

NOAA Technical Memorandum NESDIS 40

**THE GEOSTATIONARY OPERATIONAL ENVIRONMENTAL
SATELLITE DATA COLLECTION SYSTEM**

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FOREWORD

This is a revision of the NOAA Technical Memorandum NESDIS 2, June 1983. The data collection system has had major enhancements implemented and there have been several changes in application procedures since the June 1983 document was printed. In view of these changes, it became necessary to revise the entire document. We hope that this revised document will provide users and prospective users sufficient information to evaluate the different modes of operation in relation to their own data collection requirements and determine its usefulness for their programs. More detailed system component descriptions are available in the documents referenced in the text and may be obtained from the National Environmental Satellite, Data, and Information Service.

**Washington, D.C.
June 1994**

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**THE GEOSTATIONARY OPERATIONAL ENVIRONMENTAL SATELLITE
DATA COLLECTION SYSTEM**

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ABSTRACT

The GOES DCS has only a data collection capability and operates on a regional basis with areal coverage extending westward from western Europe and Africa through the Americas to eastern Australia. The system is entirely operated and funded by the USA, although many non-U.S. organizations use the system. In addition, the GOES DCS supports a certain number of reply channels that are common to the other geostationary meteorological satellites operated by Russia, China, Japan, and the European Space Agency. This allows mobile platforms that move from one area of the world to another to use the data collection system of other geostationary meteorological satellites. No processing of data into engineering units is accomplished in this system, although all messages are checked for parity errors and transmission quality.

The GOES DCS is available for use by any organization collecting environmental data and who have complied with the requirements established by the National Environmental Satellite, Data, and Information Service, as outlined under "Agreements for Use."

1. INTRODUCTION

1.1 Geostationary Operational Environmental Satellite System

1.1.1. Background

The United States of America currently operates Geostationary Operational Environmental Satellites (GOES) that are an integrated system of Earth and space environmental sensors which provide nearly continuous observational information to ground-based user stations. The GOES system is operated and controlled by the National Environmental Satellite, Data, and Information Service (NESDIS) of the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce. The system was developed by NESDIS in conjunction with the National Aeronautics and Space Administration (NASA) and based upon the results of earlier experiments with the NASA Advanced Technology Satellites. The GOES system consists of several observing subsystems including the data collection system (DCS). The DCS uses the GOES spacecraft for the relay of data from remotely located in-situ sites at or near the Earth's surface.

There are two operational GOES located in Earth-synchronous orbits over the Equator at 75EW and 135EW longitudes. These spacecraft have a radio view coverage of most of the Earth from 0E westward to 165EE longitude. Poleward coverage is limited to about 77E north or south latitudes and is further restricted to lower latitudes in either direction from the 75E and 135E satellite sub-point longitudes. See Figures 1-1 and 1-2.

1.1.2 Standby Satellite

To serve as a backup in the event of a failure of either operational satellite, there is a third geostationary satellite, when available, in orbit at longitude 105EW (located mid-way between the other two operational satellites). This satellite is normally used during the eclipse periods to prevent loss of data through either the West or East spacecraft.

1.1.3 Operations During Solar Eclipses

The GOES spacecraft undergo eclipse, i.e., the spacecraft is not in view of the sun due to the Earth being between the sun and the spacecraft during 45-day intervals around the vernal and autumnal equinoxes. The spacecraft eclipse times vary from approximately 10 minutes at the beginning and end of the eclipse periods to a maximum of approximately 72 minutes at the equinox. The eclipses begin 23 days prior to the equinox and end 23 days after the equinox; i.e., March 1 to April 15 and September 1 to October 15, and are centered on spacecraft local midnight.

During these periods, the DCS system remains powered allowing the continued collection of data through these periods. Although the eclipse period does not normally impact the DCS

users, the spring and fall eclipse schedules are disseminated to all DCS users for informational purposes.

1.1.4 Present Operational Modes

The present system supports three operational modes; interrogate, self-timed and random reporting. The interrogate mode requires polling from the NESDIS Ground System through the satellite before the DCP replies. The self-timed mode assigns specific time slots on a reply channel and the DCP contains a timing device that regulates its reply transmissions. The random reporting mode requires that the DCP reply when a preset threshold of a critical measurement parameter is reached. In order to ensure a high probability of a message being received, the random reporting messages are short (2 to 4 seconds) and are repeated in a random manner one or more times.

Figure 1-1

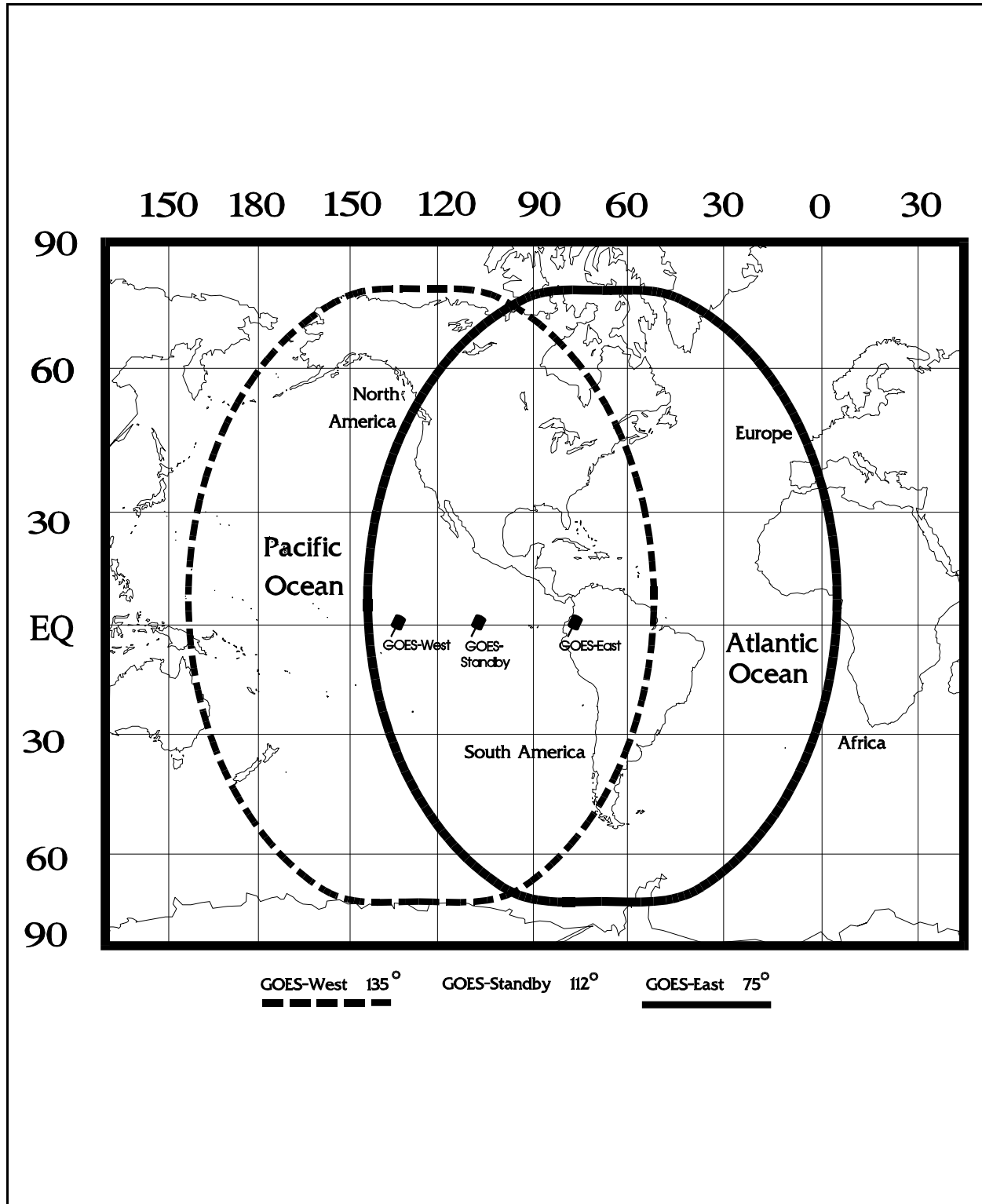


Figure 1-2

2. GOES DATA COLLECTION SYSTEM

2.1 GOES DCS

The GOES DCS is a communications relay system that uses the transponder carried on the GOES spacecraft to relay UHF transmissions from DCP's by S-band (1694.5 MHz) to properly equipped ground receive stations. Conversely, S-band transmissions from the NESDIS ground system can be relayed through the spacecraft transponder in UHF to properly equipped receivers in radio view of the spacecraft. Each spacecraft is capable of supporting up to 233 reply channels. The 200 regional or domestic channels (401.7-402.0 MHz) use 1.5 KHz channel separation and the 33 international channels (402.0-402.1 MHz) use 3.0 KHz channel separation. The 33 international channels are common with both the METEOSAT, GMS, and Russia. China's international channel frequencies are not yet established. The present ground system supports all 200 domestic channels and the 33 international channels.

The DCS has the capacity for handling at least 25,320 messages from DCP sites via the spacecraft transponder in each 1 hour period. This figure is based on the present capability to assign 30-second transmission windows for each of the 200 domestic channels available, i.e., 120 windows per hour over 200 channels ($120 \times 200 = 24,000$) plus 33 international channels ($33 \times 40 = 1320$) $1320 + 2400 = 25320$. However, with advances being made in the stability and accuracy of timing oscillators, transmission windows of 15 seconds may become standard in the future. The data transmission rate for all operational modes is currently 100 bps (bits per second). Prototype 300/1200 baud DCP's are currently being developed and should become operational in 1995.

2.2 The Four Functional Subsystems of the GOES DCS (figure 2-1)

- 1. Deployed Data Collection Platforms**
- 2. East and West Spacecraft**
- 3. Command and Data Acquisition Station (CDA)**
- 4. DOMSAT Data Dissemination Spacecraft**

2.2.1 Type of DCP's

All DCP's used in the GOES DCS must be type-certified by NESDIS. Certification specifications for each type of DCP listed may be obtained from NESDIS. The DCP's available to the user community, at this time, are:

- 1. Self-timed**
- 2. Random Reporting**
- 3. Interrogate**
- 4. Self-timed/Random**

- 5. Self-timed/Interrogate**
- 6. Random/Interrogate**

DAPS DATA DISTRIBUTION NETWORK

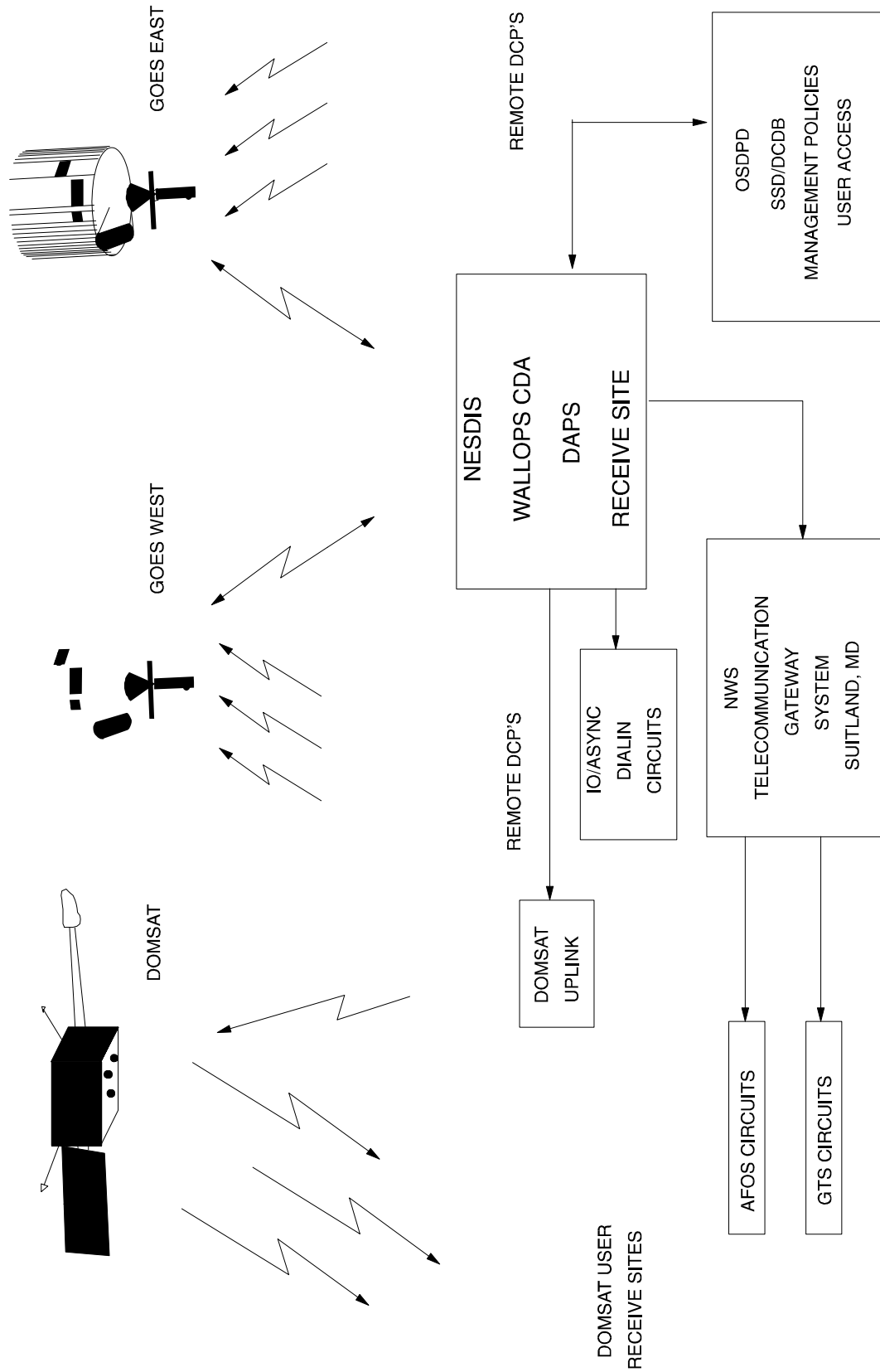


Figure 2-1

2.2.2 Self-timed Data Collection Platforms

Self-timed DCP's are platforms which contain only a transmitter and some form of time source which is preprogrammed to report during a specific hour, a specific time of that hour and at a programmed rate over a 24 hour period. This preprogrammed reporting time and rate should not be confused with the cycle of the sensors attached to the DCP. The sensor cycle refers to the frequency or time interval when the actual environmental sensors are read and these data are placed in the memory of the DCP for transmission at a later time, i.e., a DCP may record an environmental sensor every 15 minutes but these data would be transmitted through the GOES DCS only at the assigned reporting interval.

2.2.3 Random Reporting DCPs

The random reporting DCP transmits per a pre-defined sensor threshold which is triggered by an environmental event. This frequency of reporting changes when environmental thresholds are reached or exceeded. The threshold is programmed into the DCP by the user as well as other information which will control the DCP's reporting rate during the period that the environmental event is above a fixed threshold. It should be noted that only the parameter that caused the transmission should be transmitted when in the random mode. During normal periods a random reporting DCP is expected to report up to 3 times per day at random times within that day. This method of operation allows the DCP to report that it is still functioning and that all sensors are normal. The Users Guide for Random Reporting explains in detail the operation and application of this type of DCP.

2.2.4 Interrogate DCP's

This type of DCP contains both a receiver and a transmitter. The receiver is set to either the East or West spacecraft DCPI link frequency which enables it to detect its own address or ID when transmitted from the Command and Data Acquisition (CDA) station at Wallops Station, Virginia. Upon detection of its own ID it will transmit all data accumulated since the last reporting sequence. Interrogated DCP's are scheduled in a manner similar to self-timed DCP's except that the interrogation schedule for the DCP is stored in the DAPS system at the CDA instead of in the DCP. Interrogated DCP's may be interrogated as often as every 5 minutes in special situations, or as infrequently as once per day. Interrogated DCP's may also be commanded into different operating modes. This command function is invoked by NESDIS (or the users) by transmitting a second address immediately following the DCP's normal address. This second address is decoded according to the DCP's own internal programming. Up to 4096 different commands may be sent to each DCP. The command capability is described in NOAA Technical Memorandum No. NESS 82. More detailed information on this type of DCP and its operation is furnished in the User Interface Manual.

2.2.5 Self-timed Interrogate

Self-timed and Interrogate type of DCPs operate in a self-timed mode under normal conditions. When a message is not received at the DCPs normal reporting time, an interrogation address is sent via the DAPS to the DCP and a reply is expected over the interrogate reply channel.

2.2.6 Self-timed and Random Reporting DCP's

This type of DCP has the same self-timed characteristics as stated above, but also it has the capability of transmitting over a secondary channel when environmental conditions require more frequent reporting than offered under self-timed operation. This type of combined operation permits a self-timed operation when environmental conditions are normal and immediate and more frequent reporting when abnormal environmental conditions exist. NESDIS has special policies which govern the use of this type DCP and are explained in greater detail in the Users Guide for Random Reporting.

2.2.7 Random/Interrogate

The random-interrogate mode of operation is used to monitor special events (such as seismic events). When the event condition reaches a pre-set level, a random transmission is sent through the GOES spacecraft. Only the DCP ID (address) is transmitted. When the ID is received by the DCS system at the CDA, an interrogate ID is transmitted through the GOES spacecraft. The interrogate ID can be used as a notification of the event, change a DCP's mode of operation or cause certain functions to be performed.

2.2.8 Message Formats

The DCS will accept only those messages transmitted from DCP's which are received in one of two message formats. These message formats are divided into three parts, preamble, data, and post-amble. The preamble may be one of two types, long or short. The short preamble must be used for random reporting operations. However, it also can be used for self-timed and interrogate operations if the user desires. The long preamble is presented in figure 2-2, and the short preamble is presented in figure 2-3. The capability to produce at least the short preamble is a certification requirement for all types of DCP's.

The sensor data are expected to be binary-coded ASCII characters (conforming to the 128-character code set shown in figure 2-4) transmitted serially (least-significant bit first), with odd parity determining the eighth bit for each character. In lieu of pure binary data the DCS permits a pseudo-ASCII process (see figure 2.5) which provides higher data precision. Binary data are permitted with the new High Data Rate (HDR) equipment. These special requirements are needed to ensure that binary data are not misinterpreted as control characters, affecting the communications link operation. The sensor data must not contain certain ASCII characters that have special control functions in the DCS dissemination system. These prohibited characters are: DLE, NAK, SYN, ETB, CAN, GS, RS, SOH, STX, ET, ENQ, and ACK. End of Transmission (EOT) characters must appear only at the end of a

transmission and will be deleted from data prior to dissemination through the NESDIS ground system. Data characters containing parity errors will be replaced with NUL depending on the specific dissemination link. The post-amble is an ASCII EOT with odd parity. This eight bit EOT code (bit pattern 00100000-MSB first), is sent immediately following the last data character (no break).

NESDIS assigns each DCP at least one 31-bit address or ID. The address is part of the required format for transmission of sensor data, and is used by the NESDIS Ground System to route data to the user.

GOES DCS ASCII CHARACTER SET

b4b3b2b1	b7 ---- b6 --- b5 --	0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
0000		NUL	<u>[DLE]</u>	SPACE	0	@	P	'	p
0001		<u>[SOH]</u>	DC1	!	1	A	Q	a	q
0010		<u>[STX]</u>	DC2	"	2	B	R	b	r
0011		<u>[ETX]</u>	DC3	#	3	C	S	c	s
0100		EOT	DC4	\$	4	D	T	d	t
0101		<u>[ENO]</u>	<u>[NAK]</u>	%	5	E	U	e	u
0110		<u>[ACK]</u>	<u>[SYN]</u>	&	6	F	V	f	v
0111		BEL	<u>[ETB]</u>	'	7	G	W	g	w
1000		BS	<u>[CAN]</u>	(8	H	X	h	x
1001		HT	EM)	9	I	Y	i	y
1010		LF	SUB	*	:	J	Z	j	z
1011		VT	ESC	+	;	K	{	k	{
1100		FF	FS	,	<	L	\	l	
1101		CR	<u>[GS]</u>	-	=	M	}	m	}
1110		SO	<u>[RS]</u>	.	>	N	^	n	~
1111		SI	<u>[US]</u>	/	?	O	_	o	DEL

USASCII CONTROL CHARACTERS

ACK Acknowledge **EM** End of Medium **NAK** Negative ACK
BEL Bell **ENO=WRU** Enquiry **NUL** Null
BS Backspace **EOT** End of Transmission **RS** Record Separator
CAN Cancel **ESC** Escape **SI** Shift In
CR Carriage Return **ETB** End of XMIT Block **SO** Shift Out
DC1=X-ON Control 1 **ETX** End of Text **SOH** Start of Heading
DC2=TAPE Control 2 **FF** Form Feed **STX** Start of Text
DC3=X-OFF Control 3 **FS** File Separator **SUB** Substitute

Figure 2-4

DC4=TAPE **Control 4** **GS** **Group Separator** **SYN** **Synchronous Idle**
***DEL=RUB OUT** **Delete** **HT** **Horizontal Tab** **VT** **Vertical Tab**
DLE **Data Link Escape** **LF** **Line Feed** **US=ITB** **Unit Separator**

_____ **Non-printable Character - non-displayable via ASCII terminal**

|_____| **Prohibited Character - not output via the DAPS (always NUL)**

***not strictly a control character**

Figure 2-4 (cont)

Figure 2-5

2.3 East and West Spacecraft Message Relay

The two operational spacecraft which support the GOES DCS are referred to as GOES East (located at 75EW longitude) and GOES West (located at 135EW longitude). Each spacecraft is capable of supporting the 233 (200 domestic, 33 international) reply channels (see Appendix A).

To provide extra channel guard band width for the domestic frequencies GOES DCS channels are assigned as follows, odd-numbered channels to the east spacecraft at 75EW and the even-numbered channels to the west spacecraft at 135EW. This results in a 3.0 KHz separation between adjacent channels on the spacecraft. Transmissions from one type of DCP (interrogate, self-timed, etc.) will not be mixed with another type on the same channel. The international channels are assigned to both spacecraft at all times.

Command/Interrogate signals from the CDA station are received by the appropriate spacecraft at S-band then translated to UHF (east and west spacecraft interrogation and command frequencies are different: West = 468.825 MHz, East = 468.8375 MHz), and retransmitted through an Earth coverage antenna to the field of deployed DCP's. Response signals from interrogated DCP's and transmitted signals from self-timed and random reporting DCP's are received by the spacecraft at UHF, translated to S-band, and retransmitted to the CDA station. The spacecraft transponder is fully redundant to prevent DCS outages due to premature equipment failure.

2.4 Data Error Probability

Under reasonable conditions, the user can expect to obtain a bit error probability of 10^{-5} or better, using data received at the CDA. Various factors affect data quality. Some of these are determined by the GOES System design, while others are related to instantaneous spacecraft usage and propagation conditions.

The spacecraft DCS down-link power at S-band is shared between all of the reply channel activity. As the number of DCP's increases, somewhat less power is available to each simultaneously active channel. Furthermore, simultaneous operation of the imaging subsystem reduces the total power available to the DCS down-link transmission by 4 to 5 dB. Sufficient power margin is provided in the system design to accommodate full anticipated loading under the above worst-case power sharing conditions when utilizing the CDA or an equivalent performance ground readout facility.

Other factors that can affect data quality are the DCP's geographic location with respect to the spacecraft, as losses are slightly higher at the "Earth's edge"; multipath propagation, in which DCP signals are reflected from the ground, ocean, etc., and interference with direct

signals; and ionospheric scintillation, which may occasionally produce greater than normal path attenuation. Maintenance of the DCP, adjustment of the DCP antenna positioning, and provision of an unobstructed path to the GOES are essential to minimum-error performance.

2.5 NESDIS Ground System

The NESDIS ground system may be broken into two groups: the Radio Frequency front end equipment and the DCS computer equipment or DAPS. Each of these subsystems performs dedicated data transfer handling and processing functions in the GOES DCS. The DAPS system is comprised of two identical computer systems with identical front end message ingest and sharing a pair of mirrored hard disks.

2.5.1 Wallops CDA

The DAPS computer system contains the Platforms Data Tables (PDT) for each DCP authorized to operate within the DCS and all user ID's assigned. An example of a typical PDT is provided in Appendix B.

Messages are received from either operational spacecraft via S-band receiving systems at the CDA. The received DCP messages are routed to the Data Acquisition and Monitoring Subsystem (DAMS) units which will demodulate the data and perform the signal quality measurements. These signal quality measurements include the signal strength (transmitted EIRP), the frequency offset or deviation from the center frequency of the assigned channel, the modulation index, and the data quality which is an indication of the bit error rate. These quality measurements are appended to each received message along with the channel over which each message was received and from which satellite (East or West) it was relayed. A more detailed description of the DAMS units and how the quality measurements are obtained is furnished in the Users Interface Manual.

A typical DCP message with DAMS quality information which would be relayed to the user is presented in figure 2-6. A description of the contents of a typical DCP message is outlined in figure 2-7.

The DAPS operates in a fully redundant mode with an automatic fail over feature. In general, one of the two computers serves as the PRIME or operational DAPS while the other is configured as a stand-by or hot back-up. A more detailed description of the DAPS operation is discussed in the User Interface Manual.

The following example shows a DCP message:

DCP Address

	Failure Code		
		Channel & SC	
		Message Length	

----- - ---- ----
CE122654889193032018G46-3NN052WFF00028DEAap@JAAap@JAAap@JAgri

----- - -- -----
| | | |
| | | **DCP Message Data**
| | **IFPD***
| |
| **DAMS Data**
YYDDHHMMSS Quality Measurements

***NOTE:** The DAPS IFPD interface is not operational at this time. Therefore DCS users should expect an "FF" in this part of the message header.

Figure 2-6

DCP MESSAGE FORMAT

FIELD	SIZE (bytes)	CONTENTS
ADDRESS	8	DCP address
YEAR	2	Year message was received
DAY	3	Day of year message was received
HOUR	2	Hour message was received
MINUTE	2	Minute message was received
SECOND	2	Second message was received
FAILURE_CODE	1	Code for message (see Notes)
SIGNAL_STRENGTH	2	DAMS quality measurement
FREQUENCY_OFFSET	2	DAMS quality measurement
MODULATION_INDEX	1	DAMS quality measurement
DATA_QUALITY	1	DAMS quality measurement
CHANNEL_RECEIVED	3	Channel message received on
GOES_SPACECRAFT	1	GOES spacecraft used
UPLINK_CARRIER_STATUS	2	Uplink carrier status
MESSAGE_DATA_LENGTH	5	Message length (bytes)
MESSAGE_DATA	15750 (max. bytes)	Message data (variable length)

Notes:

- (1) All fields are ASCII.
- (2) When downloaded, all messages in message file are separated by three (3) NEW LINE <NL> characters.
- (3) FAILURE_CODE will contain one of the following characters:
 - G - Good message
 - ? - Message received with parity errors
 - W - Message received on wrong channel
 - D - Message received on multiple channels (duplicate)
 - A - Message received with address error(s) (correctable)

- T - Message received late/early (time error)
- U - Unexpected message received (over two minutes early/late of assigned time)
- N - PDT incomplete (user required data is missing)
- M - Scheduled message is missing

Figure 2-7

2.5.2 Data Dissemination

There are currently four mediums for the dissemination of data received by the DCS system. These four dissemination mediums are described below.

DIAL-IN

The primary method for users to retrieve their DCP message data from the DAPS is via the dial-in capability. The DAPS operates 10 dial-in lines connected in a rotary configuration. The data output from DAPS ranges from 300/9600 baud dependent upon the users equipment.

DOMSAT

Data is also disseminated via a domestic satellite (DOMSAT) which allows a user to receive the data in a near real-time manner. The data received at the CDA are relayed through the DOMSAT spacecraft in a matter of seconds. This form of dissemination also relays all error messages and upcoming DAPS events (bulletins).

NATIONAL WEATHER SERVICE TELECOMMUNICATIONS GATEWAY (NWSTG)

Data relayed through this medium must carry a special header to identify the user and the destination of the message for the Gateway system computers. These identifiers are assigned by the NWS. Only data messages are relayed through NWS, error messages and bulletins are not sent to NWS.

DIRECT READOUT

This mode of data retrieval is accomplished by users operating ground systems similar to the CDA ground system but on a smaller scale. The data is obtained directly from the spacecraft.

This mode of data retrieval is used by users with large numbers of DCPs or are located in areas where other means of data retrieval are not practical. South American and Canadian users operate their own DRGS systems.

The DAPS system stores all message data for up to 72 hours and users who retrieve their data from NESDIS should retrieve this data at least once every 24 hours.

3. Agreements for Use

3.1 Procedures for Applying to Use the GOES DCS

3.1.1 Limitations and Eligibility

International agreements limit frequencies used by the GOES to the relay of environmental data with a minimal amount of DCP housekeeping information. Environmental data are defined as observations and measurements of physical, chemical or biological properties of oceans, rivers, lakes, solid earth and/or atmosphere (including space). In addition, all data acquired through the GOES DCS are considered in the public domain (i.e., available to anyone who needs it) with exception of certain private users' who may request proprietary treatment of collected data if special conditions are met. Also, private users who want to collect environmental data that are useful or necessary for implementation of programs of the Federal Government or State or local governments may have access to the GOES DCS if they meet all other prerequisites for use of the GOES DCS. All non-U.S. or private users must submit with their application to use the GOES DCS a written statement from a sponsor which indicates that the sponsor requires all or a portion of data collected to support their program. A sponsor is defined as U.S. Federal Agency or U.S. State or local government. See Appendix C.

3.1.2 Application Requests

An organization having a requirement for data collection, or which plans to collect data using the GOES DCS capability, must formally request permission to participate. Requests should be mailed to:

**Chief, Data Collection and Direct
Broadcast Branch (E/SP21)
National Environmental Satellite, Data,
and Information Service
National Oceanic and Atmospheric Administration
NOAA Science Center, Room 806
Washington, D.C. 20233**

The prospective user must describe the proposed use of the DCS for examination by NESDIS. A questionnaire (see Appendix D) is provided to facilitate presentation of information needed to properly consider the user's request. Upon approval of the user's

request for participation in the DCS, a Memorandum of Agreement (MOA) will be prepared. There are three types of MOA's: an International Memorandum of Agreement (see Appendix E), and a Domestic Memorandum of Agreement (see Appendix F), and a Manufacturers Memorandum for Agreement (see Appendix G). (The major difference in processing the three MOA's is the number of internal NOAA offices that must coordinate the approval of the agreement. The international MOA requires approval by the Deputy Assistant Administrator for Satellites whereas the domestic and manufacturers MOA's only require coordination for approval within the NESDIS Office of Satellite Data Processing and Distribution.) The net result is a longer period of time required to process applications from non-U.S. organizations than is necessary for U.S. organizations.

Subsequent to the receipt of the properly executed MOA, NESDIS will implement the user's program by assigning DCP addresses, channel, reporting times, and user ID's as required. It is the user's responsibility to obtain permission from the appropriate communications authority to transmit on the assigned frequency. The user is also responsible for completing a PDT for each DCP assignment. An example of a completed PDF is shown in Appendix B.

3.2 Costs

Collection of environmental data from user platforms and processing these data for dissemination using the GOES DCS facilities is without charge to the user. This statement does not preclude the possibility that at some time in the future a user service fee or some form of service charge may be required for users of the DCS. At the present time, the user is responsible for costs of sensor platforms (such as procurement, maintenance, and installation) and such tests are required to establish conformity to the DCS performance specifications. The user will also be responsible for the costs of communication lines, modem equipment, and data terminals necessary for the dissemination of data from the Wallops CDA facility if a dial-in link is used.

3.3 Direct Data Readout From the GOES DCS

Any user, with discretion, may implement a data collection direct receiving facility and thereby achieve direct readout of the S-band reply data from the GOES. The direct readout facility must be passive, i.e., receive only and not be able to transmit directly to the spacecraft. This direct readout facility enables a user to be independent of the primary NESDIS Ground System. However, the user will be required to adhere to the channel assignments and schedules coordinated for GOES DCS by NESDIS. Other than these requirements, NESDIS requires no formal agreement with the operator of a direct readout facility. In order for the operator of a direct readout facility to be notified of planned or sudden changes in the DCS operational configuration, it is highly recommended that the direct readout facility operator dial into the DAPS system on a regular basis to check for changes in

spacecraft status. The manufacturers who provide ground receive equipment are indicated by (*) in Appendix H.

3.4 Data Collection Platform Sources

DCP characteristics were described in some detail in Chapter 2. There are several sources of DCP's both domestic and international. A list of DCP manufacturers is furnished in Appendix H. A word of caution is necessary for those applicants who might consider using DCP's manufactured by a non-U.S. firm, as these DCP's must be type-certified by NESDIS to operate in the GOES domestic frequency band (401.7 to 402 MHz). However, any DCP certified by a satellite operator who is a member of the Coordination for Geostationary Meteorological Satellites, will be able to operate on the international channels (402.0 to 402.1 MHz) that are common to the GOES, METEOSAT, and GMS.

APPENDIX A

<u>CHANNEL</u>	<u>FREQUENCY</u>	<u>CHANNEL</u>	<u>FREQUENCY</u>
1	401.7010	51	401.7760
2	401.7025	52	401.7775
3	401.7040	53	401.7790
4	401.7055	54	401.7805
5	401.7070	55	401.7870
6	401.7085	56	401.7835
7	401.7100	57	401.7850
8	401.7115	58	401.7865
9	401.7130	59	401.7880
10	401.7145	60	401.7895
11	401.7160	61	401.7910
12	401.7175	62	401.7925
13	401.7190	63	401.7940
14	401.7205	64	401.7955
15	401.7220	65	401.7979
16	401.7235	66	401.7985
17	401.7250	67	401.8000
18	401.7265	68	401.8015
19	401.7280	69	401.8030
20	401.7295	70	401.8045
21	401.7310	71	401.8060
22	401.7325	72	401.8075
23	401.7340	73	401.8090
24	401.7355	74	401.8105
25	401.7370	75	401.8120
26	401.7385	76	401.8135
27	401.7400	77	401.8150
28	401.7415	78	401.8165
29	401.7430	79	401.8180
30	401.7445	80	401.8195
31	401.7460	81	401.8210
32	401.7475	82	401.8225
33	401.7490	83	401.8240
34	401.7505	84	401.8255
35	401.7520	85	401.8270
36	401.7535	86	401.8285
37	401.7550	87	401.8300
38	401.7565	88	401.8315
39	401.7580	89	401.8330
40	401.7595	90	401.8345
41	401.7610	91	401.8360
42	401.7625	92	401.8375
43	401.7640	93	401.8390
44	401.7655	94	401.8405

45	401.7670	95	401.8420
46	401.7685	96	401.8435
47	401.7700	97	401.8450
48	401.7715	98	401.8465
49	401.7730	99	401.8480
50	401.7745	100	401.8495

<u>CHANNEL</u>	<u>FREQUENCY</u>	<u>CHANNEL</u>	<u>FREQUENCY</u>
101	401.8510	151	401.9260
102	401.8525	152	401.9275
103	401.8540	153	401.9290
104	401.8555	154	401.9305
105	401.8570	155	401.9320
106	401.8585	156	401.9335
107	401.8600	157	401.9350
108	401.8615	158	401.9365
109	401.8630	159	401.9380
110	401.8645	160	401.9395
111	401.8660	161	401.9410
112	401.8675	162	401.9425
113	401.8690	163	401.9440
114	401.8705	164	401.9455
115	401.8720	165	401.9470
116	401.8735	166	401.9485
117	401.8750	167	401.9500
118	401.8765	168	401.9515
119	401.8780	169	401.9530
120	401.8795	170	401.9545
121	401.8810	171	401.9560
122	401.8825	172	401.9575
123	401.8840	173	401.9590
124	401.8855	174	401.9605
125	401.8870	175	401.9620
126	401.8885	176	401.9635
127	401.8900	177	401.9650
128	401.8915	178	401.9665
129	401.8930	179	401.9680
130	401.8945	180	401.9695
131	401.8960	181	401.9710
132	401.8975	182	401.9725
133	401.8990	183	401.9740
134	401.9005	184	401.9755
135	401.9020	185	401.9770
136	401.9035	186	401.9785
137	401.9050	187	401.9800
138	401.9065	188	401.9815
139	401.9080	189	401.9830
140	401.9095	190	401.9845
141	401.9110	191	401.9860
142	401.9125	192	401.9875
143	401.9140	193	401.9890
144	401.9155	194	401.9905
145	401.9170	195	401.9920
146	401.9185	196	401.9935
147	401.9200	197	401.9950
148	401.9215	198	401.9965
149	401.9230	199	401.9980
150	401.9245		

INTERNATIONAL FREQUENCY BAND CHANNELIZATION

<u>CHANNEL</u>	<u>FREQUENCY</u>
202	402.0025
204	402.0055
206	402.0085
208	402.0115
210	402.0145
212	402.0175
214	402.0205
216	402.0235
218	402.0265
220	402.0295
222	402.0325
224	402.0355
226	402.0385
228	402.0415
230	402.0445
232	402.0475
234	402.0505
236	402.0535
238	402.0565
240	402.0595
242	402.0625
244	402.0655
246	402.0685
248	402.0715
250	402.0745
252	402.0775
254	402.0805
256	402.0835
258	402.0865
260	402.0895
262	402.0925
264	402.0955
266	402.0985

APPENDIX B

*** PLATFORM 474EC570 PARAMETERS *** INDEX = 12046

<u>Parameter</u>	<u>Description</u>	<u>Value</u>
OWN_ID	User id of owner:	NESDIS
PRIME_TYPE	Primary type: S: Self-timed, I: Interrogate, R: Random, D: Dual	S
PRIME_CHAN	Primary channel (1-266)	015
PRIME_SCID	Primary GOES spacecraft assigned: E: East, W: West	E
SECND_ADDR	Secondary address:	
SECND_TYPE	Secondary type: R: Random, I: Interrogate, or Null	
SECND_CHAN	Secondary channel (1-266)	000
SECND_SCID	Secondary GOES spacecraft assigned: E: East, W: West	
TRIGGER_MODE	Trigger mode: S: Special, T: Test or Null	
FIRST_XMT	First trans./interrog.	(HHMMSS): 002400
XMT_PERIOD	Time between trans./interrog.	(HHMMSS): 010000
XMT_WINDOW	Transmission window (S/D types)	(MMSS): 0100
XMT_RATE	Transmission rate (100/300/1200):	0100
MAX_RETRIES	Max. number of interrogation retries:	00
DATA_FORMAT	Data format (A: ASCII, B: Binary):	A
PRIME_PREAMBLE	Prime preamble (L: Long, S: Short):	L
SECND_PREAMBLE	Secondary preamble (L: Long, S: Short):	
LOC_CODE	Location code:	PQ
LOC_REGION	Location category: A: United States, B: Canada C: South America, O: Other	B
LOC_NAME	Location:	ILE BICQUETTE
LATITUDE	Latitude (DDMMSS, - is South):	482500
LONGITUDE	Longitude (DDDMMSS, - is West):	-0685400
MIN_ELEVATION	Min. elevation angle of platform (DD):	05
CATEGORY	Platform category: F: Fixed-buoy, D: Drifting-buoy, A: Aircraft, S: Ship, O: Other, B: Balloon L: Land-based	L
MANUFACTR_ID	DCPRS manufacturer name:	VALCOM, LTD.
MODEL_NO	DCPRS model number:	697-07 (8W)
SEASON_ID	Seasonal indicator:	N
NMC_FLAG	NMC dissemination (Y/N):	Y

NMC_DESCRIPTOR	NMC data descriptor:	SXCN42
ASSIGN_DATE	Date address assigned (YYYYMMDD):	19930622
DATE_DEPLOY	Date deployed (YYYYMMDD):	19890101
DATE_REDEPLOY	Date redeployed (YYYYMMDD):	19921002
PMAINT_NAME	Maintenance official name:	MIKE NESTLEBUSH
PMAINT_PHONE	Maintenance official phone:	(301)763-8063
PMAINT_FTS	Maintenance official FTS phone:	(301)763-8063
PMAINT_FAX	Maintenance official FAX phone:	(301)763-8449
PMAINT_TELEX	Maintenance official telex:	
ERR_FREQ	Consecutive failures before error:	003
ERR_DATE	Date of user contact (YYYYDDD):	0000000

*** SHEF CODES ***

SHEF_CODE1: PA SHEF_CODE2: TA SHEF_CODE3: XR SHEF_CODE4: UD SHEF_CODE5: US
SHEF_CODE6: UG SHEF_CODE7: PC SHEF_CODE8: SHEF_CODE9: SHEF_CODE10:
SHEF_CODE11: SHEF_CODE12: SHEF_CODE13: SHEF_CODE14: SHEF_CODE15:

Status (Active/Deactive): A
Last active date/time: 94059/22:24:46
Date of last update: 1994032
Updated by: NWCAE1
Entry complete (Y/N): Y
Edit number: 00004

APPENDIX C

EXTRACTED FROM: Federal Register / Vol. 46, No. 191 / Friday, October 2, 1981 / Rules and Regulations

SUMMARY

The GOES Data Collection System (DCS) has extra capacity which can be made available to non-NOAA users for the collection from remote locations of environmental data provided that NOAA, another Federal agency, or a State or local government also has an interest in or a requirement for obtaining these data, and that no alternative commercial service exists. This revision of NOAA's regulations establishing a policy for operation of the GOES DCS is necessary for two reasons. In the first place, the revision clarifies that private users who want to collect environmental data that are useful or necessary for implementation of programs of the Federal Government or State or local governments may have access to the GOES DCS if they meet all other prerequisites for access to the GOES DCS. Secondly, the revision provides that in certain exceptional circumstances NOAA may agree to a private user's request for proprietary treatment of collected data, subject to subsequent review if challenged under the Freedom of Information Act.

DATES: Effective date: October 2, 1981.

SUPPLEMENTARY INFORMATION

The GOES DCS is a system for collecting and transmitting data from remote platforms via a government owned geostationary satellite the primary purpose of which is the collection of environmental data, in particular meteorological, hydrological, and oceanic data.

On June 30, 1981, NOAA published in the Federal Register a revision to its regulations on the administration and operation of a GOES DCS. (45 FR 43701, codified at 15 CFR. Part 911.) That revision established the NOAA policy that the GOES DCS would be made available to non-NOAA users who owned or operated platforms for the collection of environmental data required by or desired for the implementation of Federal programs or required by State or local governments. All users had to agree to permit NOAA and other Federal agencies free and open use of data collected. The regulations also established a priority order by which requests from non-NOAA users for access to DCS would be processed.

The regulations of June 30, 1980, did not clearly state whether private organizations could use the GOES DCS. NOAA has interpreted its regulations so that it has permitted private organizations to use the GOES DCS provided that they had a Federal agency or State or local government sponsor for the particular collection of data. These regulations now clarify this point by naming private organizations as eligible users of the GOES DCS provided that they meet all other conditions for access to the DCS.

Since the June 30, 1980, publication of the Part 911 interpretative regulations, NOAA has received requests from non-NOAA, private users who proposed to collect data that not only would further the implementation of NOAA's responsibility for forecasting the weather and issuing severe storm warnings but also would further commercial interests of these prospective users. These users want to use the GOES DCS because no satisfactory commercial service is available for the real-time transmission of environmental data from remote locations. In addition, these users would be investing substantial sums of money in the deployment of data collection platforms and want some assurance that these data would not be made routinely available to their

competitors.

NOAA has reviewed the basis for the existing policy of "free and open use of data" and has concluded that (1) no law pursuant to which the GOES DCS is operated requires the dissemination to the public of all environmental data collected from private users and (2) the existing policy would impeded NOAA's ability to obtain. NOAA operates the GOES DCS pursuant to the general authority of the Secretary of Commerce (1) to provide warnings of and forecast weather and ocean conditions, including the collection and transmission of marine intelligence for the benefit of commerce and navigation; and (2) to participate in the development of an international basic meteorological reporting network, including the establishment, operation and maintenance of reporting stations on the high seas, in polar regions and in foreign countries. (15 U.S.C. 3.3, 49 U.S.C. 1483.) The Secretary of Commerce also is authorized to prepare studies and perform services within the authority of the Department of Commerce at the request of any person or organization, public or private, upon the payment of the actual or estimated cost of such work, and to cooperate with business organizations in the conduct of activities of the Department. (7 U.S.C. 450b; 15 U.S.C. 1525.) These laws do not mandate the disclosure of all information collected thereunder.

NOAA will continue to operate the GOES DCS under a general policy of free and open use of all data and will apply this policy to the collection and dissemination of environmental data required for warnings or forecasting. NOAA will, however, consider a request not to disseminate data collected from a private commercial user's platform that (1) NOAA deems to be commercial, confidential information or trade secrets; (2) and whose collection serves a public or Federal purpose. Data required for the protection of life and property will not be granted proprietary treatment. By amending its data policy in this limited way, NOAA and the public will be able to obtain valuable meteorological or other environmental data which would not otherwise be obtained and companies will be able to increase their productivity.

The NOAA Administrator has determined that the revised Part 911 regulations do not constitute a "major rule" within the meaning of Executive Order 12291. Preparation of a Regulatory Impact Analysis is therefore not required. The Revisions impose no major costs on the economy within the terms of the Executive Order, nor are any major costs or price increases foreseen that will impact consumers, individual industries, Federal, State, or local government agencies or geographic areas. Instead, the revisions will enable commercial users to operate more efficiently by gaining more knowledge of the environment in which they work, while, at the same time, allowing NOAA and other entities within the Federal Government to receive, at no cost to the Government, data valuable to the Public interest.

NOAA foresees no significant effects associated with the revisions to Part 911 that would adversely affect competition, employment, investment, productivity, innovation or the ability of U.S.-based enterprises to compete with foreign based enterprises in domestic or export markets.

This final rule is exempt from the requirements of the Paperwork Reduction Act of 1980 because, based on past experience, NOAA does not expect to receive ten or more requests per year from users who request proprietary treatment of data and have to respond to identical reporting requirements.

911.1 General Information

(a) The GOES Data Collection System (DCS) provides an effective method for obtaining environmental data from remote location where conventional communications are either absent or inadequate. The use of the

DCS is limited to the collection of environmental data in accordance with applicable International Telecommunication Union (ITU) regulations concerning use of the allocated frequency bands.

(b) (1) The DCS was established in 1974 to obtain from remote locations data required for the effective accomplishment of programs of the National Oceanic and Atmospheric Administration. The DCS capacity can more than provide for all of NOAA's present and near future domestic and international requirements. This makes it possible to offer to Federal and State agencies or local governments of the United States, and to those private users and foreign government agencies whose use of the system would support a program of a United States agency, the opportunity to make use of the DCS. Policy guidelines are set forth below.

(2) For purposes of this part, "user" refers to a private or governmental organization, whether for profit or not for profit, that owns or operates environmental data collection platforms for the purpose of collection and transmission of environmental data through the GOES DCS and for which a Federal agency or State or local government has a requirement for or interest in obtaining these data.

911.2 Use of the GOES DCS

(a) Use of the GOES DCS can be authorized only for the purpose of collecting environmental data. Environmental data as used here means observations and measurements of the physical, chemical or biological properties of the ocean, river, lakes, solid earth, and atmosphere (including space).

(b) The GOES DCS is not to be used for data collection where adequate private common carrier communications exist to provide the service. (Adequate is defined in terms of capacity, speed and reliability with respect to the particular use envisioned.) A user must document, with a request for use of the GOES DCS, why private common carrier communications are not adequate.

(c) A user must identify the Federal agency or State or local government which will benefit from the proposed collection of data. NOAA will confirm with the sponsoring Federal Agency, or State or local government that these data are required by, in support of or in furtherance of, a program conducted by the sponsoring agency or State or local government.

(d) User agencies and organizations will be admitted to system use with priority status as follows:

(1) NOAA users or users whose data are required for implementation of NOAA programs.

(2) Users whose data are desired to support NOAA programs.

(3) Users whose data and/or use of the GOES DCS will further a program of an agency or department of the United States Government.

(4) Users whose data are required by a State or local government of the United States. No other users will be admitted to system use.

(e) All users of the GOES DCS must use a data collection platform radio set whose technical characteristics conform to specifications established by NOAA. The message format must be as specified by NOAA.

(f) All users are responsible for all costs associated with the procurement and operation of these platform any confidential treatment of data under 911.3, and for the acquisition of these data from those platforms either directly from the satellite or from the NOAA GOES Data Collection Center at the Wallops CDA, at Wallops, Virginia.

(g) Design characteristics of the environmental data collection system on the spacecraft require that users conform to technical standards established by NOAA. See 911.5 below.

(h) NOAA will make every effort to maintain the GOES DCS in full operation at times subject to the availability of appropriations. NOAA will bear no responsibility for any losses as a result of the nonavailability of the DCS.

911.3 Treatment of Data

(a) All users of the GOES DCS must agree to permit NOAA and other agencies of the United States Government the free and open use of all data collected from their platforms, except as otherwise provided for in paragraphs (b)-(f) of this section and to provide NOAA with the necessary information on data formats to facilitate such use.

(b) NOAA will consider a request from a user, who has otherwise met the criteria of 911.2 for proprietary treatment by NOAA of all or a portion of these data collected from the platforms owned by the user. Each request for proprietary treatment must:

(1) Specifically identify the exact portion(s) of these data claimed to be confidential.

(2) State whether these data claimed to be confidential are commonly known within the user's industry or activity or is readily ascertainable by outside persons with a minimum of time and effort.

(3) State how release of these data would be likely to cause substantial harm to the user's competitive position.

(4) Identify the Federal agency or governmental program which would benefit by gaining access to these data to be collected.

(5) State whether the submitter is authorized to make claims of confidentiality on behalf of the person or organization concerned and;

(6) State when the confidential data may be made public.

(c) (1) NOAA may treat environmental data obtained by the GOES DCS as proprietary if the Assistant Administrator for Satellites, with the advice of the General Counsel and other interested Federal officers, finds that:

(i) Data are trade secrets or commercial information obtained from a user and privileged or confidential; and

(ii) Use of the GOES DCS for collection and proprietary treatment of such data is in the public

interest. Proprietary treatment of data which are required to protect life or property will be deemed not to be in the public interest.

(2) All data for which the Assistant Administrator grants proprietary treatment shall not be publicly disclosed in individually identifiable form without the user's authorization, except in accordance with the procedures set forth in paragraph (f) of this section or pursuant to the order of a court of competent jurisdiction. Such data may be combined and publicly disclosed in such formats as general statistical studies, environmental warnings and forecasts, or aggregated reports or summaries in which the identify of the user(s) furnishing such information or the confidential portions of these data shall not be disclosed.

(d) (1) The Assistant Administrator for Satellites shall notify the user in writing whether all or a portion these data will be treated as proprietary and shall state the reasons for the decision. The user may appeal the initial decision of the Assistant Administrator by filing a notice of appeal, including supporting information with Administrator of NOAA, Department of Commerce, Washington, D.C. 20230, within 30 days (excluding Saturdays, Sundays, and legal holidays) or receipt of notice.

(2) The Administrator may decide the appeal on the basis of the information already submitted or may request additional information from the user. The decision of the Administrator shall state the reasons for the decision, and shall become effective upon issuance.

(e) The Assistant Administrator for Satellites, after consultation with other interested NOAA officers, shall institute a control system to protect the confidentiality of data that have been granted proprietary treatment under the section and are in the possession of NOAA. The control system will provide for safeguarding these data and ensuring that only authorized officers and employees have access to these data for official purposes.

(f) Data that have been accorded proprietary treatment for which NOAA or another Federal agency has present requirement may be returned to the possession of the user and kept by the user until such time as NOAA or another Federal agency has a present requirement for these data at which time these data shall be made available to NOAA or to another Federal agency in accordance with the terms of a mutually acceptable agreement.

(g) (1) All requests from any person for data granted proprietary treatment under this section shall be processed consistent with NOAA Freedom of Information Act (FOIA) Regulations CFR Part 903, NOAA Directives Manual 21-25, Department of Commerce Administrative Order 205-12 and 205-14 and 15 CFR Part 4

(2) The user shall be notified within five days (excluding Saturdays, Sundays, and legal public holiday) of receipt by NOAA of an FOIA request for disclosure of data which otherwise has been granted proprietary treatment under this section. The user may submit written objections to release these data together with any supporting information, to the Assistant Administrator for Satellites, within five days (excluding Saturdays, Sundays, and legal holidays) of receipt of notice. The failure to object within prescribed time limit will be considered an acknowledgement that the user does not wish to claim exempt status under the FOIA.

(h) If data which have been granted proprietary treatment under this section were found to be disclosable in whole or a part, under the FOIA, the user submitting these data will be notified in writing and given five days (excluding Saturday, Sundays, and legal holidays) from receipt of the notice to seek judicial relief.

(a) NOAA expects to continue to operate a geostationary satellite data collection system while it operates GOES spacecraft subject to the availability of future appropriations.

(b) As use of the system in support of NOAA programs increases, it eventually may be necessary to restrict the use by other users. If a use restriction should become necessary, or in the event that NOAA discontinues operations of GOES, NOAA will provide, to the maximum extent possible, advance notice to the affected users.

911.5 GOES DCS Use Agreement

(a) Each user must have an agreement with NOAA to use the GOES DCS.

(b) These agreements will cover, but will not be limited to: (1) The period of time the agreement is valid and procedures for cancelling it, (2) conformance with ITU agreements and regulations; (3) required equipment standards, (4) standards of operation, (5) priorities for use, (6) reporting time and frequencies, (7) data formats, data delivery systems and schedules, (9) user-borne costs, and (10) proprietary treatment of data under Part 911.3.

(c) The representative of NOAA for evaluating use requests and concluding use agreements will be the Director of the Office of Satellite Data Processing and Distribution of the National Environmental Satellite, Data and Information Service, except that in the case of agreements which involve foreign government agencies or requests for proprietary treatment of data, the concurrence of the NOAA Assistant Administrator for Satellites will be obtained.

APPENDIX D

QUESTIONNAIRE

1. *Describe fully your application:*

Operational/Experimental

If experimental, please complete the following:

Name and address of the Administrator (Funding Agency)

Name and address of the party responsible for implementing your Data Collection System (DCS) program, i.e., the principal investigator.

Give the starting and ending date of the period during which you plan to collect data via satellites.

Purpose of Data

Final User of Data

2. *Type of System:*

Interrogated (I)

Self-time (S)

Random (R)

Hybrid - Self-time and Random (S/R)

Random and Interrogate (R/I)

3. *Number of Platforms:*

Number of each type of Platform

Number of Platforms with Emergency Alarm/Random Capability

Time Scale for Deployment of Each Type of Platform

4. *Location of Platforms by Types:*

State, Ocean, Province, etc.

Fixed Station - Latitude/Longitude

Mobile Station Operating Area - Latitude/Longitude of Bounding Area

5. Data:

Format of Data (ASCII/Pseudo ASCII)

Bits per Sensor Message

Bytes per Message (8 bits/byte)

6. Desired Reporting Times:

(Interval between reports: 1 hour, 3 hours, 6 hours, etc.)

7. Data Delivery:

Dedicated Circuits (GTS, AFOS)

DOMSAT

Dial-in (300, 1200, 2400, 9600 baud)

Direct Readout Ground System (DRGS)

8. Explain why commercial services cannot meet your program needs.

9. Agency to Install and Maintain Platform Equipment:

(If different from agency that is making application, state name and address of principle responsible personnel.)

10. Name of individual who will sign Memorandum of Agreement.

(Include title, address, etc.)

11. Any other information that may be of interest or may be necessary to further explain the application.

APPENDIX E

MEMORANDUM OF AGREEMENT

INTRODUCTION

The National Environmental Satellite, Data, and Information Service (NESDIS), of the National Oceanic and Atmospheric Administration (NOAA), the operator of the Geostationary Operational Environmental Satellite (GOES) [the operator] and _____ [the user] who will provide Data Collection Platforms (DCPs) and the data collected, have agreed as follows:

I. Name of Program

The program to which this Memorandum of Agreement applies shall be known as the " _____
_____ Data Collection System Program" pursuant to which meteorological data will be collected from DCPs in Quebec. These data will _____.

II. Joint Understanding

A. To qualify for collection by the GOES Data Collection System (DCS), data from the user's DCPs must be environmental data; i.e., observations and measurements of physical, chemical, or biological properties of the oceans, rivers, lakes, solid earth, and atmosphere (including space).

B. Authority for the GOES to utilize the radio frequency band 401.7 to 402.1 MHz as an uplink and the radio frequency band 468.750 to 468.950 MHz as a downlink is contained in Frequency Assignment Subcommittee/Interdepartmental Radio Advisory Committee, docket numbers 8202442, 8149078, and 8150578. Docket number 8149078 grants the operator the authority to make all such frequency channels available to the user. However, it is understood that the user must obtain authority from appropriate national agencies to transmit on frequency channels, designated by the operator, within the uplink band. The operator will also provide address codes.

C. The operator normally will not assign a channel for the user's exclusive use, but may do so when

the user establishes sufficient need as determined by the operator.

D. The operator reserves the right to terminate or suspend this program in the event of spacecraft or ground equipment limitations requiring curtailment or elimination of services.

E. Other than under the circumstances cited in paragraph D, the user will be notified of major changes in system technical characteristics in sufficient time to make orderly adjustments in its operations. Normally this would be 3 years prior to the change.

F. Data collected by the user shall be made available from NESDIS to other interested parties as appropriate.

G. DCPs which the user plans to employ as part of the GOES DCS are subject to certification by NESDIS before deployment.

H. In consultation with the user, the operator will establish the collection times and data lengths for the user's DCPs and the schedules and methods for data dissemination.

I. All transmissions from the DCPs to the GOES spacecraft will be coordinated with the operator prior to initiating such transmissions.

J. The United States Government does not warrant the suitability for any purpose of data and shall not be liable for any damage or injury brought about by the use of the GOES DCS.

K. This Memorandum of Agreement is subject to the availability of appropriated funds and personnel and to the laws and regulations of each country.

L. In case of a dispute, the parties shall consult with a view to reaching an equitable solution.

III. Specific Undertakings on the Part of the User The user shall:

A. Provide the operator a list of the user's DCPs showing the type, (self-timed, interrogate, or random) location, data type emergency alarm provisions, if any, and message load planned for each DCP.

B. Provide the operator notification prior to DCP relocation.

C. Provide the personnel, funds, and equipment necessary to support each DCP location including establishing such platform and operating and maintaining it in conformance with equipment performance standards as specified by the operator in: National Earth Satellite Service Self-timed Data Collection Platform Radio Set Certification Specifications, as revised November 1981.

D. Provide the personnel, funds, and equipment necessary to operate and maintain facilities for receipt of collected data. These responsibilities include the means to forward the collected data from the NESDIS facility to the terminal point designated by the user. The means of communication shall be established periodically by telephone dial-up to the NESDIS facility. After connection has been made, the collected data will be transferred as specified by the operator in the GOES DCS Automatic Processing System User Interface Manual, as revised September 1990.

E. Provide periodic reports, upon request from the operator, on the present application of the user's DCS data.

IV. Specific Undertakings on the Part of the Operator

The operator shall:

A. Provide and operate the GOES spacecraft and the NESDIS ground facilities for receiving data collected from the satellite.

B. Provide telemetry reduction sufficient to monitor the user's DCPs for meeting system performance standards.

C. Notify the user by the most expeditious means available whenever NESDIS system monitoring indicates a user's DCP is performing outside system specifications or is inoperative.

D. Assign priorities for participation in the GOES DCS, schedules, channel assignments, and special DCS data requests according to the following categories in order of priority:

APPENDIX F

MEMORANDUM OF AGREEMENT

INTRODUCTION

The National Environmental Satellite, Data, and Information Service (NESDIS) of the National Oceanic and Atmospheric Administration (NOAA) [hereinafter referred to as the operator, who operates the Geostationary Operational Environmental Satellite (GOES) and the Command and Data Acquisition (CDA) Station] and the _____ [hereinafter referred to as the user, the provider of Data Collection Platforms (DCPs) and the user of the data collected] agree on the "Joint Understanding" below and agree to fulfill the undertakings specified.

I. Name of Program

The program to which this Memorandum of Agreement applies shall be known as the " _____
_____ GOES Data Collection System (DCS) Program."

II. Purpose of Program

The purpose of this program is to provide for the collection and dissemination of environmental data from remote DCPs on Roatan Island, Honduras. This program will measure Photovoltaic system performance for the Department of Energy, Sandia National Laboratory.

III. Joint Understanding

A. To qualify for collection by the GOES, the data from the user's DCPs must fall within the definition of environmental data. Environmental data are defined as observations and measurements of physical, chemical, or biological properties of the oceans, rivers, lakes, solid earth, and atmosphere (including space), as defined in 15 CFR 911.2(a).

B. Authority for the GOES to utilize the radio frequency band 401.7 to 402.4 MHz as an uplink and the radio frequency band 468.835/468.825 MHz as a downlink is derived from the Frequency

Assignment Subcommittee/Interdepartmental Radio Advisory Committee. The user is responsible for obtaining authority from appropriate national agencies to transmit on frequency channels, designated by the operator, within the uplink band. The operator will provide address codes to the user.

C. The operator will normally not assign a channel to one user for exclusive use; however, such assignments (also called dedicated channels) may be made when the user presents sufficient justification as determined by the operator.

D. The operator reserves the right to terminate or suspend the user's participation in this program in the event of spacecraft or ground equipment limitations requiring curtailment or elimination of services. In general, the operator will use as a guide for curtailment or elimination the least priority category as assigned in paragraph V.(D) below, and proceed in ascending order as required without regard to user affiliation. Per Federal Regulation 15 CFR Part 911.2(h) Vol. 46, No. 191 published October 1981, "NOAA will make every effort to maintain the GOES DCS in full operation at all times subject to the availability of appropriations. NOAA will bear no responsibility for any losses as a result of the non-availability of the DCS." The Office of the Federal Coordinator for Meteorology will be notified by NESDIS of any funding limitations which would reduce the services provided by NESDIS to the GOES DCS operations.

E. Unless an exception is specified elsewhere in this Memorandum of Agreement, data collected for users shall be made available from NESDIS to other interested parties as appropriate. The user disclaims responsibility for the validity or availability of these data.

F. DCPs which the user plans to implement as part of the GOES DCS are subject to certification by the operator before deployment.

G. In consultation with the user, the operator will establish the collection times and data lengths for the user's DCPs and the schedules and methods for data dissemination from the operator's facilities.

H. The user of GOES DCS data assumes all risk. Neither the operator nor the user agencies shall be liable for any damage or injury brought about by the use of the GOES DCS or interpretation of data provided through the DCS (this includes the satellites and NESDIS ground system at the CDA).

IV. Specific Undertakings on the Part of the User

The user shall:

A. Periodically -

1. Maintain the DCS Automatic Processing System (DAPS) files of the user's DCPs showing the type (self-timed, interrogate, random), where each is to be located, which platforms are equipped with emergency alarm provisions, and other required information.

2. Provide the operator notification (via DAPS files) prior to the DCP relocation.

3. Provide the operator with message length planned for each DCP when requesting channel assignments.

B. Provide the personnel, funds, and equipment necessary to carry out the portion of the program at the DCP location.

C. Operate and maintain the DCPs in conformance with equipment performance standards as specified by the operator in: National Environmental Satellite Service Self-timed Data Collection Platform Radio Set Certification Standards, as revised. Operate DCPs in accordance with assigned schedules (failure to operate DCPs within the assigned schedules or failure to provide all information as referred to in paragraph IV.(A) above, may result in the "blocking" of DCP messages by the operator).

D. Provide the funds and equipment necessary to operate and maintain communications facilities for receipt and distribution of data from the operator facilities. These facilities include Domestic Satellite (DOMSAT) broadcast and dial-in telephone circuits. Also, the user is responsible for the operation and maintenance and modifications to any GOES direct readout ground stations which they use.

E. Provide periodic reports, upon request from the operator, on the present application of the user's DCS data.

F. Maintain the DAPS files regarding user information about DCP maintenance and program management.

G. Provide enhancements or funding for enhancements to the DCS that are mutually agreeable to the user and operator.

H. Ensure that DCPs report through at least one of the GOES satellites designated "operational" by the operator. The operator does not guarantee the availability or performance of the DCS on "nonoperational" satellites. The assignments for DCPs not reporting through one of the operator specified operational satellites will be considered as "unused resources subject to reclamation by the operator." Users choosing to receive data directly from a nonoperational satellite do so at their own risk.

V. Specific Undertakings on the Part of the Operator

The operator shall:

A. Provide funds and equipment to operate the GOES spacecraft and the NESDIS ground facilities for receiving data collected through the GOES satellite [subject to the qualifications as discussed in paragraph III.(D) and IV.(G)].

B. Provide telemetry reduction sufficient to monitor the user's DCPs for meeting system performance standards.

C. Notify the user by the most expeditious means available whenever NESDIS system monitoring indicates the user's DCP is performing outside system specifications or is inoperative.

D. Assign priorities for participation in the GOES DCS and schedule special purpose channel assignments and special DCS data requests according to the following categories in order of

priority:

- 1. Disaster Warning**
- 2. Operational**
- 3. Experimental**

E. Notify the user of modifications to the DCS schedule or DCS procedures for collecting data from the user's DCPs and for the designation and location of "operational" satellites. Notification will be made in a reasonable amount of time prior to activation of such changes unless the operator must enact modifications to provide services for emergency warnings. Sudden adverse spacecraft conditions may also preclude the operator from providing the user notification prior to changes. In any event, notification will be made as soon as possible.

F. Take all available action to ensure user compliance with assigned schedules, including the "blocking" of DCP messages at the satellites to prevent reception of the data.

G. Provide sufficient asynchronous telephone dial-in terminals (modems) on the DCS computer to allow user access to the DCS computer such that the users may fulfill their requirements from paragraph IV.(A.1), IV.(A.2), and IV.(F) and allow for data dissemination, via these circuits. The operator may set limits regarding the volume of data disseminated, via these circuits.

H. Provide a high speed output of all DCP data received by the operator's facilities for input to a DOMSAT or similar broadcast system.

I. Notify the users of any changes to the format of data disseminated in VI.(G) and VI.(H) above in sufficient time for users to make any modifications.

VI. Termination

This Memorandum of Agreement shall enter into force upon signature by both parties. If consistent with applicable authorization and appropriation Acts of Congress, this Memorandum of Agreement shall remain in force for up to 2 years unless terminated either at the election of the user or the operator,

provided notification of such termination is in writing, and forwarded by one party to the other not less than 90 days in advance of termination. Failure to use assigned channel allocations for a period of 12 months, unless other arrangements are made in writing, will be automatically considered as notice by the user of termination of those channel assignments. Each party is responsible for ensuring that the provisions of this Memorandum of Agreement are in accord with its program requirements. Either party to the Memorandum of Agreement may request amendments by letter to signatories of this Memorandum of Agreement and such amendments will take effect upon the consent of all parties.

Helen M. Wood
Director, Office of Satellite Data
Processing and Distribution

Date

Date

APPENDIX G

MEMORANDUM OF AGREEMENT

INTRODUCTION

The National Environmental Satellite, Data, and Information Service (NESDIS), of the National Oceanic and Atmospheric Administration (NOAA), the operator of the Geostationary Operational Environmental Satellite (GOES) and the Manufacturer, _____, the provider of Data Collection Platforms (DCPs) and other passive receive equipment, as well as the user of the data collected [the user], have agreed as follows:

I. Purpose of Program

The program to which this Memorandum of Agreement applies shall be known as the " _____ GOES Data Collection System (DCS) Equipment Testing Program." The purpose of this program is both to develop new and to improve existing DCPs, passive direct readout equipment, and peripheral electronic equipment used in the GOES DCS.

II. Joint Understanding

A. Authority for the GOES to utilize the radio frequency band 401.7 to 402.1 MHz as an uplink and the radio frequency band 468.750 to 468.950 KHz as a downlink is contained in the Frequency Assignment Subcommittee/Interdepartment Radio Advisory Committee docket number 8202442, 8149078, and 8150578. Docket number 8149078 grants the operator the authority to make frequency channels available to the user. However, it is understood that the user must obtain authority from appropriate national agencies to transmit on frequency channels designated by the operator, within the uplink band. The operator will

also provide address codes.

B. Unless an exception is specified elsewhere in this Memorandum of Agreement, data collected for users shall be made available from NESDIS to other interested parties as appropriate.

C. DCPs which the user plans to implement as part of an operational program in the GOES DCS are subject to certification by the operator before deployment. Other passive equipment is not subject to this requirement.

D. NESDIS shall not be liable for any changes or injury brought about by the supplying of data or use thereof by the user.

III. Specific Undertakings on the Part of the User

The user shall:

A. Ensure that all transmissions from a manufacturer's DCP through the GOES spacecraft on Channel 151 East be coordinated with other manufacturers currently having permission to use the channel prior to such transmissions.

B. Ensure that all DCPs transmitting through the GOES spacecraft on Channel 151 East meet all NESDIS specifications whether the DCP is prototype, refurbished, or a production model.

C. Use only operator assigned address for units transmitting over Channel 151 East whether the unit is prototype, refurbished, or a production model.

D. Operate and maintain the DCPs in conformance with equipment performance standards as specified by the operator in the National Environmental Satellite, Data, and Information Service Certification Standards for Data Collection Platforms Radio Sets, Self-timed Standard No. S23.010, November 1981, and Interrogated Standard No. S23.010,

November 1981, and Random Reporting Standard No. S23.012, November 1981.

E. Provide the personnel, funds, and equipment necessary to operate and maintain facilities for receipt of collected data. These responsibilities include the means to forward the collected data from the NESDIS facility to the terminal point designated by the user, if desired. The means of communication shall be established periodically by telephone dial-up to the NESDIS facility. After connection has been made, the collected data will be transferred as specified by the operator in the GOES DCS Automatic Processing System User Interface Manual, as revised September 1990.

F. Provide periodic reports, upon request from the operator, on the present application of the user's DCS data.

IV. Specific Undertakings on the Part of the Operator

The operator shall:

A. Provide and operate the GOES spacecraft and the NESDIS ground facilities for receiving data collected from the satellite.

B. Provide telemetry reduction sufficient to monitor the user's DCPs for meeting system performance standards.

C. Notify the user by the most expeditious means available whenever NESDIS system monitoring indicates the user's DCP is performing outside system specifications or is inoperative.

D. Notify the manufacturer of modifications to the established operational schedule changes, unless the operator must enact schedule modifications to provide services for emergency warnings. Sudden adverse spacecraft conditions or ground-system saturation may also preclude the operator from providing the manufacturer notification prior to schedule

changes. In any event, notification will be made as soon as possible.

E. Assign Channel 151 East for the full-time use of all manufacturers of DCPs; time periods within the Channel will not be assigned to any manufacturers.

F. Monitor use of Channel 151 East for the sole purpose of protecting the GOES DCS integrity and operational availability for the normal user.

G. Not arrange testing of DCPs for one manufacturer with other manufacturers assigned to this channel. All testing on this channel will be coordinated within the manufacturing community. In the event manufacturers are unable to establish priority, the operator will mediate.

H. Not be responsible for interference of one manufacturer with another during test periods.

I. Arrange for storage of test data under the operator assigned ID "MFGURS" for manufacturers for the period of 24 hours before de-allocation of storage space.

J. Reserve the right to terminate or suspend the manufacturer's participation in this program in the event of spacecraft or ground-equipment limitation requiring curtailment or elimination of the specific service.

K. Notify the user of major changes in system technical characteristics in sufficient time to make orderly adjustments in their program, other than under circumstances cited in paragraphs D and J.

V. Termination

This Memorandum of Agreement shall enter into force upon signature by both parties. If consistent with applicable authorization and appropriation Acts of Congress, this Agreement shall remain in force for up to 5 years unless terminated either at the election of the user or

the operator, provided notification of such termination is in writing, and forwarded by one party to the other not less than 90 days in advance of termination. Failure to use channel allocation for a period of 12 months, unless other arrangements are made in writing, will be considered automatically as notice by the user of termination.

Helen M. Wood
Director, Office of Satellite Data
Processing and Distribution

Date

Date

APPENDIX H

MANUFACTURERS

January 1994

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2. ***SUTRON CORPORATION**
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3. ***SYNERGETICS INTERNATIONAL, INC.**
1831 Lefthand Circle
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(303) 678-5200 fax (303) 678-5206
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- 7. *VITEL, INC.**
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- 8. DATA WARE DEVELOPMENT, INC.**
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- 9. QUALIMETRICS INCORPORATION**
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(916) 481-7750
ATTN: Robert C. Schmidt

- 10. TELONICS, INC.**
932 East Impala Avenue
Mesa, AZ 85204-6599
(602) 892-4444
ATTN: Stanley M. Tomkiewicz, Jr.

- 11. INTEGRAL SYSTEMS, INC. (ISI)**
500 Philadelphia Way
Lanham, MD 20706-4417
(301) 731-4233 fax (301) 731-9606
ISI manufactures DOMSAT ground systems only.

***Also provide direct readout ground receiving equipment.**