		-10.0	-12.0	144.0	102.0	101.0	100.0
120.	67.	.0		-10.0	-12.0	146.0	102.0	101.0	100.0
125.	63.	.0		-10.0	-12.0	148.1	102.0	101.0	100.0
130.	60.	.0		-10.0	-12.0	150.2	102.0	101.0	100.0
135.	58.	.0		-10.0	-12.0	152.4	102.0	101.0	100.0
140.	55.	.0		-10.0	-12.0	154.5	102.0	101.0	100.0
145.	53.	.0		-10.0	-12.0	156.6	102.0	101.0	100.0
150.	50.	.0		-10.0	-12.0	158.5	102.0	101.0	100.0
5.	48.	.0		-10.0	-12.0	160.3	102.0	101.0	100.0
160.	47.	.0		-9.8	-9.8	161.8	102.0	101.0	100.0
165.	46.	.0		-9.5	-9.5	163.0	102.0	101.0	100.0
170.	45.	.0		-9.4	-9.4	163.7	102.0	101.0	100.0
175.	45.	.0		-9.3	-9.3	164.1	102.0	101.0	100.0
180.	45.	.0		-9.3	-9.3	164.0	102.0	101.0	100.0
185.	45.	.0		-9.2	-9.2	164.3	102.0	101.0	100.0
190.	44.	.0		-9.0	-9.0	165.1	102.0	101.0	100.0
195.	43.	.0		-8.7	-8.7	166.5	102.0	101.0	100.0
200.	41.	.0		-8.3	-8.3	168.6	102.0	101.0	100.0
205.	39.	.0		-7.8	-7.8	170.8	102.0	101.0	100.0

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Annapolis,MD

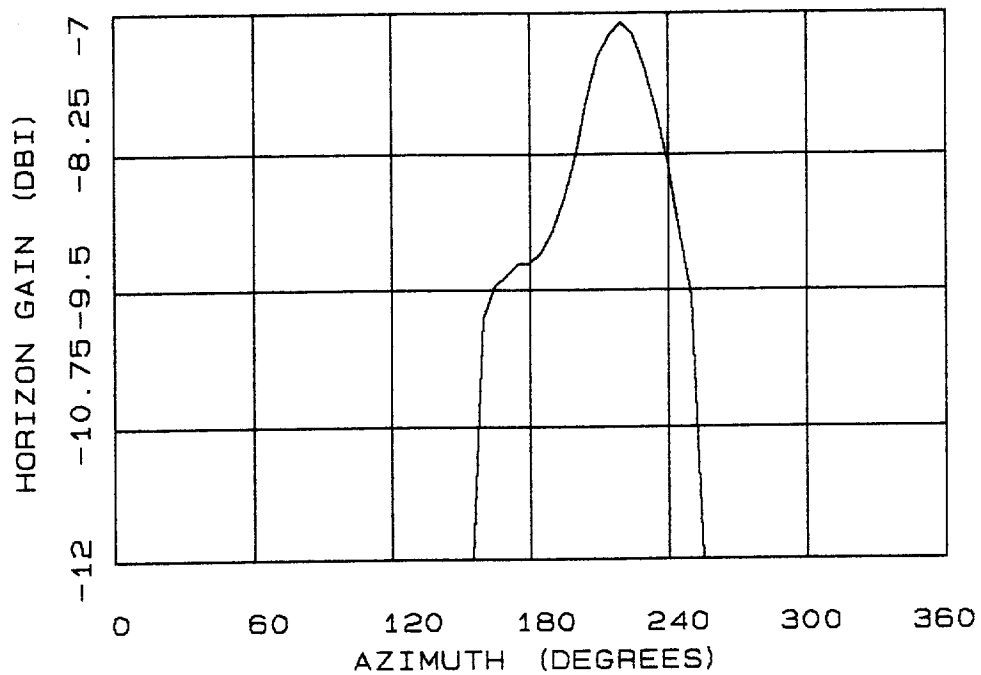
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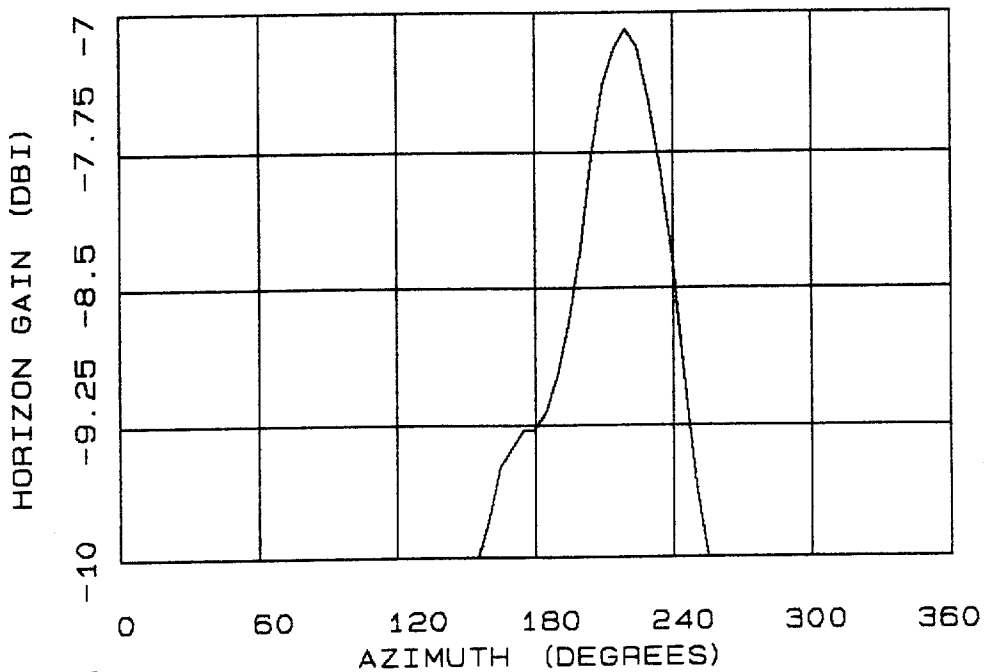
AZ DEG	DISC DEG	HOR ANG DEGREES	4GHZ HOR GAIN	6GHZ HOR GAIN	4GHZ COORD KM	6GHZ COORD KM	RAIN 4 SCAT KM	RAIN 6 SCAT KM
210.	38.	.0	-7.4	-7.4	172.6	102.0	101.0	100.0
215.	37.	.0	-7.2	-7.2	173.7	102.0	101.0	100.0
220.	37.	.0	-7.1	-7.1	174.0	102.0	101.0	100.0
225.	37.	.0	-7.2	-7.2	173.6	102.0	101.0	100.0
230.	38.	.0	-7.5	-7.5	172.3	102.0	101.0	100.0
235.	39.	.0	-7.9	-7.9	170.4	102.0	101.0	100.0
240.	41.	.0	-8.4	-8.4	168.1	102.0	101.0	100.0
245.	44.	.0	-9.0	-9.0	165.4	102.0	101.0	100.0
250.	46.	.0	-9.6	-9.6	162.5	102.0	101.0	100.0
255.	49.	.0	-10.0	-12.0	159.6	102.0	101.0	100.0
260.	52.	.0	-10.0	-12.0	156.7	102.0	101.0	100.0
265.	56.	.0	-10.0	-12.0	153.8	102.0	101.0	100.0
270.	59.	.0	-10.0	-12.0	151.1	102.0	101.0	100.0
275.	63.	.0	-10.0	-12.0	148.5	102.0	101.0	100.0
280.	67.	.0	-10.0	-12.0	145.9	102.0	101.0	100.0
285.	71.	.0	-10.0	-12.0	143.6	102.0	101.0	100.0
290.	74.	.0	-10.0	-12.0	141.3	102.0	101.0	100.0
295.	78.	.0	-10.0	-12.0	139.2	102.0	101.0	100.0
300.	82.	.0	-10.0	-12.0	137.2	102.0	101.0	100.0
305.	86.	.0	-10.0	-12.0	135.3	102.0	101.0	100.0
310.	90.	.0	-10.0	-12.0	133.5	102.0	101.0	100.0
315.	94.	.0	-10.0	-12.0	131.8	102.0	101.0	100.0
320.	98.	.0	-10.0	-12.0	130.2	102.0	101.0	100.0
325.	102.	.0	-10.0	-12.0	128.7	102.0	101.0	100.0
330.	106.	.0	-10.0	-12.0	127.2	102.0	101.0	100.0
335.	110.	.0	-10.0	-12.0	125.9	102.0	101.0	100.0
340.	114.	.0	-10.0	-12.0	124.7	102.0	101.0	100.0
345.	118.	.0	-10.0	-12.0	123.5	102.0	101.0	100.0
350.	121.	.0	-10.0	-12.0	122.4	102.0	101.0	100.0
355.	125.	.0	-10.0	-12.0	121.4	102.0	101.0	100.0
360.	128.	.0	-10.0	-12.0	120.4	102.0	101.0	100.0

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HORIZON ANTENNA GAIN PLOT 6 GHZ



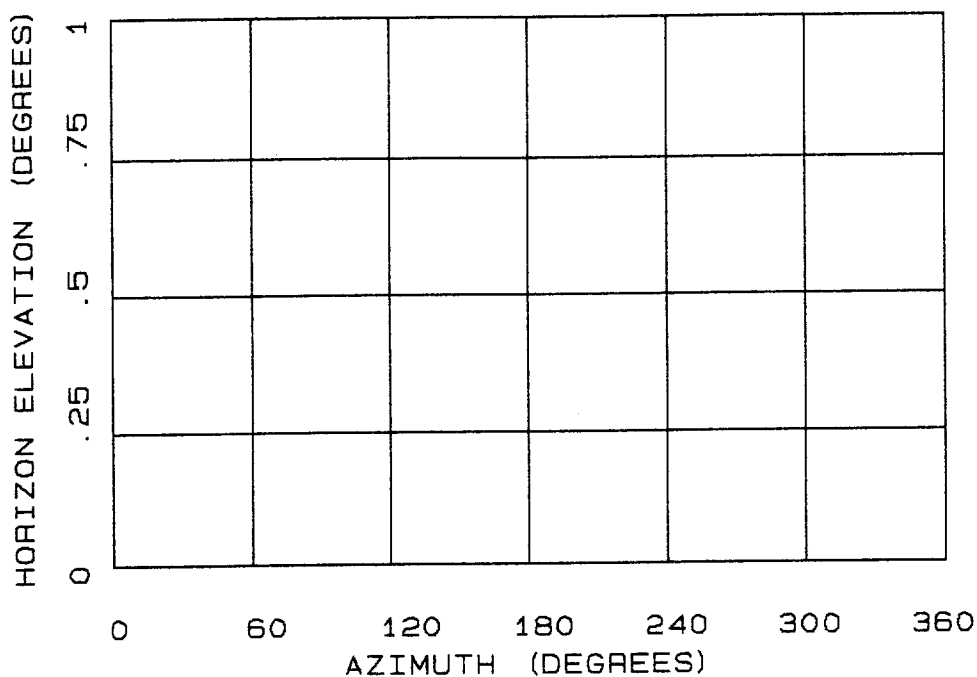
HORIZON ANTENNA PLOT 4 GHZ



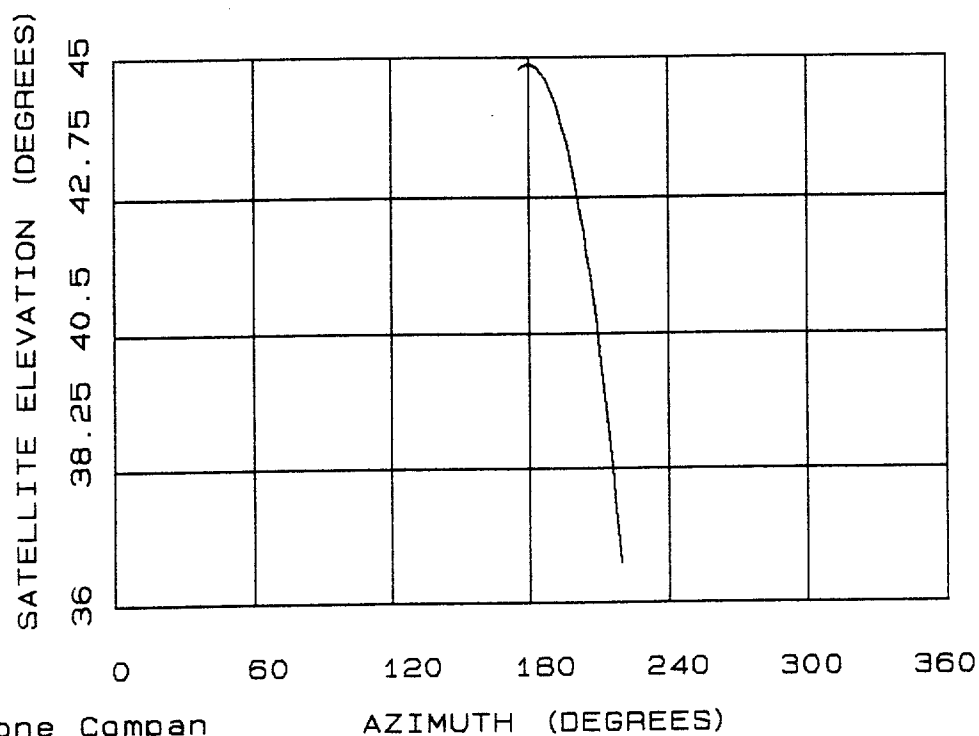
GeoPhone Compan
 Annapolis, MD
 38 59 37 N 76 32 47 W
 01-26-1980

MSI

LOCAL HORIZON PLOT

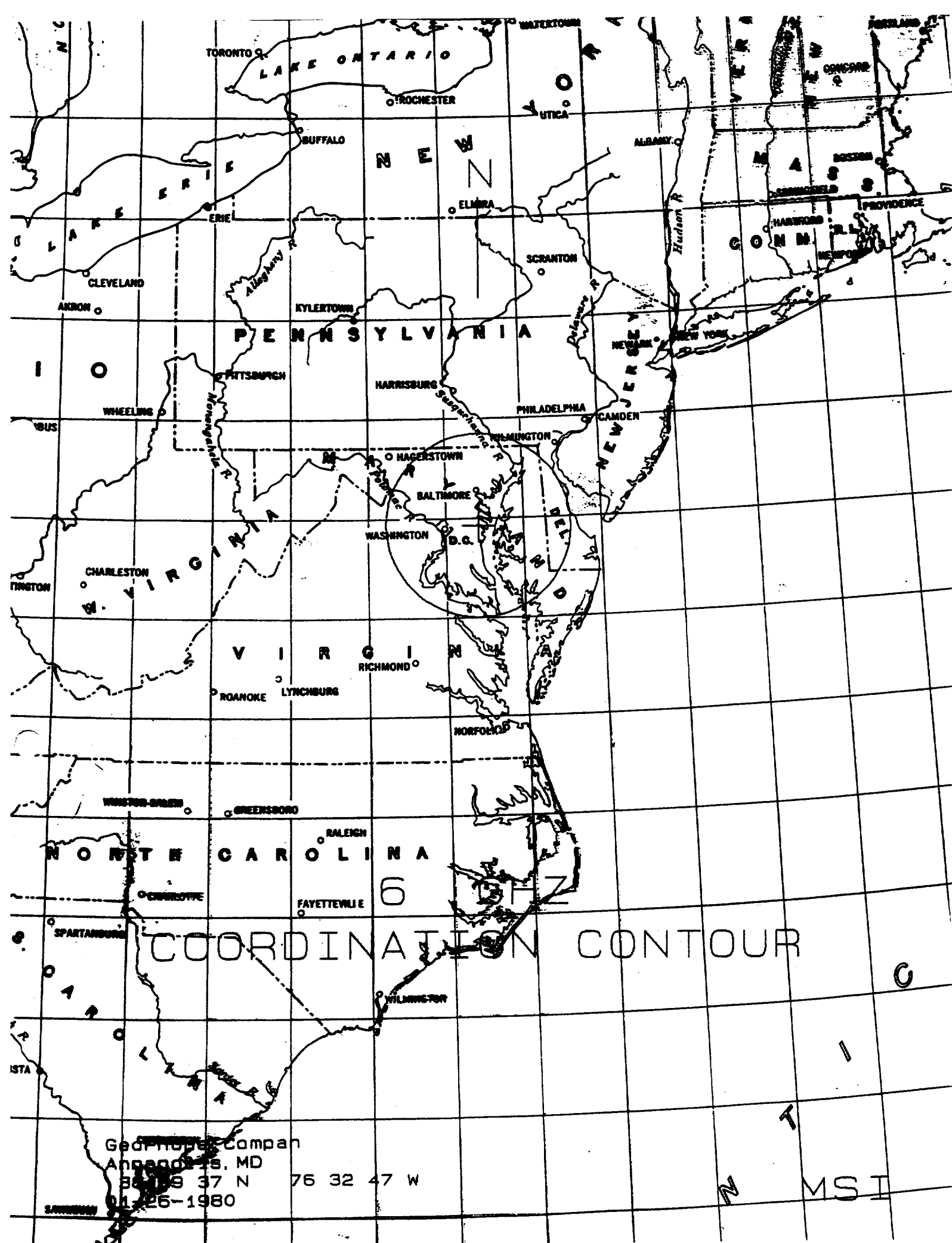


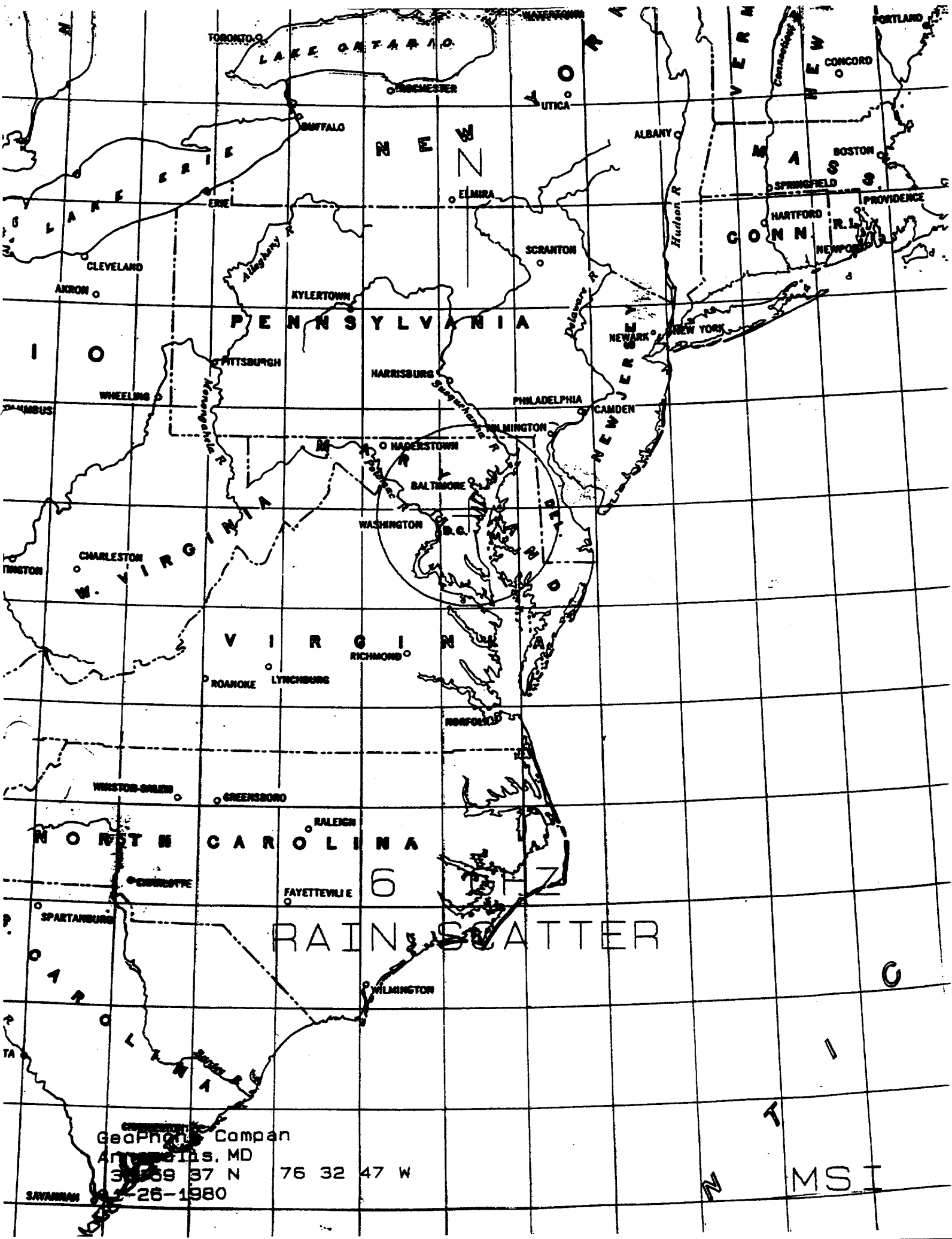
SATELLITE ELEVATION PLOT



GeoPhone Compan
Annapolis, MD
38 59 37 N 76 32 47 W
01-26-1980

MSI



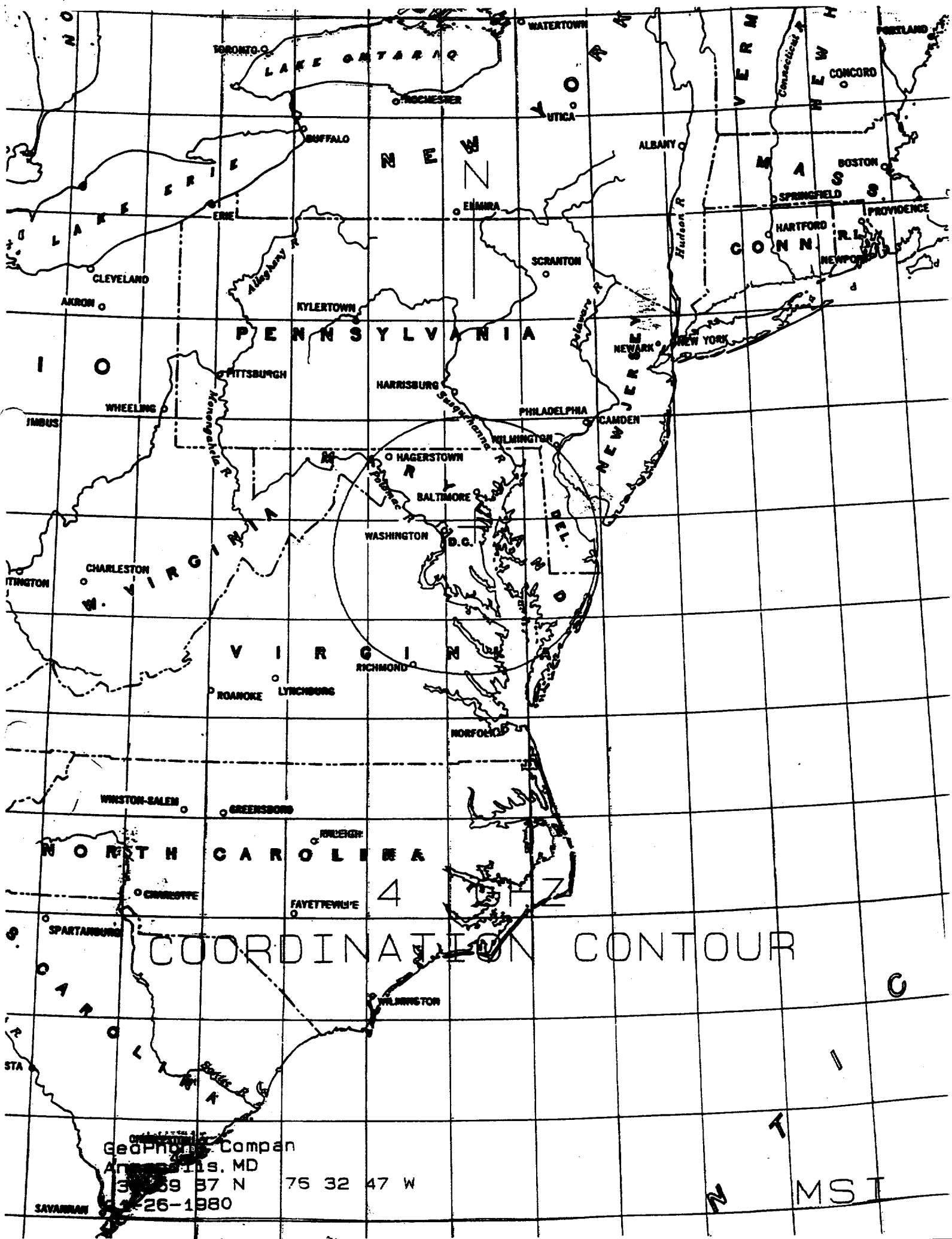


RAIN SCATTER

6

Geophysical Company
Annapolis, MD
38 59 37 N
76 32 47 W
2-26-1980

MSI



Geophysical Company

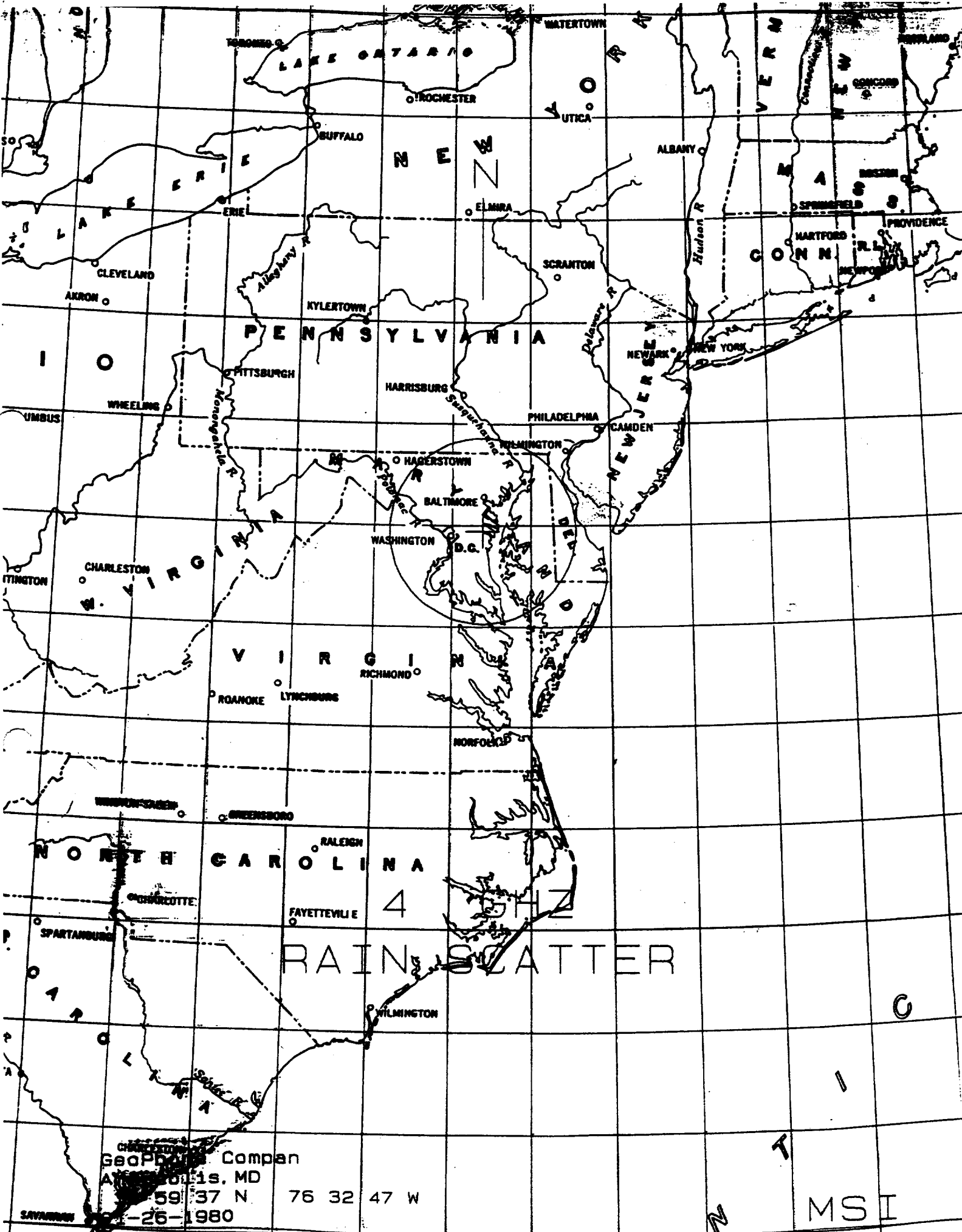
Annapolis, MD

39 37 N

76 32 47 W

1-26-1980

N MST



RAIN SCATTER

Geophysical Company
Arlington, VA

37 59 N 76 32 47 W
26-1980

MSI